Supplemental Appendices for: The Concreteness of Social Knowledge and the Quality of Democratic Choice*

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A Parameter Realizations

The experiment was programmed using z-Tree (Fischbacher 2007) and conducted via computerized network. We used the built-in function from z-Tree to generate a uniform distribution of the state of the world and partisan bias. Realizations of the state of the world in each treatment are: A 51% of the time and B 49% of the time. As reported in Figure A1, on average about 70% of voters are expert voters both in the control and treatment groups. Each level of the partisan bias occurred about $\frac{1}{3}$ of the time. In the Control Group, the partisan bias is supportive 31.94% of the time, neutral 32.22% of the time, and against 35.83% of the time. In the Treatment Group, the partisan bias is supportive 32.78% of the time, neutral 33.33% of the time, and against 33.89% of the time. The distribution of partisan bias is statistically identical between the Control Group and Treatment Group.

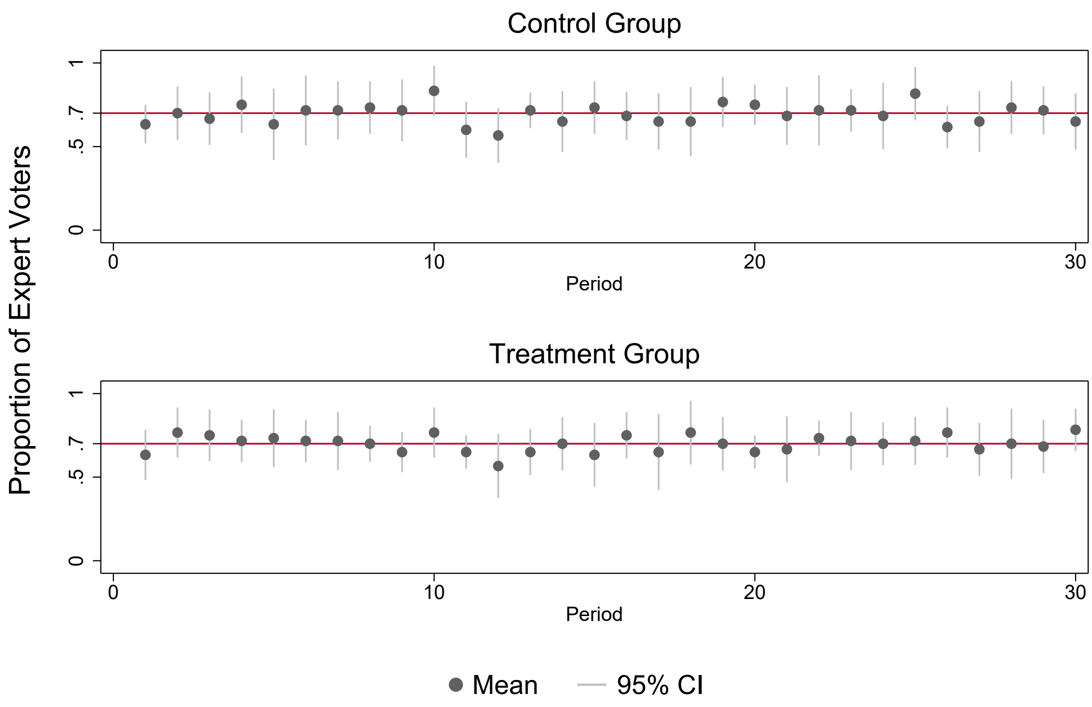

Figure A1: Distribution of Realized Expertise by Election-Period

B Regression Analysis of Quality of Democratic Choice

As a supplement to the nonparametric statistical analysis reported in the main text, we conduct linear regressions to investigate the extent to which the quality of democratic choice is different between the Control Group and Treatment Group. The results are reported in Table A1. We find that the quality of democratic choice is significantly smaller in the Treatment Group. These results are consistent with results that we report in the main text.

Table A1: Analyses of Treatment Effects on the Quality of Democratic Choice

Dependent Variable: Quality of Democratic Choice		
	(1)	(2)
Treatment	-0.121**	-0.121**
	(0.047)	(0.047)
Period		0.000
		(0.002)
Constant	0.761	0.755
	(0.031)	(0.046)
Observations	720	720

Note: OLS specification. Standard errors clustered at the electorate level. Clustered standard errors are reported in the parentheses. The signs $*$, $**$, $***$ indicate significance at 10%, 5%, and 1% level, respectively.

C Regression Analysis of Willingness to Vote

We conduct linear regressions to investigate the extent to which individual voters' willingness to vote is different between the Control Group and Treatment Group. The results are reported in Table A2. *Expert* is a dummy variable that we use to investigate the difference of willingness to vote when a subject is assigned expertise as compared to when the subject is a nonexpert voter. *Treatment* is a dummy variable that we use to indicate the Treatment Group. *ElectionPeriod* is the number of rounds which we use to control for learning effects. *Against* and *Neutral* are dummy variables that are used to identify what a specific level of partisan bias a subject plays. The inclusion of the interaction of the Treatment dummy and the Partisan Bias dummies explore treatment effects conditional on a specific level of the partisan bias. In Model 7 of Table A2, we further control for the demographic variables including gender, age, and subjects' performance on a Cognitive Reflection Task (CRT) developed by Frederick (2005).[1]

The results of Table A2 can be summarized as follows. First, on average, a subject's willingness to vote is significantly larger when she has expertise as compared to when she is a nonexpert voter. Second, expert voters in the Treatment Group always have a significantly lower cutoff willingness to vote, whether we only regress the voting data on the *Treatment* dummy or include additional control variables such as election periods, the level of partisan bias, and the demographic variables. Third, relative to the voting decisions in the scenario in which the level of the partisan bias is supportive, a voter's willingness to vote is significantly higher when the partisan bias is against and neutral. All these results yield conclusions that are the same as what we report in the main text.

[1]The CRT is conducted after subjects have finished all voting decisions. It is not incentivized; subjects are not paid for the CRT task.

Table A2: Analysis of Treatment Effects on Expert Voters' Willingness to Vote

	Dependent Variable: Cutoff Willingness to Vote						
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment		-15.421***			-15.049***	-7.607**	-8.121**
		(2.897)			(2.876)	(3.623)	(3.653)
Election Period			-0.045		0.017	0.031	0.031
			(0.078)		(0.074)	(0.073)	(0.073)
Against				24.991***	24.516***	30.323***	30.164***
				(2.481)	(2.456)	(3.878)	(3.883)
Neutral				19.647***	19.813***	25.089***	25.234***
				(2.383)	(2.330)	(4.224)	(4.255)
Treatment×Against						-11.623**	-11.141**
						(4.805)	(4.812)
Treatment×Neutral						-10.281**	-10.289**
						(4.666)	(4.705)
Age							-0.521
							(0.324)
Female= 1							-1.852
							(2.892)
CRT Performance							-0.472
							(1.206)
Expert= 1	30.966***						
	(1.549)						
Constant	1.635***	40.339***	33.300***	17.392***	24.790***	20.770***	32.972***
	(0.398)	(2.360)	(1.935)	(1.826)	(2.768)	(3.252)	(8.201)
Observations	3,600	2,511	2,511	2,511	2,511	2,511	2,511
Only Expert Voters	No	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.227	0.062	0.000	0.120	0.179	0.186	0.191

Note: OLS specification. Standard errors are clustered at the individual level. reported in the parentheses. The signs $*$, $**$, $***$ indicate significance at 10%, 5%, and 1% level, respectively.

D Learning Effects

To address the role of subject learning over the course of the experiment, we look at how the percentage of times voters succeed changes over time in our experiment. We consider the estimated quality of democratic choices as a function of the *Period* in a session. The results of the OLS regressions are summarized in Table A3.

