Online Supplementary Material

"Candidate Entry and Political Polarization: An Experimental Study"

American Political Science Review

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I. Theoretical Derivations

Best response entry strategies

Consider our citizen-candidate entry game *without* parties and with a discrete, uniform cumulative probability function of ideal points $F(x) = x/100$, $x \in \{1,2,\dots,100\}$ and density $f(x) = 1/100$. If all citizens $j \neq i$ are using cutpoint strategy (cf. (2) in the main text)

$$\check{e}_j = \begin{cases} 0 & if \quad x_j \in \{\check{x}_l + 1, \dots, \check{x}_r - 1\} \\ 1 & if \quad x_j \in \{1, \dots, \check{x}_l\} \cup \{\check{x}_r, \dots, 100\}, \end{cases} \tag{A1}$$

then the expected payoff of a citizen type x_i for *entering* the political competition, $\check{e}_i = 1$, is given by

$$E[\pi_i | x_i, \check{e}_i = 1] = (1-p)^{n-1} b \tag{A2}$$
$$+ \sum_{m=2}^{n} \binom{n-1}{m-1} p^{m-1} (1-p)^{n-m} \left[\frac{b}{m} - \frac{m-1}{m} E[v(x_i, \gamma) | \gamma \notin \{\check{x}_l + 1, \dots, \check{x}_r - 1\}] \right] - c$$

and her expected payoff from *not entering*, $\check{e}_i = 0$, by

$$E[\pi_i | x_i, \check{e}_i = 0] = (1-p)^{n-1} \left[\frac{b}{n} - \frac{n-1}{n} E[v(x_i, d) | d \in \{\check{x}_l + 1, \dots, \check{x}_r - 1\}] \right] \tag{A3}$$
$$- \sum_{m=2}^{n} \binom{n-1}{m-1} p^{m-1} (1-p)^{n-m} E[v(x_i, \gamma) | \gamma \notin \{\check{x}_l + 1, \dots, \check{x}_r - 1\}].$$

The expected policy loss terms $E[v(x_i, d)]$ and $E[v(x_i, \gamma)]$ are specified in (4) and (5) in the main text, respectively. Relating $(A1)$ and $(A2)$ and rearranging yields the best response entry strategy (3) in the main text.

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With parties, if all citizens $j \neq i$ are using cutpoint strategy $(A1)$, then the expected payoff of a citizen type x_i in the *Right Party* for *entering* the political competition, $\check{e}_i = 1$, is given by (and analogous for a citizen in the *Left Party*)

$$
\begin{aligned}
E[\pi_i|x_i, \check{e}_i = 1] &= (1-p)^{n-1} b \qquad (A4)\\
&+ \sum_{m_r=2}^{n} \binom{n-1}{m_r-1} \left(\frac{p}{2}\right)^{m_r-1} (1-p)^{n-m_r} \left[\frac{b}{m_r} - \frac{m_r-1}{m_r} E[v(x_i,\gamma)|\gamma \in \{\check{x}_r, \dots, 100\}]\right]\\
&+ \sum_{m_l=1}^{n-1} \sum_{k=0}^{n-m_l-1} \binom{n-1}{m_l} \left(\frac{p}{2}\right)^{m_l} (1-p)^{n-m_l-1} \binom{n-m_l-1}{k} \left(\frac{1}{2}\right)^{n-m_l-1}\\
&\qquad \times \left[\rho_r b - (1-\rho_r) E[v(x_i,\gamma)|\gamma \in \{1, \dots, \check{x}_l\}]\right]\\
&+ \sum_{m_r=2}^{n-1} \sum_{m_l=1}^{n-m_r} \sum_{k=0}^{n-m} \binom{n-1}{m_r-1} \binom{n-m_r}{m_l} \left(\frac{p}{2}\right)^{m_r-1} \left(\frac{p}{2}\right)^{m_l} (1-p)^{n-m} \binom{n-m}{k} \left(\frac{1}{2}\right)^{n-m}\\
&\qquad \times \left[-(1-\rho_r) E[v(x_i,\gamma)|\gamma \in \{1, \dots, \check{x}_l\}] + \rho_r \left[\frac{b}{m_r} - \frac{m_r-1}{m_r} E[v(x_i,\gamma)|\gamma \in \{\check{x}_r, \dots, 100\}]\right]\right] - c
\end{aligned}
$$

and her expected payoff from *not entering*, $\check{e}_i = 0$, is given by

$$
\begin{aligned}
E[\pi_i|x_i, \check{e}_i = 0] &= (1-p)^{n-1} \left[\frac{b}{n} - \frac{n-1}{n} E[v(x_i,d)|d \in \{\check{x}_l + 1, \dots, \check{x}_r - 1\}]\right] \qquad (A5)\\
&- \sum_{m_r=2}^{n} \binom{n-1}{m_r-1} \left(\frac{p}{2}\right)^{m_r-1} (1-p)^{n-m_r} E[v(x_i,\gamma)|\gamma \in \{\check{x}_r, \dots, 100\}]\\
&- \sum_{m_l=1}^{n-1} \binom{n-1}{m_l} \left(\frac{p}{2}\right)^{m_l} (1-p)^{n-m_l-1} E[v(x_i,\gamma)|\gamma \in \{1, \dots, \check{x}_l\}]\\
&- \sum_{m_r=2}^{n-1} \sum_{m_l=1}^{n-m_r} \sum_{k=0}^{n-m-1} \binom{n-1}{m_r-1} \binom{n-m_r}{m_l} \left(\frac{p}{2}\right)^{m_r-1} \left(\frac{p}{2}\right)^{m_l} (1-p)^{n-m} \binom{n-m}{k} \left(\frac{1}{2}\right)^{n-m}\\
&\qquad \times \left[(1-\rho_r) E[v(x_i,\gamma)|\gamma \in \{1, \dots, \check{x}_l\}] + \rho_r E[v(x_i,\gamma)|\gamma \in \{\check{x}_r, \dots, 100\}]\right].
\end{aligned}
$$

The three expected policy loss terms $E[v(x_i,.)]$ with parties are specified in (7) to (9) and the win probability of the *Right Party*, ρ_r, is described on p. 10 in the main text. Then, relating both conditions and rearranging yields the best response entry strategy (6) in the main text.

Average expected welfare

Without parties, the ex-ante (i.e., before citizen ideal points are randomly drawn), the average or expected individual payoff $\pi_e = \frac{1}{n}\sum_{i=1}^{n} \pi_{e,i}$ is given by

$$\pi_{e,No\ Party} = K - pc + \frac{b}{n} - (1-p)^n \frac{n-1}{n} \sum_{x=\breve{x}_l+1}^{\breve{x}_r-1} \sum_{\gamma=\breve{x}_l+1}^{\breve{x}_r-1} \frac{|x-\gamma|}{(\breve{x}_r-\breve{x}_l-1)^2} - \sum_{m=1}^{n} \binom{n}{m} p^m (1-p)^{n-m}$$

$$\times \frac{1}{n}\left[(n-m) \sum_{x=\breve{x}_l+1}^{\breve{x}_r-1} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(\breve{x}_r-\breve{x}_l-1)\breve{x}_l} + (m-1)\cdot\frac{1}{2}\left(\sum_{x=1}^{\breve{x}_l} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(\breve{x}_l)^2} + \sum_{x=1}^{\breve{x}_l} \sum_{\gamma=\breve{x}_r}^{100} \frac{|x-\gamma|}{(\breve{x}_l)^2}\right)\right] \quad (A6)$$

and *with* parties it is given by

$$\pi_{e,Party} = K - sc + \frac{b}{n} - (1-p)^n \cdot \frac{n-1}{n} \sum_{x=\breve{x}_l+1}^{\breve{x}_r-1} \sum_{\gamma=\breve{x}_l+1}^{\breve{x}_r-1} \frac{|x-\gamma|}{(\breve{x}_r-\breve{x}_l-1)^2} \quad (A7)$$

$$-2\sum_{m_l=1}^{n} \binom{n}{m_l} \left(\frac{p}{2}\right)^{m_l} (1-p)^{n-m_l} \cdot \frac{1}{n}\left[(n-m_l) \sum_{x=\breve{x}_l+1}^{\breve{x}_r-1} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(\breve{x}_r-\breve{x}_l-1)\breve{x}_l} + (m_l-1) \sum_{x=1}^{\breve{x}_l} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(\breve{x}_l)^2}\right]$$

$$-\sum_{m_l=1}^{n-1} \sum_{m_r=1}^{n-m_l} \sum_{k=0}^{n-m} \binom{n}{m_l} \binom{n-m_l}{m_r} \left(\frac{p}{2}\right)^{m_l} \left(\frac{p}{2}\right)^{m_r} (1-p)^{n-m} \binom{n-m}{k} \left(\frac{1}{2}\right)^{n-m}$$

$$\times \frac{1}{n}\left[\rho_l\left(k \sum_{x=\breve{x}_l+1}^{50} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(50-\breve{x}_l)\breve{x}_l} + (n-m-k) \sum_{x=51}^{\breve{x}_r-1} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(50-\breve{x}_l)\breve{x}_l} + (m_l-1) \sum_{x=1}^{\breve{x}_l} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(\breve{x}_l)^2}\right.\right.$$

