Competing for Proposal Rights: Theory and Experimental Evidence*

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Abstract

Competition for positions of power is a common practice in most organizations where decisions are reached through negotiations. We study theoretically and experimentally how different voting rules affect the incentives to compete for the right to propose a distribution of benefits in a sequential bargaining game. Under the majority rule, players with a high chance of proposing are also more likely to be excluded from a coalition when not proposing, which dampens incentives to compete for proposal rights relative to the unanimity case where no one can be excluded from a coalition. However, when rent-seeking efforts affect proposal rights only in the first bargaining round, equilibrium efforts to secure proposal rights are higher under the majority rule because they no longer affect the likelihood of coalition exclusion. Our experimental findings uncover a novel efficiency trade-off absent in theory: While gridlock is stronger under unanimity, majoritarian bargaining elicits higher competition costs regardless of the durability of efforts in affecting proposal rights, rendering both rules equally efficient. The distribution of benefits is affected by the endogeneity of proposal rights contrary to behavioral expectations as subjects gravitate towards equitable sharing and proposers often do not keep the lion's share. Further experiments reveal that subject behavior is consistent with myopic reasoning and that our results hold robustly in distinct subject samples.

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Introduction

The willingness to engage in unproductive activities in order to secure favorable outcomes, commonly referred to as ***rent seeking*** (Tullock, 1967; Krueger, 1974), is a widely recognized practice that permeates human organizations across a wide range of settings. The extent to which one's efforts can influence an organization's or group's outcome certainly depends on the rules and formal structures through which collective decisions are reached (Milgrom and Roberts, 1992; Yildirim, 2007). In the context of negotiations and bargaining, which are the focus of this article, holding agenda-setting rights is a powerful tool to skew agreements in one's favor.[1] Proposer power, or the advantage conferred upon those holding agenda control, is not only a property of equilibrium behavior in most structured bargaining models (Rubinstein, 1982; Baron and Ferejohn, 1989; Krishna and Serrano, 1996; Eraslan and Evdokimov, 2019; Ali et al., 2019), but a prominent feature supported by a wealth of evidence, anecdotal, empirical (Ansolabehere et al., 2005), and experimental alike (Palfrey, 2016). It is, thus, reasonable to conjecture that if proposal rights carry benefits, people will invest time, effort, and resources to acquire them. As such, it becomes crucial to understand how collective decision-making rules affect rent-seeking, because this can have important efficiency implications.

Examples of rent-seeking in the context of bargaining abound. In the domain of politics, the heads of legislative bodies or committees within those bodies are known to have an outsized influence on collective decisions. Department chairs in academic departments are often able steer budgetary allocations and hiring in directions preferred by them. Another example may be found in class action law suits, where one plaintiff is selected to represent the many plaintiffs. Class representatives may be able to skew settlements in line with their preferred outcome, but will need to build some consensus.[2] Technology firms often participate in standard-setting organizations to lobby for their own patented technologies to be adopted by the industry (Baron et al., 2019). But in order for their technologies to become the industry standard, they certainly need to form a coalition of adopting firms (Llanes and Poblete, 2020), a process which entails ample costly negotiations.

These settings vary widely in the scope and purpose of bargaining, but have in common that decisions are typically reached via negotiations and no individual party can single-handedly determine collective outcomes. In this article we focus on the efficiency implications of different voting rules when competition for agenda control precedes negotiations. Under majority rule, parties need only to form a minimal coalition to secure passage of their proposals. Is it more valuable to hold

[1]Our model builds and expands upon Yildirim (2007, 2010), and is closely related to a burgeoning literature on endogenous proposal rights, which we discuss in Section 2.

[2]Oftentimes members of the class disagree on what constitutes a *fair* settlement or on the type of compensation victims should receive. Class representatives have a large influence on these decisions and furthermore, can receive special compensation from the awarded monetary amount to the plaintiffs.

proposal rights when bargaining under majority rules compared to unanimity? If so, does this make bargaining under unanimity more efficient, and hence, a desirable decision rule? Alternatively, can competition for proposal rights increase gridlock, and thus, render unanimity decision rules undesirable in organizations? The questions we ask here are of primary importance in political, business, legal, and academic settings and warrant close examination.

In this study, we design an experiment based on a game-theoretic model to study rent-seeking behavior in multilateral bargaining. In our setting, a group of three players negotiate the division of a fixed amount of benefits. Prior to the bargaining game, which is modelled as in Baron and Ferejohn (1989), players engage in a contest to determine their likelihood of holding ***proposal rights***. These rights subsequently enable players to put forward a distribution of the joint benefits, but the winner of the contest (hereafter referred to as the proposer) has limited power because her decisions are subject to a vote. Furthermore, in case of disagreement, another member may be granted proposal rights. By varying the voting rule and the lasting effect of rent-seeking efforts in determining proposal rights (first round vs. all rounds), we explore how voting constraints and the strategic value of proposal rights affect rent-seeking activities.

Despite equilibrium entailing immediate agreement under both rules, the durability of proposal rights plays an important role in determining rent-seeking efforts. A natural question is which voting rule elicits stronger competition for proposal rights, and as it turns out, this depends on the durability of rent-seeking efforts in affecting proposal rights. When efforts have a permanent effect, they act as a double-edged sword: a player with high chance of proposing is ***relatively more expensive*** as coalition partners under the majority rule (i.e. when not proposing) which increases her likelihood of exclusion from the coalition. Under the unanimity rule no one can be excluded from the coalition, and as such, equilibrium aggregate efforts are higher compared to the majority rule. [3] However, when efforts are short-lived and everyone is symmetric in case of disagreement in round 1, the higher chances of proposing in the first round do not entail higher chances of exclusion from a coalition. In this case, the majority rule entails higher aggregate rent-seeking efforts. We turn to an experiment to investigate how the voting rule and durability of efforts in affecting proposer recognition affects rent-seeking choices, and conversely, how a contest preceding the bargaining affects the negotiated outcomes. Our experimental setup allows to assess the efficiency implications of each voting rule, because we can experimentally induce the cost of rent-seeking effort, the size of the benefits to be divided, and the cost associated to bargaining gridlock.

The results of our experiment show that subjects choose higher rent-seeking efforts under majority voting compared to unanimity. The voting rule is the main determinant of efforts while how

[3] We show that the under the majority rule, there exist no symmetric pure strategy equilibria. We build upon the method by Kalandrakis (2015) and provide an algorithm and computer code to find asymmetric equilibria for our experimental parameter choices.

durable the effect of efforts is on agenda-setting power has no effect, meaning that subjects fail to assess their strategic value according to equilibrium predictions. Given that efforts are lower under unanimity, one may conjecture that overall efficiency (the sum of payoffs) is higher compared to majority. However, bargaining duration and breakdown rates are higher in unanimity treatments, which in our setting, results in a mild efficiency advantage under majority, but this difference vanishes as subjects gain experience. Thus, our findings suggest two channels through which efficiency is affected in opposing directions and offers a new insight into how power struggles preceding bargaining interactions are affected by the institutional rules. We argue that failing to account for agenda control competition in bargaining leads to overestimating the efficiency of majoritarian rules, a claim that has received wide attention in the literature since it was posited by Buchanan and Tullock (1965). To the best of our knowledge, this trade-off has been unaccounted for in the theoretical literature of sequential bargaining (see Eraslan and Evdokimov (2019) for a survey), the experimental literature (see Baranski and Morton (2022) for a meta-analysis), contests (see Dechenaux et al. (2015) for a survey), and their intersections.

Turning to our other main outcome of interest, we asked: How are bargaining outcomes (i.e. division of the surplus) affected by the endogeneity of proposal rights? Theoretically, efforts only affect outcomes through their strategic value, but behaviorally, they can affect fairness considerations. Our data show that subjects condition the distribution of the total fund and their voting decisions on their effort relative to others. This finding is rather unexpected because efforts have no productive value. Moreover, they are unlikely to signal any pro-social intention. Thus, we find that a equity concerns (Homans, 1958; Adams, 1965) in bargaining arise also in a strictly competitive setting and not only in settings where pre-bargaining efforts are productive (Cherry et al., 2002; Cappelen et al., 2007; Baranski, 2016). Importantly, fairness considerations dissipate proposer power, with proposers often not keeping the largest share.

The stark departures from theoretical expectations (both at the contest and bargaining stages) led us to consider two potential sources. First, could our results have been driven by particularities of our sample in terms of the prevalence of equitable outcomes? To this end, we conducted a replication study in a separate sample, and importantly, we rule out this possibility because all our results hold robustly.

A second possibility explaining the departure from the strategic predictions may emanate from how subjects reason about the game in hand. Limited cognition theories (Jehiel, 1995; Ke, 2019; Rampal, 2022) assert that players may fail to reason forwards, either because it is cognitively demanding or because it entails reasoning about situations that players do not believe will occur. Thus, we ask if myopic reasoning, in that subjects discount heavily (or fully neglect) the possibility of bargaining delay, can explain the pattern of rent-seeking efforts.[4] Because we cannot directly observe subjects' reasoning process, we experimentally reduce the bargaining horizon to last only one round (akin to a three-player ultimatum game). We find that there is no difference in the majority-unanimity effort gap compared to the original multistage bargaining games, and that the division of the surplus is strikingly similar compared to the multi-stage counterparts. This provides evidence consistent with subjects reasoning myopically. .

Our paper contributes to a growing literature on multilateral bargaining, both theoretical (Eraslan and Evdokimov, 2019) and experimental (Palfrey, 2016; Agranov, 2020). We expand upon the theoretical work of Yildirim (2007, 2010) in which rent-seeking precedes bargaining. Our findings speak to the previous experiments on the effect of voting rules (Miller and Vanberg, 2013; Agranov and Tergiman, 2019) on multilateral bargaining, and the effect of asymmetries (Diermeier and Morton, 2005; Fréchette et al., 2005; Maaser et al., 2019), by endogenizing recognition probabilities. We also contribute to the understanding of how limited foresight affects strategic reasoning Rampal (2020); Klein Teeselink et al. (2022) when comparing multi-round bargaining to a one-round bargaining game. Finally, the robustness of our results in two distinct samples further illuminates the usefulness of laboratory experiments in understanding strategic behavior across societies and contributes to the ongoing calls for replication of experimental results (Maniadis et al., 2015; Page et al., 2021; Fréchette et al., 2022) and diversity in subject samples (Henrich et al., 2010).

The remainder of this article proceeds as follows. In Section 1 we relate our work to the previous literature with a focus on endogenous proposals in bargaining, voting rules, asymmetries in bargaining games, and the experimental contest literature. Section 2 presents the models we test and their equilibria. In Section 5 we present the results for the main experiment first a followed by the replication results in condensed form (details of the replication to be found in the Online Appendix). Section 6 deals with the effect of reducing the bargaining horizon. Section 8 discusses and concludes the article.

1 Related Literature

The first to introduce a rent-seeking contest to the multilateral bargaining literature was Yildirim (2007). In his model, players may exert costly efforts prior to each round of bargaining in order to enhance their chances of proposing. That is, in case of disagreement, another contest takes place. In one of our models, proposal rights are determined once and for all prior to the beginning of the first bargaining round, and we vary the durability of the rights to propose. Yildirim (2007)

[4] See Klein Teeselink et al. (2022) for evidence of limited foresight in settings with high stakes and Rampal (2020) for experiments testing how subjects react to their counterparts' limited foresight.

also expands his model to account for persistent recognition as we do, but he focuses on properties of equilibrium with asymmetric players. Undoubtedly, Yildirim's setup is more general, because it accounts for possible asymmetries in patience, effort costs, and initial proposal rights *endowments*. In our fully symmetric setting we show that there is no pure strategy equilibrium effort in the contest for proposal rights for majoritarian rules. With persistent recognition under unanimity, our experimental game closely resembles Yildirim (2010), for which a unique pure-strategy equilibrium effort exists.[5]

Our work also relates to the study of how voting rules affect multilateral bargaining outcomes. In standard Baron and Ferejohn games with a fixed pie to distribute, agreement is predicted to occur without delay. Proposers offer voters a share of the pie which they are indifferent between accepting and the continuation value of rejecting.[6] However, experimental evidence from the meta-analysis of Baranski and Morton (2022) shows that delay is common in majoritarian bargaining (around 20%). Miller and Vanberg (2013) find that delay is more common under unanimity (30%) than majority (13%) for groups of three. This finding is further confirmed in Agranov and Tergiman (2014) who report 19% of delay under majority and Agranov and Tergiman (2019) 44% under unanimity, for groups of 5 in their baseline treatments. Kim (2023) finds a similar pattern in a finite-horizon version Baron and Ferejohn where proposers have only one shot at proposing (14% delay under majority and 36% under unanimity, groups of 3).

We now turn to the role of player asymmetries in multilateral bargaining games *a la* Baron and Ferejohn. Eraslan (2002) generalizes the game to players with different recognition probabilities and discount factors, and shows that a unique stationary equilibrium payoff vectors exists (for each parameter configuration). We invoke this cornerstone result in our analysis because it guarantees existence of equilibrium in every subgame following the contest for proposal rights. Kalandrakis (2015) develops an algorithm to compute equilibrium payoffs, which is quite valuable because there is no closed-form solution for the expected payoffs as a function of the vector or recognition probabilities (under majoritarian bargaining). We expand upon Kalandrakis' method in order to find the optimal contest effort levels (if any) under our experimental parameters.

Experiments that involve asymmetric players include Fréchette et al. (2005) who vary both

[5]There is a burgeoning literature that aims to expand our understanding on the strategic value of proposal rights and agenda control in bargaining. See Ali et al. (2019) for a model in which predictability of the sequence of proposers increases proposer power. For other important theoretical contributions in endogenous proposer recognition see Ali (2015) who studies the sale of proposal rights through all-pay or first-price auctions. Han (2011) and Levy and Razin (2013) model endogenous proposal rights via an all-pay auctions in a setting with a dynamic status quo where players bargain over a unidimensional policy. Genc and Kucuksenel (2019) investigates a setting with private and public good provision. Finally, competition for proposal rights has also been studied in bilateral bargaining: see Board and Zwiebel (2012), Cuellar (2022) and Houba et al. (2022).

[6]See Merlo and Wilson (1995) and Eraslan and Merlo (2002) for models in which the pie to divide fluctuates stochastically, which can lead to efficient delay in equilibrium and may render unanimity rules more efficient. See Agranov et al. (2020) for a recent experiment.

voting weights and recognition probabilities, Diermeier and Morton (2005) who study a finite-horizon game in which higher proposal chances need not imply higher expected payoffs, and Maaser et al. (2019) who study nominal variations in voting weights that have no impact in equilibrium payoffs.[7] In all these experiments, asymmetries are exogenously imposed and the evidence reflects a tension between strategic behavior as predicted by equilibrium and fairness norms anchored around the bargaining asymmetries.