We find that, although the quality of democratic choice generally increases with the number of periods in the Control Group, it decreases with the number of periods in the Treatment Group. We test whether the coefficients are significantly different by treatment, and find that the coefficient of each treatment is statistically indistinguishable by treatment. We conducted similar regressions to investigate whether individuals' willingness to vote changes over time, and we find the same qualitative results. In sum, we find no evidence that differences in the quality of democratic choice can be attributed to subjects learning over the course of the experiment.

Table A3: Quality of Democratic Choice as a Function of Period

Treatment	Coefficient	t	$Pr > \|z\|$
Control	0.002	0.71	0.495
Treatment	-0.001	0.34	0.739

Note: OLS specification. Standard errors clustered at electorate level. Dependent variable is the estimate of the quality of democratic choice. Independent variable is the number of election-period. The signs $*$, $**$, $***$ indicate significance at 10%, 5%, and 1% level, respectively.

E Experiment Instructions

You are participating in group decision-making experiment, where you will be making decisions as a member of a committee. We will start with a brief instruction period. During the instruction period, you will be given a complete description of the experiment and will be shown how to use the computers. If you have any questions during the instruction period, please raise your hand and your question will be answered out loud so everyone can hear. If you have any questions after the experiment has begun, raise your hand, and an experimenter will come and assist you. The instruction period will be followed by the paid session. The experiment consists of 30 rounds, and at the end one of the 30 rounds will be randomly selected by the computer as the round to be paid. You will also receive an additional show-up fee of $7. Everyone will be paid in private and you are under no obligation to tell others how much you earned. Your earnings during the experiment are denominated in Points (experimental currency). Everyone will be given an initial starting budget that is 100 Points. The experimental currency will be converted to US dollars and you will be paid by check. The exchange rate is 10 Points = $1.

Procedure

We begin the first round by dividing you into committees of five members each. Each of you is assigned to exactly one of these committees and you are not told the identity of the other members of your committee. Your committee is tasked with making a group decision. The decision is simply a choice between one of two alternatives: A and B. Committees make decisions by voting, where whichever alternative receives more votes is the committee's decision, and ties are broken by a fair coin toss.

At the beginning of each round, the computer will randomly select a *state of the world* for your committee. The state of the world will be either A or B. Each state of the world will be selected with a 50% chance. For each committee, and for each round, the computer will choose the state of the world separately, which means the selected state of the world could be different for different committees, and the selected state of the world would vary from one round to the other. Within one committee, the assigned state of the world will be the same for every member. Please note that you do not know the randomly assigned state of the world at first.

The computer will also randomly cast two votes. There is no connection between the assigned state of the world for your committee and how the computer cast the 2 votes. This means that:

- the state of the world and computerized votes operate independently and separately.
- The computer may either cast two votes for A, two votes for B, or split their votes evenly between A and B. Please note that each of these events is equally likely. For example, on average, 33% of the time the computer will cast two votes for A, 33% of the time the computer will cast two votes for B, and 33% of the time the computer will cast one vote for A and one vote for B.

Decision Task

Before voting, you may be given *expertise*, in which case you are told which state of the world was assigned to your committee, and how the computer has voted. [IN THE TREATMENT ONLY: You are also told exactly how many people in your committee are given expertise.] Whether you are given expertise is randomly decided. Specifically, the computer will randomly generate a number for each of the 5 committee members that is an independent random number between 1 and 100. The computer may generate a different number for different participants. If the number generated for you is equal to or lower than 70, you will be told the state of the world and computerized votes. If the number generated for you is greater than 70, you will not be given expertise. Each number between 1 and 100 is equally likely, and based on this mechanism, on average 70% of your committee members will be given expertise. Note that there is no cost for expertise.

Then, once you find out whether you have been given expertise, you and your other committee members will be asked to make a vote choice. You can vote for A, B, or you can abstain. If your decision is voting for A or B, you will be asked to input your highest willingness to pay in Points to make your ballot count. If your decision is to abstain, you will not be asked to input such a willingness to pay.

If you decide to vote for A or B, note that whether your ballot will be used in determining your committee's decision depends on your reported willingness to pay and a randomly drawn voting cost. Specifically, the computer will independently generate a random voting cost for you, which will be a number between 1 and 100, and where each number is equally likely.

- If the randomly generated voting cost is equal to or lower than your reported willingness to pay, then your vote will be counted as part of your committee's decision, and the *voting cost* will be deducted from your income.
- If the randomly generated voting cost is greater than your reported willingness to pay, then your vote choice will not be used in determining your committee's decision, and you do not need to pay the voting cost.
- The higher (lower) your willingness to pay for the ballot to make it count, the more (less) likely your ballot will be a valid vote that is used to determine the committee's decision.
- Your personal voting cost is randomly drawn by the computer independently, which means different committee members may have different voting costs.
- If you abstain, you will not be charged a voting cost and your ballot will not be cast.

Please note that when you are voting, the computer has cast the 2 votes. If you get expertise, you will know how the computer has voted; otherwise, you do not know this information.

For your committee, **only the ballots of those who decide to vote meanwhile whose willingness to pay are equal to or higher than their individual cost of voting will be counted.** The 2 votes cast by the computer will always be counted. The valid ballots of your committee and the 2 votes cast by the computer will jointly make a decision for your committee. Your committee's decision will be applied to everyone in your committee, and it is determined by simple plurality, i.e. whichever alternative receives more votes is the committee's decision. For example, **including the 2 votes cast by the computer**, if there are 4 votes for A, 3 votes for B, then your committee's decision is A. If there are 0 votes for A and 2 votes for B, then your committee's decision is B.

Ties (1-1, 2-2, 3-3) are broken randomly by a fair coin toss. So, for example, including the 2 votes cast by the computer, if 2 votes are for A, 2 votes are for B, and other participants abstain, then the total vote would be 2-2, which is a tie, and the tie is broken randomly, meaning that with a 50% chance A will be the committee's decision, and with a 50% chance B will be the committee's decision.

The other committees in the room face a similar task, but the correct decision may be different for different committees. Remember that committees are completely independent, and they act independently.

Payment

Payoffs are determined as follows. If your committee's decision matches the assigned state of the world, then all participants in your committee will receive a High payoff equal to 110 points.

- For example, if your committee decision is A and the assigned state of the world is A, then all participants in your committee will receive a High payoff.
- Whether you vote or abstain, and whether your vote is A or B, if your committee's decision is correct, you will receive a High payoff.

If your committee's decision does not match the assigned state of the world, then all participants in the committee receive a Low payoff equal to 10 points.

- For example, if your committee's decision is A but the assigned state of the world is B, then all participants in your committee will receive a Low payoff.
- Whether you vote or abstain, and whether your vote is A or B, if your committee's decision is wrong, you will receive a Low payoff.

Thus, your earning will be the realized payoff (High or Low) minus the cost of voting (if any).

After the first round is completed, we will proceed to the second round and the process repeats itself. The actual experiment will consist of 30 rounds. In each round, a new state of the world will be chosen and new votes by the computer will be cast. Each round is operated independently. One of the 30 rounds will be randomly chosen as the round to be paid, and you will be paid by check. Please treat every round seriously as each round is equally likely to be selected as the round to be paid.

[Experimenter: Do you have any questions?]

[Experimenter: We will first go through a practice round. During the practice round, please do not hit any keys until you are asked to, and when you are instructed to enter information, please do exactly as asked. You will not be paid for this practice round.]

The key information of the experimental procedure and decision task is summarized below.

1

- A *state of the world* is randomly assigned for your committee.
- At the same time, the computer randomly casts two votes.
- These two things are operated independently and separately.

2

- The 5 committee members do not know the assigned state of the world *ex ante*.
- The computer determines whether you get expertise.
- On average, about 70% of voters get expertise.

3

- Every voter will be asked to decide whether to vote for A, vote for B or to abstain.
- You will be asked to input your willingness to pay to make the ballot count if you decide to vote for A or B.
- Only the ballots of those whose willingness to pay is equal to or higher than their voting cost will be counted to determine the committee's decision.
- The 2 votes cast by the computer will always be counted in the election.

