TWO-PERSON BARGAINING MECHANISMS:

A LABORATORY EXPERIMENT

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Abstract

We conduct a series of experiments in which two subjects bargain over five options. Following an experimental design closely related to De Clippel et al. (*Am. Econ. Rev.*, 2014), we evaluate the performance of three bargaining mechanisms: (α) one subject shortlists a bloc of three options before the other chooses one among them, (β) both subjects veto options simultaneously and in a bloc, and (γ) both subjects veto options simultaneously and gradually one after the other. We document that the non-symmetric shortlisting mechanism (α) is highly efficient but our data also suggest the existence of a first-mover advantage. The simultaneous mechanism (β) is less efficient than (α) and generates a high level of ex-post inequality. The gradual veto mechanism (γ) is no less efficient than (α), but has the important advantage of shutting down the possibility of any first-mover advantage.

JEL Codes: C78; D7.

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1 Introduction

Situations in which two parties negotiate over a set of options abound. Project evaluations, committee decisions, and the selection of arbitrators are few instances of the large variety of situations of bargaining between two parties. In legal settings, the standard bargaining situation involves two parties with (partially) opposing preferences.

The early literature on two-person bargaining has taken an axiomatic perspective. In most of these contributions, the "disagreement point" plays the important role of an exogenous threat (Zeuthen [1930]; Nash [1950, 1953]; Harsanyi [1956]), and even determines the distribution of a surplus. The same is true for the game-theoretical approach later initiated by Rubinstein [1982]. Further, the importance of the exogenous threat culminates in the prominent experimental approach of two-person bargaining, i.e., the ultimatum game (Harsanyi [1961] and Güth et al. [1982]).

The recent literature let aside the question of participation and concentrates on the comparative properties of conflict resolution mechanisms used in practice.[1] One of the objectives is to design bargaining rules or mechanisms that maximize some welfare criteria. The theoretical results of Hurwicz and Schmeidler [1978] and Maskin [1999] on two-person bargaining indicate that an ideal mechanism certainly does not exist, making comparative and empirical investigations essential. Note that in reality institutions often impose structure on negotiations. For instance, in the US legal system, attorneys can reject some of the potential jurors of the jury trial through a variety of mechanisms. A debate emerged in the legal doctrine on the impact of these procedures on the jury composition (Bermant and Shapard [1981]; Flanagan [2015]; Van der Linden [2018]). The methods used for the selection of arbitrators and their consequences at the individual and aggregate level have also been considered in the economics' literature (see Bloom and Cavanagh [1986]). In such a setting, De Clippel et al. [2014] design a mechanism that works in two steps[2], and that we call the non-symmetric shortlisting mechanism.

- **Non-symmetric shortlisting mechanism:** In the first step, a subject vetoes n of the $2n+1$

[1] Note that we are implicitly referring to the literature on structured bargaining, where bargaining occurs following some predetermined steps (see Camerer et al. [2019] for the distinction between structured and unstructured bargaining). Yet, there is also an experimental literature on unstructured free-form bargaining. For instance, Galeotti et al. [2019] focuses on efficiency and equity. They observe that many bargaining outcomes are Pareto efficient and document the existence of a compromise effect, i.e., that subjects tend to select equal-earnings outcomes.

[2] De Clippel et al. [2014] designed their mechanism in order to minimize the number of rounds.

options. In the second step, her opponent vetoes n out of the $n+1$ remaining options. The outcome is the only option that remains.

By definition, this mechanism, denoted α henceforth, is non-symmetric between the two subjects. The symmetry requirement, violated here, is an important concern in the bargaining literature. Symmetry (or "anonymity") seems natural for defining a legally binding protocol, and one can also argue that the absence of symmetry makes the model incomplete: if symmetry is broken it must have been broken in one way or the other (for instance randomly) and the way it is broken should be part of the model. However, De Clippel et al. [2014] convincingly argue that the Non-symmetric shortlisting mechanism is well-understood in the lab (this finding was later confirmed by Camerer et al. [2016]), and an empirical evaluation of it should concentrate on what results are produced by a mechanism.

We contribute to this empirical evaluation of two-player bargaining mechanisms by adopting an experimental design very close to the one in De Clippel et al. [2014], where players are matched by pairs and know each other's preferences. They need to select an option following the rules of a mechanism. We consider three mechanisms: the previously mentioned non-symmetric shortlisting mechanism and two symmetric variants: the simultaneous veto mechanism of Laslier et al. [2021] (denoted β) and an original gradual vetoes mechanism (denoted γ).

- **Simultaneous veto mechanism:** simultaneously, each subject vetoes n options out of the $2n+1$ available ones and the outcome is a uniform lottery over non-vetoed options.

- **Gradual vetoes mechanism:** at each step and simultaneously, each subject vetoes one option. This procedure goes on until either one or no option is left. If one option is left, this option is the outcome. If no option is left, precisely two options were removed at the previous step, and the outcome, in this case, is a lottery over these two.

We compare these mechanisms in a series of profiles that exhibit different degrees of disagreement over five options. The profiles are labeled A0, A2, A3, and A5. A0 exhibits full disagreement, i.e., subjects' preferences over options are fully opposed, whereas A5 depicts full agreement, i.e., subjects' preferences over the options are identical. Profiles A2 and A3 are intermediate, i.e., subjects agree on their worst options but have opposed preferences over their most preferred ones. In A2 the subjects agree on their worst two options and in A3 they agree on their worst three options.

We experimentally evaluate whether the three mechanisms induce high levels of ex-post satisfaction, measured over five dimensions. We first consider standard measures of aggregate welfare: (i) the (utilitarian) efficiency of the outcome and (ii) the inequality that it generates. We also explore the propensity of each mechanism to select (iii) Pareto efficient options and (iv) consensual ones.

Our results show that the non-symmetric shortlisting and gradual vetoes mechanisms outperform the simultaneous one regarding measures (i) and (ii). Moreover, the level of inequality generated by the gradual vetoes mechanism is lower than or equal to the one generated by the non-symmetric shortlisting mechanism depending on the profile. We also document the existence of a first-mover advantage in the non-symmetric mechanism, both in De Clippel et al. [2014]'s data and in our own. Indeed, the order of play matters in this mechanism. To understand this, one can think of the non-symmetric shortlisting mechanism as a generalized version of the ultimatum game where the first-mover makes an offer and the second subject chooses the offer (without an exogenous outside option in our setting). It is well-documented that the first-mover obtains a larger payoff than the second mover. The same occurs in our setting.

In our two-person setting, an option is Pareto-efficient when there is no other option preferred by both subjects. As our data show, the three mechanisms under consideration achieve high levels of Pareto-efficiency, with some differences depending on the preference profile.

As to measuring the level of consensus (iv), we define a Fallback bargaining option (or simply FB) as one that gives the highest possible level of utility to the worse-off subject. For instance, if some option a is unanimously preferred, a is the only FB option. If, by contrast, a and b are the top two options of each subject but neither is unanimously preferred, both a and b qualify as FB. Note that a FB option is necessarily Pareto-efficient but the contrary need not be the case. Regarding the frequency of FB options, both the non-symmetric shortlisting and gradual vetoes mechanisms outperform the simultaneous veto one.

As a final remark, one should note that by definition the simultaneous veto mechanism works in one step only and the non-symmetric shortlisting one in two steps. In our five alternative profiles, the gradual veto mechanism required between 2 and 3 steps on average.[3] With more options, the distinction between the gradual mechanism and the others would probably be stronger.

[3] It takes at least two rounds to reach an option. In our data, 63% of all games finish after two rounds, 96% finish after a third round, and 100% finish after a fourth round.

The rest of the paper is organized as follows. After briefly reviewing the literature, we lay down the model and the mechanisms. We then analyze the aggregate experimental results under the different mechanisms, and we end by considering individual behavior in the lab.

2 Review of the literature

The literature on mechanism design is concerned with the design of procedures that achieve efficient outcomes while giving guarantees players are treated fairly, i.e., the functioning of the bargaining does not harm some players more than others. Yet, the literature on implementation theory underlines that such design is far from trivial. As shown by both Hurwicz and Schmeidler [1978] and Maskin [1999], one cannot design simultaneous deterministic mechanisms that deliver exclusively Pareto optimal options at any Nash equilibrium when preferences are unrestricted.[4] To circumvent such difficulty, the literature proposes to focus on dynamic games that involve several stages or steps or on mechanisms involving lotteries, i.e. those allowing randomization. In both instances, the implementation becomes more permissive, which means that Pareto-efficient outcomes then exist in equilibrium. The key that brings together the previously mentioned mechanisms is the idea of vetoes. Anbarci [2006] considers the "VAOV" mechanism where players offer an option to the opponent that needs to validate the veto. Yet, this protocol involves many stages and subgame perfection becomes a bad predictor of actual experimental behavior. De Clippel et al. [2014] propose a two-stage game where the first subject vetoes half of the options and the second one vetoes all but one of the remaining ones. Barberà and Coelho [2020] design sequential games that selects one of the FB options. Finally, Laslier et al. [2021] design simultaneous mechanisms where each player vetoes a list of options, and the outcome is randomly picked among the non-vetoed options.

[4]The impossibility result can also be stated as "No Pareto efficient social choice rule is Nash implementable when the domain of preferences is unrestricted". Dutta and Sen [1991] and Moore and Repullo [1990] independently characterize the set of social choice rules that can be Nash implemented with two players and show that suitable domain restrictions (especially in the Euclidean space) can overcome this powerful negative result. In this sense, our contribution also speaks to the literature on partial honesty (see Dutta and Sen [2012]) and the one on King Solomon's dilemma (see Perry and Reny [1999]).

