

An Experimental Test of Selectorate Theory

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This article uses a laboratory experiment to test one of the main predictions of selectorate theory, that is, that democratic leaders invest more resources in public goods than autocratic leaders. The results of the experiment confirm this prediction and further show citizens are better off on average under democratic institutions than autocratic institutions. Meanwhile, autocratic leaders receive higher payoffs than democratic leaders. Additionally, this article attempts to bring domestic politics into international relations experimentation with a focus on how communication may allow democracies to organize more efficiently for war than autocracies. A game theoretical model shows democracies have the potential to organize optimally and use their citizens' skills to their full advantage while autocracies do not. The results of the experiment reveal some evidence that democracies organize more efficiently than autocracies, but that this increased efficiency did not produce a higher percentage of conflict wins.

KEYWORDS *democracy, experiment, formal modeling, selectorate theory*

Selectorate theory has emerged as one of the major theories in international relations scholars' attempt to explain the effect of domestic politics on issues of war and peace (Bueno de Mesquita, Morrow, Siverson, and Smith 1999a, 2004; Bueno de Mesquita and Siverson 1995; Bueno de Mesquita, Smith, Siverson, and Morrow 2005). With regard to domestic politics, this theory predicts that leaders of democracies will invest more resources in public goods than leaders of autocracies. While Morrow, Bueno de Mesquita, Siverson, and Smith (2008) find empirical support for this prediction, a microfoundational approach would further strengthen scholars' confidence in the underpinnings

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of selectorate theory. With that goal in mind, this article builds on previous theoretical and empirical work to test the domestic distribution aspect of selectorate theory using a laboratory experiment.

In addition, this article attempts to address empirical research suggesting that democracies are more likely than any other regime type to win the wars they enter (Lake 1992; Reiter and Stam 1998, 2002). Several arguments have been put forward to explain democratic success, including that democracies can organize and share information better, leading to battlefield advantages. This article relies on selectorate theory's predictions about the internal distribution of resources in a democracy versus autocracies to evaluate experimentally whether democratic leaders can use the promise of public goods to incentivize citizens to bear the costs of war.

This article proceeds as follows: After reviewing the literature, I present a game theoretic model that shows that democratic leaders will invest more heavily in public goods than autocratic leaders. The model further shows that allowing citizens to communicate to the leader their relative war-fighting ability creates an equilibrium in which democracies can win wars more often than autocracies. To test the model, I develop an experiment to determine the effect of regime type on public goods provisions and wartime organization. While the results provide little evidence that a superior ability to organize helps democracies win wars, the experiment does show that democratic leaders invest more resources in public goods than autocratic leaders. In short, democratic institutions compel leaders to distribute resources through public rather than private goods.

INSTITUTIONS, INFORMATION, AND WAR

Selectorate theory predicts several empirical findings at the intersection of domestic and international politics, including the Democratic Peace and that democracies tend to win the wars they enter (Bueno de Mesquita et al. 1999a, 2004, 2005; Bueno de Mesquita and Siverson, 1995). Selectorate theory starts with the assumption that leaders are primarily motivated by the desire to retain office, although their strategy for doing so may differ by regime type. The regime type of a state is determined by the ratio of two key components: the selectorate and the winning coalition. The selectorate, S , in a polity is the group of residents that has the power to participate in choosing the leader. The winning coalition, W , is the minimum subset of the selectorate that is of sufficient size to support a leader in power. When W is small, the theory predicts that the leader will invest more resources in private goods since he can keep the members of the winning coalition loyal by directly buying them off. When W is large, the leader invests more resources in public goods because buying off individuals would be too costly (Morrow et al. 2008). Roughly speaking, large W systems are democracies and small W systems are autocracies.

Viewing conflict as an act with both domestic and international consequences, selectorate theory predicts that democracies should select wars and conflicts they are more likely to win. Autocrats, meanwhile, are less dependent on successful policies to stay in office, allowing them to engage in wars in which they have a low probability of winning because losing will have little effect on the probability that they will lose power (Bueno de Mesquita, Morrow, Siverson, and Smith 1999b). If the autocrat wins, however, he can keep the spoils of war for himself. Thus, there is little downside for an autocrat to engage in war as long as he has enough resources left over to buy off his winning coalition.