$$\left. + m_r \sum_{x=\breve{x}_r}^{100} \sum_{\gamma=1}^{\breve{x}_l} \frac{|x-\gamma|}{(\breve{x}_l)^2}\right) + (1-\rho_l)\left(k \sum_{x=\breve{x}_l+1}^{50} \sum_{\gamma=\breve{x}_r}^{100} \frac{|x-\gamma|}{(50-\breve{x}_l)\breve{x}_l} + (n-m-k) \sum_{x=51}^{\breve{x}_r-1} \sum_{\gamma=\breve{x}_r}^{100} \frac{|x-\gamma|}{(50-\breve{x}_l)\breve{x}_l}\right.$$

$$\left.\left. + m_l \sum_{x=1}^{\breve{x}_l} \sum_{\gamma=\breve{x}_r}^{100} \frac{|x-\gamma|}{(\breve{x}_l)^2} + (m_r-1) \sum_{x=\breve{x}_r}^{100} \sum_{\gamma=\breve{x}_r}^{100} \frac{|x-\gamma|}{(\breve{x}_l)^2}\right)\right],$$

where $\rho_l = H\left[\frac{m_l+k}{n} - \frac{1}{2}\right]$ is the *Left Party*'s probability of winning and $H[z] = \begin{cases} 0 & if \quad z < 0 \\ 1/2 & if \quad z = 0. \\ 1 & if \quad z > 0 \end{cases}$

QRE entry conditions

Here, we derive the logit QRE conditions of entry probabilities, allowing for erroneous binary decisions at each ideal point $x \in \{1,2,\ldots 100\}$. If $\lambda = 0$, then each citizen type x makes purely random decisions (i.e., enters with probability one-half). If $\lambda \approx \infty$, then everyone follows the BNE cutpoint strategy. Since there are one-hundred different citizen types x, we must simultaneously solve one-hundred conditions. *Without* parties, the QRE condition for a citizen type x_i is given by

$$q_{x_i} = \frac{1}{1 + e^{-\lambda V(x_i, \vec{q}_x)}}. \tag{A8}$$

The *LHS* gives her entry probability q_{x_i} and on *RHS* $\vec{q}_x$ denotes the vector of entry probabilities of all feasible types $x \in \{1,2, \dots ,100\}$ that every other citizen $j \neq i$ may possess. Since ideal points are iid random draws from a uniform distribution, each x occurs with probability $1/100$ so the average entry probability of each other citizen j is given by

$$q = \frac{1}{100} \sum_{x=1}^{100} q_x. \tag{A9}$$

Further, *RHS* contains citizen i's expected net payoff from entering (cf. (3) in the main text), which is given by

$$\begin{aligned} V(x_i, \vec{q}_x) = {} & (1-q)^{n-1} \left(\frac{n-1}{n}\right) \left[b + E[v(x_i, d) | d \in \{1, \dots ,100\}]\right] \\ & + \sum_{m=2}^{n} \binom{n-1}{m-1} q^{m-1} (1-q)^{n-m} \frac{1}{m} \left[b + E[v(x_i, \gamma) | \gamma \in \{1, \dots ,100\}]\right] - c, \end{aligned} \tag{A10}$$

with

$$E[v(x_i, d) | d \in \{1, \dots ,100\}] = \frac{1}{1-q} \sum_{x=1}^{100} (1 - q_x) \frac{|x_i - x|}{100} \tag{A11}$$

and

$$E[v(x_i, \gamma) | \gamma \in \{1, \dots ,100\}] = \frac{1}{q} \sum_{x=1}^{100} q_x \frac{|x_i - x|}{100}, \tag{A12}$$

where the expected policy losses $(A11)$ and $(A12)$ account for all feasible ideal points of others (i.e., not just those of the more extreme entrants as dictated by the BNE cutpoint pair).

Then, for a given λ the one-hundred equilibrium conditions of the form $(A8)$ are simultaneously solved for $x = 1, \dots ,100$ to determine the QRE vector of entry probabilities, $\vec{q}_x^{\lambda}$.

Next, *with* parties we need to distinguish between entrants from the *Left* and *Right Party*, respectively, so we replace the average entry probability of each other citizen j $(A9)$ by the probabilities that j enters from the left or right direction, respectively:

$$q_l = \frac{1}{50} \sum_{x=1}^{50} q_x \tag{A13}$$

and

$$q_r = \frac{1}{50}\sum_{x=51}^{100} q_x, \qquad (A14)$$

where the average individual entry probability is

$$q = q_l + q_r. \qquad (A15)$$

The *RHS* of ($A8$) contains citizen i's expected net payoff from entering (cf. (6) in the main text), which for a right type $x \in \{51, \ldots, 100\}$ is given by (and similar for a left type $x \in \{1, \ldots, 50\}$)

$$V(x_i, \vec{q}_x) = (1-q)^{n-1}\left(\frac{n-1}{n}\right)\left[b + E[v(x_i, d)|d \in \{1, \ldots, 100\}]\right] +$$

$$+ \sum_{m_r=2}^{n}\binom{n-1}{m_r-1}(q_r)^{m_r-1}(1-q)^{n-m_r}\cdot\frac{1}{m_r}\left[b + E[v(x_i,\gamma)|\gamma \in \{51, \ldots, 100\}]\right] \qquad (A16)$$

$$+ \sum_{m_l=1}^{n-1}\sum_{k=0}^{n-m_l-1}\binom{n-1}{m_l}(q_l)^{m_l}(1-q)^{n-m_l-1}\binom{n-m_l-1}{k}\left(\frac{1}{2}\right)^{n-m_l-1}$$

$$\times \rho_r\left[b + E[v(x_i,\gamma)|\gamma \in \{1, \ldots, 50\}]\right]$$

$$+ \sum_{m_r=2}^{n-1}\sum_{m_l=1}^{n-m_r}\sum_{k=0}^{n-m-1}\binom{n-1}{m_r-1}\binom{n-m_r}{m_l}(q_r)^{m_r-1}(q_l)^{m_l}(1-q)^{n-m}\binom{n-m}{k}\left(\frac{1}{2}\right)^{n-m}$$

$$\times \frac{\rho_r}{m_r}\left[b + E[v(x_i,\gamma)|\gamma \in \{51, \ldots, 100\}]\right] - c,$$

with

$$E[v(x_i, d)|d \in \{1, \ldots, 100\}]] = \frac{1}{1-q}\sum_{x=1}^{100}[1-q_x]\frac{|x_i - x|}{100}, \qquad (A17)$$

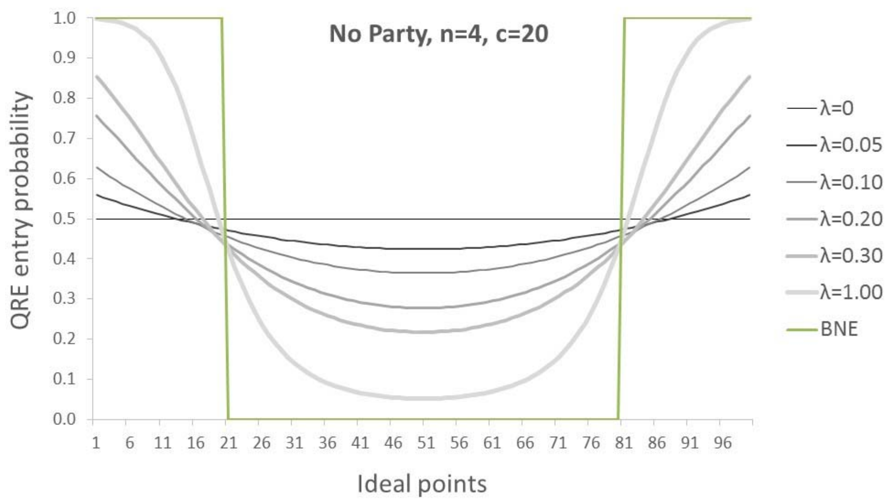
$$E[v(x_i,\gamma)|\gamma \in \{51, \ldots, 100\}] = \frac{1}{q_r}\sum_{x=51}^{100} q_x \frac{|x_i - x|}{50}, \qquad (A18)$$

and

$$E[v(x_i,\gamma)|\gamma \in \{1, \ldots, 50\}] = \frac{1}{q_l}\sum_{x=51}^{100} q_x \frac{|x_i - x_j|}{50} \qquad (A19)$$

where he expected policy losses ($A17$) to ($A18$) account for all feasible ideal points of others, and $\rho_r = H\left[\frac{m_r+k}{n} - \frac{1}{2}\right]$ gives the win probability of the *Right Party* with $H[z] = \begin{cases} 0 & if \quad z < 0 \\ 1/2 & if \quad z = 0 \\ 1 & if \quad z > 0 \end{cases}$. Then, for a given λ the one-hundred equilibrium conditions of the form ($A8$) are simultaneously solved for $x = 1, \ldots, 100$ to determine the QRE vector of entry probabilities, $\vec{q}_x^{\lambda}$.