3 Theoretical setting

Two players, denoted by $i = 1, 2$, bargain over A, the finite set of options. For each player i, we let $\succ_i$ denote her ordinal preferences over the options and $\succ = (\succ_1, \succ_2)$ be the ordinal preference profile. Since we focus on legal settings, where both parties are given detailed information over the potential options, it makes sense to assume that $\succ$ is common knowledge. For each option x and each player i, $l(x, \succ_i) = \#\{a \in A \mid x \succ_i a\}$ denotes the number of options less preferred than x for player i. Observe that $l(x, \succ_i)$ measures in an ordinal manner how satisfied player i when option x is implemented: the larger $l(x, \succ_i)$, the higher is x in the preferences of player i.

We focus on the notion of fair compromise between two players. A natural first step in this direction is Pareto optimality. If an option is not Pareto optimal (that is less preferred than some other option by both players), it is usual to disregard it as unappealing. The set $\textsc{po}(\succ) = \{x \in A \mid \nexists y \text{ s.t. } y \succ_i x \text{ for } i = 1, 2\}$ consists of the Pareto optimal options.

Remark that Pareto optimality does not suffice in this setting to single out a fair compromise since, for instance, with fully opposed preferences (that is when they disagree on how to rank every pair of options), all options are Pareto optimal. We follow the literature in this regard and consider Fallback bargaining[5] as an appealing notion of compromise. To describe this notion, assume that for every preference profile, each player (sincerely) assigns each option x a score equal to $l(x, \succ_i)$ the number of elements less preferred than x. Fallback selects the options whose minimal total score is the highest. The set of Fallback bargaining options is defined by $\textsc{fb}(\succ) = \arg\max_{x \in A} \min_{i=1,2} l(\succ_i, x)$. Any Fallback bargaining option is Pareto optimal under the assumption that no player is indifferent between two options. Moreover, any profile admits one Fallback bargaining option while there might two of them for some preference profiles.

While we defined Fallback without interpersonal comparability of preferences, in our experiments, we reward subjects with monetary payoffs (hence interpersonal comparability might be an issue). To get rid of this potential problem, we design the monetary payoffs to be linear in the ranking (see Table 1) so that a subject always receives €20 for her best alternative, €15 for her second best, etc.. We assume that if player i gets a monetary payoff

[5]The idea of Fallback bargaining (Brams and Kilgour [2001], De Clippel and Eliaz [2012]) is also present in the literature under different names: for instance, the Rawlsian arbitration rule in Sprumont [1993], the Kant-Rawls social compromise in Hurwicz and Sertel [1999], the Unanimity Compromise in Kıbrıs and Sertel [2007] and the Maximin rule (Congar and Merlin [2012]).

$u_i(a)$ associated to option $a \in A$, her utility equals $u_i(a)$; that is her utility equals the monetary payoff she obtains. We consider that $u_i(a) > u_i(b) \iff a \succ_i b$ and let $u = (u_1, u_2)$ denote the utility profile.

Moreover, the difference between the ordinal preferences and the monetary payoffs should not be a strong issue since, as explained in the sequel, our mechanisms are ordinal in nature so that the *equilibrium outcome* simply depends on the ordinal preferences over the options.[6]

4 Mechanisms

As discussed in the introduction, we study three different mechanisms using vetoes: the non-symmetric shortlisting (α), simultaneous (β), and gradual vetoes (γ) mechanisms. For the sake of simplicity, we assume that there is an odd number of options, i.e. $\#A = 2k+1$, but the different mechanisms can be adapted when there is an even number.

4.1 Non-symmetric shortlisting mechanism

We let $\mathcal{A}^k$ denote the set of subsets of A consisting of exactly k options. The non-symmetric shortlisting mechanism $\alpha : \mathcal{A}^k \times \mathcal{A}^k \to A$ requires that the first-mover, denoted player i, announces a list ℓ_i of k vetoed options and then the second mover, player j with $j \neq i$, announces a list ℓ_j of k vetoed options among the non-vetoed ones. The outcome $\alpha(\ell_1, \ell_2) = A \setminus (\ell_1 \cup \ell_2)$ is the unique option that remains non-vetoed after the players' vetoes. As shown by De Clippel et al. [2014], for each preference profile $\succ$, this mechanism admits a unique subgame perfect equilibrium outcome.

The following strategies always constitute an equilibrium:

- ℓ_1: Player 1 vetoes her worst k options in the top $k+1$ options of player 2,

- ℓ_2: Player 2 vetoes her worst k options in $A \setminus \ell_1$.

The equilibrium outcome (unique for all equilibria), which we denote $o_{1,2}(\succ)$, is the option selected at equilibrium when 1 moves first and 2 moves second:

$$o_{1,2}(\succ) = \max_{\succ_1} \overbrace{\underbrace{\{a \in A \mid l(a, \succ_2) \geq k\}}_{\text{Not among the worst } k \text{ for Player 2}}}^{\text{Best option for Player 1}}. \tag{1}$$

[6]This applies to the mechanism α (which is deterministic) but also to mechanisms β and γ where lotteries are involved as long as players' preferences over lotteries satisfy stochastic dominance.

In other words, $o_{1,2}(\succ)$ represents the most preferred option of Player 1 over the $k+1$ most preferred ones of Player 2. To see the logic behind (1), observe that the outcome is never among the worst k options of either Player since both have k veto rights. Still, Player 1 has an advantage: she vetoes first so that she can induce her best option among the best $k+1$ options of Player 2 (i.e. not the worst k options of Player 2). Similarly, when Player 2 moves first, the outcome equals $o_{2,1}(\succ)$, the most preferred option of Player 2 over the $k+1$ most preferred ones of Player 1.[7] For some preference profile $\succ$, neither $o_{1,2}(\succ)$ nor $o_{2,1}(\succ)$ are FB options.

The following examples (later used in the experiment in the profiles A2 and A3) illustrate the advantage that Player 1 enjoys in this mechanism assuming that both players play strategically.[8]

Preferences are such that $a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$ and $c \succ_2 b \succ_2 a \succ_1 d \succ_1 e$. This means that both players agree over their worst two options (d and e) but disagree over their top three (a, b and c). If Player 1 vetoes b and c, the only rational choice for Player 2 is to veto d and e, which leads to a as a final choice so that Player 1 is more satisfied than Player 2 (i.e. $l(\succ_1, a) = 4 > l(\succ_2, a) = 2$) whereas we the contrary will arise if Player 2 moves first. If one considers preferences $a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$ and $b \succ_2 a \succ_2 c \succ_1 d \succ_1 e$, a similar phenomenon arises. Being rational leads Player 1 to veto b and c, then Player 2 to veto d and e so that a is the final outcome. Player 1 is again more satisfied than Player 2 (i.e. $l(\succ'_1, a) = 4 > l(\succ'_2, a) = 3$).

4.2 Simultaneous mechanism

The simultaneous mechanism $\beta : \mathcal{A}^k \times \mathcal{A}^k \to \Delta$ requires that, simultaneously, each player i announces a list ℓ_i of k vetoed options. It follows that any option in the union of ℓ_1 and ℓ_2 is vetoed. The outcome $\beta(\ell_1, \ell_2) = \text{uni}(A \setminus (\ell_1 \cup \ell_2))$ is a uniform lottery over the non-vetoed options.[9] When the two players veto disjoint sets of options (i.e. $\ell_1 \cup \ell_2 = \emptyset$), the mechanism selects the option x which is the unique non-vetoed one (i.e. $x = A \setminus (\ell_1 \cup \ell_2)$).

Under mild assumptions concerning the extension of preferences to lotteries, this game

[7] If one randomizes the identity of the first-mover, the set of subgame-perfect equilibria outcomes for each preference profile $\succ$ equals $o_{1,2}(\succ) \cup o_{2,1}(\succ)$. This guarantees ex-ante fairness but no ex-post fairness. In this paper, we focus on ex-post fairness.

[8] We would like to thank an anonymous referee for suggesting this example.

[9] For any set $X \subseteq A$, uni(X) is the uniform lottery over elements in X. A uniform lottery is defined as follows: for each $X \subseteq A$, uni(X) is the lottery such that $\text{uni}(X)_i = \frac{1}{\#X}$ if $i \in X$ and $\text{uni}(X)_i = 0$ if $i \notin X$.

admits a pure-strategy equilibrium for each preference profile $\succ$.[10] The game in general admits several equilibria, but at each equilibrium, a unique option is selected and this option is Pareto efficient. The set of pure-equilibrium outcomes coincides with the set $\textsc{pv}(\succ)$, the Pareto-and-veto rule whose definition is as follows:

$$\textsc{pv}(\succ) = \underbrace{\textsc{po}(\succ)}_{\text{Pareto optimal options}} \cap \underbrace{\{a \in A \mid l(a, \succ_1) \geq k\}}_{\text{Not among the worst } k \text{ for Player 1}} \cap \underbrace{\{a \in A \mid l(a, \succ_2) \geq k\}}_{\text{Not among the worst } k \text{ for Player 2}} . \quad (2)$$

In other words, the simultaneous mechanism selects the Pareto efficient options that are not among the k least preferred options of any of the players. For each $x \in \textsc{pv}(\succ)$, any pair (ℓ_1, ℓ_2) with the following properties constitutes an equilibrium selecting x:

- ℓ_1 vetoes k options less preferred than x for 1,
- ℓ_2 vetoes k options less preferred than x for 2 and
- $\ell_1 \cap \ell_2 = \emptyset$.

It can be shown that any FB option is an equilibrium outcome, so that for each $\succ$, $\textsc{fb}(\succ) \subseteq \textsc{pv}(\succ)$. The reason for this is that any FB option is Pareto efficient. To see why it is never among the worst k options for each player, it suffices to note that for each preference profile, there is some option that is ranked among the top $k+1$ options or better by both players (see Brams and Kilgour [2001] for a precise analysis of the "depth" of the FB options, that is the minimal ranking that players associate FB options with).