4

- Collective decisions are made by simple plurality; i.e. whichever alternative receives more votes is the committee's decision.
- Ties are broken by a fair coin toss.
- If your committee's decision matches the assigned state of the world, then all participants in your committee receive a High payoff equal to 110 points.
- If your committee's decision does not match the assigned state of the world, then all participants in the committee receive a Low payoff equal to 10 points.

F Comprehension Quiz

To make sure subjects understand how the experiment works, we ask them to answer the following comprehension quiz before they start making voting decisions in the experiment. The comprehension quiz is programmed using z-Tree (Fischbacher 2007) and conducted via computerized network. If a subject provides a wrong answer to a question, detailed explanations pop up on the computer screen. A subject can also raise her hand and an experimenter would answer her questions in private. Subjects cannot skip questions. They can make voting decisions only after they have answered all the questions correctly.

1. If in your committee, there are 2 votes for A, 0 votes for B, but in the other committee, there are 2 votes for A, 5 votes for B, what would be your committee's decision? [Answer: A]

2. Because each state of the world will be chosen with a 50% chance, if A was chosen for your committee in the last three rounds, does it mean that B will be chosen for your committee in this round (with a somewhat higher probability)? [Answer: No]

3. Regarding the 2 votes cast by the computer, on average 33% of the time the 2 votes are for A, 33% of the time the 2 votes are for B, and 33% of the time 1 vote is for A and 1 vote is for B. If you saw that in the first round the 2 votes are for A, in the second round there is 1 vote for A and 1 vote for B, does it mean that for the current round, it is somewhat more likely that the 2 votes are for B? [Answer: No]

4. Assume that in the round to be paid, A was the state of the world, and including the computerized votes your committee's decision was A. Your willingness to pay was 38 Points, in the end of the session, you find that your voting cost was 38 Points, what are your earnings for this round? [Answer: 72]

5. Assume that in the round to be paid, B was the state of the world, and including the computerized votes your committee's decision was A. Assume that your highest willingness to pay to make your vote count was 61, but the voting cost for your was 83, what are your earnings for this round? [Answer: 10]

6. Assume that in the round to be paid, including the computerized votes your committee's decision was the state of the world. You decided to abstain. Your voting cost was 48 Points. What are your earnings in this round? [Answer: 110]

7. Assume that the state of the world was A, the computer cast 2 votes for B. In your committee, 4 voters decided to vote for A, 1 voter decided to abstain. For those who decided to vote, their willingness to pay to make their vote count were 30, 50, 70, 90, respectively. If the computer randomly generated a voting cost 50 for everyone, how many votes were used to decide the committee's decision? [Answer: 3]

8. True or False: Based on the mechanism of how a voter is exogenously given expertise, on average about 70% of voters will have expertise. But in a particular round, it is possible that all the 5 voters get expertise or only 1 of the 5 voters get expertise. [Answer: True]

9. If A was the state of the world, the computer cast 1 vote for A and 1 vote for B. There was 1 committee member who got expertise and whose willingness to pay was 100 Points but he mistakenly voted for B, and the other committee members' votes are not counted (either because they abstain or their willingness to vote is less than their cost of voting), what was your committee's decision? [Answer: B]

10. You decide to vote for A, but your group decision is B. If the state of the world is B, and your willingness to pay is equal to or higher than your voting cost (which is 25 Points), how many points do you earn? [Answer: 85]

11. If A was the state of the world, and the computer cast 2 votes for A. Assume everyone in your committee gets expertise and no one will vote for the wrong alternative, how many votes are needed for your committee to guarantee a High payoff? [Answer: 0]

12. If B was the state of the world, and the computer cast 2 votes for A. Assume everyone in your committee gets expertise and no one will vote for the wrong alter-

native, how many votes are needed for your committee to guarantee a High payoff? [Answer: 3]

13. Including the votes cast by the computer, 6 votes are used to determine the committee's decision. Among the 6 votes, there are 3 votes for A and 3 votes for B. What is the probability that everyone in your committee will get a High payoff (110 Points)? [Answer: 50%]

14. In the selected round to be paid, if you decided to vote for A, and you would like to pay 75 points to make your vote count. The computer randomly generated a voting cost for you, which is 11 points. Regardless of the election outcome, how much voting cost will actually incur to your payoff? [Answer: 11]

15. In the selected round to be paid, if you decided to vote for B, and you would like to pay 15 points to make your vote count. The computer randomly generated a voting cost for you, which is 88 points. Regardless of the election outcome, how much voting cost will actually incur to your payoff? [Answer: 0]

G Pivotal Voting Models

There are N individuals deciding between two alternatives, $w = A$ and $w = B$, who make a collective decision by holding a vote. There are two equally likely states of the world, $\omega = A$ or $\omega = B$, and voters receive a utility normalized to 1 if alternative $w = \omega$ is adopted in state of the world ω, and 0 otherwise. In addition to this uncertainty, voters also face a hurdle represented by a partisan bias, denoted by β, which determines how many votes need to cast against a given alternative. This might represent partisan voters (as in the case of the motivating example) whose preferences are independent of the state of the world, in which case the total electorate would actually be larger. When $\beta > 0$, then alternative B receives β votes and voters must cast more than β votes in favor of alternative A in order to overturn alternative B. Similarly, when $\beta < 0$, then alternative A receives partisan support of $|\beta|$, and voters need to place at least $|\beta|$ votes in favor of alternative B to achieve the desired alternative. The partisan bias is drawn from a uniform distribution on $\{-(N-1), \ldots, 0, \ldots, N-1\}$. Ties are broken by a fair coin toss between the two alternatives A or B.

At the beginning of the game, voter i gains expertise with probability $\gamma \in [0,1]$. Expertise informs a voter of the state of the world and the partisan bias: (ω, β). A voter's private ballot cost is independently drawn from a uniform distribution on $[0,1]$. Following the realization of her private ballot cost, c_i, a voter must choose either to abstain, vote for alternative A, or vote for alternative B.

Denote by $d \geq 0$ a voter's private benefit to casting a ballot independent of the election's result, i.e. her duty term a la Riker and Ordeshook (1968). Additionally, let $s \geq 0$ represent a voter's sense of solidarity that she might receive by voting with other voters, which linearly scales the number of other voters who vote. Let V represent a voter's conjecture of the number of *other* informed voters who cast a vote, voter i's linear utility if she votes is

$$\mathbb{1}_{\{\omega=w\}} - c_i + d + s \cdot V,$$

and

$$\mathbb{1}_{\{\omega=w\}},$$

when i does not vote.

To summarize, the timing of the game is as follows:

1. The state ω, the partisan bias β, and private ballot costs are independently drawn.

2. Voters must decide whether to vote, and place their ballots.

3. The collective decision is reached and payoffs are received.

Instrumental Considerations. In a pivotal voter model, each voter is motivated by her assessment of the likelihood that she will be pivotal. In general, a voter must consider how many other voters have expertise. Let M be the random variable representing an individual voter's conjecture regarding the *total* number of expert voters. Notice that when a voter learns this quantity, then her belief is simply a point mass on the correct value, but when a voter is not informed of the number of other expert voters, then she must form a belief regarding this quantity. For a given partisan bias β, the probability a voter's preferred alternative wins if she votes is

$$P(M \geq \beta) \cdot P(V \geq \beta \mid M) + \frac{1}{2} P(M \geq \beta - 1) \cdot P(V = \beta - 1 \mid M).$$

The first term is the probability that an expert voter turns a tie into a win and the second term is the probability that an expert voter turns a loss into a tie. If an expert voter instead abstains, then the probability her preferred alternative is chosen is

$$P(M \geq \beta + 1) \cdot P(V \geq \beta + 1 \mid M) + \frac{1}{2} P(M \geq \beta) \cdot P(V = \beta \mid M).$$

From these expressions, an expert voter is pivotal with probability

$$\frac{1}{2}\Big[P(M \geq \beta) \cdot P(V = \beta \mid M) + P(M \geq \beta - 1) \cdot P(V = \beta - 1 \mid M)\Big]. \tag{1}$$

In the proceeding sections we analyze two different cases of the model, which differ in that the pivot probability, Equation (1), manifests differently in each case. First, we consider an expert voter's strategic decision to vote when she does not know how many other voters also have expertise, which resembles the Control Group in our experiment. Second, we consider the same strategic scenario, but where an expert voter knows the number of other expert voters, which resembles the Treatment Group from our experiment. We focus on the non-zero willingness to vote equilibria when they exist.