Figure I.1: QRE distributions of entry probabilities - Example



II. Sample Instructions and decision screens

Instructions ($Party$, $n = 4$, $c = 10$)

Thank you for agreeing to participate in this decision-making experiment. You will receive $7 for participating, plus additional earnings during the experiment that depend on your own decisions, the decisions of others, and chance. Your earnings in the experiment are expressed in *points*. 250 points are worth $1. At the end of the experiment, your total earnings in points will be exchanged into dollars and paid to you in cash. No other participant will be informed about your payment!

Please switch off your cellphone, remain quiet, and do not communicate with other participants during the entire experiment! Raise your hand if you have any questions, and one of us will come to you to answer them.

Parts and Decision Rounds

The experiment consists of two parts, labeled *Part 1* and *Part 2*. Each part has *30 decision rounds*. We will read you the instructions for Part 1 now. After completing Part 1 we will read instructions for Part 2.

Instructions Part 1

Your Group

At the beginning of *each* round, all participants will be randomly divided into *groups of 4*. Thus, in addition to yourself, there will be three other members in *your group*. Note that you will not know who these other members are. Also, please note that the groups are completely independent of each other. In any particular round you will have no interaction at all with participants in the other groups.

Group Decision Problem

In *each* round, your group will decide on a *group outcome*, which can be any integer between 1 and 100. This is done by electing a *group leader*, whose *best outcome* will be implemented as the group outcome. Each of you will be told what your own best outcome is in that round, and different group members will generally have different best outcomes. You receive the highest benefits if the group outcome equals your own best outcome, and receive lower benefits the further the group outcome is from your own best outcome. We will explain the exact payoff details shortly.

Random Assignment of Best Outcomes

How is your own best outcome assigned in a round? This is done by the computer. It will randomly assign each member in your group a best outcome by choosing one of the integers from 1 to 100, with each integer being equally likely. The computer does this completely independently for each group member, so typically different members will each have a different best outcome. You are only told your own best outcome. You are not told the best outcome of any other group member. Therefore, knowing your own best outcome gives you no information whatsoever about anybody else's best outcome. All you know about another group member's best outcome is that it is some integer from 1 to 100, with an equal chance of being any of those integers. Importantly, best outcomes are reassigned independently in each round, so your own best outcome will typically vary from round to round, and your past assigned best outcomes have nothing to do with your future assigned best outcomes.

Low Number and High Number Members

If your best outcome is 50 or less, then we refer to you as a "Low number" member. If your best outcome is 51 or greater, then we refer to you as a "High number" member. The same holds for the other members in your group.

Decision-Making Stages

Each round consists of two *decision-making stages*, labeled *Stage 1* and *Stage 2*.

Stage 1

Each group member will decide on whether or not to enter as a candidate in the upcoming election for group leader of the current round. Whoever will become the group leader receives a *bonus of 5 points*. However, if you choose to enter as a candidate for leadership, then you must pay an *entry fee of 10 points*. If you choose not to enter, then you do not pay any fee (0 points). The winner of the election will be the group leader, and the group outcome coincides with her or his best outcome.

Stage 2

In this stage, if more than one low number member entered in Stage 1, then the computer will randomly select one of them for the election with an equal chance for each. This selected member is called "Low Number Candidate." Similarly, if more than one high number member entered in Stage 1, then the computer will randomly select one of them for the election with an equal chance for each. This selected member is called "High Number Candidate." Each group member casts a single vote for exactly one candidate. The candidates are indicated on the computer screen, represented by decision buttons labeled with their member ID label letter and whether they are from Low or High. For example, if member X and member Q are the respective low and high number candidates, then there will be two decision buttons with labels "Low Number Candidate X" and "High Number Candidate Q", respectively. If no low (high) number member entered in Stage 1, then there is no low (high) number candidate.

Each group member, whether a candidate or not, then votes for one of the candidates by clicking on the respective decision button, possibly for her- or himself. If you are a candidate yourself, then the label on your decision button is highlighted in red. *The candidate with the most votes in your group is the elected group leader.* If the candidates have the same number of votes, then one of them will be randomly selected as the group leader, with an equal chance for each.

Special case: If no group member entered as a candidate in Stage 1, then there is no voting. Instead, one of the four group members will be randomly selected as the group leader, with an equal chance for each. Please note that this randomly selected group leader does not pay the entry fee (because she or he actually did not enter) but nonetheless still receives the leader bonus of 5 points and the group outcome equals her or his best outcome.

It is important to remember that the group outcome is always exactly equal to the best outcome of the group leader, regardless of whether she or he entered and won the election or was selected randomly after nobody entered.

Your Round Earnings

Your round earnings will depend on three factors: the distance between your own best outcome and the group outcome, whether you chose to enter the election as a candidate, and whether you are the group leader. There are only four possibilities:

(i) <u>You were a candidate but not elected to be group leader</u>

In this case, your round earnings equal "100 points minus the absolute distance between your own best outcome and the group outcome, minus the 10 points entry fee" or:

$$\begin{aligned} &Your\ round\ earnings\ (candidate, but\ not\ group\ leader) \\ &\quad = 100 - |your\ best\ outcome - group\ outcome| - 10. \end{aligned}$$

Example: Your own best outcome is 60, and the group outcome is 91, then your round earnings are $100 - |60 - 91| - 10 = 59$ points.

(ii) <u>You were a candidate and elected to be group leader</u>

In this case, your round earnings are equal to exactly 95 points, or:

$$\begin{aligned} &Your\ round\ earnings\ (candidate\ and\ group\ leader) \\ &\quad = 100 - |your\ best\ outome - group\ outcome| + 5 - 10 \\ &\quad = 100 - 0 + 5 - 10 = 95. \end{aligned}$$

(iii) <u>You were not a candidate and were not the group leader</u>

In this case, your round earnings equal "100 points minus the absolute distance between your own best outcome and the group outcome" or:

$$\begin{aligned} &Your\ round\ earnings\ (neither\ candidate\ nor\ group\ leader) \\ &\quad = 100 - |your\ best\ outcome - group\ outcome|. \end{aligned}$$

Example: Your own best outcome is 60, and the group outcome is 15, then your round earnings are $100 - |60 - 15| = 55$ points.

(iv) <u>Nobody entered as a candidate and you were randomly selected to be group leader</u>

In this case, your round earnings are equal to exactly 105 points, or:

$$\begin{aligned} &Your\ round\ earnings\ (not\ candiate, but\ group\ leader) \\ &\quad = 100 - |your\ best\ outome - group\ outcome| + 5 \\ &\quad = 100 - 0 + 5 = 105. \end{aligned}$$

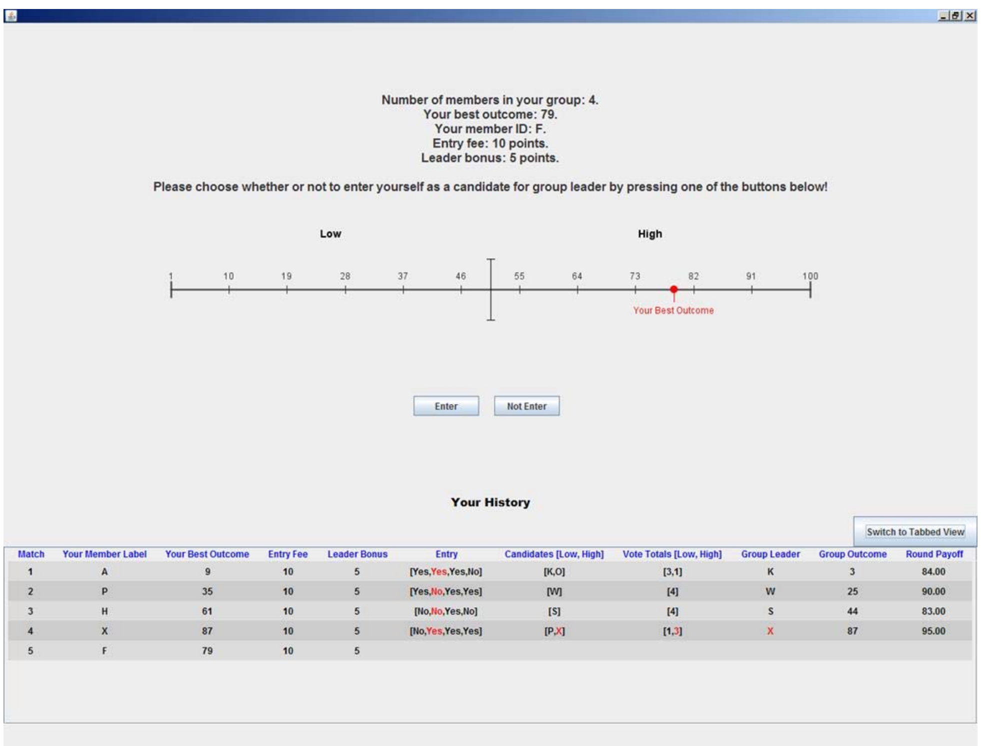
Observe that if you are a candidate, your expected round payoff is highest if you vote for yourself. This is because in case you will be elected group leader, you receive the leader bonus of 5 points and avoid any losses in points from the absolute difference between your best outcome and the group outcome, as your best outcome will be the group outcome.

Note that *your total earnings* in Part 1 are equal to the sum of all your round earnings in that part.