4.3 Gradual vetoes mechanism

In the gradual vetoes mechanism, players simultaneously veto options until one or none is left. This takes several steps. More precisely, at each step, both players (simultaneously) veto an option. If exactly one option remains, this option is the outcome. If all options have been vetoed, this means that exactly two options were non-vetoed at the previous stage and that both were vetoed, the outcome is a random draw over these two options. This process is repeated until an outcome emerges.

For the sake of precision, we introduce its formal definition. For each player i and each step t, we denote by v_i^t the option vetoed by player i at step t and by $v^t = \{v_1^t, v_2^t\}$ the set of vetoed options at stage t. The set A^t contains the non-vetoed options at the beginning of step t. It is defined in a recursive manner: letting $A^1 = A$, we have $A^t = A^{t-1} \setminus v^{t-1}$ for each $t \geq 2$.

[10] See Laslier et al. [2021] for a precise analysis; stochastic dominance suffices to prove this claim.

The rules of the mechanism are as follows:

· At any step t :

a. If $\#A^t \geq 2$, then each player $i = 1, 2$ announces v_i^t in A^t.

b. If $A^t = \{x\}$, x is the outcome.

c. If $A^t = \emptyset$, then $A^{t-1} = v^{t-1} = \{x, y\}$ for some $x, y \in A$ with $x \neq y$. The outcome is uni(x, y), a uniform lottery over the two vetoed options in stage $t-1$.

Observe that the number of steps is endogenous; in our experimental setting with 5 options, it can vary from 3 (when the players veto disjoint options in steps 1 and 2) to 5 steps (where both players veto the same option in steps 1 to 4). While the set of subgame-perfect equilibria outcomes is large, it can be shown that it never contains an element among the worst two elements of a player. Moreover, the next remark and proposition underline two properties of the subgame perfect equilibrium outcomes.

Remark: The gradual vetoes mechanism may lead to Pareto-dominated options in a subgame perfect equilibrium.

To see why, consider the following preference profile $\succ = (\succ_1, \succ_2)$ with $a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$ and $a \succ_2 b \succ_2 c \succ_2 d \succ_2 e$. The unique FB option is a. Consider the following strategy profile:

1. Step 1: Voter i vetoes a
2. For any $t \geq 1$ step t: Voter i vetoes her least preferred option in A^t

This strategy profile leads to b. Given that the opponent vetoes a in the first step, the best possible outcome that a player can reach is b. It is hence a subgame perfect equilibrium. Yet, this equilibrium requires that both players veto their most preferred option, a highly unlikely situation in an experimental setting.

Imposing this behavioral restriction leads us to prove our formal result on the gradual vetoes mechanism (see appendix A for a proof).

Proposition 1. *In the profiles used in the experiment, any subgame perfect equilibrium of the gradual vetoes mechanism selects a* FB *option and, for any* FB *option, there is an equilibrium that implements it.*

5 Experimental design

We conducted experiments between June 2019 and October 2020 in the PSE and CREST experimental labs.[11] In each session, 20 subjects play 40 games. In each game, each subject is paired with another one. Their monetary payoffs are common knowledge and no communication (via chat, in person, or cellphones) was allowed. They play together, then see the result of their game on their screen, i.e the option selected, and start again in the next game. At the end of the 40 games, the computer selects 10 games randomly, and the subjects receive the sum of their gains in these games. The experiment was computerized using zTree (Fischbacher [2007]).[12]

In our experimental sessions, we tested the mechanisms described above: the *non-symmetric shortlisting mechanism*, the *simultaneous mechanism*, and the *gradual vetoes mechanism*. For the sake of simplicity, each session was based on a single mechanism. It is thus a between-subject design. We feared that confronting subjects with multiple mechanisms would confuse them. For each mechanism, we ran three sessions. Given that there are 20 subjects (and so 10 pairs of subjects) and 40 games, there are 400 games per session. A priori, we should thus have 1,200 observations for each mechanism. Yet, for one session in the simultaneous mechanism and another one in the non-symmetric shortlisting mechanism, there were only 16 subjects and thus eight pairs. The data points for these mechanisms are then 1,120 each. Likewise, there were only 18 subjects and 9 pairs in the three sessions with the gradual vetoes mechanism, so there are 1,080 data points for this last mechanism.

In each game, the subjects need to select an option among five available options. In the non-symmetric shortlisting mechanism, one subject in each pair is the first-mover. This first-mover selects three out of five options. The second mover then selects one option in this shortlist. In the simultaneous mechanism, both subjects select at the same time three out of five options. If there is only one option in common, this option is selected. If there are several, the computer breaks the tie by randomly selecting one option among the tied ones. In the gradual vetoes mechanism, the subjects simultaneously remove one option. Then, after observing the remaining options, each of them removes again one option simultaneously. These "rounds of elimination" are organized until only one option remains. In case the two

[11] To avoid any lab effect, we reproduce the entire analysis in restricting the sample to data coming from the lab in which we covered all: CREST. The results are remarkably similar, see appendix E.

[12] The full instructions as presented to subjects at the beginning of the experiment are in the supplementary material. After reading instructions and before starting the experiment, we let subjects answer a quiz about the rules to facilitate their understanding. The quiz questions are also available in the supplementary material.

last options are removed at the same time, the computer breaks the tie randomly in selecting one of the two tied options.

To give the possibility to subjects to coordinate and learn, we let them play several games together before reshuffling the pairs. In particular, we organized five repetitions of the same game with the same two subjects. Then, the pairs were randomly reshuffled and there are five more repetitions of the same game. After this, the preference profile changed, and it started again with 2 x 5 repetitions.

The experiment was run over four different preference profiles, chosen in order to exhibit an increasing degree of agreement among the voters. For the sake of clarity, we denote them as follows:

A0: The preferences of subjects are exactly opposed, the level of agreement is 0.
A2: Subjects agree on the two worst options (d, e) and have opposed preferences on the others
A3: Subjects agree on the three worst options (c, d, e) and have opposed preferences on the others
A5: Subjects fully agree about all five options.

Table 1 presents the four preference profiles which we consider in the experiment. We indicate with a "*" the options that are Pareto-efficient (for instance, all the options are Pareto-efficient in A0). Moreover, we write in bold the FB options. For instance, c is the unique FB option in A0 whereas a and b are both FB in A3.

The monetary payoff associated with an option depends on its rank in the subject's preference. As shown in Table 1, the option ranked first gives the subject a payoff of € 20 whereas the option ranked fourth is associated with € 5. The order in which the subjects play with these preference profiles varies by session, but is identical for all three mechanisms. In all of them, we start with profile A0 (full disagreement). Since this profile is straightforward in terms of theoretical predictions, we see it as a way for subjects to familiarize themselves with the experimental design. Then, the order is A2, A3, A5 in a session, A3, A5, A2 in another one, and finally A5, A2, A3.

For the sake of clarity, Table 2 shows, for each profile, the different theoretical predictions for the non-symmetric shortlisting mechanism (denoted $O_{1,2}$ and $O_{2,1}$), for the simultaneous mechanism (the prediction is PV, see section 4.2.) and for the gradual vetoes one (the predicition is FB, see 4.3). The last row of Table 2 shows the utility associated with the option that maximizes efficiency (that is the sum of payoffs).

Table 1: Preference profiles and monetary payoffs.

A0		**A2**		**A3**		**A5**		**Monetary payoff**
1	2	1	2	1	2	1	2	
a^*	e^*	a^*	c^*	$\boldsymbol{a}^*$	$\boldsymbol{b}^*$	$\boldsymbol{a}^*$	$\boldsymbol{a}^*$	**€20**
b^*	d^*	$\boldsymbol{b}^*$	$\boldsymbol{b}^*$	$\boldsymbol{b}^*$	$\boldsymbol{a}^*$	b	b	**€15**
$\boldsymbol{c}^*$	$\boldsymbol{c}^*$	c^*	a^*	c	c	c	c	**€10**
d^*	b^*	d	d	d	d	d	d	**€5**
e^*	a^*	e	e	e	e	e	e	**€0**

Table 2: FB options and equilibrium predictions.

	A0	**A2**	**A3**	**A5**
$\text{O}_{1,2}(\cdot)$	c	a	a	a
$\text{O}_{2,1}(\cdot)$	c	c	b	a
$\text{PV}(\cdot)$	c	a, b, c	a, b	a
$\text{FB}(\cdot)$	c	b	a, b	a
maximal sum of payoffs	€20	€30	€35	€40

6 Aggregate results with the non-symmetric shortlisting mechanism

We first present the experimental results regarding the non-symmetric shortlisting mechanism. We report results from our experiment, as well as a re-analysis of those from De Clippel et al. [2014] who use a similar experimental design with the exception of a single preference profile.[13]

As argued in the introduction, we focus on several measures to understand the outcome of each game. For each outcome x, we define its efficiency by $u_1(x) + u_2(x)$, that is the sum of monetary payoffs of subjects 1 and 2, and its inequality by $\mid u_1(x) - u_2(x) \mid$, the absolute value of the payoff difference between subjects. We also define the first-mover advantage, measured for each outcome x as $u_1(x) - u_2(x)$, the payoff difference between the first and the second mover. The inequality measures how different the payoffs are between the two subjects whereas the first-mover advantage measures the difference in favor of the subject

[13] This additional profile, to which we refer as Pf5 is equal to ($a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$) vs ($e \succ_2 c \succ_2 a \succ_2 b \succ_2 d$). Note that we also standardized the payoff from 0 to 20 in their data to make their results comparable to ours. In their experiment, stage payoffs range from 0 to 1 with a scale of 0.25 whereas our stage payoffs range from 0 to 20 with a scale of 5. In both experiments, the monetary payoff that a subject associates to an option is simply linear with its rank.

playing first.