There are two experiments which are closest to our work. First, Lee and Sethi (2022) study willingness to pay for the right to propose in a finite-horizon, Baron and Ferejohn, three-player game. The authors choose experimental parameters such that, theoretically, having higher proposal odds yields lower equilibrium payoffs. Prior to bargaining, subjects state their willingness to pay to be the subject with low or high proposing odds. The data show that subjects display a higher willingness to pay for having higher chances of proposing, contrary to theoretical prediction. Empirically, those with a higher recognition probability also receive a better bargain, which rationalizes the willingness to pay patterns. Lee and Sethi report that two-way splits are modal, but three-way splits represent close to 45% of all agreements (pooling over all treatments). In our data, three-way splits are modal, thus the evidence from both studies suggests that the pre-bargaining proposal-seeking stage increases the prevalence of inclusive splits relative to games with exogenous proposal rights, where these are 33% of all agreements (see Baranski and Morton (2022)).

A second closely-related paper is Kim and Kim (2022), who study a contest prior to a three-player ultimatum game with majority voting. The focus is on whether heterogeneity in outside options affects the rent-seeking efforts, yet the authors find a similar effort levels in all their treatments. One finding we share with Kim and Kim is that subjects under-invest relative to the subgame perfect Nash equilibrium benchmark in our one-round bargaining games.

Finally, our work is related to a vast literature on contests, both theoretical (Skaperdas, 1996; Konrad, 2009) and experimental as surveyed by (Dechenaux et al., 2015). In a typical lottery contest as initially modelled by Tullock (1980), costly efforts are simultaneously exerted to determine the odds of winning a fixed, indivisible prize.[8] In our setting, the prize players win is the right to propose, which carries the pecuniary benefits associated to the rents that proposers can extract. One stylized experimental finding is that rent-seeking efforts are typically above the Nash equilibrium (under standard preferences) yet we find that efforts are below the equilibrium prediction in all except one treatment. Our setting can also be interpreted as a multiple prize contest, where the size and number of the prizes is endogenously determined through the bargaining process. We find

[7]See Miller et al. (2018) for an experiment on the role that asymmetries in players' outside options have on bargaining behavior.

[8]See Kimbrough and Sheremeta (2014) for a game in which bargaining disagreements are resolved via a contest and Kimbrough and Sheremeta (2014) for how earning the right to propose in bargaining may reduce disagreements and rent-seeking.

that subjects tend to be *fair* and distribute the benefits in accordance with rent-seeking effort. This behavior resembles the distributive assumptions behind proportional contests as modelled by Cason et al. (2010, 2020).

2 The Model

For the sake of conciseness, we present the game with three players as it will be implemented in the laboratory. The game can be easily generalized to more players, different voting rules, and contests success functions.

Consider a game in which three players $i \in \{1, 2, 3\}$ must split a total fund of fixed size equal to F. Players are risk-neutral and derive utility solely from their own payoffs, that is, $u_i(\mathbf{x}) = x$ for any vector of payoffs $\mathbf{x} \in \mathbb{R}^n$. Before bargaining starts, players engage in a contest by choosing costly efforts in order to determine the likelihood of being selected as the proposer of a division of the fund. We first explain the bargaining game (stage 2) in order to make clear the role of the stage 1 contest.

At the bargaining stage, players engage in negotiations for potentially infinitely many *rounds*. In each round of bargaining $t \in \{1, 2, ...\}$, one player is randomly chosen according to the probability distribution $(\pi_1^t, \pi_2^t, \pi_3^t)$ to divide the total fund among the three players by submitting a proposal $\mathbf{s} = (s_1, s_2, s_3)$ such that $\sum s_i = F$. Next, players proceed to vote (simultaneously). If the required number of votes in favor are received (denoted by q) the allocation is binding. For $q = 2$ we have majority rule, and $q = 3$ we have unanimity.

Let $v_i \in \{0, 1\}$ be the voting actions where 1 means *yes*, and 0, *no*. If $\sum_i v_i \geq q$ proposal $\mathbf{s}$ is approved, otherwise the bargaining process repeats itself in round $t + 1$ with probability δ (this is the discount factor). With probability $1 - \delta$, bargaining breaks down, which implies that the fund to distribute vanishes resulting in $s_i = 0$ for all i.[9]

Prior to the beginning of the bargaining stage, a contest takes place to determine players' chances of proposing. Each players simultaneously and independently chooses an effort level $e_i \in \mathbb{R}_+$ at a cost $c(e_i) = e_i$. Effort levels affect the probability of being the proposer in round t, which we denote by π_i^t, through a contest success function described below.

We are interested in exploring the effects of the durability of the effect that initial rent-seeking efforts have on recognition probabilities. To this end, we distinguish between two cases, permanent and temporary, as defined in the following.

[9] In our main treatments we set $\delta = 0.85$ and in our one-round bargaining experiments $\delta = 0$. Thus we leave this as a free parameter for now.

Definition 1. *When rent-seeking efforts are **permanent** we have that:*

$$\pi_i^t(\mathbf{e}) = \frac{e_i}{\sum e_j} \; \forall t\,.$$

*When rent-seeking efforts are **temporary** we have that*

$$\pi_i^t(\mathbf{e}) = \begin{cases} \frac{e_i}{\sum e_j} & \text{if} \quad t = 1 \\ \frac{1}{3} & \text{if} \quad t > 1 \end{cases} .$$

3 Equilibrium

As is customary in the bargaining literature (Eraslan and Evdokimov, 2019), we will focus on stationary subgame perfect equilibria (SSPE) in the bargaining game. There are two main properties of stationarity that we must comment on. First, stationary strategies are history-independent as they require that players neglect past play in their strategy formulation. However, when bargaining is preceded by a proposal contest as in our setting, the history of play at the bargaining stage includes the vector of efforts in stage 1. Thus, we allow for strategies to depend on $\mathbf{e}$ indirectly through the effect of efforts on π. Second, stationarity requires identical play in identical subgames. Note, however, that for the temporary proposal rights case, strategies in the first bargaining round need not coincide with strategies in further rounds because the subgames are not identical (recognition probabilities are different). This will be important in the characterization of optimal efforts and we will return to it when we deal with the temporary rights case. In the usual way, subgame perfection requires that there is no profitable deviation in any subgame.

After solving for the equilibrium in any bargaining subgame and obtaining the bargaining payoffs associated with each possible effort vector, we proceed by backward induction to find the optimal contest stage efforts. We will solve for symmetric, pure strategy equilibria (when these exist).

3.1 Strategies and Outcomes

A player's effort pure strategy in the contest stage is a function $g : \mathbb{R}^3_+ \to \mathbb{R}_+$. When a player i is a proposer, her proposal strategy is a function $s_{ij}(\pi)$ for each player j. A proposal strategy also specifies the probability that the proposer invites each player j to the coalition. We denote the inclusion probability strategies by $r_{ij}(\pi)$.[10] A player's voting strategy is a function $a_i : \mathbb{R}_+ \to \{0, 1\}$. Note that we have specified time-independent strategies due the fact that we will focus on stationary equilibria.

[10] As Eraslan and Evdokimov (2019) explain, this makes the problem isomorphic to one in which mixed strategies over the proposal are allowed.

3.2 Equilibrium under efforts with a permanent effect

Denote by r_{ij} the probability that player i invites player j to her coalition by offering her the smallest share of the fund she would accept (derived in equilibrium). Let $r_i = (r_{i1}, r_{i2}, r_{i3})$ denote the vector of invitation probabilities. Fixing a stationary strategy profile σ induces a vector of continuation payoffs given by (V_1, V_2, V_3) (Eraslan, 2002). A continuation payoff V_i is the payoff that player i expects to receive at the beginning of every bargaining subgame assuming that all players are following the strategy profile σ. As such, player i is willing to vote in favor only when offered share $s_i \geq \delta V_i$, a share that yields the discounted expected payoff.

The following Proposition collects a series of results present in Eraslan (2002) but which are central to our analysis, hence we concisely present them here.

Proposition 2. *Consider a Baron and Ferejohn bargaining game with three players, a fixed surplus to divide normalized to 1, $\delta \in (0,1)$, and a $q \in \{2,3\}$ voting rule. Let (π_1, π_2, π_3) be a strictly positive vector of recognition probabilities, which are fixed in all rounds of bargaining. Then, the following hold*

1. *There exists a unique vector of ex ante payoffs (V_1, V_2, V_3);*
2. *Under unanimity ($q = 3$), $V_i = \pi_i$.*
3. *Under majority ($q = 2$), V_i is weakly increasing in π_i;*

Specifically, in a SSPE, the values V_i satisfy:

$$V_i = \pi_i \left(1 - \sum_{j \neq i} r_{ij} \delta V_j\right) + \sum_{j \neq i} \pi_j r_{ji} \delta V_i \,. \tag{1}$$

Note that the fund to distribute has been normalized to 1, but clearly any fund size F can be considered, and the expected equilibrium payoff would be $V_i F$. For the unanimity voting rule, $r_{ji} = 1$ because no one can be excluded. Thus, result 2 in Proposition 2 is easily derived. As such, the maximization problem that players solve under unanimity is given by

$$\max_{e_i \in \mathbb{R}^0_+} F \frac{e_i}{\sum e_j} - c(e_i) \,. \tag{2}$$

For the majoritarian voting rule, a full characterization of equilibrium requires us to specify the associated probabilities with which players are included into a winning coalition. These are generally not unique (Fréchette et al., 2005), and moreover, a closed-form solution does not exist for the V_i's (Kalandrakis, 2015). With three players, the minimum winning coalition always consists of the proposer and the voter with lowest equilibrium payoff (i.e. cheapest partner). We denote by $\underline{V}$ the SSPE equilibrium payoff of the player with the lowest ex ante payoff other than the proposer.

The maximization problem that players solve under the majoritarian rule is given by

$$\max_{e_i \in \mathbb{R}^0_+} FV_i(e_i, \boldsymbol{e_{-i}}) - c(e_i)\,. \tag{3}$$

Proposition 3. *When efforts have a permanent effect on the probability of proposing the following hold.*

1. *Under the majority rule:*

   (a) *There is no symmetric pure strategy equilibrium vector. For any vector (e, e, e) there exists $\epsilon > 0$ such that $FV_i(e - \epsilon, e, e) - c(e - \epsilon) > FV_i(e, e, e) - c(e)$.*

   (b) *In any subgame induced by (e_1, e_2, e_3), the proposer offers one other member $s = F\delta\underline{V}$ and keeps $F(1 - \delta\underline{V})$. Voters accept any share $s_j \geq F\delta V_j$.*

2. *Under the unanimity rule:*

   (a) *The optimal investment is $e^* = \frac{2F}{9}$.*

   (b) *In any subgame induced by (e_1, e_2, e_3), the proposer (player i) offers each member $j \neq i$ a share $s_j = F\delta V_j$ and keeps $F(1 - \sum_{j \neq i} \delta V_j)$. Voters accept any share $s_j \geq \delta F V_j$.*

The proof for the non-existence of symmetric equilibria may be found in the Online Appendix section A, but we present the economic intuition here.[11] When two players have an equal chance of proposing, and a third player has a slightly smaller chance (an undercutting deviation), the lower recognition player is invited into the coalition more often. As such, even if she is the proposer less often, the positive effect on coalition inclusion leaves her continuation payoff unchanged (weakly monotonic V_i property, see part 1 of Proposition 2). Thus, it is clear that any player would have an incentive to decrease effort by a small amount and save the associated cost without sacrificing her expected bargaining payoff.[12]

Because in the experiment we implement a finite effort choice set, the theoretical results presented here may not hold under the experimental parameters. The proof of non-existence of symmetric effort equilibria under majority relies on profitable *small* deviations. To ensure our argument follows through in the finite effort choice set, we expand upon the algorithm by Kalandrakis (2015)

[11] The remaining statements of Proposition 3 are derived from Eraslan (2002) (1b and 2b) and from Yildirim (2010) (2a).

[12] As suggested by Huseyin Yildirim, we reached out to Querou and Soubeyran in order to obtain a draft of their working paper (Querou and Soubeyran, 2012), which is not publicly available. The authors make a similar argument, but our proofs take different approaches.

designed to numerically compute the expected equilibrium values of the bargaining game, for any recognition vector induced by efforts. Iterating over a finite effort grid as implemented in the experiment, we verify that there is no equilibrium symmetric efforts under majority. Importantly, we identify asymmetric equilibria, an issue we discuss in

3.3 Equilibrium Under Temporary Rights

We now consider the case when efforts have a one-round effect in altering proposal rights. There are two motivations for this theoretical consideration. First, it *turns off* the deleterious effect that recognition probabilities have on coalition inclusion. By do doing so, it allows us to identify a unique symmetric equilibrium for the majority bargaining game. Second, it provides a strong contrast with the value of proposal rights under unanimity because it creates *large* difference in the equilibrium efforts. This variation will allow to test experimentally if subjects anticipate the off-equilibrium value of proposal rights.

We start by solving the majority rule case. Note that the bargaining subgame starting in round 2 is identical to the case of durable proposal rights with symmetric players, that is, $\pi_i = 1/3$ for all i. At round 2, prior to nature selecting the proposer, the ex ante equilibrium payoff is $V_i^2 = 1/3$ for all i. The superscript 2 indicates round 2.[13]

We now proceed to characterize equilibrium behavior in round 1 of bargaining. Denote by r^1_{ij} the probability that player i invites j to the coalition in round 1. Conditional on the proposer being revealed, all players have the same continuation value ($V_i^2 = 1/3$). Because once the proposer in round 1 is revealed all players are symmetric thereafter, the proposer randomizes which other player to include in the coalition. Hence, $r^1_{ij} = 1/2$ also.

By backward induction, a player's expected payoff from the bargaining game, prior to nature revealing the identity of the first proposer, is $F\pi_i(1 - \delta V_i^2) + F(1 - \pi_i)\delta V_i^2/2$. At the contest stage a player faces the following maximization problem:

$$\max_{e_i} F\pi_i(\mathbf{e})(1 - \delta/3) + F(1 - \pi_i(\mathbf{e}))(\delta/3)/2 - c(e_i) \quad . \tag{4}$$

By the same token, noticing that 2 players will be offered $\delta F/3$ when not proposing, the problem a player faces for the unanimity bargaining case is given by:

$$\max_{e_i} F\pi_i(e)(1 - 2\delta/3) + F(1 - \pi_i(\mathbf{e}))(\delta/3) - c(e_i) \ . \tag{5}$$

[13] The expected payoff after a rejection in round 1 is obtained by solving system (1) for $\pi_i = 1/3$. Because all players are symmetric, the coalition inclusion probabilities when not proposing are $r^2_{ji} = 1/2 \ \forall i, j$, where the superscript 2 denotes round 2 onwards. This means that non-proposers have equal chances of being invited to the coalition, which implies that $V_i^2 = 1/3 \ \forall i$.