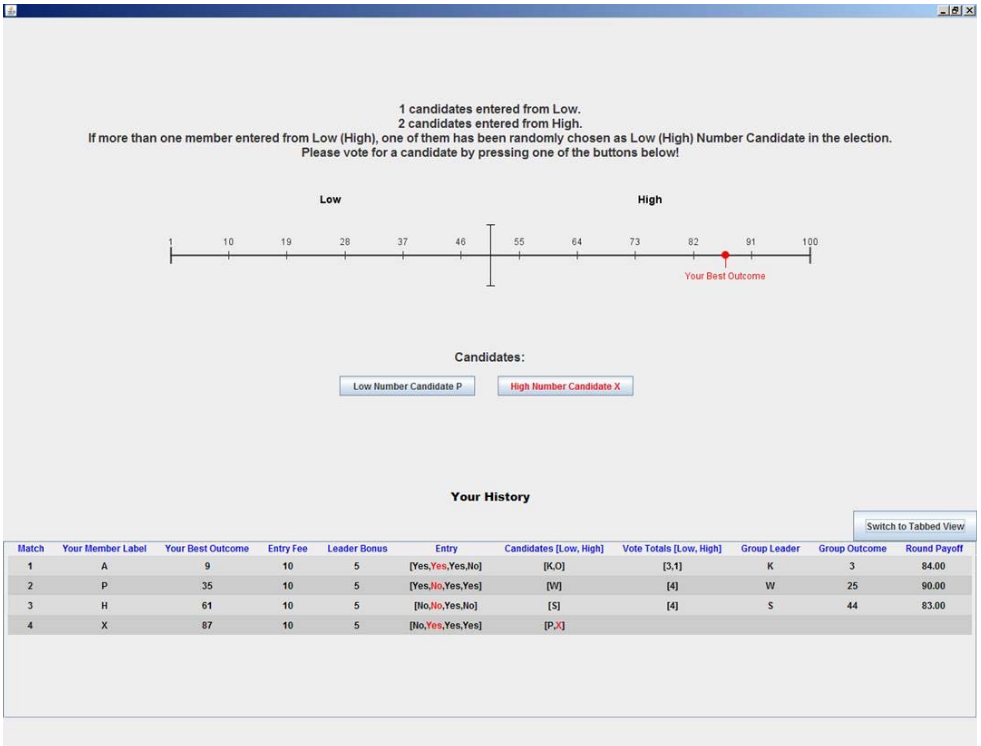
Each of the 30 decision rounds in Part 1 will follow the rules just described. Remember that you are randomly re-matched into new 4-person groups and randomly reassigned your own best outcomes between each round. At the bottom of your computer screen there will be a full summary of the history of your experience and payoffs in all prior rounds.

Decision screens (*Party*, $n = 4$, $c = 10$ points)

Entry decision

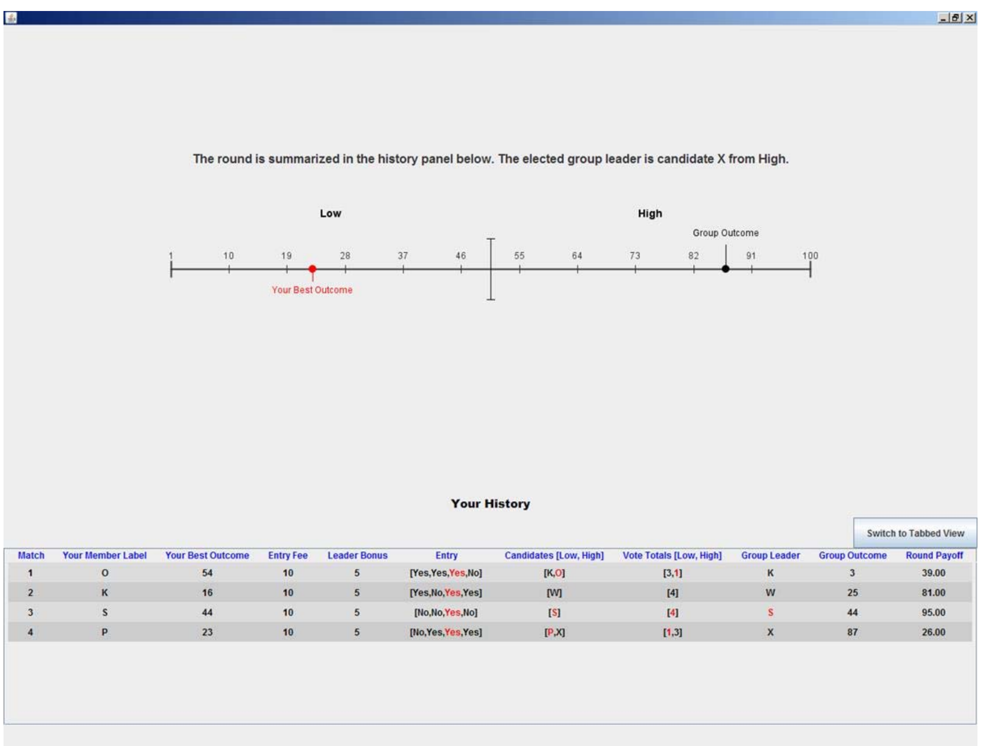


Voting decision



Match	Your Member Label	Your Best Outcome	Entry Fee	Leader Bonus	Entry	Candidates [Low, High]	Vote Totals [Low, High]	Group Leader	Group Outcome	Round Payoff
1	A	9	10	5	[Yes,Yes,Yes,No]	[K,O]	[3,1]	K	3	84.00
2	P	35	10	5	[Yes,No,Yes,Yes]	[W]	[4]	W	25	90.00
3	H	61	10	5	[No,No,Yes,No]	[S]	[4]	S	44	83.00
4	X	87	10	5	[No,Yes,Yes,Yes]	[P,X]				

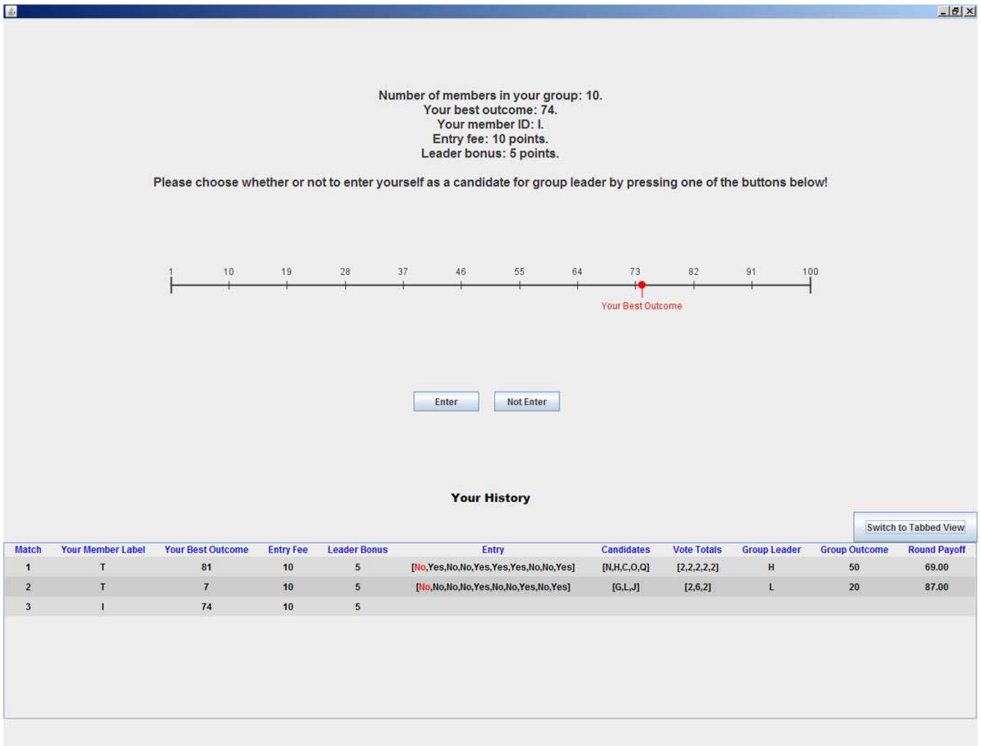
Election results



Match	Your Member Label	Your Best Outcome	Entry Fee	Leader Bonus	Entry	Candidates [Low, High]	Vote Totals [Low, High]	Group Leader	Group Outcome	Round Payoff
1	O	54	10	5	[Yes,Yes,Yes,No]	[K,O]	[3,1]	K	3	39.00
2	K	16	10	5	[Yes,No,Yes,Yes]	[W]	[4]	W	25	81.00
3	S	44	10	5	[No,No,Yes,No]	[S]	[4]	S	44	95.00
4	P	23	10	5	[No,Yes,Yes,Yes]	[P,X]	[1,3]	X	87	26.00