G.1 Unknown Number of Expert Voters

In this section we consider an expert voter's decision to vote, based on her assessment of the likelihood that she will affect the outcome of the election. We are interested in finding a symmetric vote cost cutoff where an expert voter with cost c votes if and only if $c \leq \overline{c}(\gamma; \beta)$, and abstains if $c > \overline{c}(\gamma; \beta)$. Denote by $\hat{c}^*(\gamma) = (\overline{c}(\gamma; 0), \overline{c}(\gamma; 1), \ldots, \overline{c}(\gamma; N-1))$. An expert voter does not know the number of other expert voters, so she instead uses the distribution determining expertise to form a belief about the number of other expert voters. Additionally, an expert voter, who knows other voters' symmetric cost cutoff,

$\overline{c}(\gamma;\beta)$, calculates the likelihood that other voters will vote. At a given partisan bias, β, suppose that an expert voter expects other voters to use the symmetric cutoff rule $\overline{c}$, then from (1), the pivot probability for an individual expert voter is

$$
\begin{aligned}
Piv(\gamma,\overline{c};\beta) \equiv & \sum_{m=\beta}^{N-1} \binom{N-1}{m} \gamma^m (1-\gamma)^{N-1-m} \binom{m}{\beta} (\overline{c})^{\beta} (1-\overline{c})^{m-\beta} \\
& + \sum_{m=\beta-1}^{N-1} \binom{N-1}{m} \gamma^m (1-\gamma)^{N-1-m} \binom{m}{\beta-1} (\overline{c})^{\beta-1} (1-\overline{c})^{m-\beta-1} \\
= & \binom{N-1}{\beta} (\gamma\overline{c})^{\beta} (1-\gamma\overline{c})^{N-1-\beta} + \frac{1}{2}\binom{N-1}{\beta-1} (\gamma\overline{c})^{\beta-1} (1-\gamma\overline{c})^{N-1-(\beta-1)} .
\end{aligned}
$$

For a given γ, the symmetric best-response for an expert voter at a given state β, is characterized by the balloting cost c^* that solves

$$
Piv(\gamma, c^*;\beta) + d + s((N-1)\gamma c^*) = c^*. \tag{2}
$$

The left-hand side is the probability an individual committee member is pivotal, the voter's duty benefit, and her solidarity payoff, and the right-hand side is the private cost of voting. Denote a solution to equation (2) by $c^*(\gamma, d, s;\beta)$, which gives the vector of symmetric pure-strategy Bayesian Nash equilibrium balloting cutoffs. Straightforward calculations of the binomial density allows us to write (2) as:

$$
\begin{aligned}
\binom{N-1}{\beta} (\gamma c_{\beta}^*)^{\beta} (1-\gamma c_{\beta}^*)^{N-1-\beta} + \frac{1}{2}\binom{N-1}{\beta-1} (\gamma c_{\beta}^*)^{\beta-1} (1-\gamma c_{\beta}^*)^{N-1-(\beta-1)} \\
+ d + s((N-1)\gamma c_{\beta}^*) = c_{\beta}^*.
\end{aligned}
$$

To generate point predictions, we set $d = s = 0$, thus focusing on pure pivotality considerations, and compute c_{β}^* using the parameters of our experiment, $N = 5$ and $\gamma = 0.7$. When the partisan bias is against ($\beta = -2$), by solving

$$
\frac{1}{2}\binom{4}{2}(0.7c^*)^2(1-0.7c^*)^2 + \frac{1}{2}\binom{4}{1}(0.7c^*)(1-0.7c^*)^3 = c^*,
$$

we get $c_{-2}^* = 0$ and $c_{-2}^* = 0.2755$.

Similarly, when the partisan bias is neutral, by solving

$$\frac{1}{2}\binom{4}{0}(0.7c^*)^0(1-0.7c^*)^4 = c^*,$$

we get $c_0^* = 0$ and $c_0^* = 0.2398$. Finally, since when the partisan bias is supportive, there is not a pivotal independent voter, the symmetric Bayesian Nash equilibrium cutoff willingness to vote is $c_2^* = 0$.

The average symmetric Bayesian Nash equilibrium willingness to vote, averaged over equally likely realizations of the partisan bias, is given by

$$\frac{1}{3}\left(c_{-2}^* + c_0^* + c_2^*\right). \tag{3}$$

From the symmetric Bayesian Nash equilibrium calculated when $d = s = 0$, and using the parameters from our experiment, the average willingness to vote when the number of expert voters remains unknown is

$$\frac{1}{3}(c_{-2}^* + c_0^* + c_2^*) = \frac{1}{3}(27.55 + 23.98 + 0) = 17.18.$$

G.2 Known Number of Expert Voters

In this section we consider the case where expert voters are also informed about the number of other expert voters. Suppose the realized number of *other* expert voters is M, then for a given level of the partisan bias β, the pivot probability, (1), is

$$Piv(\gamma, \overline{c}, M; \beta) \equiv \frac{1}{2}\left[\binom{M-1}{\beta}(\overline{c})^{\beta}(1-\overline{c})^{M-1-\beta} + \binom{M-1}{\beta-1}(\overline{c})^{\beta-1}(1-\overline{c})^{M-1-(\beta-1)}\right].$$

The best-response cutoff for expert voters, $c^*(\beta)$, must satisfy the equality

$$Piv(\gamma, c_\beta^\dagger, M; \beta) + d + s(Mc_\beta^\dagger) = c_\beta^\dagger.$$

Similar to above, the left-hand side is the probability an individual committee member is pivotal, the voter's duty benefit, and her solidarity payoff, and the right-hand side is the private cost of voting. Denote a solution to equation (G.2) by $c^*(\gamma, d, s; M, \beta)$, which gives the vector of symmetric pure-strategy Bayesian Nash equilibrium balloting cutoffs. We can write (G.2) as:

$$\frac{1}{2}\Bigg[\binom{M-1}{\beta}\left(c_\beta^\dagger(M)\right)^\beta\left(1-c_\beta^\dagger(M)\right)^{M-1-\beta}+\binom{M-1}{\beta-1}\left(c_\beta^\dagger(M)\right)^{\beta-1}\left(1-c_\beta^\dagger(M)\right)^{M-1-(\beta-1)}\Bigg]$$
$$+d+s(Mc_\beta^\dagger(M))=c_\beta^\dagger(M).$$

To generate point predictions, we set $d = s = 0$, and compute $c_\beta^*(M)$. Based on the setting of our experiment, when the partisan bias is against and there is only one expert voter, which means $M = 1$, $c_{-2}^\dagger(1) = 0$. When there are two expert voters, by solving

$$\frac{1}{2}c^\dagger(2) = c^\dagger(2),$$

we get $c_{-2}^\dagger(2) = 0$. When there are three expert voters, by solving

$$\frac{1}{2}\binom{2}{2}c^\dagger(3)^2 + \frac{1}{2}\binom{2}{1}c^\dagger(3)(1-c^\dagger(3)) = c^\dagger(3),$$

we get $c_{-2}^\dagger(3) = 0$. When there are four expert voters, by solving

$$\frac{1}{2}\binom{3}{2}c^\dagger(4)^2(1-c^\dagger(4)) + \frac{1}{2}\binom{3}{1}c^\dagger(4)(1-c^\dagger(4))^2 = c^\dagger(4),$$

we get $c_{-2}^\dagger(4) = 0$ and $c_{-2}^\dagger(4) = 0.3333$. When there are five expert voters, by solving

$$\frac{1}{2}\binom{4}{2}c^\dagger(5)^2(1-c^\dagger(5))^2 + \frac{1}{2}\binom{4}{1}c^\dagger(5)(1-c^\dagger(5))^3 = c^\dagger(5),$$

we get $c_{-2}^\dagger(5) = 0$ and $c_{-2}^\dagger(5) = 0.3473$.