We are now ready to present the main results concerning the equilibrium effort levels.

Proposition 4. *When efforts have a temporary effect on the probability of proposing the following hold.*

1. *Under the majority rule:*

   (a) *The optimal investment is* $e^* = \frac{2F(1-\delta/2)}{9}$.

   (b) *The proposer offers one other member* $s = \delta F/3$ *and keeps* $F(1 - \delta/3)$.

2. *Under the unanimity rule:*

   (a) *The optimal investment is* $e^* = \frac{2F(1-\delta)}{9}$.

   (b) *The proposer offers each member* $s = \delta F/3$ *and keeps* $F(1 - 2\delta/3)$.

Equipped with these theoretical propositions, we now proceed to explain the experimental implementation of the games.

4 Experimental Design

Subjects were randomly placed in groups of three to divide a fund of $F = 320$ tokens. They were endowed with 100 tokens for the contest stage and could choose any effort amount $e \in [10, 100] \subset \mathbb{N}$. At the bargaining stage, subjects were informed about the effort and recognition probability of each member in their group. We employed a partial strategy method at the proposal stage by eliciting a division of the fund from each subject. Only one proposal was selected for voting according to the vector of recognition probabilities.

Voting worked as follows. Once proposals were submitted, but before the selected proposal was revealed, subjects reported the smallest share that they would accept for themselves. Votes were tallied in favor whenever the share offered to the voter was equal to or greater than the voting threshold.

Our goal with this voting design feature is threefold. First, it provides a direct measure of subjects' minimum acceptable share, which cannot be accurately obtained through a direct voting mechanism. Second, it precludes subjects from directly manifesting preferences for the overall distribution of the fund and brings the theory closer to the model's assumptions, namely, that $u_i(\mathbf{x}) = x_i$. This allows to test directly the equilibrium prediction that a player votes in favor if and only if her share is greater than or equal to the discounted continuation value of the game (i.e. $s_i \geq \delta V_i$). Third, players might care about the identity of the proposer when voting, especially when a group has failed to reach an agreement in round 1 (see Kim (2023) and Baranski and Morton (2022) for ample evidence of retaliation against proposers). This plausible behavior would

Table 1: Treatments, Sessions, and Sample Size

Treatment Acronym	Voting Rule	Effect of Efforts on Probability of Proposing	# of Sessions	Matching Groups	Total Subjects	# of Games
MAJ-PERM	Majority	Permanent	4	10	78	260
UN-PERM	Unanimity	Permanent	3	6	54	180
MAJ-TEMP	Majority	Temporary	3	6	54	180
UN-TEMP[1]	Unanimity	Temporary	3	6	54	171

[1] One session suffered a software malfunction in game 8, hence the lower number of total games.

violate stationarity, and hence, we *turn o* this possibility by design in order to bring the decision environment closer to assumptions under which equilibrium predictions are derived.

The probability of bargaining breaking down exogenously after a rejection was set at 0.15, thus $\delta = 0.85$. During the bargaining stage, we allow subjects to bargain indefinitely until they reached an agreement, moment at which they are informed if bargaining has exogenously ended at some previous round. This important design feature allows us to observe the exact timing of agreement, a variable that we use to calculate bargaining efficiency.

We conducted four treatments in which we varied the voting rule (majority and unanimity) and the durability of efforts in determining proposal rights (temporary and permanent) in a manner we have already explained. Subjects participated only in one treatment. Table 1 summarizes the experimental design.[14]

Each game, consisting of an effort choice and a bargaining stage with possibly many rounds, was played a total of 10 periods but only one was randomly selected at the end of the experiment to count for payment. Subjects were randomly re-matched each period to avoid reputation building. In some sessions we had more than one matching group, so that subjects were only re-matched with other subjects in the same matching group. All sessions had matching groups of 9 subjects with the exception of one session for MAJ-PERM, in which we had four matching groups of size 6.[15]

All interactions were anonymous and computerized. The software was programmed in zTree (Fischbacher, 2007). The experiments were conducted at the experimental laboratory of Universidad del Rosario in Bogotá, Colombia between February 2019 and December 2021. Each token in the experiment represented 300 Colombian Pesos (COP). Subjects were paid a show-up fee of 10,000 COP, which at the time of the experiment represented about 3 US Dollars.

[14] The equilibrium efforts for the parameters chosen are displayed in Table 2.

[15] Initially, we decided to discard the session data because of this mistake by the experimenter and its possible effect on the likelihood of encountering the same group composition (subjects did not know the size of the matching group). However, the results from those matching groups do not differ significantly from the rest, hence we include them in our analysis.

4.1 Equilibrium behavior under the experimental parameters

For the treatment with a temporary effect of effort on proposal probabilities we obtain an optimal symmetric effort of 66 tokens for MAJ-TEMP and 11 for UN-TEMP. For the treatment with a permanent effect the optimal effort is 71 tokens for UN-PERM. There are no asymmetric equilibria.

To obtain the equilibrium effort under the majority rule, we developed an algorithm that searches of the grid of efforts for a vector (e_1, e_2, e_3) for which there is no profitable deviation. For the intermediate step of obtaining the equilibrium values of each bargaining subgame for every vector of efforts, we build on Kalandrakis's 2015.[16]

5 Experimental Results

We start by presenting the results for effort provision, bargaining gridlock as measured by the round of agreement, and total efficiency. Subsequently, we will focus on distribution of the total fund in bargaining outcomes.[17] Throughout the analysis, we refer to a test as yielding a significant difference if the associated p-value is at most 0.05. When our unit of observation is at the subject level (e.g. effort or share demanded), we estimate random effects models. In all our estimations, standard errors are clustered at the matching group level.

5.1 Effort Provision

Table 2: Rent-Seeking Efforts: Equilibrium and Observed Behavior

Treatment	Equilibrium Behavior		Observed Behavior	
	Effort Vector	Mean Effort	Periods 1-5	Periods 6 - 10
MAJ-PERM	$\boldsymbol{e}^* = (13, 27, 80)$ $\boldsymbol{e}^* = (14, 26, 80)$	40	33.64	32.09
UN-PERM	$\boldsymbol{e}^* = (71, 71, 71)$	71	28.53	17.60
MAJ-TEMP	$\boldsymbol{e}^* = (66, 66, 66)$	66	32.56	30.86
UN-TEMP	$\boldsymbol{e}^* = (11, 11, 11)$	11	27.55	21.31

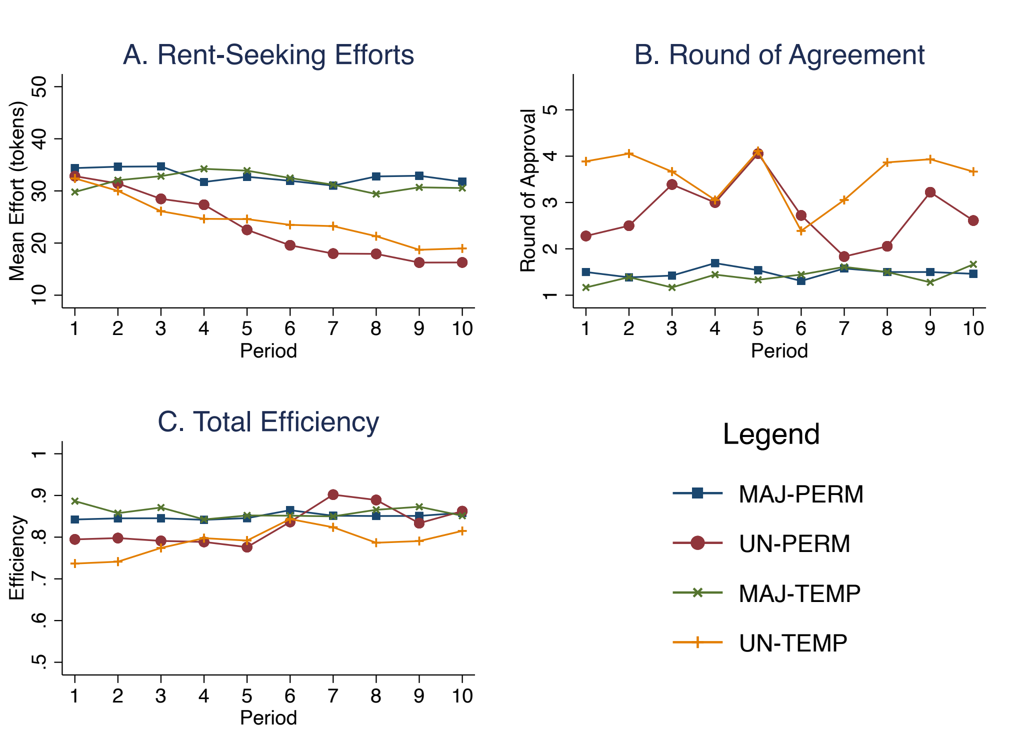
The evolution of efforts over the ten periods of play are displayed in Panel A of Figure 1. The first important observation is that efforts in all treatments start around 33 tokens (which is

[16]The code is available upon request. We note that it takes about 4 weeks to run the algorithm on a *standard computer*. Our next step is to decentralize the computations so as to be able to employ multiple cores in a super-computer and speed up the process. We tested other parameters (i.e. size of the fund and a finer effort grid), and in every case we obtained that the aggregate investments under the majority rule are lower.

[17]An analysis of voting thresholds is presented in the Online Appendix Section B.2.1.

1/3 of endowment) and there are no statistically significant differences between them. Table B1, column 1, shows the regression results for period 1 efforts on treatment dummies, none of which are significantly different from each other.[18]

Figure 1: Evolution of Mean Efforts, Agreement Round, and Total Efficiency



Notes: Subjects can choose rent-seeking efforts between 10 and 100 tokens (Panel A). Higher efforts entail lower efficiency because they are purely wasteful, they only affect recognition probabilities. The round of agreement is the round within a bargaining period in which a proposal receives the required number of votes in favor (Panel B). A higher agreement round also reduces efficiency because it entails a larger likelihood of bargaining termination, as induced by the discount factor of 0.85. Total efficiency (Panel C) is given by the proportion of expected final payoffs to the maximum attainable payoffs. Maximum efficiency is attained when subjects choose the minimum effort (10 tokens) and reach an agreement in round 1.

The second important observation is that efforts decline with experience in the game for the unanimity treatments, but remain rather steady under majority. Evidence for this is provided in the regression analysis presented in Table B2. The *Period* trend coefficient is negative and significant for the unanimity treatments, but statistically indistinguishable from 0 for the majority treatments. Pooling -TEMP and -PERM treatments by voting rule, rent seeking efforts are 36% higher under majoritarian bargaining (23.81 under unanimity vs 32.4 tokens under majority, $p = 0.002$).

Third, we find that the durability of proposal rights has no effect on effort choices within each

[18]For robustness, we conducted two-sided Mann-Whitney tests with each individual effort choice in period one as an independent unit of observation. We reject that efforts are drawn from different distributions in each treatment. For MAJ-TEMP vs MAJ-PERM, $p = 0.17$; for UN-TEMP vs UN-PERM, $p = 0.93$; for MAJ-TEMP vs UN-PERM, $p = 0.41$; for MAJ-PERM vs UN-TEMP, $p = 0.54$, for MAJ-TEMP vs UN-TEMP, $p = 0.48$, for MAJ-PERM vs UN-PERM, $p = 0.60$.

voting rule. The theory posits that the dummy variable *Permanent* should be significantly negative for the majority rule and positive for the unanimity rule, but we observe the opposite sign in both cases.

Conclusion 1. *Rent-seeking e orts at the contest stage to determine proposal rights are higher under majority rule bargaining than unanimity. The di erence arises with experience as e orts unravel in the unanimity bargaining games but remain steady in the majority games. E ort choices are unresponsive to the how durable their e ect is on proposal rights within each voting rule, revealing that subjects neglect their strategic value as predicted in equilibrium.*

5.2 Bargaining Gridlock and The Round of Agreement

Panel B in Figure 1 displays the mean round of agreement for each treatment over the course of the ten games and a histogram with the percentage of agreements by round, for each treatment is provided in Figure B1. On average, it takes more than twice as long to reach an agreement under the unanimity rule than under the majority rule, with the mean round of agreement being 1.45 and 3.15 respectively. Our econometric analysis (see Table B3, column 3) robustly confirms the statistical significance of this difference ($p < 0.01$).[19]

As will become clear from the analysis of the proposer's share and voting thresholds, fairness considerations play an important role in the division of the 320 tokens. Thus, one possibility is that reaching agreements become harder when efforts differ widely between members of the group. In particular, when players choose similar effort levels, two notions of fairness coincide: equity (in the sense of proportionality) and equality. But when efforts differ widely, the share an equality-oriented subject expects to receive will differ from what an equity-oriented subject would accept. To account for this possibility, we include the standard deviation of the group's efforts as an independent variable explaining the round of agreement expecting that a lower standard deviation of efforts will correlate negatively with the length of agreement delay. In line with our conjecture, we find a positive marginal effect of the standard deviation of efforts on delay, but it is significant only in the majoritarian treatments. For example, if efforts are 50, 30, and 10 tokens (st. dev. is 20), the predicted round of agreement is 1.6 and falls to 1.1 when all efforts are equal.

In the preceding analysis we have focused on the round of agreement as the outcome variable of interest. We conducted an identical analysis with bargaining delay being our dichotomous outcome variable and find comparable results: higher delay under unanimity compared to majority (58% vs 24%, $p < 0.01$)) and no difference along the durability of efforts dimension. Concerning differences in efforts, the standard deviation is 20, the predicted probability of delay is 26%, which drops by

[19] We find no differences in round of agreement along the durability of rights dimension within each voting rule. See Table B3, columns 1 and 2.

11 percentage points if all efforts are equal. For the unanimity treatments, the probability of delay falls from 62% to 53% under the respective standard deviations.

Conclusion 2. *Immediate agreements are more prevalent under the majority rule (76%) than under the unanimity rule (42%). As the di erences in rent-seeking e orts between group members increases, the more likely a group is to delay agreement, indicative of clash of fairness views between subjects.*

5.3 Efficiency Considerations: Which voting rule dominates?

The analysis of rent-seeking efforts demonstrates that unanimity leads to higher efficiency (as measured by total payoffs) at the contest stage because it elicits lower efforts. Consistent with previous research, we also find that bargaining under unanimity entails more gridlock than under the simple majority rule. Because delay is costly and can lead to exogenous bargaining termination, the higher rate of impasse expected under unanimity may override any contest efficiency advantage. Thus, we ask: Which collective decision-making rule yields the highest aggregate payoffs?