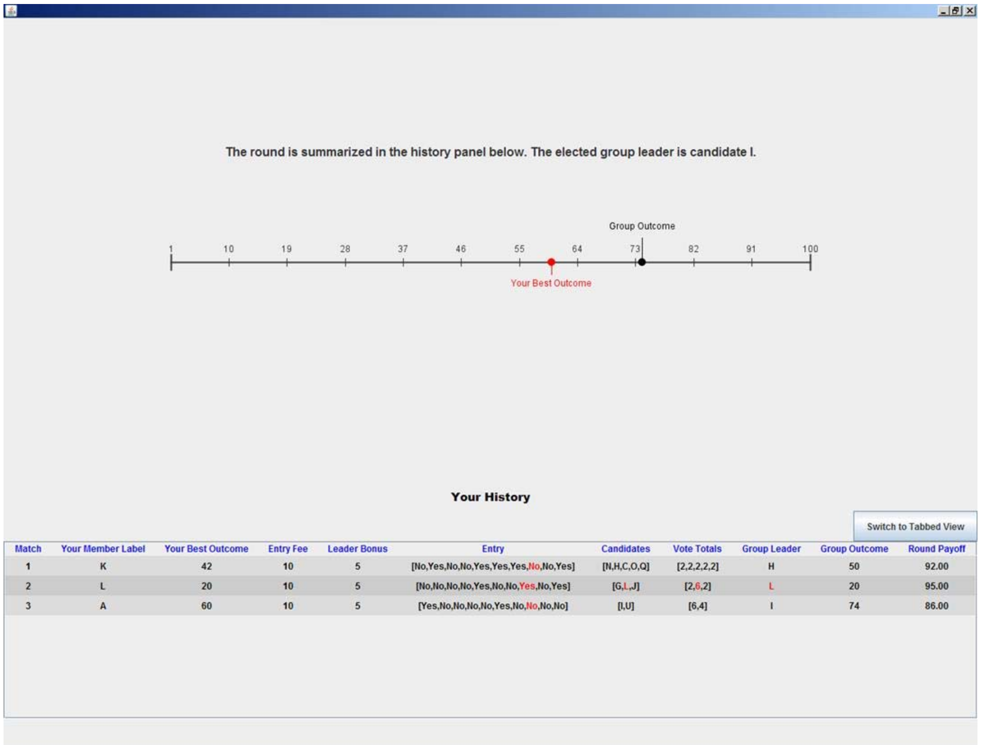
Decision screens (*No Party*, $n = 10$, $c = 10$ points)

Entry decision



Voting decision

Election results



III. Data: Tables and Figures

Table III.1: Entry rates - Predictions and data

n	c	Party	p^{obs}	p^{*} (p^{*}_{emp})	$p^{\hat{\lambda}}$ ($p^{\hat{\lambda}}_{emp}$)
4	10	No	.687	.840 (.844)	.603 (.602)
4	10	Yes	.673	.680 (.671)	.569 (.570)
4	20	No	.560	.400 (.417)	.457 (.459)
4	20	Yes	.496	.340 (.364)	.434 (.436)
10	10	No	.519	.420 (.426)	.465 (.465)
10	10	Yes	.445	.280 (.256)	.424 (.423)
10	20	No	.426	.200 (.181)	.331 (.330)
10	20	Yes	.321	.160 (.152)	.303 (.302)

Note: n and c denote the electorate size and entry cost, respectively. p denotes an individual's (expected) entry rate, where superscript *obs* indicates *obs*ervations, superscript * indicates BNE, and superscript $\hat{\lambda}$, the maximum likelihood estimate of the degree of error, indicates QRE. The subscript *emp* refers to the *emp*irical, or realized, distribution of ideal points as compared to the theoretical distribution. Standard errors of p^{obs} are all in the range [.013, .016].

Table III.2: Average payoffs – Predictions and data

n	c	*Party*	$\bar{\pi}^{obs}$	π_e^{*} (π_{emp}^{*})	$\pi_e^{\hat{\lambda}}$ $(\pi_{emp}^{\hat{\lambda}})$
4	10	No	69.26	66.98 (67.00)	69.91 (70.67)
4	10	Yes	70.42	69.09 (69.06)	71.96 (72.14)
4	20	No	64.22	64.59 (64.00)	66.65 (66.95)
4	20	Yes	68.03	66.69 (66.56)	68.41 (68.73)
10	10	No	64.44	59.71 (60.28)	65.45 (65.01)
10	10	Yes	68.31	61.24 (63.98)	68.36 (68.31)
10	20	No	62.61	57.59 (59.25)	63.20 (63.24)
10	20	Yes	64.35	59.90 (61.89)	65.94 (65.91)

Note: n and c denote the electorate size and entry cost, respectively. π denotes an individual's (expected) payoff, where superscript *obs* indicates *obs*ervations, superscript * indicates BNE, and superscript $\hat{\lambda}$, the maximum likelihood estimate of the degree of error, indicates QRE. The subscript *emp* refers to the *emp*irical, or realized, distribution of ideal points as compared to the theoretical distribution. Standard errors for $\bar{\pi}^{obs}$ are in the range [.71, .82].

Table III.3: Average payoffs, policy losses, and entry expenses – Predictions and data

Treatment			Payoffs			Policy losses			Entry expenses			Bonus
n	c	*Party*	$\bar{\pi}^{obs}$	$\bar{\pi}_{emp}^{*}$	$\bar{\pi}_{emp}^{\hat{\lambda}}$	$\bar{v}^{obs}$	$\bar{v}_{emp}^{*}$	$\bar{v}_{emp}^{\hat{\lambda}}$	$p^{obs}c$	$p_{emp}^{*}c$	$p_{emp}^{\hat{\lambda}}c$	b/n
4	10	No	69.26	67.00	70.67	25.12	25.81	24.55	6.87	8.44	6.02	1.25
4	10	Yes	70.42	69.06	72.14	24.10	25.48	23.41	6.73	6.71	5.70	1.25
4	20	No	64.22	64.00	66.95	25.83	28.91	25.12	11.20	8.33	9.18	1.25
4	20	Yes	68.03	66.56	68.73	23.30	27.42	23.81	9.92	7.27	8.71	1.25
10	10	No	64.44	60.28	65.01	30.87	35.96	30.84	5.19	4.26	4.65	0.50
10	10	Yes	68.31	63.98	68.31	27.74	33.96	27.96	4.45	2.56	4.23	0.50
10	20	No	62.61	59.25	63.24	29.38	37.63	30.66	8.52	3.62	6.60	0.50
10	20	Yes	64.35	61.89	65.91	29.74	35.58	28.56	6.42	3.03	6.04	0.50

Note: n and c denote the electorate size and entry cost, respectively. $p, \bar{\pi}$, and $\bar{v}$, denote an individual's expected or average entry rate, payoff, and payoff loss, respectively. Superscript *obs* indicates *obs*ervations, superscript * indicates BNE, and superscript $\hat{\lambda}$, the maximum likelihood estimate of the degree of error, indicates QRE. The subscript *emp* refers to the empirical, or realized, distribution of ideal points as compared to the theoretical distribution. Standard errors for $\bar{\pi}^{obs}$ are in the range [.71, .82], and for $\bar{v}^{obs}$ and $p^{obs}c$ they are in the range [.69, .80] and [.13, .34], respectively.

Table III.4: Observed average payoffs, policy losses, and entry expenses of leaders and non-leaders

Leader	n	c	*Party*	$\bar{\pi}^{obs}$	$\bar{v}^{obs}$	$p^{obs}c$	b
No	4	10	No	60.65	33.49	5.86	-
	4	10	Yes	62.23	32.13	5.64	-
	4	20	No	57.19	34.44	8.37	-
	4	20	Yes	61.88	31.07	7.06	-
	10	10	No	61.04	34.30	4.66	-
	10	10	Yes	65.34	30.82	3.84	-
	10	20	No	60.12	32.64	7.24	-
	10	20	Yes	62.00	33.04	4.96	-
Yes	4	10	No	95.11	0	9.89	5
	4	10	Yes	95.00	0	10.00	5
	4	20	No	85.30	0	19.70	5
	4	20	Yes	86.50	0	18.50	5
	10	10	No	95.00	0	10.00	5
	10	10	Yes	95.08	0	9.92	5
	10	20	No	85.00	0	20.00	5
	10	20	Yes	85.50	0	19.50	5

Note: n and c denote the electorate size and entry cost, respectively. $p, \bar{\pi}$, and $\bar{v}$, denote an individual's entry rate, average payoff, and average payoff loss, respectively. *obs* indicates observations. For non-leaders, standard errors of $\bar{\pi}^{obs}$, $\bar{v}^{obs}$, and $p^{obs}c$ are in the range $[.74, .98]$, $[.70, .89]$, and $[.15, .36]$, respectively. For leaders, standard errors of $\bar{\pi}^{obs}$ and $p^{obs}c$ are both in the range $[.00, .34]$.