Next, when the partisan bias is neutral and there is only one expert voter ($M = 1$),

$c_0^\dagger(1) = 0.5$. When there are two expert voters, by solving

$$\frac{1}{2}\binom{1}{0}(1 - c^\dagger(2)) = c^\dagger(2)$$

we get $c_0^\dagger(2) = 0.3333$. When there are three expert voters, by solving

$$\frac{1}{2}\binom{2}{0}(1 - c^\dagger(3))^2 = c^\dagger(3)$$

we get $c_0^\dagger(3) = 0.2679$. When there are four expert voters, by solving

$$\frac{1}{2}\binom{3}{0}(1 - c^\dagger(4))^3 = c^\dagger(4)$$

we get $c_0^\dagger(4) = 0.2291$. When there are five expert voters, by solving

$$\frac{1}{2}\binom{4}{0}(1 - c^\dagger(5))^4 = c^\dagger(5)$$

we get $c_0^\dagger(5) = 0.2024$. Finally, when the partisan bias is supportive, there is not a pivotal independent voter, so $c_2^\dagger(M) = 0$ for all M.

The average symmetric Bayesian Nash equilibrium, averaged over equally likely realizations of the partisan bias and number of expert voters, is given by

$$\frac{1}{3}c^*_{-2}+\frac{1}{3}\sum_{j=1}^{N}\binom{N}{j}(c_0^\dagger(j))^j(1-c_0^\dagger(j))^{N-j}c_0^\dagger(j)+\frac{1}{3}\sum_{j=1}^{N}\binom{N}{j}(c_2^\dagger(j))^j(1-c_2^\dagger(j))^{N-j}c_2^\dagger(j). \quad (4)$$

From the symmetric Bayesian Nash equilibrium calculated when $d = s = 0$, and using the parameters from our experiment, the average willingness to vote when the number of expert voters is known is

$$
\begin{aligned}
&\frac{1}{3}c_2^\dagger + \frac{1}{3}\sum_{j=1}^{N}\binom{N}{j}(c_0^\dagger(j))^j(1-c_0^\dagger(j))^{N-j}c_0^\dagger(j) + \frac{1}{3}\sum_{j=1}^{N}\binom{N}{j}(c_2^\dagger(j))^j(1-c_2^\dagger(j))^{N-j}c_2^\dagger(j) \\
=&\frac{1}{3}c_2^\dagger + \frac{1}{3}\sum_{j=1}^{N}\binom{N}{j}(c_0^\dagger(j))^{j+1}(1-c_0^\dagger(j))^{N-j} + \frac{1}{3}\sum_{j=1}^{N}\binom{N}{j}(c_2^\dagger(j))^{j+1}(1-c_2^\dagger(j))^{N-j} \\
=&\frac{1}{3}(0+0.2180+0.0155) = 0.0778.
\end{aligned}
$$

G.3 Combining the Models

We now compare the two cases of the pivotal voter model, one resembling our Control Group and the other resembling our Treatment Group. Subtracting (4) from (3) we obtain the difference

$$
\begin{aligned}
&\frac{1}{3}\Bigg[\sum_{j=1}^{N}\binom{N}{j}(c_0^\dagger(j))^{j+1}(1-c_0^\dagger(j))^{N-j} + \sum_{j=1}^{N}\binom{N}{j}(c_2^\dagger(j))^{j+1}(1-c_2^\dagger(j))^{N-j} - c_0^* - c_2^*\Bigg] \\
=&17.18 - 7.78 = 9.4,
\end{aligned}
$$

which corresponds to the same calculation we use to obtain our main treatment effect, where here the calculation is conducted on the symmetric Bayesian Nash equilibria of the pivotal voting model that best resembles our experimental conditions.

To summarize, the symmetric Bayesian Nash equilibrium for the various cases covered in our experiments are reported in Table A4. The point predictions are reported in brackets. Based on Mann-Whitney sign-rank tests and exact Fisher-Pitman permutation tests, the purely instrumental symmetric Bayesian Nash equiibrium predictions are significantly different from the experimental observations in every case at 0.01 level of significance. Moreover, the numerical value for the average difference in willingness to vote between pivotal voting models is 9.4, and the treatment effect from our experiment is 15.4. The difference, $15.4 - 9.4 = 6$ is statistically significant at 0.05 level.

Table A4: Symmetric Bayesian Nash equilibrium Predictions

		Partisan Bias			
		Supportive	Neutral	Against	Average
Unknown Expertise	Obs.[Pred.]	21.3 [0]	46.4 [24.0]	51.5 [0 or 27.6]	40.3 [17.2]
Known Expertise	Average	13.6 [0]	28.5 [21.8]	32.4 [1.6]	24.9 [7.8]
	M= 1	37.5 [0]	23.3 [50.0]	5 [0]	
	M= 2	11.8 [0]	29.7 [33.3]	31.1 [0]	
	M= 3	15.3 [0]	29.4 [26.8]	31.2 [0]	
	M= 4	12.0 [0]	27.8 [22.9]	35.0 [0 or 33.3]	
	M= 5	13.8 [0]	28.4 [20.2]	27.6 [0 or 34.7]	

Note: In the estimation of average willingness to vote for each treatment group, we use the non-zero cutoff equilibrium when it exists.

G.4 Existence Argument

We conclude our analysis of pivotal voting models by sketching the argument that establishes the existence of at least one symmetric Bayesian Nash equilibrium in each of the two cases we analyze above. It is important to note that there are generally multiple equilibria in each of the models presented.

Let $z \in \{0, 1\}$ be an indicator, and define the following smooth mapping:

$$\Psi^z_\beta(c; s, d) = z(Piv(\gamma, c; \beta) + s(N-1)\gamma c) + (1-z)(Pv(\gamma, c, M; \beta) + sMc) + d,$$

and note that a symmetric Bayesian Nash equilibrium is characterized by fixed points of $\Psi^z_\beta(c; s, d)$ in c at each β. Note first that $\Psi^z_\beta(0; s, d) > 0$ when $\beta \geq 0$. Thus, when $\Psi^z_\beta(1; s, d) < 1$, then, when $\beta \geq 0$, existence of a symmetric Bayesian Nash equilibrium, c^*_β, follows by the Intermediate Value Theorem. When the partisan bias favors voters, so that $\beta < 0$, then there is a unique cutoff, characterized by

$$d + zs(N-1)\gamma c) + (1-z)sMc = c,$$

which, after rearranging, is

$$c^*_\beta = \frac{d}{1 - zs(N-1)\gamma c) - (1-z)sMc}.$$

Finally, when $\Psi_{\beta}^{z}(1; s, d) > 1$, there is a symmetric Bayesian Nash equilibrium in which $c_{\beta}^{*} = 1$.