Table 3 presents data from a benchmark (i.e., random selection), from De Clippel et al. [2014], and from our data. The benchmark is simply a simulation of the measures if an option was selected randomly. We observe that the non-symmetric shortlisting mechanism is close to selecting the most efficient outcome (see Table 2 for the maximal sum of payoffs at each profile). The main shortcoming of this mechanism seems to be related to the difference between the subjects' payoffs. First, we see that inequalities are positive and statistically significant compared to the benchmark. They range from 2.5 to 7.83, except in A5 where the subjects' preferences are identical and hence inequality is necessarily 0.

Table 3: Non-symmetric shortlisting mechanism: efficiency and inequality.

	Benchmark (random selection)			**De Clippel et al. [2014]**			**Our data**		
	Efficiency	Inequality	First-mover	Efficiency	Inequality	First-mover	Efficiency	Inequality	First-mover
A0	20.00	12.00	0.00	20.00	2.50	-1.18	20.00	2.50	-0.43
				(.)	(0.00)	(0.00)	(.)	(0.00)	(0.25)
A2	20.00	2.00	0.00	27.78	6.11	3.43	27.39	2.79	-0.14
				(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.65)
A3	20.00	4.00	0.00	34.42	4.85	2.76	30.45	3.80	0.95
				(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
A5	20.00	0.00	0.00				38.04	0.00	0.00
							(0.00)	(.)	(.)
Pf5	20.00	10.00	0.00	26.03	7.83	3.14			
				(0.00)	(0.00)	(0.00)			

Note: Entries are means. The benchmark is calculated from an average of random selections. In parentheses are p-values of t-tests testing equality between means of benchmark vs. means of De Clippel et al. [2014]/our data (two-tailed). Pf5 is ($a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$) vs ($e \succ_2 c \succ_2 a \succ_2 b \succ_2 d$). N per cell=440 (De Clippel et al. [2014]), 280 (our data).

The data from De Clippel et al. [2014] also show that the first-mover gains on average around 3 full points more than the second mover in most profiles (statistically significant at $p < 0.01$ compared to the benchmark). This is a substantial advantage given that the average payoff in their experiment is 13.52 (with a standard deviation of 4.77). A first-mover advantage also appears in our experimental data in profile A3 where the difference in payoffs between the first and second mover is around 0.95, for an average payoff of 14, and a standard deviation of 5. Although small, this difference is still statistically significant ($p < 0.01$).

Note however that the first-mover advantage is absent in some profiles, especially in our experimental data. In profiles A0 and A2, we even observe a negative first-mover advantage (a negative first-mover advantage means that the second player obtains, on average, a larger payoff than the first player). We interpret this as an effect of subjects having other-regarding preferences like equity or altruism.[14] Note, however, that the very possibility of the existence of a first-mover advantage (or disadvantage) justifies the search for a symmetric mechanism. Furthermore, we report in appendix B the evolution of the first-mover advantage as the experiments advance. We find that the difference in payoffs between the first and second subjects increases when subjects get used to the experiment. In A2 for example (conflicting preferences over the three first options), it goes from -1.62 during the first 20 rounds of the experiment to 0.45 during the last 20 rounds.

We now focus on Pareto efficiency and the rate at which FB options are selected. Recall, as argued in the theoretical analysis, that the outcome reached by subgame perfection in any profile corresponds to the most preferred option of the first-mover over the three most preferred ones of the second-mover. This option is Pareto efficient but need not be FB. Both hypotheses seem to be validated in the data: selected options tend to be Pareto-efficient but might fail to be FB.

More precisely, regarding Pareto efficiency, Table 4 indicates that in the vast majority of observations, the selected option is Pareto efficient. This is rather clear in the data collected by De Clippel et al. [2014], in which such options are selected about 90% of the time. We also find this pattern in our replication data, although the rate of selection of Pareto efficient options is smaller, especially in A3. Yet, even in this profile, the pairs of subjects manage to reach a Pareto-efficient option, 76% of the time.

Moreover, Table 4 reveals that the non-symmetric shortlisting mechanism often fails to select a FB option and that the frequency with which this failure occurs depends on the profile. In A0, for instance, in which subjects have conflicting preferences over all five options, subjects coordinate over *c* “only" 82% of the time. Most worrying, in A2, in which subjects agree on their worst two options, subjects coordinate over *b* only 28% of the time (De Clippel et al. [2014] data) or 60% of the time (our data).

[14]See De Clippel et al. [2014] section D for a discussion on the role of other-regarding preferences in their data. Note that we also attribute the differences between the results in the data of De Clippel et al. [2014] and our data to the nature of the sample. De Clippel et al. [2014] conducted their experiment with a sample of undergraduate students in economics and social sciences, whereas we conducted ours with a more diverse sample in which students do not represent a majority of subjects. Evidence shows that students tend to be less generous than non-students, while not particularly better at coordinating (see Carpenter et al. [2008], Falk et al. [2013], Belot et al. [2015] and Bol et al. [2016] among others).

Table 4: Non-symmetric shortlisting: Rates of Pareto-efficient and FB options

	Benchmark (random selection)		**De Clippel et al. [2014]**		**Our data**	
	Pareto	FB	Pareto	FB	Pareto	FB
A0	100%	20%	100%	82%	100%	82%
			(.)	(0.00)	(.)	(0.00)
A2	60%	20%	89%	28%	88%	60%
			(0.00)	(0.00)	(0.00)	(0.00)
A3	40%	40%	97%	97%	76%	76%
			(0.00)	(0.00)	(0.00)	(0.00))
A5	20%	20%			91%	91%
					(0.00)	(0.00)
Pf5	40%	40%	90%	90%		
			(0.00)	(0.00)		

Note: Entries are proportions. The benchmark is calculated from an average of random selections. In parentheses are p-values of t-tests testing equality between proportions of benchmark vs. proportions of De Clippel et al. [2014]/our data (two-tailed). Profile 5 is ($a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$) vs ($e \succ_2 c \succ_2 a \succ_2 b \succ_2 d$). N per cell=440 (De Clippel et al. [2014]), 280 (our data).

7 Aggregate results with alternative mechanisms

We now evaluate the performance of the alternative mechanisms in our data.[15] By design, these mechanisms give the possibility to have ties between several winning options. Mimicking the design of the experiment as experienced by subjects in the case of ties, we calculate the results below by selecting a single winning option among tied options. However, in Table 7 below, we also consider the full implications of ties for our indicators of performance.

We start our evaluation of the performance of the alternative mechanisms with efficiency and inequality.

All profiles merged, the efficiency variable has a mean of 28.65 (with a standard deviation of 9.20) and the inequality one has a mean of 2.24 (with a standard deviation of 4.04). Table 5 shows the poor performance of the simultaneous mechanism compared to the non-symmetric shortlisting one. In some profiles, both achieve similar efficiency levels, but in others, the non-symmetric shortlisting mechanism is substantially and significantly ($p < 0.01$) more efficient (by 2 or 3 points, i.e., 30% of the standard deviation). By contrast, the gradual vetoes mechanism is as efficient as the non-symmetric shortlisting one. The dif-

[15]Full results can be found in Appendix C. We also report some regression analysis of the data in appendix F, in which we account for the non-independence of the observations at the experimental-session level.

ferences in means are not statistically different under most profiles, and when they are (in A5), it is because the gradual vetoes mechanism is more efficient than the non-symmetric shortlisting one, by around 1.50 (i.e, 16% of the standard deviation).

Inequality follows the same trend: it is generally higher with the simultaneous mechanism (by 0.5 or 1 point, i.e., 20% of the standard deviation), and this difference is statistically significant ($p < 0.05$) in many instances. By contrast, the gradual vetoes mechanism is not more unequal than the non-symmetric shortlisting one. The only profile for which inequality is statistically significantly different ($p < 0.01$) between the two is A3, but the difference is in favor of the gradual vetoes mechanism: -1.50 (i.e. 35% of the standard deviation). Furthermore, it is important to remember that, although the non-symmetric shortlisting mechanism is not more unequal than the gradual vetoes under most profiles, it still gives an advantage to the first-mover in several profiles (see Table 3 above), which indicates that a difference between the two is the asymmetry between subjects induced by the order in which subjects play in the non-symmetric shortlisting mechanism.[16]

Table 5: Comparison of mechanisms: efficiency and inequality.

	Shortlisting		**Simultaneous**		**Gradual**	
	Efficiency	Inequality	Efficiency	Inequality	Efficiency	Inequality
A0	20.00	2.50	20.00	3.07	20.00	3.04
			(.)	(0.25)	(.)	(0.27)
					(.)	(0.95)
A2	27.39	2.78	28.18	3.57	27.00	1.30
			(0.17)	(0.05)	(0.55)	(0.00)
					(0.06)	(0.00)
A3	30.45	3.80	28.37	3.23	29.74	3.59
			(0.01)	(0.00)	(0.35)	(0.26)
					(0.09)	(0.07)
A5	38.04	0.00	35.18	0.00	39.52	0.00
			(0.00)	(.)	(0.00)	(.)
					(0.00)	(.)

Note: Entries are means. In parentheses are p-values of t-tests testing the equality of means between shortlisting vs. simultaneous/gradual (first row of parentheses) and between simultaneous vs. gradual (second row of parentheses) (two-tailed). N per cell = 280 (shortlisting and simultaneous), 270 (gradual).

[16] We also present the (absence of) first-mover advantage under the alternative mechanisms in appendix D. This is not surprising given that which subject "plays first" is purely artificial in these symmetric mechanisms in which all subjects play at the same time.