We decompose the total efficiency measure into two components: contest stage and bargaining stage efficiency. For the contest stage, we measure efficiency as sum of post-rent seeking holdings relative to the holdings that would arise when subjects choose the minimum effort. Hence, maximum contest efficiency arises when $e = 10$ (the lower bound on the effort choice set) for each subject in the group. For bargaining efficiency, we calculate the probability that bargaining has not terminated by the time an agreement is reached, and hence the fund has not vanished. This is given by $\delta^{\tau\;1}$, where τ is the round of approval. Full bargaining efficiency is attained if approval occurs in round 1. Finally, our measure of total efficiency is given by the total expected payoffs relative to highest possible aggregate payoffs (i.e. when $e = 10$ for every subject and agreement is reached in round 1).[20]

Panel C in Figure 1 displays the evolution of the average efficiency throughout the 10 periods of play. In the first 5 periods, mean efficiency is higher in the majority rule treatments compared to the unanimity voting rule (0.85 vs. 0.78, $p = 0.007$ see regression results in Table 3). In the last 5 periods, both rules yield virtually the same level of efficiency (0.84 and 0.86, $p = 0.549$).

Conclusion 3. *E ciency, measured as the total expected payo s relative to the maximum attainable payo s, is initially higher in majoritarian bargaining treatments. However, the rapid decline in rent-seeking e orts under unanimity renders both voting rules equally e cient once subjects have gained experience.*

[20] Specifically, total efficiency is given by $\frac{300-\sum_i e_i + 320\delta^{\tau-1}}{590}$ where the denominator is the total fund (320 tokens) plus 270, which is the sum of endowments minus the sum of minimum efforts. Note that this measure is always between 0 and 1.

Table 3: Efficiency, OLS Estimation

	Periods 1-5	**Period 6-10**	**All Periods**
Majority Rule	0.072**	0.016	0.045
	(0.025)	(0.026)	(0.023)
Cons.	0.779***	0.840***	0.809***
	(0.019)	(0.022)	(0.019)
N	400	391	791

Standard errors in parentheses clustered at the matching group level. Accepted proposals only. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5.4 Bargaining

We now turn to the bargaining stage in order to investigate if and how rent-seeking efforts affect the distribution of the total fund. We focus on the the overall split and the proposer's share. Due to space constraints, we relegate the analysis of voting thresholds to the online appendix. Table 4 contains a summary of the main bargaining outcomes.

Table 4: Bargaining Outcomes

	MAJ-PERM	**MAJ-TEMP**	**UN-PERM**	**UN-TEMP**
Overall division:				
Prediction	2-Way splits	2-way splits	3-way splits	3-way splits
2-way splits (%)	9.62	16.67	0	0
3-way splits (%)	90.34	83.33	100	100
Proposer's Share:				
Observed (% of Fund)	38.01	39.56	35.07	33.36
Observed / Prediction[1]	0.52	0.55	0.86	0.78
Voting Threshold:				
Observed (% of Fund)	33.13	33.23	29.47	31.41
Observed / Prediction[1]	1.18	1.17	1.21	1.11
Round of Approval:				
Prediction	Round 1	Round 1	Round 1	Round 1
Round 1	76.15	76.11	43.89	39.77
Round 2	12.69	15.00	17.78	21.64
Round 3+	11.15	8.89	38.33	38.60

Accepted proposals only, pooled for all periods of play.
[1] In PERM treatments, the equilibrium in the bargaining subgame depends on the vector of efforts as explained in Section 2. For MAJ-PERM we use the algorithm by Kalandrakis (2015) to obtain the expected bargaining payoffs, which we use to calculate the proposer's equilibrium share and voting thresholds.

5.4.1 Proposer power and the Division of the Total Fund

It is clear from Table 4 that bargaining outcomes hold little resemblance to the SSPE benchmark. Two-way splits are not modal in the majority voting treatments, instead, three-way splits represent an overwhelming proportion of agreements. Proposers keep around 38% of the fund in the majority treatments and 34% in the unanimity treatments. In all cases the share proposers keep in accepted allocations is substantially below the equilibrium predictions. These findings are rather unexpected finding because two-way splits represent close to 67% of all agreements in three-player Baron and Ferejohn experiments (without a proposer contest) published to date (see Baranski and Morton (2022)), and our expectation was that the preceding contest for proposal rights would ignite subjects' *competitiveness* in bargaining leading to enhanced proposer power.

To understand the determinants of the proposer's shares, we estimated a mixed-effects regression with subject level random effects. The dependent variable is the share that proposers keep as a proportion of the total fund in accepted allocations. We included in our regression the proposer's effort choice relative to the total effort, which represents the probability of proposing in PERM treatments and round-one proposing in TEMP treatments. In terms of the theoretical predictions of the SSPE, the estimated coefficient should be 0 for MAJ-TEMP, and UN-TEMP because there is no effect of efforts on the share offered to voters ($s_i = \delta F/3$). To the contrary, the proposer's share in MAJ-PERM and UN-PERM is positively affected by her recognition probability , thus we should expect a positive and significant coefficient in those treatments. This happens because as π_i increases, others' chances of recognition fall, and the share offered to others declines.[21]

In our regression we also include the round in which the agreement took place to account for within-group dynamics, and the period of play to account for learning. We estimate the model for each treatment and then pooling but controlling for the voting rule and the durability of rights.

The estimation results are presented in Table 5. We find that in all treatments, there is no indication of an increase in proposer power over the course of the experiment as can be seen by the non-significant period trend coefficient. Second, the proposer's effort relative to total efforts is positively correlated with the proposer's kept share. Thus, it can be argued that equity concerns, in the sense of proportionality relative to efforts, plays a role in subject's bargaining behavior. Third, When focusing on the pooled estimation, we find a small significant difference of 4 percentage points between majority and unanimity bargaining. And fourth, the durability of proposal rights bears no impact on the proposer's share.

We now turn to investigate in more detail how rent-seeking effort shape the division of the total fund. Figure 2 shows a scatter plot of where each observation is an effort-share pair and the red line

[21] Recall that player j's SSPE predicted share is $V_j = 0{:}85 \ {}_j$ in UN-PERM, and that it is weakly increasing for MAJ-PERM games.

Table 5: Determinants of Proposers' Shares, Mixed Effects Regression

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) UN-PERM	(4) UN-TEMP	(5) Pooled
Effort / Sum of Efforts	0.194***	0.151*	0.121*	0.099	0.156***
	(0.026)	(0.062)	(0.057)	(0.052)	(0.023)
Period (Trend)	0.002	0.002	-0.001	-0.001	0.001
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Constant	0.300***	0.328***	0.306***	0.302***	0.283***
	(0.012)	(0.015)	(0.014)	(0.012)	(0.008)
Majority Rule					0.040***
					(0.008)
Permanent Rights					-0.003
					(0.009)
N	260	180	180	171	791
χ^2	57.73	6.83	10.88	7.23	68.55

Standard errors in parentheses are clustered at the matching group level. We control for the round of approval, which has no significant impact on the proposer's share. Random effects estimations at the subject level. Accepted proposals only. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

represents the identity line. We have pooled by majority and unanimity for ease of visualization. Our first observation is that 93.9% of recipients (other than the proposer) receive a share greater than or equal to their effort in majoritarian bargaining and 99.6% under unanimity. These are all the points above the break-even line. Second, most shares are between 95 and 110 tokens, reflective of the focality of splits on the neighborhood of equality (93% in majority and 99% in unanimity).

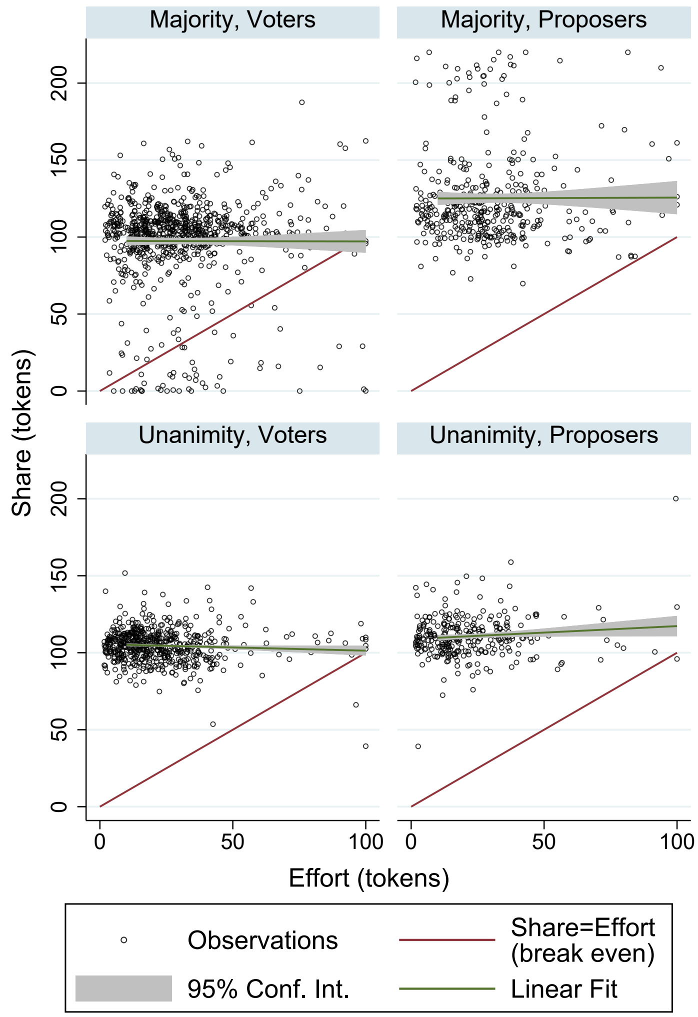
Are proposer guided by the rent-seeking efforts of the voting members when assigning the shares of the fund? Under the majority rule, proposers offer a larger share to the voter with the higher effort 61% of the time, 25% of the time they offer equal shares, and only 11% of the time a lower share to the higher effort voter. A similar pattern is observed under unanimity, as shown in Table 6. Thus, we find is evidence of a *coarse* version of equity concerns (Cook and Hegtvedt, 1983).

Table 6: Types of Proposals and their Relationship to Rent-Seeking Efforts (in Percentages)

	MAJ-PERM	**MAJ-TEMP**	**UN-PERM**	**UN-TEMP**
All shares ordered by effort	40.89	30.54	34.13	38.93
Voters' Shares ordered by effort	67.11	53.29	58.10	62.83
Voters' shares equalized	21.33	30.54	24.55	27.43

Accepted proposals only, pooled for all periods of play. *All shares ordered by effort* refers to allocations in which $share_i > effort_i$ for each subject $i \in 1, 2, 3$. *Voters' Shares ordered by effort* refers to allocations where $share_i > effort_i$ for the voters but the proposer's share need not satisfy the same inequality. *Voters' shares equalized* are allocations in which both voters receive the same share.

Figure 2: Shares and Efforts, by Voting Rule and Subject Role (proposer vs. voter)



Conclusion 4. *Regardless of the voting rule, the modal agreements are three-way splits of the total fund. The proposer's share is 4 percentage points higher in majority treatments compared to unanimity (38% vs 34%). Proposers take into account rent-seeking e orts when distributing the fund by o ering voters who exerted higher e orts a larger share, displaying a coarse form of equity concerns.*

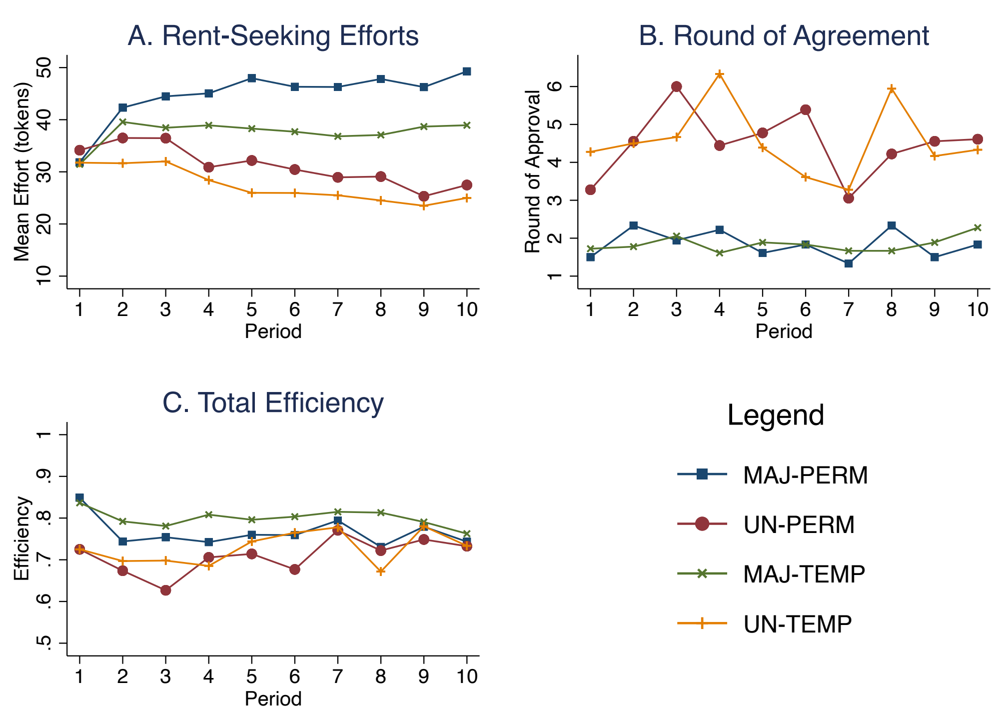
5.5 Replication of the Main Experiment

The discrepancy between theory and experimental results, both at the contest and bargaining stages, warrants a closer investigation. In particular, we would like to know if our results are unique to the Colombian subject pool or if indeed, the observed behavior is robust. To this end, we conducted the same experimental treatments at LINEEX at the University of Valencia in Spain (n=216, 54 subjects in 6 matching groups per treatment).[22]

As can be observed from Figure 3, the main results from the initial experiment hold by and large. Rent-seeking efforts to secure proposal rights are larger under majority than unanimity (41.2 vs 29.3 tokens, $p < 0.001$), and the durability of efforts in affecting proposal rights has no significant effect (see columns 1 and 2 of the regression result Table C7). As in Colombia, there are no differences between treatments in efforts in the first period (see Table C8).

With respect to bargaining behavior we also find that three-way splits are modal in all treatments and there is strong evidence of equitable sharing. The proposer's share is correlated with relative efforts in all treatments (see Table C9) and voting threshold too (see Table C12).