In contrast, to retain power a democratic leader needs to spend resources on the war that otherwise would have gone to public goods and then invest the spoils back into public goods. Upon losing a war, public good provision is lower than if he had not entered the war, decreasing his chances of surviving in office. Croco (2011) finds that democratic leaders who are culpable for a war and then lose are significantly more likely to be removed from office than autocratic leaders under the same circumstances. Therefore, democratic leaders should initiate wars only when they expect to win, leading to democracies winning a higher percentage of wars than autocracies due to the selectivity of democratic leaders (Gelpi and Griesdorf 2001; Reiter and Tillman 2002).

Furthermore, several scholars suggest that democracies are more efficient and make better decisions because information can flow more freely (Ober 2008; Reiter and Stam 2002; Russett 2009). If fighting wars is a collective-action problem, selectorate theory predicts that citizens in a democracy benefit from winning wars if the spoils become public goods. This benefit gives citizens the incentive to use relevant skills and exert more effort if they expect that others will do the same. If citizens' costs are not recovered, they can punish leaders who selected a losing war by voting them out of office. Furthermore, democracies draw soldiers broadly from civilian society, incorporating a wide range of skills and aptitudes relevant to war into the military, which, in turn, increases military effectiveness (Janowitz 1979; Lasley 2009).¹ Thus, democratic militaries, which are more likely to maximize human capital in war, fight with higher levels of efficiency, initiative, and leadership (Reiter and Stam 1998, 2002).²

In contrast, citizens of an autocracy have no incentive to reveal private information about their skills or put forth effort in a conflict. Citizens know that the leader will keep any spoils of war for himself or invest them in maintaining his winning coalition, so they have no reason to incur any cost on behalf of the regime or apply skills acquired in civilian life in the military.

¹For example, Walters (1978) reports the ease with which the US military discovered and put to use language skills he acquired as a child.

²Biddle and Long (2004) found that controlling for human capital, civil-military relations, and culture, democratic political organization does not provide battlefield advantages. However, the authors do not deal with the endogeneity between democracy and these control variables.

Furthermore, autocrats who fear removal from power through military coups often intentionally prevent the military from functioning as a meritocracy, valuing loyalty instead. Autocrats may rely on family, ethnic, religious, or ideological loyalties when promoting to leadership roles, leaving citizens, soldiers, and commanders who could make substantial contributions to the war effort in lesser roles (Quinlivan 1999).³ This type of coup-proofing limits soldiers' leadership skills and initiative and has a negative impact on overall military effectiveness (Biddle and Zirkle 1996; Pilster and Böhmelt 2011, 2012). Moreover, autocrats such as Saddam Hussein discourage debate, stifling the flow of information, and staff the military exclusively with supporters of the regime (Cordesman and Wagner 1990; Woods, Lacey, and Murray 2006). Thus, autocrats go to war without all the information relevant to fighting an effective war, with citizens who will not invest their full effort in the war, and with a military arranged for loyalty rather than to maximize the effectiveness of their human capital.

Selectorate theory and the democratic efficiency argument both explain the empirical results that show democracies winning a higher percentage of wars than autocracies. Selectorate theory focuses on a selection argument, namely that democracies fight easier wars, while the democratic efficiency argument suggests that for a given level of war difficulty, democracies should be more likely to organize effectively and win than autocracies. These theories are not necessarily competing and can easily complement each other (Clark and Reed 2003). In fact, selectorate theory's prediction about democratic leaders' higher investments in public goods should also incentivize citizens to overcome the collective action problem of war in a way not possible in autocracies. Essentially, the domestic distribution aspect of selectorate theory drives the democratic efficiency argument.

The primary goal of the following experiment is to provide microfoundations for selectorate theory's assumption that democratic institutions cause leaders to distribute resources through public rather than private goods. Furthermore, I attempt to bring domestic politics into a group conflict experiment with the hope of disentangling the effect of selection and the effect of democracies' superior ability to organize. This experiment provides an advantage over naturally occurring data because I can hold the difficulty of the war constant and begin the game with it already under way, allowing me to focus on differences in how wars play out conditional on regime type. By truncating the game tree in this way, I can make causal inferences about how the internal decision-making rules of a state affect the leaders' domestic distribution of resources and the state's ability to successfully fight wars.