H Quantal Response Equilibrium Analysis

In this section, and building off the pivotal voting models presented in the previous sections, we introduce stochastic terms into the calculus of otherwise instrumentally minded voters, and focus on symmetric quantal-response equilibria. We follow the logit specification used in Goeree and Holt (2005) and discussed in Goeree, Holt and Palfrey (2016). Specifically, let the parameter $\mu \geq 0$ represent the degree of noise in voters' decisions so that individual voter i's expected utility includes a stochastic disturbance $\mu\varepsilon_i$, where ε_i is drawn independently across i from a logistic distribution. This is equivalent to idiosyncratic duty terms, i.e. where $d_i = \mu\varepsilon_i$ is the specification above. Denoting i's pivot probability by PIV_i, i votes if and only if

$$PIV_i \geq \mu\varepsilon_i \Rightarrow \frac{PIV_i}{\mu} \geq \varepsilon_i,$$

which occurs with probability

$$Prob(vote_i) = F\left[\frac{PIV_i}{\mu}\right]$$

Taking the inverse of $Prob(vote) = F(\cdot)$ and multiplying both sides by μ yields

$$\mu F^{-1}(Prob(vote)) = PIV.$$

Using the logistic distribution, $F(x) = 1/(1 + e^{-x})$, we derive the quantal response equilibrium condition:

$$\mu\left[-\ln\left(\frac{1 - Prob(vote)}{Prob(vote)}\right)\right] = PIV,$$

where the right-hand side is obtained from (1). In the Control Group, when $\mu = 0$, then the symmetric quantal-response equilibrium condition is same as that for a symmetric

Bayesian Nash equilibrium when $s = 0$, expressed above by (2). As a function of μ, Figure A2 illustrates how the symmetric quantal-response equilibrium provides a description of how the disturbance term, ε, can influence vote choices, which are otherwise dependent on pivotality concerns. Specifically, as μ increases, the symmetric quantal-response equilibrium cutoff willingness to vote also increases.

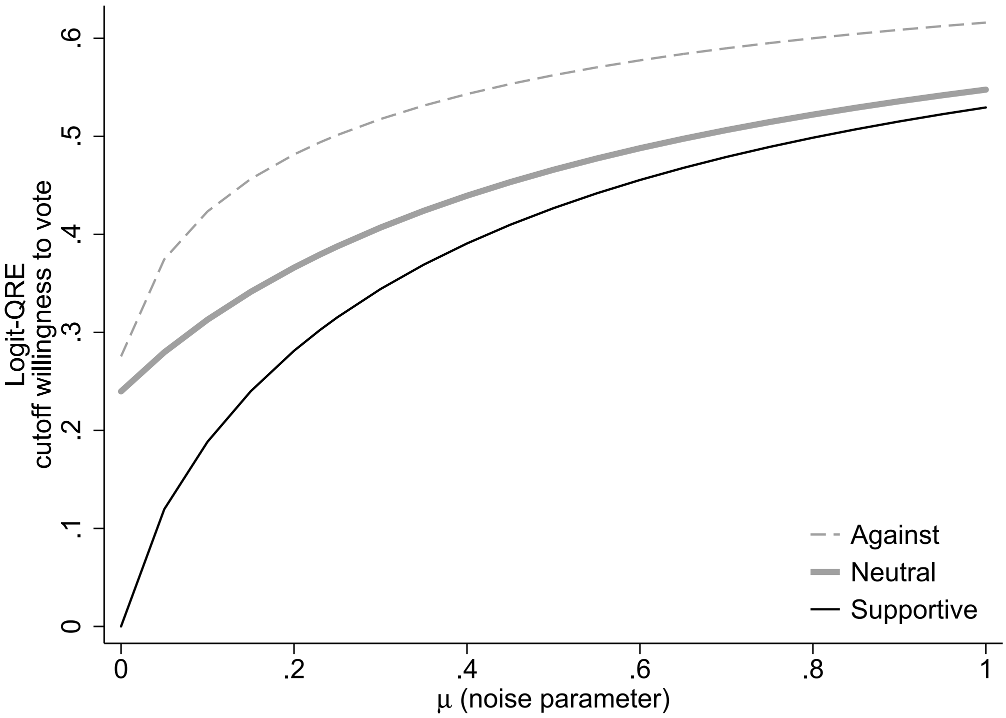

Figure A2: Symmetric Logit-QRE cutoff willingness to vote by μ (Control Group)

For the Treatment Group, when $\mu = 0$, then the symmetric quantal response equilibrium condition is equivalent to the symmetric Bayesian Nash equilibrium. As above, the symmetric quantal-response equilibrium cutoff willingness to vote increases as the logistic errors have a greater influence on vote choices. Figure A3 illustrates the relationship between the symmetric quantal-response equilibrium cutoff willingness to vote at each level of the partisan bias, as a function of μ.

Figure A4 plots the pointwise difference between symmetric vote cost cutoff quantal-response equilibrium willingness' to vote. It is straightforward to see that the symmetric vote cost cutoff quantal-response equilibrium willingness to vote is pointwise in μ higher in the Control Group than in the Treatment Group.

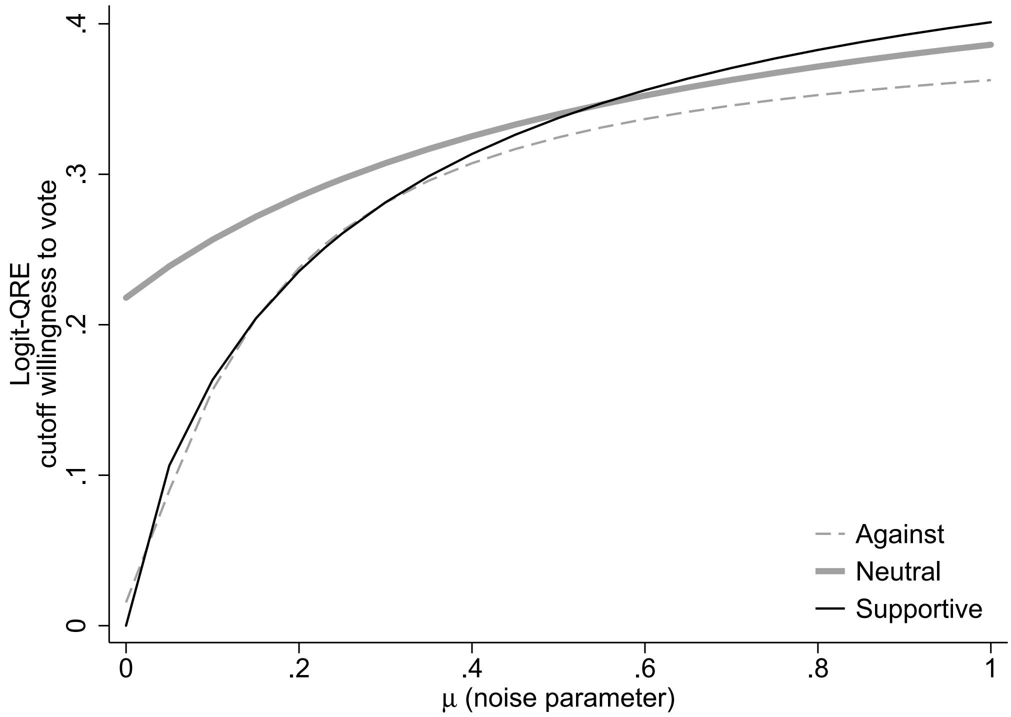

Figure A3: Symmetric Logit-QRE cutoff willingness to vote by μ (Treatment Group)