Figure 3: Evolution of Mean Efforts, Agreement Round, and Total Efficiency in Replication Experiment (Spanish Sample)



Conclusion 5. *We replicate our experiment in a separate sample and the same pattern of behavior emerges at the contest and bargaining stages. This reveals that the stark departures from theoretical predictions, both at the contest and bargaining stages, are not driven by particularities of the sample of our rst experiment.*

[22]We were also interested in understanding the role of risk preferences and gender in the contest and bargaining behavior, as well as investigating through direct elicitation the reason behind subjects choices. In Section 7 we discuss these results.

6 Are subjects myopic? Evidence from One-Round Bargaining Games

The results from our main experimental treatments clearly indicate that subjects do not reason about proposer power in a manner consistent with equilibrium dynamics. The most telling evidence in this regard is that the durability of rights bears no impact on efforts despite this being central in determining theoretical continuation values, which are derived assuming forward-looking behavior.

One possibility, which we set out to test here, is that subjects mentally reduce the multi-round bargaining game to a one-round game. This could be due to the cognitive burden of assessing one's own and others' behavior in further rounds or because subjects assume that agreements will be reached immediately. If this is the case, then we would expect that the majority-unanimity effort gap should remain in a one-round version.

Instead of proposing an ad-hoc model attempting to rationalize subjects' choices[23], we propose a new experiment to assess indirectly the extent to which subjects neglect the bargaining horizon. To this end, we study behavior in a reduced, one-round bargaining game preceded by the same contest rules (this corresponds to the limiting case where $\delta = 0$). We argue that, if subjects act myopically in the main treatments, their contest behavior will be *similar* compared to the one-round version of the game. Specifically, we test whether the bargaining horizon affects the difference in efforts between majority and unanimity treatments. While we cannot provide a direct test of foresight abilities, our experimental design *by elimination* (Niederle, 2015), sheds light into the role of the bargaining horizon.

Theoretically, the equilibrium effort vector of the reduced game is identical for both voting rules. Note that, at the bargaining stage, the continuation payoff upon rejection is 0, which enables the proposer to extract the total fund F under both rules. As such, the ex ante value of the game, prior to the identity of the proposer being revealed, is $\pi_i F$. For the experimental parameters we implement, the optimal effort is $e = 71$. In total, we recruited 135 Colombian subjects and 108 Spanish subjects for the sessions of the one-round bargaining game with majority (MAJ-1R) and for the unanimity rule (UN-1R). Hereafter, we analyze both subject samples side-by-side.

Figure 4 displays the evolution of effort by period of play. First and foremost, efforts under majority rule are 48% higher (45.1 vs 31.1, pooling both samples), confirming our main result.

Does the bargaining horizon affect the difference in rent-seeking efforts between voting rules? Regression analysis (Table 7) shows that the difference between unanimity and majority in single-rounds games remains the same when compared with the multi-round games (Majority 1-Round

[23] Several important models of limited foresight have been developed earlier. See for example the seminal work by Jehiel (1995, 1998) and more recent work by Ke (2019); Rampal (2022).

Table 7: Random Effects Linear Regression of Efforts in One-Round and Multi-Round Bargaining Games, by Laboratory

	Colombia		Spain	
	(1)	(2)	(3)	(4)
1-Round Games	9.222*	6.087	-0.603	-0.872
	(4.367)	(4.290)	(3.138)	(3.197)
Majority Rule	8.301**	0.815	11.890***	1.932
	(2.673)	(3.279)	(3.109)	(2.875)
Maj. One-Round	4.732	5.472	2.808	4.469
	(5.904)	(5.397)	(5.208)	(5.582)
Period (trend)		-1.645***		-1.051***
		(0.244)		(0.258)
1-Round Period		0.606		0.049
		(0.434)		(0.350)
Majority Period		1.397***		1.810***
		(0.394)		(0.430)
1-Round Majority Period		-0.171		-0.302
		(0.691)		(0.839)
N	3723	3723	3240	3240
χ^2	36.682	121.227	28.737	53.652

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. * $p < 0{:}05$, ** $p < 0{:}01$, *** $p < 0{:}001$.

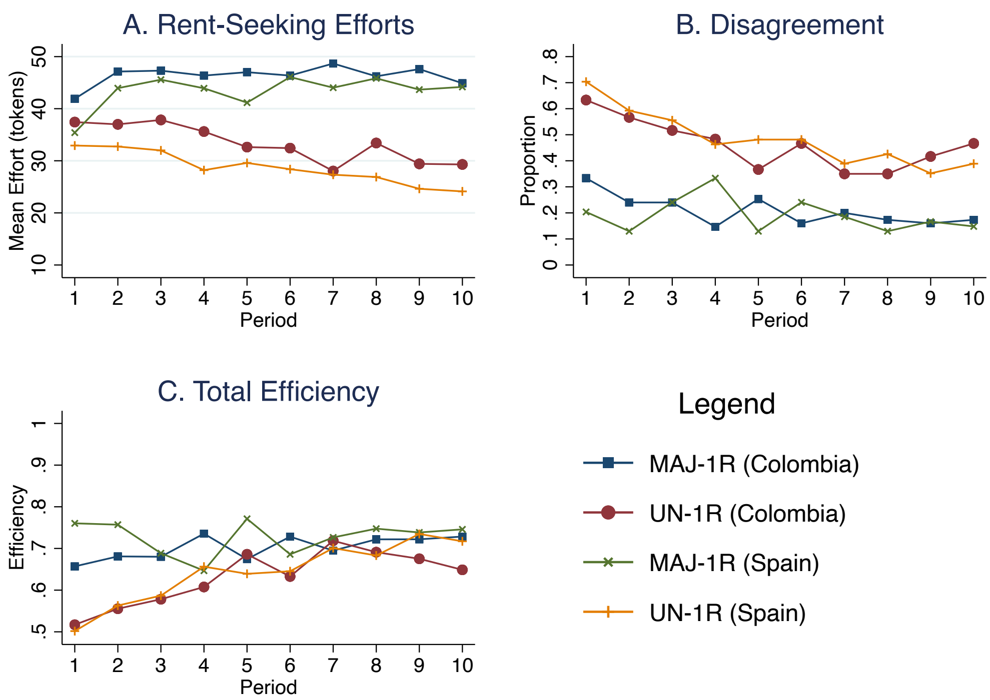


Figure 4: Evolution of Mean Efforts, Disagreement Rates, and Total Efficiency in One-Round Bargaining Games, by Treatment and Laboratory

in Table). This result holds after controlling for period of play too.

In Spain, the bargaining horizon has no effect, while in Colombia, subjects invest about 9 tokens more in single-round games (columns 1 and 3). However, when we control for experience, the sample level difference vanishes. Note that the *period* estimated coefficient reveals that efforts fall in all unanimity treatments (the period trend is negative) and that the bargaining horizon makes no difference (1-Round Period is not statistically significant).

Conclusion 6. *In a single-round version of the bargaining game, mean e orts are higher under the majority rule than under unanimity. There is no di erence in the magnitude of the majority-unanimity e ort gap between single-round and multi-round games. The latter is consistent with subjects reasoning myopically about the value of e orts in multi-round games.*

7 Discussion

When we conducted the Spanish follow-up experiment we had two additional questions that we wanted to answer. The first concerns the role of individual characteristics on subject behavior. Do risk preferences and gender explain rent-seeking efforts? Do men and women bargain differently?

Second, we sought to investigate the stated reasons behind subjects' choices. To this end, we asked two open-ended questions in our final survey, one about proposal strategies and the other about effort choices, on which we report in this section.

7.1 The role of Gender

We now investigate the role of gender both a the contest and bargaining stages. Previous experimental contest with a fixed prize, show evidence that female subjects choose higher efforts than male subjects (Price and Sheremeta, 2015; Dechenaux et al., 2015). Evidence from auctions experiments also reveals a tendency for females to bid more than males (Casari et al., 2007; Ham and Kagel, 2006; Chen et al., 2013). Table 8 pools all treatments by voting rule. In both rules we find females bidding more than males, which our regression analysis confirms for the multi-round games (the difference is significant only under unanimity bargaining, see Table C9).

Turning to the bargaining stage, females are 18% percentage points more likely to offer three-way splits than males in majority rule treatments. Our findings can be interpreted as females being equally or even more likely than males to sort into proposing in bargaining, yet their motives differ as female promote more fair outcomes.

Table 8: Mean Efforts and Proposal Type, by Gender and Voting Rule

	Majority	**Unanimity**
	Majority	**Unanimity**
Effort (tokens)		
Female	42.7	31.8
Male	40.8	25.3
Three-Way Splits (%)		
Female	85.4	99.7
Male	67.6	99.7

7.2 The role of Risk Aversion

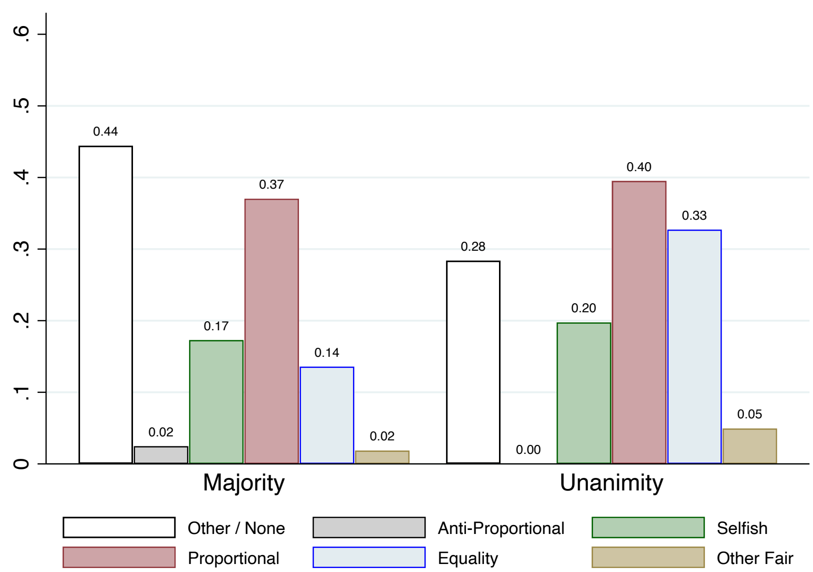
The extant experimental literature on contests with a fixed prize shows evidence that risk aversion is negatively correlated with rent-seeking effort choices (Dechenaux et al., 2015; Shupp et al., 2013). We investigate the role of risk preferences in our experiment by asking subjects to state their willingness to take risks in a 0 (not willing) to 10 (completely willing) scale, as in Dohmen et al. (2011). Our regression results show that the higher willingness to take risks correlates positively with effort choices in the first game (Table C8), and all throughout the experiment for both voting rules (see Table C9).

7.3 The Equitable Sharing Puzzle

Equitable sharing in the form of proposers' tendency to sort voters' shares of the fund according to their efforts arises despite the competitive nature of the preceding contest. Equity concerns are widely documented in bargaining experiments with joint production of the surplus such as Gantner et al. (2001); Cherry et al. (2002); Cappelen et al. (2007) in bilateral settings and Baranski (2016); Gantner et al. (2016) in multilateral bargaining. However, in these experiments a productive phase precedes negotiations where a clear public benefit is created by individual costly efforts or investments.

It is important to stress that we do not find perfect proportionality, but the distribution of the benefits can be largely described by the principle of ***status congruence*** (Homans, 1958) or ***rank order equality*** as Cook and Hegtvedt (1983) refer to it, which is a coarser conception of the proportional equity principle (Adams, 1965). Answers to an open-ended question at the end of the experimental sessions conducted in Spain confirm that subjects care about ***fairness*** and take efforts into account when proposing.

Figure 5: Subject's Stated Motives for their Bargaining Proposals



Notes: This figure pools single- and multi-round bargaining games by voting rule.

Based on the answers to an open ended question about the motives behind subjects' proposed divisions of the total fund, we identified 5 main categories (which are not mutually exclusive). Responses coded as ***Proportional*** are those stating that the offered shares are positively related to the recipients' rent-seeking efforts, including cases where the subject aims to prioritizes his/her own share. ***Anti-proportional*** motives are coded when subjects state that the offered shares are inversely related to efforts. References to maximizing one's payoff or prioritizing one's earning over others, are coded as *Sel sh*. *Equality* motives are coded when the subject aims to offer an equal shares.

Figure 5 shows subjects' stated motives behind their bargaining proposals. Proportionality, equality, and other fairness concerns are present in 53% of responses under the majority rule and 78% under unanimity. Subjects report equality concerns more often under unanimity (14% vs 33%). Both of these patterns are reflective of how the strategic environment may trigger appeals to different norms of fairness.

We now reflect on one of our experimental design choices, where we did not allow for communication between subjects. Studies allowing for communication show that proposer power is larger compared the no communication benchmark (Agranov and Tergiman, 2014), when the fund to divide is an exogenous parameter. However, when joint production precedes bargaining, communication does not increase proposer power (Gantner et al., 2019; Baranski and Cox, 2023), because subjects tend to respect each others contributions. Our result show strong evidence for fairness considerations akin to those present in games with joint production. Thus, we hypothesize that allowing for communication channels will not lead to a sizeable increase in the proposer's share in our setting.

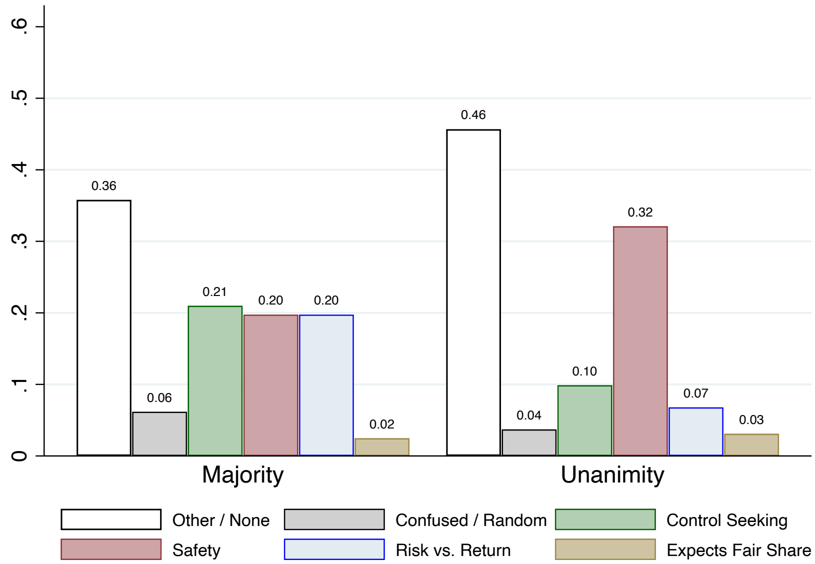
7.4 Subjects' Stated Motives for the Rent-seeking Effort Choices

We asked subjects to explain the reasons behind their effort choices and classified their answers in the following non-mutually exclusive categories. *Control-seeking* refers to statements about the desire to be the proposer. *Risk versus return* motives are those in which subjects explain balancing a trade-off between keeping their endowment and investing to enhance their odds of having their proposals selected. *Safety* motives are those in which subjects state that their primary concern was to have guaranteed earnings. *Expects a fair share* is coded when subjects state that they expect to receive a share of the fund in line with their effort choice. The prevalence of these categories by voting rule is shown in Figure 6.