³For example, in Jordan and Morocco, the king appoints relatives to key military positions, as have the Kims in North Korea (Bellin 2004; Byman and Lind 2010). Likewise, in Iraq, none of the four regional commanders Saddam Hussein appointed in 2003 had significant military backgrounds or competence (Hosmer 2007).

The experimental literature on interstate conflict is quite small, and a large portion of it focuses on conflict games where subjects act as international leaders accountable to no specific domestic audience (Durham, Hirshleifer, and Smith, 1998; Johnson, McDermott, Barrett, Cowden, Wrangham, McIntyre, and Rosen 2006; McDermott and Cowden, 2003; McDermott, Cowden, and Koopman 2002; Tingley and Walter 2011a, 2011b).⁴ Others ask citizens to evaluate leaders or make recommendations based on hypothetical situations (Mintz and Geva 1993; Rousseau 2005; Tomz 2007; Tomz and Weeks 2010). Neither of these types of experiments captures important dynamics between leaders and their domestic audiences and cannot address the effect of regime type on leaders' decisions.

McGillivray and Smith (2008) created a Prison's Dilemma experiment with two groups where the leader of each group made a decision about cooperating or defecting. The group then made a decision to replace the leader with a challenger after a specified number of rounds. The results showed that leadership turnover influenced patterns of cooperation between groups. There is little domestic politics in their experiment, though, other than leadership replacement and a reward for the leader retaining office. All members of the groups receive the same payment from the outcome of the Prisoner's Dilemma.

Overall, the experimental literature in international relations has ignored how internal decision-making rules affect conflict, the accountability of a leader to her domestic audience, and the fact that different members of a state benefit differently from war. To begin to fill in this gap, I present a probabilistic conflict game in which the leader decides which members of the group bear the cost of conflict, allocates winnings from the war, and then citizens decide if they approve of the leader's actions or not. I vary internal decision-making rules accordingly, giving some groups small W and some large W , while keeping the selectorate size constant. I also vary whether members of a group can communicate their ability to contribute to the war effort to the leader. These two sources of variation permit causal inference on the effect of regime type, the effect of communication, and their interaction with respect to both the state's organization for war and how the leader distributes resources internally in a way that is impossible with observational data. The game is explained in detail and solved for equilibria in the next section.

THE MODEL

The game is played in groups of seven players. One player is randomly selected as the leader of the group. An initial endowment of points is

⁴For a complete review of the use of experiments in International Relations, see McDermott (2002a, 2002b, 2011)

allocated to each member of the group in such a way that two members receive 5 points, three members receive 10 points, and two members receive 15 points. These allocation rules are public knowledge. The number of points held by a player is known to herself but is not revealed to other members of the group. In the most general sense, this private information represents an ability the citizen has that would be useful in the war effort but is costly for the citizen to use.⁵ In fact, Rotte and Schmidt (2003) argue that skills acquired in civilian life have become more useful in war due to the transferability of basic technological and organizational skills.⁶

The leader, knowing only her own endowment of points, then decides to send up to five members of the group to engage in conflict. If a player is sent to the conflict, she loses her initial endowment of points. This loss represents her cost of fighting and effort put forth. Players not sent to the conflict keep their initial endowment. Each member fights on an individual battlefield, where a “battle” is conceived of broadly as any contribution made by an individual to the war effort and the probability a player wins her battle increases with her endowment.⁷ If a group wins at least three battles, a prize of 100 points is awarded to that group.

If the group earns the prize, the leader distributes the winnings. She can give all 100 points to one player (including herself) or she can split it among multiple players. She can also choose to invest part or the entire prize in a public good, whereby it gets multiplied by 2.8 and distributed evenly to all players.⁸ For example, the leader could keep 90 points for herself and invest the other 10 in the public good. The 10 points invested in the public good are then multiplied by 2.8, to become 28, and then divided by 7 and distributed evenly. The payoffs would then be 94 to the leader and 4 to all other players.