Table III.5: Random-effects logit regressions - Entry and distance from median per treatment combination

n	c	*Party*	*Constant*	$\frac{\lvert x_{i,t} - x_{median}\rvert}{49}$	*Block of 15 periods* (1 *if 2nd*)
4	10	No	0.801* (.424)	1.379*** (.295)	0.049 (.165)
4	10	Yes	0.283 (.315)	1.377*** (.271)	0.200 (.159)
4	20	No	-0.404 (.363)	1.859*** (.278)	0.089 (.152)
4	20	Yes	-1.176*** (.484)	2.187*** (.277)	0.091 (.157)
10	10	No	-0.525* (.235)	1.172*** (.227)	-0.096 (.131)
10	10	Yes	-0.710** (.265)	0.894*** (.234)	-0.024 (.134)
10	20	No	-0.521* (.232)	0.704*** (.231)	-0.395** (.131)
10	20	Yes	-1.545*** (.289)	1.235*** (.258)	-0.188 (.144)

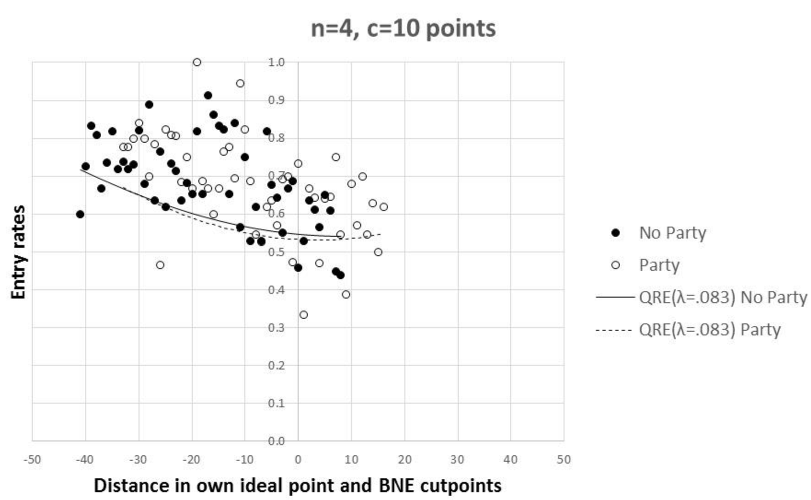
Note: n and c denote the electorate size and entry cost, respectively. * (**; ***) indicates a one-tailed 5% (1%, 0.1%) significance level. The data is clustered at the indvidual level.

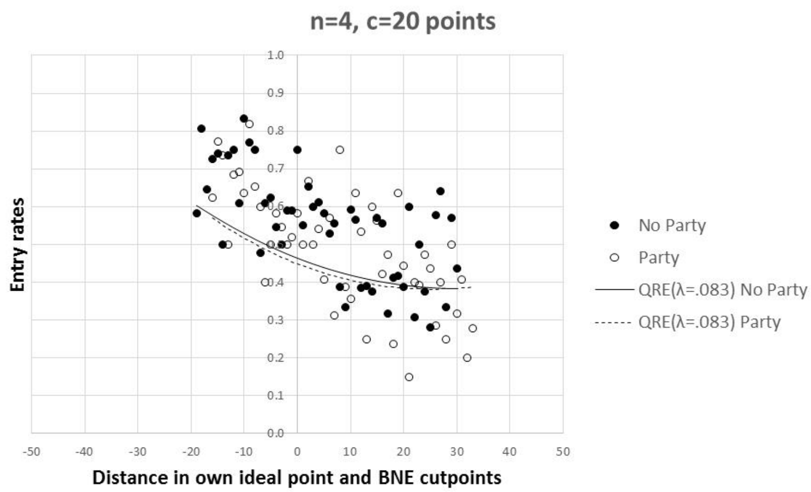
Table III.6: Random-effects OLS regressions – Payoff and distance from median per treatment combination

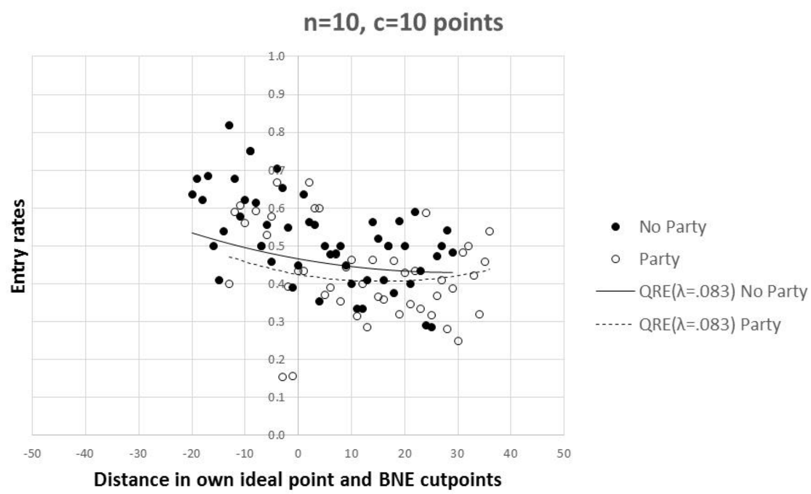
n	*c*	*Party*	*Constant*	$\frac{\lvert x_{i,t} - x_{median} \rvert}{49}$	*Block of 15 periods* (1 *if 2nd*)
4	10	No	74.76*** (1.75)	-9.70*** (2.73)	-1.29 (1.59)
4	10	Yes	73.08*** (1.80)	-6.75** (2.71)	1.40 (1.64)
4	20	No	72.88*** (1.73)	-15.71*** (2.62)	-1.31 (1.55)
4	20	Yes	72.73*** (1.80)	-7.08** (2.70)	-2.28 (1.62)
10	10	No	73.82*** (1.62)	-19.65*** (2.45)	0.79 (1.45)
10	10	Yes	78.31*** (1.59)	-18.98*** (2.37)	-1.41 (1.38)
10	20	No	69.79*** (1.57)	-16.28*** (2.44)	1.78 (1.40)
10	20	Yes	71.68*** (1.71)	-16.34*** (2.54)	1.50 (1.46)

Note: n and c denote the electorate size and entry cost, respectively. * (**; ***) indicates a one-tailed 5% (1%, 0.1%) significance level. The data is clustered at the indvidual level.

Figure III.1: Entry rates per ideal points for normalized distances to median ideal point – Predictions and data




n=4, c=20 points
Entry rates
Distance in own ideal point and BNE cutpoints
No Party
Party
QRE(λ=.083) No Party
QRE(λ=.083) Party


n=10, c=10 points
Entry rates
Distance in own ideal point and BNE cutpoints
No Party
Party
QRE(λ=.083) No Party
QRE(λ=.083) Party

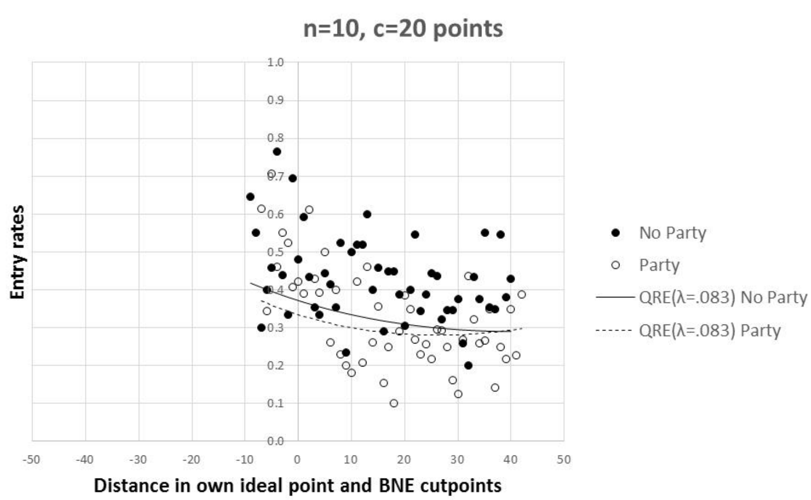

n=10, c=20 points
Entry rates
Distance in own ideal point and BNE cutpoints
No Party
Party
QRE(λ=.083) No Party
QRE(λ=.083) Party

Figure III.2: Frequency of participants with ideal points {51, … ,100}

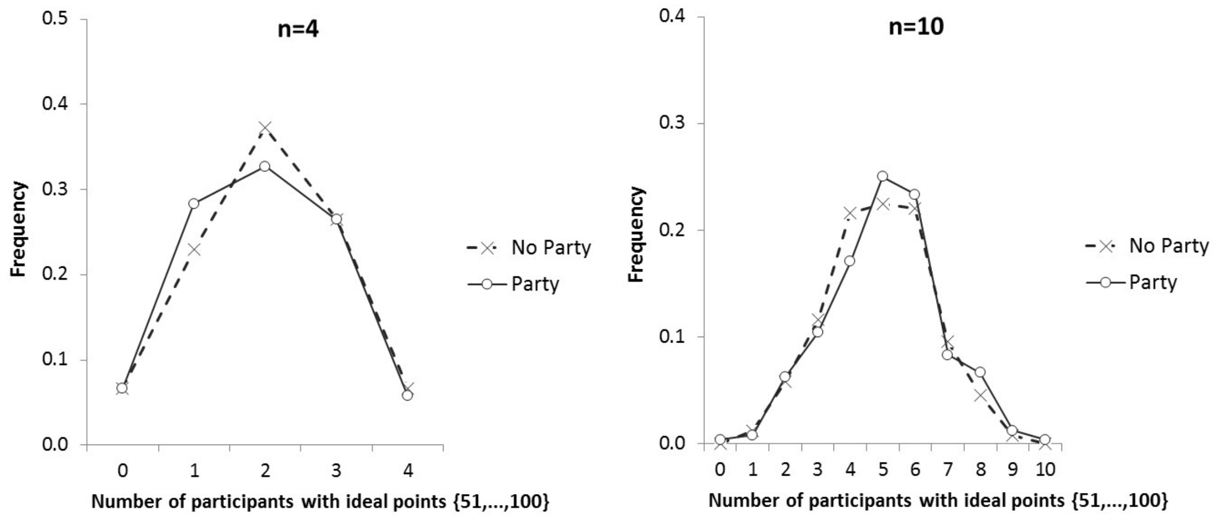


Figure III.3: Cumulative frequency distributions of average individual entry rates