Control-seeking motives are expressed by 20% of subjects under majority voting, twice as much as than under unanimity, and a similar pattern is observed for subjects reporting a *risk vs. return* evaluation motive. Conversely, safety concerns are more prevalent under unanimity. Hence, we find that the voting rule affects the motives behind subjects effort choices, and as shown next, these motives are correlated with rent-seeking efforts.

Table 9 shows the mean effort by voting rule for each of the main motives we identified. Subjects that report being concerned with the safety of their earnings choose the lowest efforts under both rules while control seekers choose the highest efforts.

Figure 6: Subject's Stated Motives for Rent-seeking Effort Choices



Notes: This figure pools single- and multi-round bargaining games by voting rule.

Table 9: Mean Efforts for each Motive, by Voting Rule

	Majority	**Unanimity**
Safety		
Yes	31.6	19.4
No	44.4	33.7
Risk vs. Return		
Yes	39.7	32.7
No	42.5	28.8
Control Seeking		
Yes	53.1	48.3
No	38.9	33.7

8 Conclusion

In this article, we have explored how competition for proposal rights affects bargaining behavior and vice-versa. Our setting can be understood as the merging of two cornerstone models in political economy: rent-seeking contests as modelled by Tullock (1980) and multilateral bargaining as modeled by Baron and Ferejohn (1989). Thus, on the one hand we endogenize the origin of proposal rights in bargaining, and on the other, we endogenize the distribution of the prize in a contest. We provide the first experimental investigation of competition for proposal rights in a multi-stage model of sequential bargaining and uncover a robust series of findings.

Our experimental findings can be summarized as follows. Competition for proposal rights is fiercer under majoritarian voting rules than under unanimity. Second, subjects do not value long lasting rent-seeking efforts more than short-lived efforts. The evidence suggests that this is due to myopic reasoning about the effect of proposal rights on the ensuing bargaining game. As indirect evidence of limited foresight, we find that the majority-unanimity effort gap remains virtually unchanged when comparing multi-round bargaining and one-round bargaining games. Third, bargaining behavior displays fairness concerns in the form of proportionality in sharing. Quite strikingly, three-way splits of the fund are modal in majoritarian games, contrary to a wealth of evidence from games with exogenous proposal rights (Palfrey, 2016; Agranov, 2020). This suggests that subjects perceive rent-seeking efforts as entitlements and not in a competitive fashion as predicated by the strategic incentives of the underlying non-cooperative game. Furthermore, the equitable sharing patterns dilute proposers' empirical shares relative the theoretical benchmarks, which is consistent with subjects' under investment in efforts in some treatments.

Our results have implications for institutional and organizational design because they illuminate a long-standing debate on the efficiency of different voting rules in collective decision making. Rent-seeking efforts are wasteful from a welfare point of view, thus unanimity dominates the majority rule in this dimension. However, bargaining costs are larger under unanimity because subjects take more rounds to reach an agreement. Incorporating both effects, majoritarian rules yield slightly higher efficiency which fades with experience. This is driven by subjects reducing their effort choice under unanimity mainly, not by quicker agreements. As such, the argument that majoritarian rules are preferable from an efficiency standpoint (Buchanan and Tullock, 1965), must be qualified because the gains, if any, can be rather small once endogenous power struggles are accounted for. It is possible that we are underestimating the efficiency of the unanimity rule case because our measure is based on material payoffs, assuming a linear utility function in which money and utility are equivalent. Nevertheless, it is reasonable to argue that subjects care about the distribution of payoffs among other members (especially in light of proportional sharing), and not just their own payoff. Because unanimity leads to a more inclusive distribution of earnings, one can argue that the majority efficiency advantage shrinks further if utility over full distributions is considered as a welfare measure. Moreover, we have set a lower bound on effort which binds often under unanimity, meaning that perhaps, subjects would choose even lower efforts if feasible.

We find qualitatively similar behavior between two subjects pools in countries that differ substantially in levels of economic development, inequality, and cultural measures of collectivism and trust. The replication of studies is a growing concern among experimental economists (Coffman and Niederle, 2014; Maniadis et al., 2015; Camerer et al., 2019; Page et al., 2021; Fréchette et al., 2022). This is particularly important in our case when behavior departs so starkly from previous experimental work on multilateral bargaining with and exogenous proposer selection chances. Furthermore, we believe that it is important to test for robustness of experimental findings in diverse subject samples, especially with current critiques of the lack of generalizability of findings because most experiments are conducted in laboratories within western, industrialized, and developed nations (Henrich et al., 2010). While there is no clear established link between these variables and bargaining behavior that we can point to in the literature, and importantly, our study is not designed to investigate cultural differences strategic behavior, our minor sample differences do not alter the main insights we have presented.

In closing, there are many open questions to address in the study of rent seeking and negotiations. For example, there are production and rent-extraction trade-offs which occur in many organizations, but we only allow for using effort resources to compete for resources, but not to increase the value of joint production. Perhaps in such a setting, rent-seeking efforts will be penalized while productive ones rewarded. Alternative functions for the competition for proposal rights (i.e. all pay auctions as in Ali (2015)) raise interesting theoretical predictions and may affect behavioral expectations and notions of fairness. Moreover, the bargaining protocol we have implemented is just one of many possible negotiation rules, and thus, considering whether our results hold under alternative bargaining protocols is another venue to explore.

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Online Appendix for
"An Experimental Study of Competition for the Right to Propose"

by Andrzej Baranski and Ernesto Reuben

Table of Contents

A Proof of non-existence of pure strategy equilibria in majoritarian bargaining with permanent effect of efforts of proposal rights

Consider a Baron and Ferejohn (1989) bargaining game with n players, a q voting rule with $1 < q < n$, and a pie of size 1 (this normalization is without loss of generality). Let π_i denote the probability that player i is the proposer. Denote by v_i the equilibrium payoff that arises in a stationary subgame perfect equilibrium, which we know exists and is unique (Eraslan, 2002).

The following lemma formalizes an example that Eraslan (2002) presented without a proof. Once we establish this result, we proceed to prove part 1 of Proposition 2.

Lemma A.1. *Consider the case in which all members except player 1 have the same probability of being recognized. Denote by π_1 the probability that player 1 has of being recognized and by v_1 her equilibrium payoff. Let all the remaining $n-1$ members of the committee have the same chance of being selected denoted by π and hence the same equilibrium payoff v. Then, we have that:*

1. $v_1 > v \iff \pi_1 > \frac{1}{n-\delta(q-1)}$;
2. $v_1 < v \iff \pi_1 < \frac{1-\delta}{n-\delta q}$.

Proof. First, we note that $\pi = (1-\pi_1)/(n-1)$. Let $v_1 > v$. Since player 1 is the "most expensive" to include in the winning coalition, she is always excluded. The payoff function for player 1 can be written as

$$v_1 = \pi_1(1-\delta(q-1)v)\ . \tag{6}$$

Now we examine player $j > 1$. Whenever player 1 proposes, j has probability $(q-1)/(n-1)$ of being assigned her continuation value. Whenever a member $i \neq j > 1$ is the proposer, player j is invited into the coalition with probability $(q-1)/(n-2)$. Putting these facts together we compute the expected payoff when player j is not the proposer to be

$$\delta v\left[\pi_1\left(\frac{q-1}{n-1}\right)+(n-2)\pi\left(\frac{q-1}{n-2}\right)\right]\ . \tag{7}$$

In order to obtain the ex ante value of the game for player $j > 1$ we must add to equation (7) the expected payoff when player j is the proposer. This yields:

$$v = \pi(1-\delta v(q-1)) + \delta v\left[\pi_1\left(\frac{q-1}{n-1}\right)+\pi(q-1)\right] \tag{8}$$

which clearly depends only on v. Next, we proceed to solve for v and obtain the equilibrium payoff to be

$$v = \frac{\pi}{1-\delta\pi_1\left(\frac{q-1}{n-1}\right)}\ . \tag{9}$$

Next, we substitute the right hand side of equation (6) and obtain

$$v_1 = \pi_1 \left[1 - \delta(q-1)\left(\frac{\pi}{1-\delta\pi_1\left(\frac{q-1}{n-1}\right)} \right) \right]. \tag{10}$$

Using the fact that $\pi = (1-\pi_1)/(n-1)$ one can compare equations (9) and (10) to determine conditions on π_1 and π for which $v_1 > v$. Explicitly

$$\begin{aligned} \frac{\pi_1(n-1-\delta(q-1))}{n-1-\delta\pi_1(q-1)} &> \frac{1-\pi_1}{n-1-\delta\pi_1(q-1)} \qquad (\ ) \\ \pi_1 &> \frac{1}{n-\delta(q-1)} . \end{aligned}$$

Next, we turn to the case when $v_1 < v$. Clearly, player 1 will always be included in any minimum winning coalition whenever $j > 1$ proposes. The payoff to player 1 is given by $v_1 = \pi_1(1-\delta(q-1)v) + (1-\pi_1)\delta v_1$. After solving we obtain for v_1 in terms of v and we obtain:

$$v_1 = \frac{\pi_1(1-\delta(q-1)v)}{1-\delta(1-\pi_1)} . \tag{11}$$

Any player $j > 1$ always includes player 1 in the coalition and randomizes over his choices of the remaining players with equal probability. The disbursement amount is given by $(v_1 + (q-2)v)\,\delta$. Whenever player 1 proposes, the probability of j's inclusion is $(q-1)/(n-1)$. Whenever another player proposes (not 1 or j) player j is invited into the coalition with probability $(q-2)/(n-2)$. Putting these facts together we obtain

$$v = \pi(1-\delta v_1-\delta(q-2)v) + \delta v\left[\pi_1\left(\frac{q-1}{n-1}\right) + (n-2)\pi\left(\frac{q-2}{n-2}\right)\right] ,$$

which simplifies

$$v = \frac{\pi(1-\delta v_1)}{1-\delta\pi_1\left(\frac{q-1}{n-1}\right)} . \tag{12}$$

Solving simultaneously for equations (12) and (11) we obtain that

$$v = \frac{\delta\pi_1 + 1 - \delta - \pi_1}{M} \tag{13}$$

$$v_1 = \frac{(n-1+\delta-\delta q)\,\pi_1}{M} , \tag{14}$$

where $M := n-1+\delta\pi_1 n-\delta\pi_1 q-n\delta+\delta$. Comparing (13) and (14) we verify that $v_1 < v$ holds whenever $\pi_1 < \frac{1-\delta}{n-\delta q}$.

We now show that for every symmetric vector of efforts the contest stage, there exists a unilateral downward deviation that leaves the continuation values of the bargaining game unchanged.

Corollary 5. *Let* **e** *be any symmetric, positive vector of efforts. Then, there exists* $\bar{\epsilon} > 0$ *such that for all* $\epsilon \in (0, \bar{\epsilon})$ *we have that* $v_i = 1/n$ *for all* i*.*

Proof. Let $\epsilon > 0$ and consider $(e - \epsilon, e, ..., e)$ the vector after player 1, without loss of generality, deviates. Then $v_1 < v \iff \frac{e-\epsilon}{3e} < \frac{1-\delta}{n-\delta q}$. Rearranging terms, we obtain

$$\bar{\epsilon} := e - \frac{3e(1-\delta)}{n - \delta q} < \epsilon$$

.

We are now ready to prove part 1a of Proposition 3.

A.1 Proof of Proposition 3

Proof. By Corollary 5, for any $\epsilon \in (0, \bar{\epsilon})$ we have that $FV_i(e - \epsilon, e, e) - c(e - \epsilon) > FV_i(e, e, e) - c(e)$. This is because $FV_i(e - \epsilon, e, e) = FV_i(e, e, e) = 1/3$ and $c(\cdot)$ is an increasing function, we have $c(e - \epsilon) < c(e)$. Hence, a small downward deviation is profitable meaning that (e, e, e) is not an equilibrium.

B Regressions, Tables, and Figure for Experiment 1 (Colombian Sample)

B.1 Rent-seeking Efforts

Table B1: Regression Results for Effort Choice in Period 1

	Coef.	S.E.
Constant	34.385***	(2.333)
UN-PERM	-1.551	(3.648)
MAJ-TEMP	-4.588	(3.648)
UN-TEMP	-1.977	(3.648)
N	240	

Standard errors in parentheses. Treatment MAJ-PERM is the base level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B2: Random Effects Model for the Determinants of Effort Provision

	(1) Majority Rule		(2) Unanimity Rule	
Constant	33.076***	(4.027)	33.767***	(2.836)
Permanent Rights	1.150	(4.471)	-1.661	(3.317)
Period (Trend)	-0.248	(0.315)	-1.644***	(0.252)
N	1320		1053	

Standard errors in parentheses clustered at the matching group level. Subject-level random effects. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

B.2 Bargaining Duration and Gridlock

Table B3: Determinants of the Round of Agreement, OLS Regression

	(1) Majority	(2) Unanimity	(3) Pooled	(4) Majority	(5) Unanimity	(6) Pooled
Permanent Rights	0.088	-0.784		0.086	-0.677	
	(0.215)	(0.721)		(0.214)	(0.723)	
Majority Rule			-1.698***			-1.805***
			(0.383)			(0.376)
Period (Trend)	0.016	-0.025	-0.004	0.021	0.020	0.015
	(0.025)	(0.059)	(0.028)	(0.023)	(0.065)	(0.028)
Std. Dev. of Efforts				0.021**	0.042	0.032***
				(0.005)	(0.022)	(0.008)
Constant	1.313***	3.688***	3.173***	0.970***	2.897***	2.691***
	(0.158)	(0.375)	(0.324)	(0.104)	(0.629)	(0.344)
N	440	351	791	440	351	791

Standard errors in parentheses clustered at the matching group level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

B.2.1 Voting Thresholds

Recall that the voting threshold is given by δV_i (as a proportion of the total fund). For treatments MAJ-TEMP and UN-TEMP, efforts should have no effect V_i because it is equal to 1/3 due to the ensuing symmetry. For the treatment UN-PERM, $V_i = \pi_i$, which means we should expect a positive effect of one's relative effort choice on her threshold. While there is no explicit functional form for V_i under majority, we know it is weakly monotonic in effort (Eraslan, 2002). Thus, a positive effect is also expected.