Finally, all seven group members vote on whether to award the leader a bonus of 25 additional points. I choose to use a vote on a bonus rather than an election to simplify the game, given experimental time constraints. Voting on the bonus is costless to all players, which makes the citizens indifferent between voting *yes* and voting *no*. To test selectorate theory's prediction

⁵Specifically, private information in the model could proxy for something that is partially observable by the leader, such as physical size, which correlates with, but does not completely determine, fighting ability. It could also represent technical skills possessed by a citizen that are difficult for the leader to observe. For example, Mamadouh (2004) examines the connection between the study of geography and war, including geographers' direct involvement in World War I. Likewise, Leff (1991) recounts how, during World War II, members of the War Advertising Council volunteered their expertise to contribute to the war effort through public information campaigns. Finally, Schröder (2006) discusses the complex role of civilian experts in the European Union security community.

⁶Rotte and Schmidt (2003:183) cite the Boer War (1899–1902) as an example, “where less trained but more flexible British reservists proved more useful for modern war than the regular soldiers.”

⁷For example, a player with 5 points has a one-third chance of winning, a player with 10 points has a fifty-fifty chance of winning, and a player with 15 points has a three-fifths chance of winning.

⁸This multiplier creates a marginal per capita return of 0.4, which is approximately the mean reported by Zelmer (2003) in a survey of 27 public goods experiments.

about variation in W/S , I refer to a democracy as a system in which the leader needs at least four of seven votes in favor of the bonus for it to be awarded. An autocracy is a system in which the leader needs only two of seven votes for the bonus to be awarded.

Equilibria Description

Since the citizens are indifferent between voting *yes* and voting *no* on the bonus, the citizens can employ a variety of strategies in equilibria. Three such strategies seem most prominent: citizens who always vote *yes*, citizens who always vote *no*, and citizens who condition. I call a “conditioning strategy” a strategy in which a citizen votes *yes* when she receives a payoff at least as high as her initial endowment and *no* otherwise. In all equilibria, the leader will vote to award her the bonus. I focus on equilibria in which all citizens’ use the conditioning strategy.⁹ I first present the equilibrium under the assumptions of the conditioning strategy for a democracy when citizens have no ability to communicate to the leader their relative ability to contribute to the war effort.

Under the conditioning strategy, the leader of a democracy decides whom to send to the conflict based on the knowledge that she can guarantee the bonus by not sending three citizens, who keep their endowment and vote *yes* on the bonus. These three votes plus the leader’s give the necessary four votes. The leader also uses her knowledge of her own initial endowment of points to derive her expected payoffs based on the probability of winning the prize.¹⁰ Using this private information, we obtain the probabilities of winning at least three battles, as shown in Table 1.

TABLE 1 Probability of Winning the Conflict Given the Leader’s Endowment

| Strategy | Sees 15 | Sees 10 | Sees 5 |
|---------------------|---------|---------|--------|
| Sends 3 | .095 | .106 | .120 |
| Sends 4 | .253 | .276 | .280 |
| Sends 5 | .426 | .458 | .511 |
| Sends 4 (inc. self) | .303 | .293 | .245 |
| Sends 4 (inc. self) | .479 | .458 | .445 |

⁹If at least three citizens always vote *yes* or at least four citizens always vote *no* in a democracy, in equilibrium, the leader will send five randomly selected citizens to the conflict and keep all of the winnings from the conflict.

¹⁰The leader is not given the opportunity to accept a negotiated settlement that would result in her group receiving a positive payoff with certainty. This set-up truncates the game tree to avoid the issue that democracies are less likely to select into a difficult war. If the leader opts out of the war by not sending any group members to fight, all players retain their original endowment, but there is no chance of additional points being added to any group members’ payoffs.

If the leader's endowment equals 15, she maximizes her expected payoff by sending five players to the conflict, excluding herself, and then investing 25 points in the public good if the group wins the conflict and keeping the rest. The 25 points invested in the public good give a payoff of 10 points to each member of the group. This distribution results in five citizens receiving at least their initial endowment as a payoff. Thus, when the conflict is won, the leader has the necessary votes to earn the bonus. There is a 0.426 chance of winning the conflict. The leader's payoff in expectation is thus $[15 + .426(75 + 25 + 10)] = [61.9]$, where the 15 is the leader's initial endowment, the 75 is the part of the prize from the conflict kept by the leader, the 25 is the bonus, and the 10 is the leader's share of the public goods. Likewise, for the other possible endowments, she maximizes her expected payoff with the same strategy, and the expected payoff for a leader with an endowment of 10 or 5 is [60.4] or [61.2] respectively.