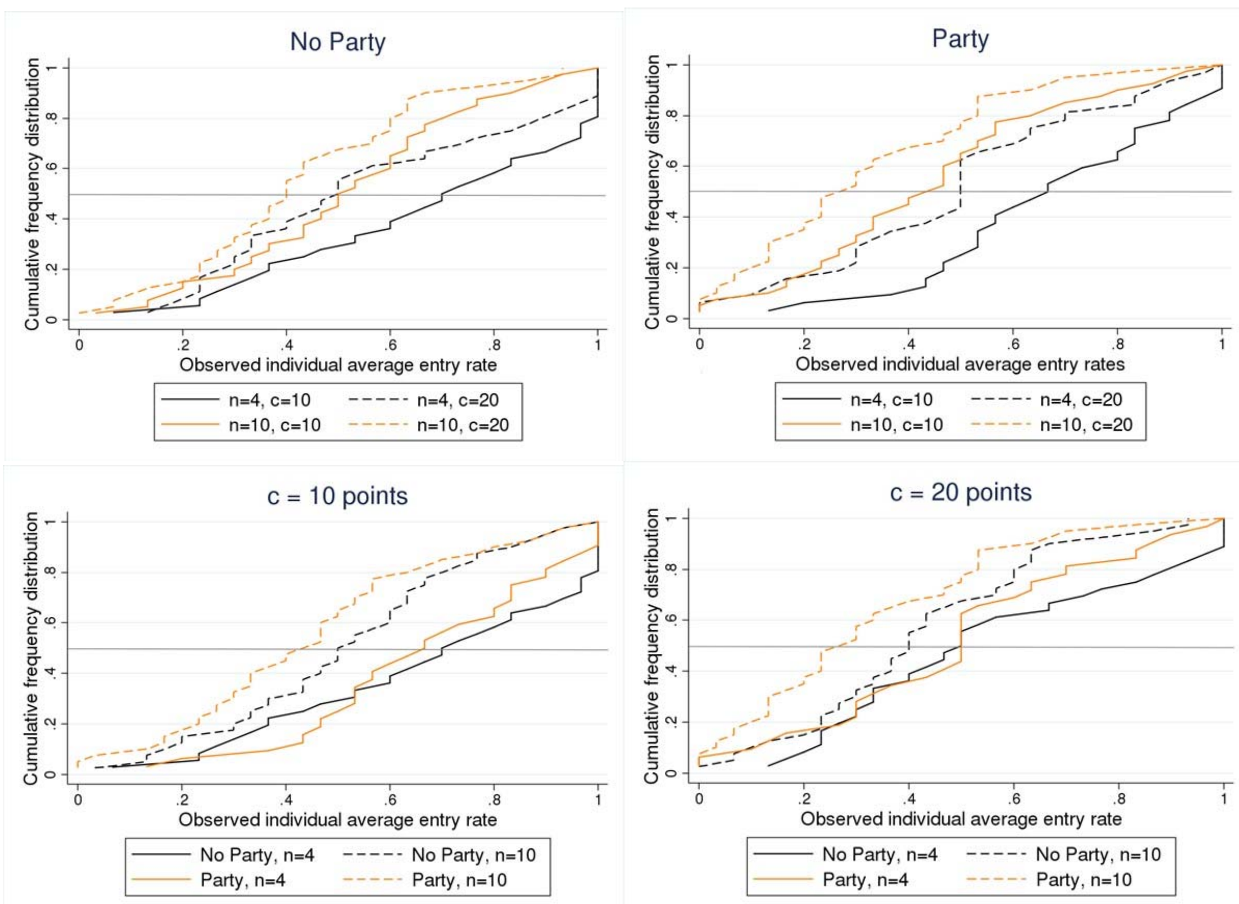
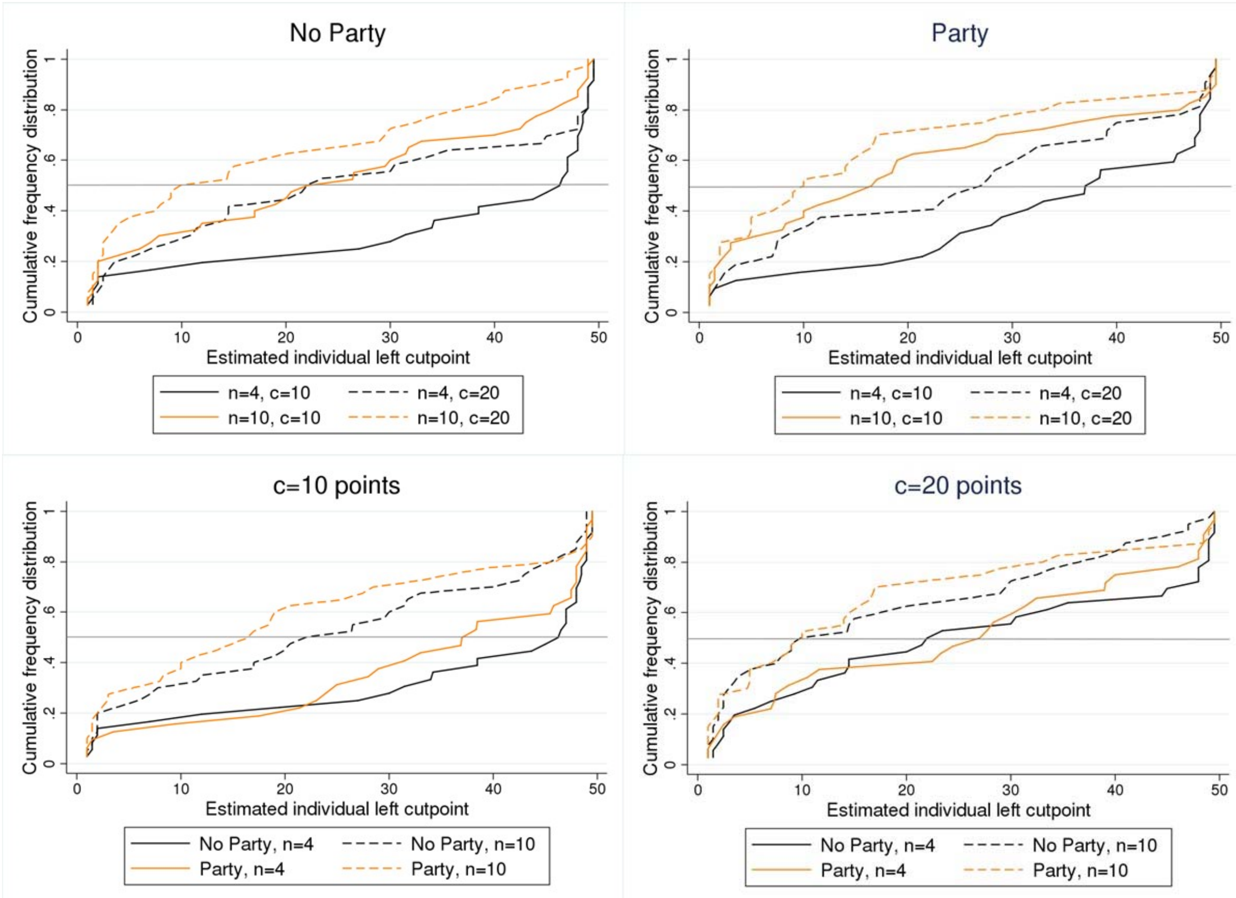


Figure III.4: Cumulative frequency distributions of estimated individual cutpoint pairs



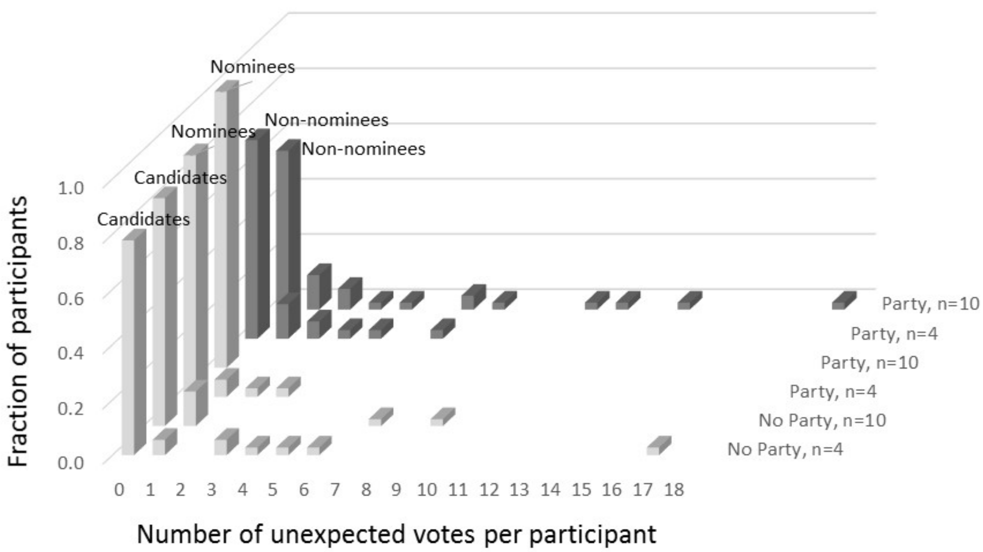
IV. Additional analysis of individual voting behavior