Table 6 also shows that the simultaneous mechanism does not perform as well as the non-symmetric shortlisting one when it comes to the rate of Pareto efficient and FB outcomes. In A3 and A5, the rate at which a Pareto-efficient or FB option is selected drops by 10 or even 20% points compared to the non-symmetric shortlisting mechanism (statistically significant at $p < 0.01$). In these profiles, it is difficult for subjects playing simultaneously to coordinate on who is going to remove the Pareto-dominated options and select the Pareto-efficient and FB options, that is *a* or *b* (see below for a detailed analysis of the strategies adopted by subjects).

Table 6: Comparison of mechanisms: Rates of Pareto-efficient and FB options.

	Shortlisting		**Simultaneous**		**Gradual**	
	Pareto	FB	Pareto	FB	Pareto	FB
A0	100%	82%	100%	76%	100%	76%
			(.)	(0.12)	(.)	(0.09)
					(.)	(0.89)
A2	88%	60%	92%	56%	87%	74%
			(0.12)	(0.35)	(0.87)	(0.00)
					(0.09)	(0.00)
A3	76%	76%	65%	65%	72%	72%
			(0.00)	(0.00)	(0.26)	(0.26)
					(0.07)	(0.07)
A5	91%	91%	71%	71%	96%	96%
			(0.00)	(0.00)	(0.01)	(0.01)
					(0.00)	(0.00)

Note: Entries are proportions. In parentheses are p-values of t-tests testing the equality of proportions between shortlisting vs. simultaneous/gradual (first row of parentheses) and between simultaneous vs. gradual (second row of parentheses) (two-tailed). N per cell = 280 (shortlisting and simultaneous), 270 (gradual).

The gradual vetoes mechanism performs better. The rates at which Pareto-efficient and FB options are selected approach those of the non-symmetric shortlisting mechanism. The difference in rates is never larger than 6% points and not statistically significant at a level of $p < 0.01$, except in A2 and A5 in which the gradual vetoes mechanism performs even better than the non-symmetric shortlisting one. This is for example the case in A2, in which the subjects have conflicting preferences over the three first options. The rate at which the FB option (b) is selected increases by 14% points (statistically significant at $p < 0.01$).

An important issue with these alternative mechanisms is that they can lead to ties, i.e., the selection by subjects of several options. In our experiment, these ties are broken by a lottery in which the computer selects an option randomly among the tied options. Ties need not be a bad outcome, their adequacy depends on the profile. For instance, in A3, one may argue that the ideal outcome rejects the three Pareto-dominated options c, d, e but uses a fair lottery on the a and b. However, in the unanimous profile (A5) a tie is obviously a bad result.

Overall, 33% of all the games in our data end up with a lottery, but there are some differences between mechanisms: 54% of lotteries with the simultaneous mechanism, and only 12% with the gradual vetoes. To evaluate the performance of each of these mechanisms, we re-calculate Table 6 by giving the rate at which all Pareto-inefficient options have been excluded by the subjects (i.e., if there is a tie, it only includes Pareto-efficient options), and the rate at which all non-FB options have been excluded (i.e., if there is a tie, it is between FB options only).

Table 7: Comparison of mechanisms: Rates of Pareto-efficient and FB options considering ties.

	Simultaneous			**Gradual**		
	Pareto-only	FB-only	Ties	Pareto-only	FB-only	Ties
A0	100%	63%	32%	100%	71%	11%
	(.)	(0.00)		(.)	(0.00)	
				(.)	(0.05)	
A2	87%	35%	58%	86%	65%	16%
	(0.70)	(0.00)		(0.59)	(0.21)	
				(0.87)	(0.00)	
A3	36%	36%	72%	70%	70%	21%
	(0.00)	(0.00)		(0.13)	(0.13)	
				(0.00)	(0.00)	
A5	47%	47%	52%	96%	96%	1%
	(0.00)	(0.00)		(0.03)	(0.03)	
				(0.00)	(0.00)	

Note: Entries are proportions. In parentheses are p-values of t-tests testing the equality of proportions between shortlisting (Table 6) vs. simultaneous/gradual (first row of parentheses) and between simultaneous vs. gradual (second row of parentheses) (two-tailed). N per cell = 280 (simultaneous), 270 (gradual).

Table 7 reveals that the performance of the alternative mechanisms drops when we take ties into account. The most affected one is the simultaneous mechanism. This is not surprising given that it has a much higher rate of tied games than the gradual vetoes one. Under the simultaneous mechanism, the rate at which subjects manage to remove all Pareto-inefficient and non-FB options drops well below those of the non-symmetric shortlisting mechanism, by up to 40% points. The differences are almost always statistically significant at a level of $p < 0.01$. In A3, these rates even fall below the random benchmark (36% vs 40%).

Yet, Table 7 shows that the gradual vetoes mechanism still performs well even with this measure of performance that takes ties into account. In most profiles, the rates at which subjects manage to remove all Pareto-inefficient or non-FB options are very similar to those of the non-symmetric shortlisting mechanism. The largest difference, and the only one that is statistically significant at a level of $p < 0.01$, is a difference of 7% points for the selection rate of FB options in A0. The other differences are smaller and not statistically significantly different from 0. Furthermore, the gradual vetoes mechanism performs better than the non-symmetric shortlisting mechanism one in A5 (96% vs 91%, statistically significant at $p < 0.05$). This is thus clear evidence of the performance of the gradual vetoes mechanism is a strong alternative to the non-symmetric shortlisting mechanism that leads to similar rates of performance without introducing any asymmetry between subjects.

8 Results of individual decisions

As a final step in our analysis, we analyze the individual decisions made by the subjects in the simultaneous and gradual vetoes mechanisms.

We focus on the rate of vetoes that are put on the same options by both subjects.[17] This indicates whether subjects manage to coordinate to remove the undesirable options. By definition, there cannot be common vetoes under the non-symmetric shortlisting mechanism. We thus focus on the simultaneous and gradual vetoes mechanism. To make the results comparable across mechanisms, we focus on the two first vetoes put by each subject under both mechanisms. In the case of the simultaneous mechanism, this means analyzing the universe of decisions made by subjects. For the gradual vetoes mechanism, this means focusing on the two first rounds of elimination. In 63% of cases, the game stops there because there is only one option left. In appendix G, we report the results for all rounds of eliminations.

[17]In appendix H, we explore other forms of strategies and find some interesting patterns, in particular, that subjects are more aggressive under the mechanism with gradual vetoes. However, we focus in the main text on the rate of same vetoes as it is the most striking difference between mechanisms and the one that really explains the aggregate results.

Table 8: Comparison of mechanisms: individual strategies.

	Simultaneous Same vetoes	**Gradual** Same vetoes
A0	19%	8%
		(0.00)
A2	36%	25%
		(0.00)
A3	47%	30%
		(0.00)
A5	39%	26%
		(0.00)

Note: Entries are proportions of vetoes that are put on the same options by both subjects (out of two vetoes). In parentheses are p-values of t-tests testing the equality of proportions between simultaneous vs. gradual (two-tailed). N per cell = 1,120 (simultaneous), 1,080 (gradual).

Table 8 reveals that with every single profile, coordination works better under the gradual vetoes mechanism than under the simultaneous one.[18] The rate of vetoes put on the same options is between 8% and 17% points lower under the gradual vetoes mechanism ($p < 0.01$). This in turn explains why this mechanism produces better aggregate results: subjects can more easily coordinate to remove the undesirables options compared to the simultaneous mechanism. This also explains why there are fewer ties.

9 Conclusion

This work focuses on the design of bargaining mechanisms that help reach efficient and fair agreements in settings in which two players have possibly conflicting preferences, as is the case in most legal bargaining situations. We take as a point of comparison the non-symmetric shortlisting proposed and tested by De Clippel et al. [2014]. We confirm that this mechanism achieves high levels of efficiency but, due to its non-symmetric nature, generates

[18]Note that this can be seen as a hard test for this difference in coordination between the two mechanisms. Our experimental design allows subjects to partially coordinate even in the simultaneous mechanism because the pairs play together for five rounds before being reshuffled. This for example explains why there are, in the simultaneous mechanism, "only" 39% of common vetoes in profile A5 where subjects have the exact same preferences over the options available. In the first round played between each pair, this rate is 65%. Meanwhile, this rate is 36% of common vetoes in the first round in the gradual vetoes mechanism.

asymmetries between the first and the second mover.

We then consider two alternative mechanisms: the simultaneous and the gradual vetoes mechanisms. While the simultaneous mechanism performs poorly both in terms of efficiency and inequality, the gradual vetoes mechanism achieves high levels of efficiency, and even reduces inequality when compared to the non-symmetric shortlisting mechanism. It appears that the gradual revelation of vetoes by subjects acts as a coordination device, reducing the difference in payoffs between both subjects and helping them to remove the dominated options. While this finding is novel in the context of consensus-reaching mechanisms, it speaks to the literature on auction games where it is acknowledged that sequential auctions are easier to understand for subjects than simultaneous ones (see e.g., Li [2017]).

Further work devoted to the development of simple mechanisms that generate better and fairer agreements for two or more parties seems to be a natural research venue. For instance, one could consider the experimental investigation of mechanisms that break ties in some optimal way, focusing on efficiency, fairness, or some normative solution concept such as the Nash bargaining solution.[19]

[19]We would like to thank an anonymous referee for this suggestion.

References

N. Anbarci. Finite alternating-move arbitration schemes and the equal area solution. *Theory and Decision*, 61:21–50, 2006.

S. Barberà and D. Coelho. Compromising on compromise rules. *The RAND Journal of Economics*, 2020.

M. Belot, R. Duch, and L. Miller. A comprehensive comparison of students and non-students in classic experimental games. *Journal of Economic Behavior & Organization*, 113:26–33, 2015.