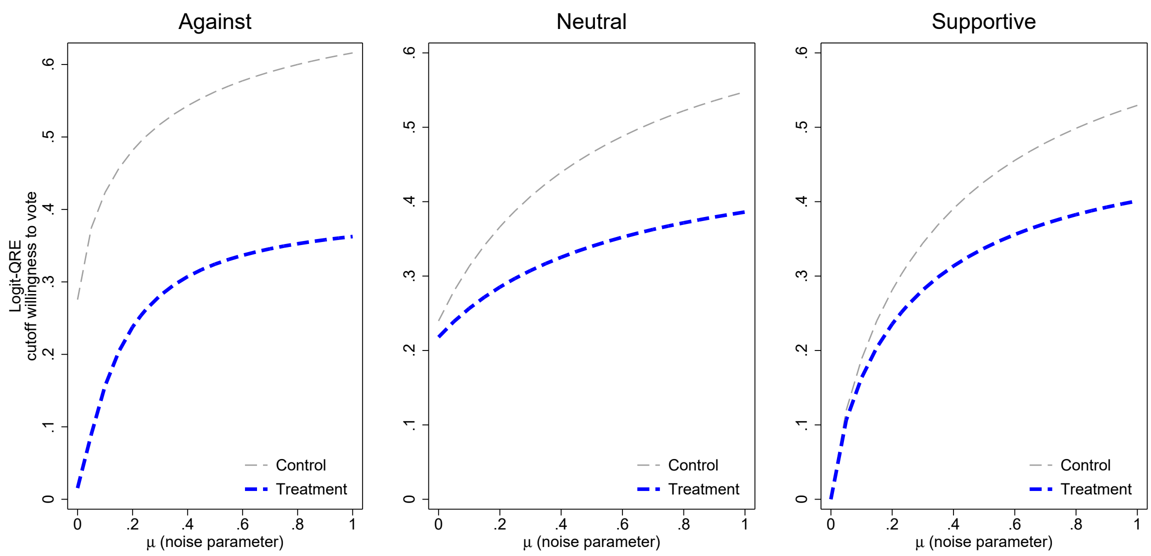

Figure A4: Symmetric Logit-QRE cutoff willingness to vote by μ and Partisan Bias

Finally, we compute the value of the weight on logistic noise, μ, that best fits our experimental data via maximum likelihood, and denote the estimated value by $\hat{\mu}$. To avoid issues related to over-fitting, we conduct the maximum likelihood estimation for the pooled data of all treatments and all levels of the partisan bias, each weighted by one-sixth, for all thirty periods of each session. We find that the value $\hat{\mu}^* = 0.23$ provides the best match between the symmetric quantal-response equilibrium and our experimental data. Then, following standard practice (e.g., Goeree, Holt and Palfrey 2016), we use the estimate of $\hat{\mu}^*$ we obtained from our data to derive point predictions of the symmetric quantal-response equilibrium vote cost cutoffs for that data. These results are reported in Table A5. Not surprisingly, the symmetric quantal-response equilibrium vote cost cutoff predictions, calibrated from our data, fit our data better than those produced by the symmetric Bayesian Nash equilibria of the pivotal voting model in the previous section, which were independent of our data. However, when we break down the analysis by the partisan bias, in 4 out of 6 cases, the predictions obtained by the quantal-response model are significantly different from the experimental observations. These results may suggest that a purely instrumental game-theoretical model, even with logistically distributed errors added to vote choice, does not fit the experimental results well.

Table A5: Logit-QRE Estimations ($\mu = 0.23$)

		Partisan Bias			
		Supportive	Neutral	Against	Average
Control Group	Obs.	21.3	46.4	51.5	40.3
	Est.	30.2	37.9	49.4	39.2
Treatment Group	Obs.	13.6	28.5	32.4	24.9
	Est.	25.1	29.2	25.3	26.6

I Utilitarian Welfare

Suppose that the utilitarian planner chooses a symmetric cost cutoff for voters to follow.

I.1 Treatment Group

In this case the utilitarian planner chooses a symmetric vote cost cutoff which depends on the number of expert voters, $M \leq N$ where N is the total number of voters, and the partisan bias, β. We denote the utilitarian's optimal cost cutoff by $\overline{c}_U^*(M;\beta)$.

For a supportive partisan bias, $\overline{c}_U^*(M;\beta = -2) = 0$.

For a partisan bias of β, utilitarian welfare in the treatment group when the number of expert voters is M is

$$W_\beta^T(\overline{c};M) = N\left(\sum_{k=\beta+1}^{M}\binom{M}{k}\overline{c}^k(1-\overline{c})^{M-k} + \frac{1}{2}\binom{M}{\beta}\overline{c}^\beta(1-\overline{c})^{M-\beta}\right) - \frac{M}{2}\overline{c}^2.$$

When $\beta = 0$, and since $N = 5$, the problem is

$$\max_{\overline{c}\in(0,1]} 5(\sum_{k=1}^{M}\binom{M}{k}\overline{c}^k(1-\overline{c})^{M-k} + \frac{1}{2}\binom{M}{0}\overline{c}^0(1-\overline{c})^M) - \frac{M}{2}\overline{c}^2,$$

which can be simplified to

$$\max_{\overline{c}\in(0,1]} 5(1 - \frac{1}{2}\binom{M}{0}\overline{c}^0(1-\overline{c})^M + \frac{1}{2}\binom{M}{0}\overline{c}^0(1-\overline{c})^M) - \frac{M}{2}\overline{c}^2,$$

which can be simplified to

$$\max_{\overline{c}\in(0,1]} 5(1 - \frac{1}{2}\binom{M}{0}\overline{c}^0(1-\overline{c})^M) - \frac{M}{2}\overline{c}^2,$$

which can be simplified to

$$\max_{\overline{c}\in(0,1]} 5(1 - \frac{1}{2}(1-\overline{c})^M) - \frac{M}{2}\overline{c}^2.$$

The first derivative of this function

$$\frac{5}{2}M(1-\overline{c})^{M-1} - M\overline{c},$$

so the first-order condition is

$$\frac{5}{2}(1-\overline{c})^{M-1} = \overline{c}. \tag{5}$$

If $M = 1$, this first-order condition reduces to

$$\frac{5}{2} = \overline{c},$$

and so

$$\overline{c}^*_U(1;\beta = 0) = \min\{\tfrac{5}{2}, 1\},$$

implying that $\overline{c}^*_U(1;\beta = 0) = 1$.

Case $M = 2$ then becomes

$$\frac{5}{2}(1-\overline{c}) = \overline{c},$$

which solving for $\overline{c}$ gives

$$\frac{7}{2}\overline{c} = \frac{5}{2},$$

which rearranges to

$$\overline{c} = \frac{5}{7}.$$

Cases $M = 3, 4, 5$ follow by substituting for M and solving (5) for $\overline{c}$ in each case.

When the partisan bias is against, it is obvious that $\overline{c}^*_U(1;\beta = -2) = 0$, so we can focus on $M = 2, 3, 4, 5$. For $M = 2$, because voters can only trigger a tie, the utilitarian planner's problem reduces to

$$\max_{\overline{c}\in[0,1]} N\overline{c}^2 - \overline{c}^2,$$

which is linear and increasing in c^2, so $\overline{c}^*_U(2;\beta = 2) = 1$. Finally, for $M = 3, 4, 5$, the utilitarian planner's problem is

$$\max_{\overline{c}\in[0,1]} N\left(\sum_{k=\beta+1}^{M}\binom{M}{k}\overline{c}^k(1-\overline{c})^{M-k} + \frac{1}{2}\binom{M}{\beta}\overline{c}^\beta(1-\overline{c})^{M-\beta}\right) - \frac{M}{2}\overline{c}^2.$$

Using standard results (e.g., Hartley and Fitch 1951), we can write

$$\sum_{k=\beta+1}^{M} \binom{M}{k} \overline{c}^k (1-\overline{c})^{M-k} = \frac{\int_0^{\overline{c}} t^{\beta}(1-t)^{M-\beta-1}dt}{\int_0^1 t^{\beta}(1-t)^{M-\beta-1}dt},$$

which using the Leibniz integral rule, the first-order condition is

$$\frac{\overline{c}^{\beta}(1-\overline{c})^{M-\beta-1}}{\int_0^1 t^{\beta}(1-t)^{M-\beta-1}dt} + \frac{1}{2}\binom{M}{\beta}\overline{c}^{\beta-1}(1-\overline{c})^{M-\beta-1}[\beta(1-\overline{c}) - (M-\beta)\overline{c}] = \frac{M}{N}\overline{c},$$

which reduces to

$$\frac{\overline{c}^{\beta}(1-\overline{c})^{M-\beta-1}}{\int_0^1 t^{\beta}(1-t)^{M-\beta-1}dt} + \frac{1}{2}\binom{M}{\beta}\overline{c}^{\beta-1}(1-\overline{c})^{M-\beta-1}[\beta - M\overline{c}] = \frac{M}{N}\overline{c}.$$