We estimated the same regression specifications as we did for the proposer's share. The results, reported in Table B5, reveal that efforts play a key role in subjects' threshold decisions. In all

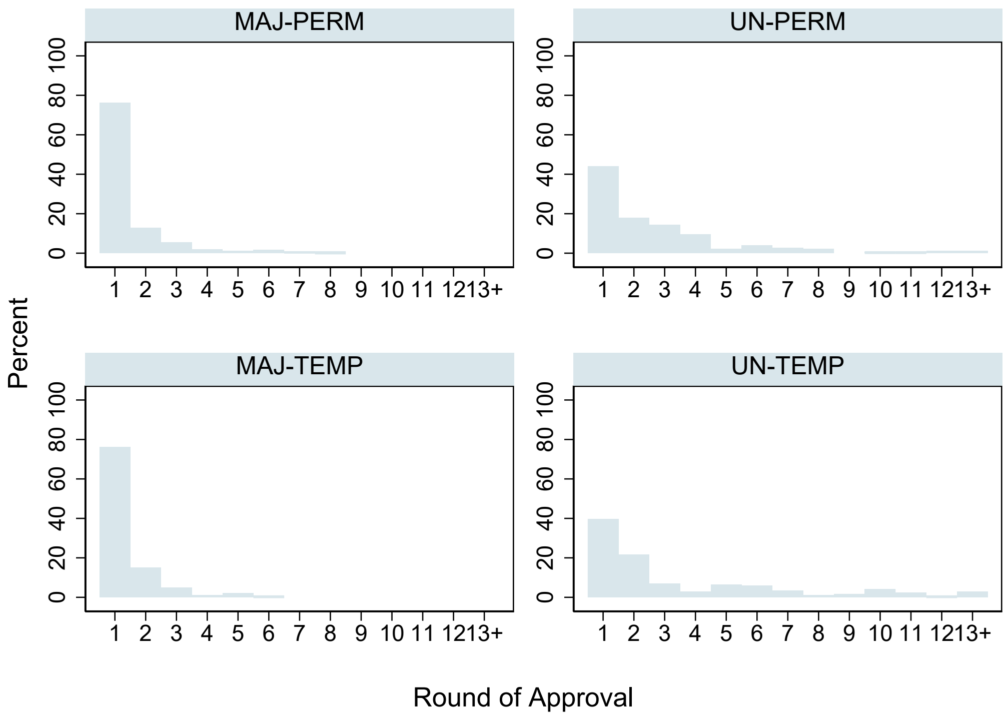

Figure B1: Round in which an Agreement is Reached, by Treatment

Table B4: Probability of Agreement Delay (Probit Model), Marginal Effects

	(1) Majority	(2) Unanimity	(3) Pooled	(4) Majority	(5) Unanimity	(6) Pooled
Majority Rule			-0.341***			-0.360***
			(0.061)			(0.058)
Permanent Rights	-0.000	-0.040	-0.018	0.000	-0.028	-0.011
	(0.097)	(0.078)	(0.063)	(0.096)	(0.076)	(0.061)
Period (Trend)	0.001	-0.008	-0.003	0.003	-0.003	0.001
	(0.007)	(0.010)	(0.006)	(0.006)	(0.012)	(0.006)
Std. Dev. of Efforts				0.006***	0.004	0.006**
				(0.002)	(0.004)	(0.002)
N	440	351	791	440	351	791

Standard errors in parentheses clustered at the matching group level. * p < 0:05, ** p < 0:01, *** p < 0:001.

treatments, we uncover a positive and significant relationship, which further evidences subjects' concerns for equity in the distribution of the fund.

Subjects in the majority treatments ask for nearly 3 percentage points more of the fund than subjects in the unanimity treatments ($p < 0.05$). Again, we find no significant difference in thresholds along the durability of rights dimension ($p > 0.1$).

Table B5: Determinants of Voting Thresholds, Mixed Effects Regression

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) UN-PERM	(4) UN-TEMP	(5) Pooled
Effort / Sum of Efforts	0.105**	0.124**	0.095*	0.083**	0.101**
	(0.026)	(0.042)	(0.049)	(0.038)	(0.017)
Majority Rule					0.027**
					(0.009)
Permanent Rights					-0.009
					(0.009)
Round	-0.003	-0.002	-0.003**	-0.001	-0.001**
	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)
Period (Trend)	0.001	0.001	0.002*	0.001	0.001**
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Constant	0.294**	0.287**	0.257**	0.282**	0.271**
	(0.015)	(0.016)	(0.027)	(0.025)	(0.014)
N	780	540	540	513	2373
χ^2	18.38	14.80	50.61	8.99	46.64

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. Accepted proposals only. * p < 0:05, ** p < 0:01, *** p < 0:001.

In short, we find little support for the SSPE bargaining outcomes. Equity concerns, in the form of proportionality relative to efforts, is a better descriptor of proposal and voting behavior.

C Tables and Figure for the Replication Experiment (Spanish sample)

Table C6: Number of Sessions, Matching Groups, and Sample Size in Spanish Sample

Treatment	Sessions	Matching Groups	Subjects	Average Payments
MAJ-PERM	2	6	54	21.7 EUR
UN-PERM	3	6	54	20.2 EUR
MAJ-TEMP	2	6	54	21.2 EUR
UN-TEMP	3	6	54	20.9 EUR

Table C7: Mean Effort in Spanish Sample

Treatment	Period 1-5	Period 6-10
MAJ-PERM	42.33	47.19
UN-PERM	34.04	28.26
MAJ-TEMP	37.34	37.84
UN-TEMP	29.96	24.89

Table C8: Regression Results for Effort Choice in Period 1, Spanish Sample

	(1)		(2)		(3)	
Constant	31.833***	(2.886)	20.840***	(4.904)	20.986***	(5.346)
UN-PERM	2.315	(4.082)	2.764	(4.024)	2.763	(4.033)
MAJ-TEMP	-0.389	(4.082)	0.441	(4.032)	0.462	(4.052)
UN-TEMP	-0.074	(4.082)	1.689	(4.071)	1.692	(4.081)
Risk			1.867**	(0.679)	1.862**	(0.684)
Female					-0.206	(2.950)
N	216		216		216	

Standard errors in parentheses. Treatment MAJ-PERM is the base level. * p < 0:05, ** p < 0:01, *** p < 0:001.

Table C9: Random Effects Model for the Determinants of Effort Provision in Spanish Sample

	Majority Rule			Unanimity Rule		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	33.414***	20.970***	17.893***	33.205***	20.958***	17.467***
	(2.563)	(4.662)	(3.556)	(3.383)	(4.631)	(5.288)
Permanent Rights	7.167	6.151	6.526*	3.720	1.977	2.082
	(3.755)	(3.453)	(3.289)	(4.580)	(4.159)	(4.194)
Period (Trend)	0.760*	0.760*	0.760*	-1.051***	-1.051***	-1.051***
	(0.355)	(0.355)	(0.355)	(0.265)	(0.265)	(0.265)
Risk		2.286***	2.379***		2.477***	2.584***
		(0.570)	(0.524)		(0.687)	(0.718)
Female			3.750			4.848*
			(3.846)			(1.982)
N	1080	1080	1080	1080	1080	1080
χ^2	22.72	33.41	68.72	19.68	29.35	47.42

Standard errors in parentheses clustered at the matching group level. Subject-level random effects. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

[1] *Risk* is a self-reported measure (non-incentivized) on a scale between 0 and 10 scale, where 0 represent unwillingness to take risks and 10 willingness to take risks.

Table C10: Bargaining Outcomes in Spanish Sample

	MAJ-PERM	**MAJ-TEMP**	**UN-PERM**	**UN-TEMP**
Overall division:				
Prediction	2-Way splits	2-way splits	3-way splits	3-way splits
2-way splits (%)	33.52	42.04	1.85	2.96
3-way splits (%)	63.70	54.63	97.96	97.04
Proposer's Share:				
Observed (% of Fund)	42.38	45.38	35.57	32.84
Voting Threshold:				
Observed (% of Fund)	33.13	33.23	29.47	31.41
Round of Approval:				
Prediction	Round 1	Round 1	Round 1	Round 1
Round 1	60.56	56.67	21.67	24.44
Round 2	20.00	22.78	20.00	17.78
Round 3+	19.44	20.56	58.33	57.78

Accepted proposals only, pooled for all periods of play. Predictions refer to the SSPE outcomes.

Table C11: Determinants of Proposers' Shares, Mixed Effects Regression in Spanish Sample

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) UN-PERM	(4) UN-TEMP	(5) Pooled
Effort / Sum of Efforts	0.266**	0.211**	0.349**	0.123*	0.236**
	(0.071)	(0.092)	(0.050)	(0.063)	(0.037)
Round	-0.003	-0.002	-0.004	-0.002	-0.003*
	(0.003)	(0.006)	(0.003)	(0.001)	(0.001)
Period (Trend)	0.006**	0.007**	-0.000	-0.002	0.003**
	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
Constant	0.294**	0.345**	0.239**	0.308**	0.262**
	(0.030)	(0.046)	(0.016)	(0.020)	(0.014)
Majority Rule					0.087**
					(0.011)
Permanent Rights					-0.014
					(0.010)
N	180	180	180	180	720
χ^2	34.31	7.87	76.48	9.05	260.35

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. Accepted proposals only. * $p < 0{:}05$, ** $p < 0{:}01$, *** $p < 0{:}001$.

Table C12: Determinants of Voting Thresholds, Mixed Effects Regression in Spanish Sample

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) UN-PERM	(4) UN-TEMP	(5) Pooled
Effort / Sum of Efforts	0.172***	0.113***	0.243***	0.093***	0.156***
	(0.044)	(0.026)	(0.042)	(0.026)	(0.020)
Round	-0.002	-0.001	-0.002***	-0.000	-0.001***
	(0.002)	(0.004)	(0.001)	(0.000)	(0.000)
Period (Trend)	0.002	0.003	0.001	0.001	0.002***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Majority Rule					0.038***
					(0.006)
Permanent Rights					-0.011*
					(0.006)
Constant	0.275***	0.297***	0.214***	0.274***	0.252***
	(0.019)	(0.011)	(0.016)	(0.015)	(0.010)
N	1320	1080	1080	1053	4533
χ^2	28.05	23.23	74.02	27.13	115.95

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. Accepted proposals only. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

D Pooled Analysis controlling for Sample

Table D13: OLS of Effort Provision in First Period of Play, Pooled Analysis with Sample Controls

	Coef.	Std. Err.
Constant	34.385***	(2.695)
UN-PERM	-1.551	(2.782)
MAJ-TEMP	-4.588	(4.040)
UN-TEMP	-1.977	(3.700)
Spain	-2.551	(2.861)
UN-PERM Spain	3.866	(5.312)
MAJ-TEMP Spain	4.199	(4.590)
UN-TEMP Spain	1.903	(4.676)
N	456	

* p < 0:05, ** p < 0:01, *** p < 0:001.

Table D14: Random Effects Model for the Determinants of Effort Provision, Pooled Analysis with Sample Controls

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) MAJORITY	(4) UN-PERM	(5) UN-TEMP	(6) UNANIMITY
Spain	3.517	3.284	0.339	2.872	1.560	-0.563
	(4.186)	(4.184)	(4.692)	(4.641)	(4.370)	(4.317)
Permanent Rights			1.150			-1.658
			(4.409)			(3.243)
Perm. Spain			6.017			5.379
			(5.731)			(5.530)
Period (Trend)	-0.291	-0.185	-0.248	-2.055***	-1.179***	-1.644***
	(0.494)	(0.286)	(0.311)	(0.292)	(0.307)	(0.246)
Period Spain	1.524**	0.472	1.007*	0.947	0.185	0.594
	(0.571)	(0.648)	(0.465)	(0.561)	(0.381)	(0.358)
Constant	34.466***	32.728***	33.076***	34.365***	31.333***	33.768***
	(3.549)	(3.702)	(3.971)	(2.963)	(2.776)	(2.773)
N	1320	1080	2400	1080	1053	2133
χ^2	39.67	1.44	40.47	71.67	34.58	77.57

Standard errors in parentheses clustered at the matching group level. Subject-level random effects.
* p < 0:05, ** p < 0:01, *** p < 0:001.

Table D15: Determinants of Proposers' Shares Pooled Analysis with Sample Controls

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) UN-PERM	(4) UN-TEMP
Spain	0.044***	0.071***	0.010	-0.001
	(0.011)	(0.016)	(0.008)	(0.006)
Effort / Sum of Efforts	0.222***	0.186***	0.256***	0.113***
	(0.032)	(0.054)	(0.048)	(0.040)
Round	-0.004*	-0.003	-0.003	-0.001
	(0.002)	(0.004)	(0.002)	(0.001)
Period (Trend)	0.003**	0.004**	0.000	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Constant	0.281***	0.300***	0.258***	0.306***
	(0.014)	(0.024)	(0.013)	(0.013)
N	440	360	360	351
χ^2	184.63	43.83	61.67	12.40

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. Accepted proposals only. * p < 0:05, ** p < 0:01, *** p < 0:001.

Table D16: Determinants of Voting Thresholds, Mixed Effects Regression Pooled Analysis with Sample Controls

	(1) MAJ-PERM	(2) MAJ-TEMP	(3) UN-PERM	(4) UN-TEMP
Spain	0.025	0.042***	0.020**	0.004
	(0.017)	(0.014)	(0.010)	(0.014)
Effort / Sum of Efforts	0.116**	0.161***	0.274***	0.142***
	(0.045)	(0.025)	(0.030)	(0.038)
Round	-0.007*	-0.004	-0.002***	-0.002***
	(0.003)	(0.003)	(0.001)	(0.001)
Period (Trend)	-0.001	0.002	-0.003*	-0.002
	(0.001)	(0.002)	(0.001)	(0.001)
Constant	0.315***	0.282***	0.238***	0.293***
	(0.022)	(0.015)	(0.016)	(0.024)
N	2157	1749	3918	4281
χ^2	54.03	85.83	88.65	66.25

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. Accepted proposals only. * p < 0:05, ** p < 0:01, *** p < 0:001.

Table D17: Random Effects Linear Probability Regression for Minimum Winning Coalitions, Pooled Analysis with Sample Controls

	(1) MAJ-PERM	(2) MAJ-TEMP
Spain	0.296***	0.022*
	(0.053)	(0.011)
Constant	0.072***	0.017**
	(0.024)	(0.006)
N	2157	3918
F-stat	31.14	3.96

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. Accepted proposals only. * $p < 0{:}05$, ** $p < 0{:}01$, *** $p < 0{:}001$.