G. Bermant and J. Shapard. The voir dire examination, juror challenges, and adversary advocacy. In *The trial process*, pages 69–114. Springer, 1981.

D. Bloom and C. Cavanagh. An analysis of the selection of arbitrators. *American Economic Review*, 76(3):408–22, 1986.

D. Bol, S. Labbé St-Vincent, and J-M. Lavoie. Recruiting for laboratory voting experiments: Exploring the (potential) sampling bias. In *Voting experiments*, pages 271–286. Springer, 2016.

S.J. Brams and D.M. Kilgour. Fallback bargaining. *Group Decision and Negotiation*, 10:287–316, 2001.

C.F Camerer, A. Dreber, E. Forsell, T.-H. Ho, J. Huber, M. Johannesson, M. Kirchler, J. Almenberg, A. Altmejd, and T. Chan. Evaluating replicability of laboratory experiments in economics. *Science*, 351(6280):1433–1436, 2016.

C.F. Camerer, G. Nave, and A. Smith. Dynamic unstructured bargaining with private information: theory, experiment, and outcome prediction via machine learning. *Management Science*, 65(4):1867–1890, 2019.

J. Carpenter, C. Connolly, and C.K. Myers. Altruistic behavior in a representative dictator experiment. *Experimental Economics*, 11(3):282–298, 2008.

R. Congar and V. Merlin. A characterization of the maximin rule in the context of voting. *Theory and Decision*, 72(1):131–147, 2012.

G. De Clippel and K. Eliaz. Reason-based choice: A bargaining rationale for the attraction and compromise effects. *Theoretical Economics*, 7(1):125–162, 2012.

G. De Clippel, K. Eliaz, and B. Knight. On the selection of arbitrators. *American Economic Review*, 104:3434–58, 2014.

B. Dutta and A. Sen. A necessary and sufficient condition for two-person Nash implementation. *Review of Economic Studies*, 58:121–128, 1991.

B. Dutta and A. Sen. Nash implementation with partially honest individuals. *Games and Economic Behavior*, 74:154–169, 2012.

A. Falk, S. Meier, and C. Zehnder. Do lab experiments misrepresent social preferences? the case of self-selected student samples. *Journal of the European Economic Association*, 11(4): 839–852, 2013.

U. Fischbacher. z-tree: Zurich toolbox for ready-made economic experiments. *Experimental economics*, 10(2):171–178, 2007.

F.X. Flanagan. Peremptory challenges and jury selection. *The Journal of Law and Economics*, 58(2):385–416, 2015.

F. Galeotti, M. Montero, and A. Poulsen. Efficiency versus equality in bargaining. *Journal of the European Economic Association*, 17(6):1941–1970, 2019.

W. Güth, R. Schmittberger, and B. Schwarze. An experimental analysis of ultimatum bargaining. *Journal of economic behavior & organization*, 3(4):367–388, 1982.

J.C. Harsanyi. Approaches to the bargaining problem before and after the theory of games: a critical discussion of Zeuthen's, Hicks', and Nash's theories. *Econometrica*, pages 144–157, 1956.

J.C. Harsanyi. On the rationality postulates underlying the theory of cooperative games. *Journal of Conflict Resolution*, 5(2):179–196, 1961.

L. Hurwicz and D. Schmeidler. Construction of outcome functions guaranteeing existence and Pareto optimality of Nash equilibria. *Econometrica*, 46:1447–1474, 1978.

L. Hurwicz and M.R. Sertel. Designing mechanisms, in particular for electoral systems: The majoritarian compromise. In R. Sertel Murat, editor, *Economic Design and Behaviour*. London: MacMillan, 1999.

O. Kıbrıs and M.R. Sertel. Bargaining over a finite set of alternatives. *Social Choice and Welfare*, 28:421–437, 2007.

J.-F. Laslier, M. Núñez, and R. Sanver. A solution to the two-person implementation problem. *Journal of Economic Theory*, 194(105261), 2021.

S. Li. Obviously strategy-proof mechanisms. *American Economic Review*, 107(11):3257–87, 2017.

E. Maskin. Nash equilibrium and welfare optimality. *Review of Economic Studies*, 66:23–38, 1999.

J. Moore and R. Repullo. Nash implementation: A full characterization. *Econometrica*, 58: 1083–1099, 1990.

J.F. Nash. The bargaining problem. *Econometrica*, 18:155–162, 1950.

J.F. Nash. Two-person cooperative games. *Econometrica*, 21:128–140, 1953.

M. Perry and P.J. Reny. A general solution to King Solomon's dilemma. *Games and Economic Behavior*, 26(2):279–285, 1999.

A. Rubinstein. Perfect equilibrium in a bargaining model. *Econometrica: Journal of the Econometric Society*, pages 97–109, 1982.

Y. Sprumont. Intermediate preferences and Rawlsian arbitration rules. *Social Choice and Welfare*, 10:1–15, 1993.

M. Van der Linden. Bounded rationality and the choice of jury selection procedures. *The Journal of Law and Economics*, 61(4):711–738, 2018.

F. Zeuthen. *Problems of monopoly and economic warfare*, volume 25. Routledge, 1930.

A Equilibria of the gradual vetoes mechanism

This section shows that the subgame-perfect equilibrium outcomes of the gradual vetoes mechanism coincide with the FB options in the profiles used in the experiment.

The game we are considering is an extensive form game with complete information and simultaneous moves, and the definition of subgame-perfect equilibrium is standard: it is a strategy profile that generates a Nash equilibrium in each subgame.

The main result of this section holds under two assumptions: (i) players only use weakly undominated strategies and (ii) their preferences over lotteries satisfy stochastic dominance. Ruling out weakly undominated strategies implies that, at each stage, no player casts a veto against her best available option on the stage. Stochastic dominance is satisfied by most preference extensions in the literature. It simply requires that, when comparing two lotteries, a shift in probability to strictly preferred options yields strictly preferred lotteries. As in the case of subgame perfect equilibrium, we do not include its formal definition since it is standard.

Before laying out the analysis of the four profiles, we fully describe the outcomes with only two and three options since this will be useful in the sequel.

A.1 Two options

With two options, only four preference profiles are possible: (i) $a \succ_i b$ for $i = 1,2$, (ii) $b \succ_i a$ for $i = 1,2$, (iii) $a \succ_1 b$ and $b \succ_2$ and (iv) $b \succ_1 a$ and $a \succ_2 b$. Since every player vetoes her worst option since this the only weakly non-dominated strategy, it follows that in profiles (i) and (ii), the only equilibrium outcome is the unanimously preferred option whereas in profiles (iii) and (iv) the only outcome is the lottery $uni(a,b)$.

A.2 Three options

Each equilibrium selects a unique FB option and the set of equilibrium outcomes corresponds to the set of FB options.

W.l.o.g we fix $a \succ_1 b \succ_1 c$ and consider the different preferences of player 2. This is possible since the game is symmetric so permuting the name of the options would give the corresponding payoff matrix and equilibrium outcome.

When $a \succ_2 b \succ_2 c$ and when $a \succ_2 c \succ_2 b$, a is the unique equilibrium outcome since the payoff matrix equals:

	b	c
b	a	a
c	a	a

When $b \succ_2 a \succ_2 c$, both a and b are equilibrium outcomes whereas b is the only equilibrium outcome when $b \succ_2 c \succ_2 a$ as one deduces from the payoff matrix:

	a	c
b	c	a
c	b	$uni(a,b)$

Finally, when $c \succ_2 a \succ_2 b$, the unique equilibrium outcome is a whereas when $c \succ_2 b \succ_2 a$, only b is selected in equilibrium as one can see in the next payoff matrix:

	a	b
b	c	$uni(a,c)$
c	b	a

A.3 Profile A0

In this profile $a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$ and $e \succ_2 d \succ_2 c \succ_2 b \succ_2 a$. The matrix of the game is as follows:

	a	b	c	d
b	d	$\Gamma(a,c,d,e)$	d	c
c	d	d	$\Gamma(a,b,d,e)$	b
d	c	c	b	$\Gamma(a,b,c,e)$
e	$\mathbf{c}^*$	c	b	b

It follows that c is the unique equilibrium outcome with the strategy (e,a) being an equilibrium. This outcome is independent of the outcomes of the subgames that involve 4 options, analyzed in the sequel.

$\Gamma(a,c,d,e)$: This game admits a unique equilibrium (e,a) with outcome $uni(c,d)$ with preferences $a \succ_1 c \succ_1 d \succ_1 e$ and $e \succ_2 d \succ_2 c \succ_2 a$.

	a	d	e
c	d or e	d	$uni(a,e)$
d	$uni(c,e)$	$uni(a,e)$	c
e	$uni(c,d)$	$uni(a,d)$	$uni(a,c)$

$\Gamma(a,b,d,e)$: This game admits a unique equilibrium (e,a) with outcome $uni(b,d)$ since restricted preferences are given by $a \succ_1 b \succ_1 d \succ_1 e$ and $e \succ_2 d \succ_2 b \succ_2 a$.

	a	b	d
b	$uni(d,e)$	d	$uni(a,e)$
d	$uni(b,e)$	$uni(a,e)$	b
e	$uni(b,d)$	$uni(a,d)$	$uni(a,b)$

$\Gamma(a,b,c,e)$: This game admits a unique equilibrium (e,a) with outcome $uni(b,c)$ as preferences over (a,b,c,e) are given by $a \succ_1 b \succ_1 c \succ_1 e$ and $e \succ_2 c \succ_2 b \succ_2 a$.

	a	b	c
b	$uni(c,e)$	c	$uni(a,e)$
c	$uni(b,e)$	$uni(a,e)$	b
e	$uni(b,c)$	$uni(a,c)$	$uni(a,b)$

A.4 Profile A2

In this profile $a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$ and $c \succ_2 b \succ_2 a \succ_2 d \succ_2 e$. The matrix of the game is as follows:

	b	a	d	e
b	$\Gamma(a,c,d,e)$	c	a or c	a or c
c	a	b	a or b	a or b
d	a or c	b or c	$\Gamma(a,b,c,e)$	b
e	a or c	b or c	b	$\Gamma(a,b,c,d)$

The equilibria for the subgames that with 4 non-vetoed options are determined in the sequel; their outcome is irrelevant to prove that b is the unique equilibrium outcome. For instance, the strategy (c,a) is an equilibrium.