Figure IV.1 displays the distribution of the number of unexpected votes across all participants, with the number of such votes on the horizontal axis (from zero to the maximum observed of eighteen) and the respective fraction of individuals on the vertical axis. The figure also separates out the observations for independent candidates, nominees, and non-nominees as they face different decision tasks.[i] The diagonal axis shows combinations of party mode and group size, with data pooled for both entry costs. The figure indicates that only very few participants voted unexpectedly. Specifically, 77.8 and 82.5 percent of the independent candidates in 4- and 10-person groups always voted as predicted, and these numbers are 87.5 and 100 percent for nominees and 71.9 and 57.5 percent for non-nominees, respectively. And of the participants who cast at least one

[i] Compared to nominees in *Party*, there can be more than two contenders to choose from by candidates in *No Party*, including themselves. And, non-nominees in *Party* must realize that their expected payoff is greater if they vote for the contender whose ideal point is from the same direction as the own one, while nominees simply vote for themselves.

anomalous vote, many did so just once or little more than this. Hence, the few deviations from equilibrium voting are due to the behavior of only a handful of the participants in the experiment. For example, the three largest individual counts of unexpected votes are seventeen by a candidate in $(No\ Party, n = 4)$ and thirteen and eighteen by two non-nominees in $(Party, n = 10)$, where the latter of them never entered.

Figure IV.1: Number of unexpected votes per individual



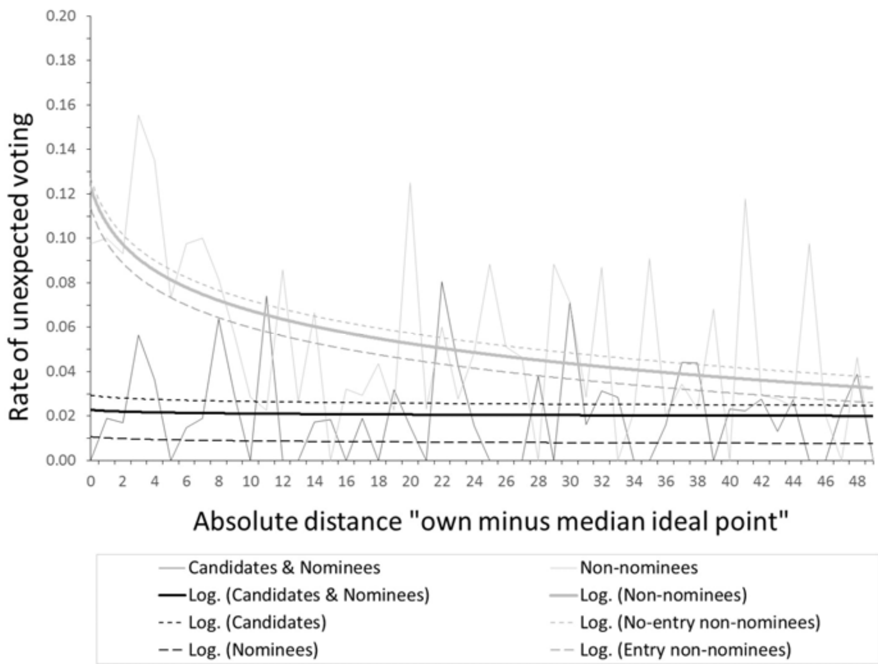
Note: The fractions are shown per independent candidates, nominees, and non-nominees and are pooled for both entry cost treatments, so the figure connects only the party mode and group size.

We also examine whether the observed rates of unexpected voting depend on the ideal point.[ii] Figure IV-2 shows the rates on the vertical axis and the absolute distance in the own ideal point and the closer "median" ideal point, 50 or 51, on the horizontal axis. Thus, at zero on the horizontal axis both ideal points coincide and at 49 the distance between them is maximal. The figure shows the data (lines with spikes) and respective logarithmic trend lines for candidates and nominees combined and for non-nominees (thick black and gray lines, respectively), and also separate logarithmic trends for candidates and nominees (dashed black lines) and non-nominees who did and did not enter (dashed gray lines). We find that unexpected voting of candidates and nominees doesn't depend on the own ideal point, as measured by the absolute distance in the own and median ideal points (Spearman's $\rho = -0.018$ for both roles combined and -0.037 and 0.034

[ii] The following analysis pools all data and utilizes only participants who cast at least one unexpected vote in the entire session. Using instead all participants in the nonparametric tests yields many ties and decreases the p-values, except for two increases where the results are statistically significant whether or not all individuals are considered.

for each role, respectively; $p \geq 0.799$), and is higher for candidates (but the difference is not significant, $p = 0.115$, individual level one-tailed Wilcoxon-Mann-Whitney test, fifteen and four participants per role).

Figure IV.2: Unexpected voting per absolute distance in own and median ideal points



Note: The figure depicts unexpected voting rates per absolute distance in own and median ideal points for non-nominees and for candidates and nominees combined. At zero, the own ideal point is 50 or 51, and at 49 ($50 - 1$ or $100 - 51$) the distance is maximal. The dashed lines show the respective logarithmic trends.

By contrast, we observe a negative association between unexpected voting and the absolute distance in the own and median ideal points for non-nominees ($\rho = -0.424$ overall, and -0.363 and -0.352 for entrants and non-entrants; $p \leq 0.012$). In *Party*, note that anomalous voting of non-nominees tends to be smaller when they entered ($p = 0.006$, one-tailed Wilcoxon signed-ranks test, 25 individuals) and especially high for ideal points within about ten points of the median (see Figure IV.2). Also, the rates are always greater in the non-nominee than nominee role ($p = 0.003$, same test, 26 individuals). Overall, our results indicate that among those who vote unexpectedly, candidates and nominees make "plain" errors while for non-nominees models that incorporate the pecuniary consequences of erroneous voting and beliefs about nominee ideal points seem more suitable.[iii] This also makes sense, since the expected payoff-maximizing vote is more obvious for

[iii] For example, QRE (McKelvey and Palfrey 1995, 1998) allows for decision-making errors and thus unexpected voting. It also predicts that such votes get more frequent the nearer an ideal point is to 50 or 51, as the expected policy loss if someone else is elected decreases towards the median.

[iv] Table 6 in the paper suggests two more patterns of average individual rates of unexpected voting for primary comparisons. First, the rates are always weakly greater with a lower than larger entry cost for candidates and nominees

candidates and nominees than for non-nominees, which is also supported by learning towards BNE voting of participants in the latter role: while unexpected voting doesn't depend on the period for candidates and nominees combined using all 60 periods or the first and last 30 periods only (Spearman's $\rho = -0.112$, -0.247, and -0.029; $p \geq 0.188$), it does so negatively for non-nominees for all 60 and last 30 periods ($\rho = -0.312$ and -0.378; $p = 0.093$ and 0.003, respectively) but not the first 30 periods ($\rho = -0.159, p = 0.402$).[iv]

V. References

Großer, Jens, and Thomas R. Palfrey. 2014. "Candidate Entry and Political Polarization: An Antimedian Voter Theorem." *American Journal of Political Science* 58 (1): 127-43.

McKelvey, Richard D., and Thomas R. Palfrey. 1995. "Quantal Response Equilibrium for Normal Form Games." *Games and Economic Behavior* 10 (1): 6-38.

McKelvey, Richard D., and Thomas R. Palfrey. 1998. "Quantal Response Equilibrium for Extensive Form Games." *Experimental Economics* 1 (1): 9-41.

($p = 0.035$, one-tailed Wilcoxon signed-ranks test for both roles combined, eighteen individuals), but no pattern is seen for non-nominees (albeit, $p = 0.074$ in favor of greater rates with a lower cost, same test, 26 individuals). Second, the rates are always greater in smaller than larger groups for candidates and nominees ($p = 0.029$, one-tailed Wilcoxon-Mann-Whitney test, twelve and seven individuals in 4- and 10-person groups, respectively), and the reverse is seen for non-nominees (but the difference is not significant, $p = 0.241$, same test, nine and seventeen individuals). Finally, for the two possible within-subject comparisons, unexpected voting is neither associated between both entry costs for candidates and nominees combined and for non-nominees nor between the nominee and non-nominee roles in *Party* (Spearman's $\rho = -0.026$, 0.105, and 0.058; $p \geq 0.611$). Due to few unexpected votes by few individuals, all these findings are hard to interpret as we would need to control for, say, ideal points and expected payoffs.