Using that the beta function is

$$B(x,y) = \int_0^1 t^{x-1}(1-t)^{y-1}dt,$$

and thus

$$\int_0^1 t^{\beta}(1-t)^{M-\beta-1}dt = B(\beta+1, N-\beta),$$

and using that $B(x+1,y) = B(x,y)\frac{x}{x+y}$, we can write

$$B(\beta+1, M-\beta) = B(\beta, M-\beta)\frac{\beta}{\beta+M-\beta} = B(\beta-1, M-\beta)\frac{\beta}{M}\cdot\frac{\beta-1}{\beta-1+M-\beta},$$

and since $\beta = 2$, we have that

$$B(3, M-\beta) = B(1, M-2)\cdot\frac{2}{M}\cdot\frac{2}{M-1},$$

and finally since $B(1,x) = \frac{1}{x}$,

$$B(3, M-\beta) = \frac{2}{M(M-1)(M-2)}.$$

Thus, since $N = 5$ we can write the planner's first-order condition as

$$5(M-1)(M-2)\overline{c}^2(1-\overline{c})^{M-3} + 5\binom{M}{2}\overline{c}(1-\overline{c})^{M-3}[2 - M\overline{c}] = \overline{c}. \tag{6}$$

Solving (6) yields the utilitarian planner's symmetric vote cost cutoffs when the partisan bias is against and $M = 3, 4, 5$.

I.2 Control Group

In this case the utilitarian planner chooses a symmetric vote cost cutoff which depends only on the partisan bias, β, which we denote by $\overline{c}_U^*(\beta)$.

For a supportive partisan bias, $\overline{c}_U^*(\beta = -2) = 0$.

For a partisan bias of β, utilitarian welfare in the control group is

$$W_\beta^C(\overline{c}) = N\left(\sum_{k=\beta+1}^{N}\binom{N}{k}(0.7\overline{c})^k(1-0.7\overline{c})^{N-k} + \frac{1}{2}\binom{N}{\beta}(0.7\overline{c})^\beta(1-0.7\overline{c})^{N-\beta}\right) - \frac{N}{2}0.7\overline{c}^2.$$

For a neutral partisan bias, we can write the utilitarian planner's problem as

$$\max_{\overline{c}\in[0,1]} N\left(1 - \frac{1}{2}\binom{N}{0}(0.7\overline{c})^0(1-0.7\overline{c})^N\right) - \frac{N}{2}0.7\overline{c}^2,$$

which simplifies to

$$\max_{\overline{c}\in[0,1]} N\left(1 - \frac{1}{2}(1-0.7\overline{c})^N\right) - \frac{N}{2}0.7\overline{c}^2.$$

The first-order condition is

$$N(1-0.7\overline{c})^{N-1} = 0.7\overline{c},$$

which since $N = 5$ is

$$5(1-0.7\overline{c})^4 = 0.7\overline{c}. \tag{7}$$

A solution to (7) gives $\overline{c}_U^*(\beta = 0)$.

When the partisan bias is against, and using the same techniques as above, we write the first-order condition as

$$\frac{0.7N(N-1)(N-2)(0.7\overline{c})^2(1-0.7\overline{c})^{N-3}}{2} + 0.35\binom{N}{2}\overline{c}(1-\overline{c})^{N-3}[2-0.7N\overline{c}] = 0.7N\overline{c},$$

which since $N = 5$, is

$$10.5(0.7\overline{c})^2(1-0.7\overline{c})^2 + 0.35\binom{5}{2}\overline{c}(1-\overline{c})^2(2-3.5\overline{c}) = 3.5\overline{c}. \quad (8)$$

A solution to (8) gives $\overline{c}_U^*(\beta = 2)$.

I.3 Comparisons

Table A6 summarizes the utilitarian planner's symmetric cost vote cutoff prescription in each case.

Table A6: Optimal Willingness to Vote by Treatment and Partisan Bias

		Partisan Bias		
		Supportive	Neutral	Against
Control Group	Exp. Obs.	21.3	46.4	51.5
	Pred.	0	48.2	96.2
Treatment Group	Exp. Obs.	13.6	28.5	32.4
	Pred. $M = 1$	0	100	0
	Pred. $M = 2$	0	71.4	100.0
	Pred. $M = 3$	0	53.7	100.0
	Pred. $M = 4$	0	44.0	86.7
	Pred. $M = 5$	0	37.7	67.5

We use both Mann-Whitney sign-rank test and the exact Fisher-Pitman permutation test to examine whether the experimental observations are different from the utilitarian planner's prescription. We use the electorate averages as the unit of independent observation in the statistical analysis to examine the difference on the quantities of interest. The numbers reported in Table A7 are p-values of statistical tests. All statistical tests reported in this table are two-sided and non-parametric.

Table A7: Comparisons between Experimental Results and Utilitarian Planner's Prescriptions

Partisan Bias	Statistical tests	Control Group	Treatment Group				
			M=1	M=2	M=3	M=4	M=5
Panel A: Willingness to Vote							
Against	Wilcoxon signed-rank	0.002	0.166	0.012	0.003	0.002	0.012
	Fisher-Pitman permutation	0.000	0.500	0.008	0.001	0.000	0.008
	# observations	12	3	8	11	11	7
Neutral	Wilcoxon signed-rank	0.938	0.109	0.008	0.002	0.003	0.037
	Fisher-Pitman permutation	0.825	0.250	0.004	0.000	0.001	0.033
	# observations	12	3	9	12	12	10
Supportive	Wilcoxon signed-rank	0.002	n/a	0.006	0.002	0.002	0.003
	Fisher-Pitman permutation	0.000	n/a	0.004	0.000	0.000	0.001
	# observations	12	1	10	12	12	11
Panel B: The Quality of Democratic Choice							
Against	Wilcoxon signed-rank	0.002	n/a	0.012	0.003	0.006	0.311
	Fisher-Pitman permutation	0.000	n/a	0.008	0.001	0.003	0.313
	# observations	12	3	8	11	11	7
Neutral	Wilcoxon signed-rank	0.695	0.109	0.008	0.002	0.003	0.017
	Fisher-Pitman permutation	0.492	0.250	0.004	0.000	0.001	0.018
	# observations	12	3	9	12	12	10
Supportive	Wilcoxon signed-rank	n/a	n/a	n/a	n/a	n/a	n/a
	Fisher-Pitman permutation	n/a	n/a	n/a	n/a	n/a	n/a
	# observations	12	1	10	12	12	11

Note: When the partisan bias is supportive, the achieved quality of democratic choice is always 100%, which is identical to the utilitarian planner's prescription, so statistical tests are not applicable in these cases. In the Treatment Group, when the partisan bias is against and there is only one expert voter, the quality of democratic choice is zero, which is identical to the utilitarian planner's prescription, so statistical tests are not applicable in this case. When the partisan bias is supportive and there is only one expert voter, we have only one observation, so statistical tests are omitted for this case.

References

Fischbacher, Urs. 2007. "z-Tree: Zurich toolbox for ready-made economic experiments." *Experimental Economics* 10(2):171–178.

Frederick, Shane. 2005. "Cognitive reflection and decision making." *Journal of Economic Perspectives* 19(4):25–42.

Goeree, Jacob K and Charles A Holt. 2005. "An explanation of anomalous behavior in models of political participation." *American Political Science Review* pp. 201–213.

Goeree, Jacob K, Charles A Holt and Thomas R Palfrey. 2016. *Quantal Response Equilibrium: A Stochastic Theory of Games*. Princeton University Press.

Hartley, HO and ER Fitch. 1951. "A chart for the incomplete beta-function and the cumulative binomial distribution." *Biometrika* 38(3/4):423–426.

Riker, William H and Peter C Ordeshook. 1968. "A Theory of the Calculus of Voting." *The American political science review* 62(1):25–42.