$\Gamma(a,c,d,e)$: This game admits two equilibrium outcomes, a or c, since restricted preferences are $a \succ_1 c \succ_1 d \succ_1 e$ and $c \succ_2 a \succ_2 d \succ_2 e$.

	a	d	e
c	d	a	a
d	c	a or c	$uni(a,c)$
e	c	$uni(a,c)$	a or c

$\Gamma(a,b,c,e)$: This game admits (c,a) which leads to b as the unique equilibrium as implied by the preferences $a \succ_1 b \succ_1 c \succ_1 e$ and $c \succ_2 b \succ_2 a \succ_2 e$.

	a	b	e
b	c	a or c	$uni(a,c)$
c	b	a	$uni(a,b)$
e	$uni(b,c)$	$uni(a,c)$	b

$\Gamma(a,b,c,d)$: This game admits (c,a) with outcome b as the unique equilibrium as implied by preferences $a \succ_1 b \succ_1 c \succ_1 d$ and $c \succ_2 b \succ_2 a \succ_2 d$.

	a	b	d
b	c	a or c	$uni(a,c)$
c	b	a	$uni(a,b)$
d	$uni(b,c)$	$uni(a,c)$	b

‘

A.5 Profile A3

In this profile $a \succ_1 b \succ_1 c \succ_1 d \succ_1 e$ and $b \succ_2 a \succ_2 c \succ_2 d \succ_2 e$. The matrix of the game is as follows:

	a	c	d	e
b	$\Gamma(c,d,e)$	$\Gamma(a,d,e)$	$\Gamma(a,c,e)$	$\Gamma(a,c,d)$
c	$\Gamma(b,d,e)$	$\Gamma(a,b,d,e)$	$\Gamma(a,b,e)$	$\Gamma(a,b,d)$
d	$\Gamma(b,c,e)$	$\Gamma(a,b,e)$	$\Gamma(a,b,c,e)$	$\Gamma(a,b,c)$
e	$\Gamma(b,c,d)$	$\Gamma(a,b,d)$	$\Gamma(a,b,c)$	$\Gamma(a,b,c,d)$

where $\Gamma(X)$ stands for the subgame where players bargain over X. Whenever X has three options, the outcome is determined directly by the analysis in Section A.2. This directly implies that the payoff matrix can be simplified as follows:

	a	c	d	e
b	c	$\mathbf{a}^*$	a	a
c	$\mathbf{b}^*$	$\Gamma(a,b,d,e)$	a or b	a or b
d	b	a or b	$\Gamma(a,b,c,e)$	a or b
e	b	a or b	a or b	$\Gamma(a,b,c,d)$

The subgames that involve 4 options are determined in the sequel. Each of these subgames admits an equilibrium; moreover, their equilibrium outcome is irrelevant to determine the set of equilibrium outcomes over the whole game. It follows that the equilibrium outcomes are a (sustained by the profile (b,c)) and b (sustained by the profile (c,a)), as wanted.

$\Gamma(a,b,d,e)$: This game admits two equilibrium outcomes, a and b, with the restricted preferences $a \succ_1 b \succ_1 d \succ_1 e$ and $b \succ_2 a \succ_2 d \succ_2 e$.

	a	d	e
b	d	a	a
d	b	a or b	$uni(a,b)$
e	b	$uni(a,b)$	a or b

$\Gamma(a,b,c,e)$: This game admits two equilibrium outcomes, a or b, with the restricted preferences $a \succ_1 b \succ_1 c \succ_1 e$ and $b \succ_2 a \succ_2 c \succ_2 e$.

	a	c	e
b	c	a	a
c	b	a or b	$uni(a,b)$
e	b	$uni(a,b)$	a or b

$\Gamma(a,b,c,d)$: This game admits two equilibrium outcomes, a or b, with the restricted preferences $a \succ_1 b \succ_1 c \succ_1 d$ and $b \succ_2 a \succ_2 c \succ_2 d$.

	a	c	d
b	c	a	a
c	b	a or b	$uni(a,b)$
d	b	$uni(a,b)$	a or b

A.6 Profile A5

In this profile $a \succ_i b \succ_i c \succ_i d \succ_i e$ for $i = 1, 2$. The restriction that voters rule out weakly dominated strategies implies that neither of the voters vetoes a at any stage. Thus, the only outcome of the game is a since in any subgame a is always unanimously preferred and hence never vetoed.

B Coordination patterns in experimental sessions

In each of the experiments analyzed in this paper, the subjects play together for a certain number of rounds. It is thus possible that they learn how to play a strategy that increases their payoff during the experiment. Consequently, the results of games played in the first rounds of the experiment may differ from the ones in the last rounds. The tables below report the results of the experimental session by distinguishing the games happening at the beginning of the sessions and those at the end. In doing so, we aim to identify possible coordination and learning patterns between subjects.

B.1 Coordination patterns with the non-symmetric shortlisting mechanism

In the data of De Clippel et al. [2014], there are 40 rounds in each session. To identify coordination patterns between subjects, we reproduce Tables 3 and 4 of the main text by splitting the sample in two: the games played in the 20 first rounds of the session on the one hand and those played in the 20 last rounds on the other. In our data, there are also 40 rounds per session, so we use the same split-sample strategy. Note however that the preference profile A0 was always played first. so there is an empty cell for this profile in the rows for the 20 last rounds.

We find some coordination patterns between subjects, but only a few are systematic across preference profiles. The patterns are indeed quite different depending on the profile: in some, efficiency increases and inequality decreases as the experiment advances (e.g. Pf5), in others, this pattern is reversed (e.g., A2). The most systematic pattern deals with the first-mover advantage: the first-mover advantage tends to increase as the experiment progresses in both De Clippel et al. [2014] and our data. This pattern is observed in virtually all profiles. It suggests that subjects learn how to take advantage of their position during the experiment.

	Efficiency		**Inequality**	
	20 first rounds	20 last rounds	20 first rounds	20 last rounds
A0	20.00	20.00	3.00	1.90
A2	27.96	27.55	5.92	6.35
A3	34.62	34.25	4.87	4.83
Pf 5	25.40	26.56	8.15	7.56

Note: Coordination efficiency and inequality in De Clippel et al. [2014].

	First-mover advantage	
	20 first rounds	20 last rounds
A0	-1.17	-1.20
A2	2.92	4.05
A3	1.72	3.62
Pf 5	0.60	5.27

Note: First-mover advantage in De Clippel et al. [2014].

	Efficiency		**Inequality**	
	20 first rounds	20 last rounds	20 first rounds	20 last rounds
A0	20.00	.	2.50	.
A2	29.00	26.75	2.87	2.75
A3	30.25	30.55	3.65	3.89
A5	38.00	38.05	0.00	0.00

Note: Efficiency and inequality in our data (20 first vs. 20 last rounds).

	First-mover advantage	
	20 first rounds	20 last rounds
A0	-0.43	.
A2	-1.62	0.45
A3	0.15	1.39
A5	0.00	0.00

Note: First-mover advantage in our data (20 first vs. 20 last rounds).

B.2 Coordination patterns with alternative mechanisms

We reproduce the results of Table 5 of the text using the same sample split-sample strategy as above. Again, we do not find much pattern of coordination between subjects as the experimental session advance. The only (mild) pattern that we find is for the simultaneous mechanism: efficiency and but also inequality increase as the experiment progresses. This suggests that subjects managed to coordinate and learn how to play the most profitable strategy for them as the experiment advanced. Note however that these increases are small, and cannot be found for the gradual vetoes mechanism.

	Efficiency		**Inequality**	
	20 first rounds	20 last rounds	20 first rounds	20 last rounds
A0	20.00	.	3.07	.
A2	27.40	28.61	3.70	3.50
A3	27.37	28.77	3.00	3.32
A5	35.50	35.00	0.00	0.00

Note: Efficiency and inequality with the simultaneous mechanism (20 first vs. 20 last rounds).

	Efficiency		**Inequality**	
	20 first rounds	20 last rounds	20 first rounds	20 last rounds
A0	20.00	.	3.04	.
A2	26.78	27.11	0.78	1.55
A3	31.72	28.75	4.17	3.30
A5	38.89	39.83	0.00	0.00

Note: Efficiency and inequality with the gradual vetoes mechanism (20 first vs. 20 last rounds).

C Full results

The table below presents the full results of our experimental sessions. It gives the selection rate of each option, a, b, c, d, and e, under each profile of preferences and mechanism.

	Shortlisting	**Simultaneous**	**Gradual vetoes**
A0			
a	2.50%	5.36%	4.44%
b	5.36%	9.29%	10.74%
c	81.79%	76.43%	75.93%
d	6.07%	7.14%	7.04%
e	4.29%	1.79%	1.85%
A2			
a	13.21%	17.86%	5.56%
b	60.00%	56.07%	74.44%
c	14.64%	17.86%	7.41%
d	10.36%	6.43%	7.78%
e	1.79%	1.79%	4.81%
A3			
a	47.50%	30.71%	32.96%
b	28.57%	33.93%	38.89%
c	15.71%	25.00%	20.00%
d	6.79%	7.50%	5.93%
e	1.43%	2.86%	2.22%
A5			
a	90.71%	70.71%	96.30%
b	2.14%	15.71%	2.59%
c	5.00%	9.64%	1.11%
d	1.07%	2.50%	0.00%
e	1.07%	1.43%	0.00%

Note: Rates at which each option is selected in each profile and each mechanism in our data.