E Supplementary Tables for the Analysis of the One-Round Bargaining Experiments

Table E18: Mean Effort in One-Round Bargaining Games

Treatment	Prediction	Period 1-5	Period 6-10
Colombia			
MAJ-1R	e =71	45.94	46.75
UN-1R	e =71	36.11	35.5
Spain			
MAJ-1R	e =71	42.00	44.76
UN-1R	e =71	31.09	26.74

Table E19: Random Effects Linear Regression of Efforts in One-Round Bargaining Games, by Voting Rule controlling for Sample

	(1) Majority One-Round		(2) Unanimity One-Round	
Spain	-2.965	(5.081)	-4.630	(4.691)
Period (trend)	0.321	(0.400)	-1.021***	(0.226)
Constant	44.580***	(2.957)	38.931***	(3.923)
N	1290		1140	
χ^2	0.822		23.865	

Standard errors in parentheses clustered at the matching group level. Random effects estimations at the subject level. * p < 0:05, ** p < 0:01, *** p < 0:001.

Table E20: Bargaining Outcomes in One-Round Games

	Colombia		**Spain**	
	MAJORITY	**UNANIMITY**	**MAJORITY**	**UNANIMITY**
Overall division:				
Prediction	1-way splits	1-way splits	1-way splits	1-way splits
2-way splits (%)	19.79	1.96	28.37	0
3-way splits (%)	79.17	98.04	71.63	100
Proposer's Share:				
Prediction (% of Fund)	100	100	100	100
Observed (% of Fund)	43.44	36.55	45.59	38.55
Voting Threshold:				
Prediction (% of Fund)	0	0	0	0
Observed (% of Fund)	26.13	23.53	25.75	23.41
Acceptance Rate				
(%)	76.80	51.00	78.33	51.67

Accepted proposals only, pooled for all periods of play. Predictions refer to the subgame perfect equilibrium outcomes assuming a purely selfish utility function.

F Supplementary Analysis of Efficiency

Table F21: Linear Regression for Total Efficiency

	Pooled Labs		All Games		Games 6-10	
	All Games	Games 6-10	Colombia	Spain	Colombia	Spain
Majority Rule	0.056***	0.031	0.045*	0.064**	0.016	0.041
	(0.018)	(0.020)	(0.023)	(0.026)	(0.026)	(0.027)
1-Round Bargaining	-0.099***	-0.064*	-0.153***	-0.043	-0.140**	0.017
	(0.035)	(0.037)	(0.050)	(0.047)	(0.058)	(0.036)
Maj. 1-Round	-0.013	-0.041	-0.010	-0.000	-0.012	-0.057
	(0.043)	(0.045)	(0.060)	(0.056)	(0.068)	(0.043)
Spain	-0.040**	-0.043**				
	(0.018)	(0.018)				
Constant	0.784***	0.810***	0.809***	0.719***	0.840***	0.738***
	(0.017)	(0.019)	(0.019)	(0.023)	(0.022)	(0.023)
N	2321	1156	1241	1080	616	540
F-statistic	11.763	8.655	12.506	3.723	8.397	1.310
R^2	0.087	0.061	0.144	0.037	0.129	0.010

Standard errors in parentheses clustered at the matching group level. * p < 0:05, ** p < 0:01, *** p < 0:001.

G Experimental Instructions for MAJ-PERM Treatment in English

Experiment Instructions

This is an experiment in the economics of decision making. The instructions are simple, and if you follow them carefully and make good decisions, you may earn a CONSIDERABLE AMOUNT OF MONEY which will be PAID TO YOU IN CASH at the end of the experiment. We follow a no-deception ethical policy in this laboratory. Hence, these instructions fully describe the experiment.

A Brief Overview of the Experiment

In this experiment you will be part of a group of 3 people that must decide how to split 320 tokens. You will each make proposals and one of them in your group will be randomly selected for voting. Prior to negotiating how to split the money, you will have the opportunity to bid in order to have your proposal selected for voting. Higher bids lead to higher chances of selection. The full details of the experiment follow.

The Details of the Experiment

As expressed above, this experiment involves three main tasks: **(1) Bidding, (2) Proposing and (3) Voting.** We proceed to fully explain each stage.

(1) Bidding

You will have 100 tokens in a private account and will choose to bid any amount you wish in order to have your proposal selected. The minimum bid is 10. The probability that your proposal is selected depends on your bid and the bids of the other members in your group. The following formula determines the probability that your proposal is selected:

$$Probability = \frac{My\ Bid}{Sum\ of\ Bids}$$

Let us explain the formula above with a metaphor. Suppose there are 100 balls in a box. Each subject in your group will be assigned a proportion of the balls depending on their bid relative to others' bids. One ball will be randomly selected by the computer, and if it has your ID, then your proposal will be chosen.

Example: Subjects 1 and 3 invest 20, and subject 2 invests 10. Then, the probabilities are

Probability for subject 1: $\frac{20}{50} \times 100 = 40\%$

Probability for subject 2: $\frac{10}{50} \times 100 = 20\%$

Probability for subject 3: $\frac{20}{50} \times 100 = 40\%$

(2) Proposal

Everyone will enter a distribution of the 450 tokens. The proposals will be selected randomly according to the probabilities determined by the bids.

(3) Voting

Prior to knowing which proposal was selected, you will enter your minimum acceptable share. If the share offered to you is greater than or equal to your stated minimum, then your vote will count in favor. If a majority votes in favor, that is 2 or more members, then the proposal is approved.

If approved: the result will be binding and your group will remain in standby while others finish their allocations. Next, you will be randomly matched into new groups of 3 and your ID number will also be randomly assigned for the new group.

If rejected: every member in your group will proceed to stage (2) in order to enter a new allocation. However, there is a 15% chance that negotiations are forcefully terminated, in which case the 320 tokens disappear and no more bargaining takes place. The computer will allow you to negotiate until approval, and once you do so, the computer will inform you if bargaining came to an end earlier or not. The two following situations may arise:

(1) If **bargaining ended** earlier, then everyone's share is 0 tokens (the 320 vanish).

(2) If **bargaining did not end**, you receive the share assigned to you in the accepted proposal.

Example: Suppose your group accepts in round 1. Then, you receive the approved share.

Example: Suppose your group rejects 5 proposals and accepts in round 6. The computer reveals to you that bargaining terminated in round 3. Then, your share is 0. If bargaining had not been terminated, you would have received the approved share.

Your Earnings

In total, you will participate in 10 matches with groups randomly composed in each of them. One of the 10 matches will be randomly chosen for payment by the computer and will be revealed to you at the end of the experiment.

Your earnings (E) are then given by

$$E = \underbrace{(100 - Bid)}_{How\ much\ you\ did\ not\ bid} + Assigned\ Share$$

Notice that if bargaining is terminated prior to the round in which your group approved the allocation, then the assigned share is equal to 0 and your earnings would be

$$E = \underbrace{(100 - Bid)}_{How\ much\ you\ did\ not\ bid}$$

The conversion rate between tokens and euros is 10 Tokens = 1 euro. Hence, your final payment is given by:

$$Payment = Show\ Up\ Fee + E/10$$

Are there any questions so far? Please raise your hand.

Summary of the Experiment

1. Everyone is randomly assigned into groups of 3
2. Out of your 100 tokens endowment, you will decide how much to bid. The minimum bid is 10.
3. Your probability of proposing depends on how much you bid relative to others.
4. Each one of you will submit a proposal for the division of 320 tokens.
5. One of the proposals will be chosen for voting according to the probabilities determined by the bids.
6. If a majority accepts, the allocation is binding, and you will wait in standby until the other groups decide on an allocation.
7. If a majority rejects, everyone in the group will be called to submit a new proposal, and the process repeats itself until a given allocation is accepted. After each rejection, there is a 15% chance that bargaining is terminated and the fund vanishes. However, you will be allowed to negotiate until reaching an agreement and will only learn if bargaining terminated earlier upon reaching an agreement.
8. In each match you will be randomly paired with new members. Each match you will receive 100 token for bidding.
9. 1 of the 10 matches of play will be chosen randomly for payment. The selected match is the same for everyone.
10. Each token is equivalent to 0.1 Euros.

What should you do? If we knew the answer to this question, we would not need to run an experiment.

H Experimental Instructions for MAJ-PERM Treatment in Spanish

Instrucciones

En este experimento usted deberá tomar una serie decisiones. Las instrucciones son sencillas, y en caso de seguirlas cuidadosamente y tomar buenas decisiones, usted podrá recibir un pago sustancial. Este le será entregado en efectivo al finalizar el experimento. En este laboratorio seguimos una regla ética de completa transparencia, por lo cual nuestras instrucciones son veraces y describen el experimento tal cual es.

Resumen

Usted formará parte de un grupo de 3 personas que deben decidir cómo dividir 320 fichas. Cada uno en el grupo propondrá una división de las fichas y una de las propuestas será seleccionada aleatoriamente para someterse a votación. Antes de proponer, cada miembro tendrá la oportunidad de incrementar la probabilidad de selección de su propuesta mediante un pago el cual llamaremos apuesta. Cuanto más grande sea su apuesta en comparación con las apuestas de los demás de miembros del grupo, mayor será su probabilidad de selección. A continuación, le presentamos los detalles.

Detalles del Experimento

Tal y como se explicó anteriormente, el experimento cosiste de tres partes: **(1) Apuesta (2) Propuesta** y **(3) Votación**

(1) Apuesta

Usted tendrá 100 fichas en una cuenta privada y deberá escoger cuantas fichas apostar para que su propuesta sea seleccionada. La apuesta mínima son 10 fichas. La probabilidad de selección de su propuesta dependerá de su apuesta y las de los demás integrantes del grupo con base en la siguiente fórmula:

$$Probabilidad = \frac{Mi\ Apuesta}{Suma\ de\ las\ Apuestas}$$

A continuación, le explicamos de forma metafórica cómo funciona el proceso de selección de propuestas. Suponga que hay 100 bolas en una urna. Cada persona en su grupo recibirá cierta proporción de las bolas en la urna dependiendo de su apuesta y las de los demás. Aleatoriamente se seleccionará una bola de la urna, si tiene su nombre, entonces su propuesta sería seleccionada.

Ejemplo: Los sujetos 1 y 3 apuestan 20 y el sujeto 2 apuesta 10. Entonces, las probabilidades de selección son:

Probabilidad Sujeto 1: $\frac{20}{50} \times 100 = 40\%$

Probabilidad Sujeto 2: $\frac{10}{50} \times 100 = 20\%$

Probabilidad Sujeto 3: $\frac{20}{50} \times 100 = 40\%$

(2) Propuestas

Cada miembro del grupo deberá proponer una forma de distribuir las 320 fichas. La probabilidad de selección de su propuesta se determina con base en las apuestas como ya hemos explicado.

(3) Votación

Antes de conocer cual propuesta fue seleccionada, usted deberá someter el monto mínimo que está dispuesto a aceptar. En caso de que la propuesta seleccionada incluya un monto equivalente o superior al que usted está dispuesto a aceptar, su voto contará a favor. Para que se apruebe la propuesta se requiere una mayoría simple a favor, es decir, 2 o más votos.

En caso de aprobación: las negociaciones terminan y usted estará en espera de que los otros grupos terminen sus negociaciones. Seguidamente, se formarán grupos nuevos de forma aleatoria con tres sujetos cada uno y su número de sujeto también será asignado de forma aleatoria.

En caso de rechazo: todo en el grupo procederán nuevamente a la fase (2) para someter sus propuestas. Sin embargo, las negociaciones se darán por concluidas prematuramente con un 15% de probabilidad, en cuyo caso las 320 fichas desaparecen y no habrá más negociaciones. El software dejará que el grupo negocie hasta que haya una propuesta aprobada. Seguidamente, la pantalla le indicará si las negociaciones se habían dado por concluidas en una ronda anterior o no. Pueden darse las siguientes dos situaciones:

1. En caso de que ya se hubieran concluido las negociaciones prematuramente, cada persona recibe 0 (las 320 fichas desaparecen).
2. En caso de no haberse dado por concluidas las negociaciones prematuramente, usted recibe el monto asignado en la propuesta que fue aceptada.

Ejemplo. El grupo llega a un acuerdo en la ronda 1. Cada quien recibe el monto asignado.

Ejemplo. Suponga que el grupo rechaza 5 propuestas y acepta la propuesta en la ronda 6. La computadora le indica que las negociaciones se dieron por concluidas en la ronda 3.

En dado caso, todos reciben 0. Si las negociaciones no se hubieran dado por concluidas, cada quien recibiría el monto asignado en la ronda 6.

Determinación de su Pago

Usted participará en **10 procesos** de apuesta y negociación. En cada uno de ellos, la composición del grupo será aleatoria y al inicio de cada proceso usted cuenta con 100 fichas para apostar. Solamente uno de los 10 procesos será seleccionado al azar para realizar el pago correspondiente. Al final del experimento usted sabrá cual proceso fue seleccionado.

Sus ganancias serán calculadas de la siguiente manera:

$$Ganancia = \underbrace{(100 - Apuesta)}_{Fichas\ que\ usted\ retuvo} + Monto\ Asignado$$

Recuerde que en caso de darse por concluidas las negociaciones antes de llegar a un acuerdo, el monto a recibir es 0 y sus ganancias serían:

$$Ganancia = \underbrace{(100 - Apuesta)}_{Fichas\ que\ usted\ retuvo}$$

La tasa de cambio entre fichas y pesos colombianos es de 1 ficha igual a 0.10 Euros. Por lo tanto, el pago final que usted recibirá incluyendo el pago fijo es de:

$$Pago\ final\ (Euros) = 5\ + Ganancia \times 0.10$$

¿Tiene alguna pregunta? Por favor, levante su mano.

Resumen del Experimento

1. Todos los participantes serán asignados al azar en grupos de 3
2. Usted deberá decidir cuantas fichas apostar de las 100 que le han sido asignadas. La apuesta mínima es de 10 fichas.
3. La probabilidad de que su propuesta sea seleccionada depende de su apuesta en relación con la de los demás.
4. Cada miembro debe hacer una propuesta de cómo dividir las 320 fichas.

5. Sólo una será seleccionada al azar de acuerdo a las probabilidades que fueron determinadas por las apuestas.
6. En caso de recibir mayoría de votos la propuesta seleccionada, las negociaciones terminan.
7. En caso de no contar con la mayoría de votos, todos en el grupo hacen una nueva propuesta y el proceso se repite hasta que lleguen a un acuerdo. Tras cada propuesta rechazada, existe un 15% de probabilidad de darse por concluidas prematuramente las negociaciones y que se pierdan las 320 fichas. Sin embargo, el grupo debe negociar hasta llegar a un acuerdo, momento en el cual el computador les revelará si las negociaciones ya habían terminado.
8. En cada proceso de apuesta y negociaciones, usted será asignado a un grupo de tres integrantes al azar y tendrá nuevamente 100 fichas a su disposición para apostar.
9. Uno de los 10 procesos será escogido por el computador para determinar su pago.
10. Cada ficha equivale a 0.10 Euros.

¿Qué debo hacer? ¿Qué decisiones debo tomar? Si supiéramos las respuestas a estas preguntas, no tendríamos motivo para conducir este experimento.