D First-mover advantage in alternative mechanisms

The table below presents the first-mover advantage for the alternative mechanisms. Unsurprisingly, we do not find any effect given that, in these mechanisms, which subject play “first" or “second" is purely artificial. They indeed both play at the same time. Yet, for coding purposes, there is a first and a second-mover in our Z-tree program. This is what we use in the analysis below.

	Simultaneous	**Gradual vetoes**
A0	0.93	0.89
A2	0.00	-0.19
A3	-0.16	-0.30
A5	0.00	0.00

Note: First-mover advantage in alternative mechanisms. Entries are average differences between the payoff of the first-mover and the payoff of the second-mover in our data.

E Analysis of data from the CREST lab

For our data, we conducted 6 experimental sessions: 3 in the PSE lab and 6 in the CREST lab. To discard any possibility to our results are driven by a lab effect, we reproduce Table 5 by focusing on data coming from sessions organized in the CREST lab. All three mechanisms were covered in the sessions of the CREST lab whereas only the non-symmetric shortlisting mechanism was covered in the PSE lab. Focusing on data from the CREST lab, we still have 400 games for the simultaneous mechanism (1 session), 800 games for the simultaneous mechanism (2 sessions), and 1,080 games for the gradual vetoes mechanism (3 sessions).

	Shortlisting		**Simultaneous**		**Gradual**	
	Efficiency	Inequality	Efficiency	Inequality	Efficiency	Inequality
A0	20.00	2.60	20.00	2.95	20.00	3.04
			(.)	(0.62)	(.)	(0.52)
					(.)	(0.87)
A2	26.10	1.30	27.75	3.15	27.00	1.30
			(0.08)	(0.00)	(0.36)	(0.99)
					(0.29)	(0.00)
A3	28.80	3.40	28.77	3.32	29.74	3.59
			(0.98)	(0.80)	(0.38)	(0.47)
					(0.26)	(0.21)
A5	38.00	0.00	35.25	0.00	39.52	0.00
			(0.00)	(.)	(0.00)	(.)
					(0.00)	(.)

Note: Entries are means using CREST experimental data only. In parentheses are p-values of t-tests testing the equality of means between shortlisting vs. simultaneous/gradual (first row of parentheses) and between simultaneous vs. gradual (second row of parentheses) (two-tailed). N per cell = 100 (shortlisting), 200 (simultaneous), 270 (gradual).

The results are going in the same direction as those that include data from both labs: the results of the gradual vetoes mechanism are not statistically significantly different from those of the non-symmetric shortlisting mechanism, and when they are it is the gradual vetoes mechanism that performs better (i.e. profile A5). By contrast, the performance of the simultaneous mechanism is generally poorer than the non-symmetric shortlisting and gradual vetoes mechanisms (e.g., profile A5) although differences are not always statistically significant due to the relatively low number of observations.

F Regression analysis

In our experiment, subjects are grouped by sessions. To account for the non-independence among the sessions and their effects on p-values, we reproduce Table 5 using an OLS regression framework, in which we cluster standard errors by session. The regression model is the following:

$$Y_{ij} = \text{A} + \text{B}\beta_{ij} + \text{C}\gamma_{ij} + \epsilon_{ij} \tag{3}$$

Where Y is efficiency (first table) or inequality (second table) of each pair of subject i at session j, β is a dummy variable capturing the simultaneous mechanism and γ a dummy variable capturing the gradual vetoes mechanism. The non-symmetric shortlisting mechanism is thus the reference category. To calculate the p-value of the difference between the simultaneous mechanism and the one with gradual vetoes, we estimate an extra OLS regression:

$$Y_{ij} = \text{A} + \text{B}\alpha_{ij} + \text{C}\gamma_{ij} + \epsilon_{ij} \tag{4}$$

Where α is a dummy variable capturing the non-symmetric shortlisting mechanism. The reference category is thus the simultaneous mechanism.

We find that results hold: differences in efficiency are statistically significant in particular for preference profiles A3 and A5, and differences in inequalities are statistically significant in profiles A2 and A3.

	Profile A0		**Profile A2**		**Profile A3**		**Profile A5**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Shortlisting	(ref)	(.)	(ref)	-0.79	(ref)	2.07*	(ref)	2.86***
				(0.82)		(1.01)		(0.85)
Simultaneous	(.)	(ref)	0.79	(ref)	-2.07*	(ref)	-2.86***	(ref)
			(0.82)		(1.02)		(0.85)	
Gradual	(.)	(.)	-0.40	-1.18	-0.71	1.48	1.45	4.34***
			(1.05)	(0.90)	(0.94)	(0.98)	(0.88)	(0.32)

Note: Entries are coefficients from OLS regressions predicting efficiency. In regression (1), the non-symmetric shortlisting mechanism is the reference category, in regression (2) the simultaneous mechanism is the reference category. In parentheses are standard errors clustered by session. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	Profile A0		**Profile A2**		**Profile A3**		**Profile A5**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Shortlisting	(ref)	-0.57	(ref)	-0.79	(ref)	0.57*	(ref)	(.)
		(0.58)		(0.92)		(0.30)		
Simultaneous	0.57	(ref)	0.79	(ref)	-0.57*	(ref)	(.)	(ref)
	(0.58)		(0.92)		(0.30)			
Gradual	0.53	-0.03	-1.49	-2.28***	-0.21	0.36	(.)	(.)
	(0.64)	(0.65)	(0.82)	(0.56)	(0.38)	(0.30)		

Note: Entries are coefficients from OLS regressions predicting inequality. In regression (1), the non-symmetric shortlisting mechanism is the reference category, in regression (2) the simultaneous mechanism is the reference category. In parentheses are standard errors clustered by session. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

G Analysis of individual decisions (same vetoes)

The table below presents the detail of individual decisions of subjects under the gradual vetoes mechanism. It shows the rate of common vetoes, i.e., vetoes that are put on the same option by both subjects at the same time, at each round of elimination: first, second, and third. Mechanically, it takes at least two rounds to reach a final selected option. 63% of all games finish there, and 96% finish after a third round. Since the numbers are too small, we do not include the fourth round in the table (depending on the profile, the N is as small as 8). We observe that the rate of common vetoes increases with the number of rounds. This is not particularly surprising given that there are fewer and fewer options available and that subjects are likely to pick the same veto, even by chance.

	Same vetoes		
	Round 1	Round 2	Round 3
A0	10%	7%	20%
A2	17%	33%	46%
A3	21%	39%	58%
A5	23%	30%	90%

Note: Entries are the rate of common vetoes at each round of elimination in the gradual vetoes mechanism.

H Analysis of individual decisions (other strategies)

To further study the individual decisions made by subjects during the experiment, we define two intuitive veto strategies: a *cautious* veto and an *aggressive* veto. The cautious strategy consists in putting a veto on the option associated with the smallest personal payoff for the subject among the remaining options. The *aggressive* strategy consists in putting a veto on the option associated with the largest payoff for the opponent. The first table below reproduces Table 8 of the main text and presents the share of cautious and aggressive vetoes adopted by subjects. To make the results comparable across mechanisms, we focus on the two first vetoes put by each subject under both mechanisms. In the case of the simultaneous mechanism, this means analyzing the universe of decisions made by subjects. For the gradual vetoes mechanism, this means focusing on the two first rounds of elimination. From the first table below, we observe both strategies capture a substantial share of individual decisions. We also observe that while the share of cautious vetoes tends to be larger under the simultaneous mechanism compared to the one with gradual vetoes, the share of aggressive vetoes tends to be lower, regardless of the preference profiles. Note however that overall the individual strategies seem to follow similar patterns under both mechanisms in the sense that the share of cautious and aggressive vetoes is mostly a function of the preference profile. For example, nobody has adopted an aggressive strategy in profile A5, which is not a surprise given that both paired subjects share the same preference for the options available.

To further explore individual decisions, we construct a second table in which we report the share aggressive and cautious vetoes under the gradual vetoes mechanism at each round of elimination: first, second, and third. The most striking pattern is that, with the exception of Profile A0, the rate of cautious vetoes increases with the round of elimination, whereas the rate of aggressive vetoes decreases (at least from the first to the second elimination round). This suggests that subjects adopt a strategy of first acting aggressively, probably as they anticipate that their opponent will seek the options associated with their highest payoff, and then, as the final decision is getting closer, they secure their payoff by removing the option associated with their smallest personal payoff.

	Simultaneous		Gradual	
	Cautious	Aggressive	Cautious	Aggressive
A0	86%	93%	82%	94%
			(0.01)	(0.15)
A2	52%	34%	43%	42%
			(0.00)	(0.00)
A3	58%	18%	50%	20%
			(0.00)	(0.26)
A5	60%	0%	58%	0%
			(0.31)	(.)

Note: Entries are proportions of vetoes put on the option associated with the smallest personal payoff of the subject (*cautious*) and on the option associated with the largest payoff of the opponent (*aggressive*) among the remaining options (out of two vetoes). In parentheses are p-values of t-tests testing the equality of proportions between simultaneous vs. gradual. N per cell = 1,120 (simultaneous), 1,080 (gradual).

	Cautious			Aggressive		
	Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
A0	72%	94%	85%	93%	96%	88%
A2	31%	67%	95%	53%	32%	53%
A3	38%	72%	88%	24%	16%	31%
A5	54%	69%	92%	0%	0%	0%

Note: Entries are the rate of cautious and gradual vetoes at each round of elimination in the gradual vetoes mechanism.