Since the citizens do not know the leader's initial endowment before choosing their strategy, the expected value for an individual citizen when all six citizens are playing the conditioning strategy is [6.3].

In an autocracy, the citizens' conditioning strategy guarantees the bonus for the leader because at least one citizen cannot be sent to the conflict. That citizen, plus the leader's vote, gives the autocrat the necessary two votes for the bonus. Therefore, regardless of the autocrat's initial endowment, she will send five citizens to the conflict, keep the entire prize if the group wins, and keep her initial endowment. The expected payoff for an autocrat playing this strategy with an endowment of 15 is: $[15 + 25 + .426 \cdot 100] = [82.6]$. The expected payoff for an autocrat with an endowment of 10 or 5 is [80.8] or [81.1] respectively. In all cases, one of the citizens keeps her initial endowment while the others receive a payoff of zero. The overall expected payoff for a citizen in an autocracy when all citizens are playing the conditioning strategy is [1.7].

In equilibrium, both democracies and autocracies will always send five groups members to the conflict, giving them both an equal probability of winning the conflict. However, after winning the conflict, democratic leaders will invest resources in public goods while autocratic leaders will not.

Communication

If we allow communication before the leader decides on whom to send to the conflict, the equilibrium specified for democracies and autocracies without communication remains, but a second type of equilibrium for democracies is added.¹¹ If communication is allowed, the citizens may play a

¹¹The solution here is not unique, and other types of equilibria likely exist as well. I choose to focus on the particular equilibrium presented because it reveals the potential for democracies to win a higher percentage of conflicts than autocracies.

strategy of the type: “If all members of the group reveal their initial endowment, the leader selects the players with the five highest endowments, and, given the group wins the prize, I receive my endowment back, then I will always vote for the leader to get the bonus (whether or not we win the conflict).”¹² The leader must convince citizens with endowments of 15 to reveal their private information by promising them a payoff of at least 15. The cheapest way to accomplish this is by investing enough of the prize in public goods that each player receives a payoff of 15, which can be reached with 38 points in the public good. The probability that a group wins if it sends the players with the five highest endowments is 0.575, giving an expected payoff for a citizen of [10.2].

Given this strategy for the citizens, the expected payoff of the leader if she sends the players with the five highest initial endowments is [70.9]. If the leader sent the five highest endowments and the group won the prize, the next best strategy for the leader would be to keep the entire prize. This strategy costs the leader the bonus, so the payoff would be 100 for an endowment of 10 or 15 or 105 otherwise. Conditional on winning the prize, the payoff from the proposed equilibrium is 102.2. This payoff shifts to 107.2 if the leader’s initial endowment was 5. Therefore, the leader has no incentive to keep the entire prize if the group wins. She is better off taking her share of the public goods, 62% of the prize, and the bonus.

This strategy set is enforceable because the leader knows that there are two 5s, three 10s, and two 15s initially. If these totals are not revealed, then we assume that the leader, now with no chance of earning the bonus, randomly selects five of the six citizens for the conflict and keeps the entire prize if it is won. A citizen with an endowment of 15 thus has a five-sixths chance of getting a payoff of zero and a one-sixth chance of keeping her 15, for an expected payoff of [2.5]. Upon seeing a 15, a citizen has an expected payoff of $[.575 \cdot 38 + 2.8 \cdot 1/7] = [8.74]$ under the proposed equilibrium. Thus, citizens cannot improve their payoffs by concealing or misrepresenting their true endowment.

Thus, there is equilibrium of the game for a democracy that can communicate where the leader selects the players with the five highest endowments for the conflict and keeps 62% of the prize if the group wins while investing the remainder in public goods. This equilibrium increases the payoffs of both the leader and the citizens over the equilibrium with no communication.

In an autocracy, this strategy set is not equilibrium. Upon winning the conflict, this equilibrium requires the leader to invest 38 points in public goods for a payoff of 15 per citizen. A democrat would not try to buy off

¹²This equilibrium requires that citizens reward the leader for efficient war organization rather than winning the war. While this may appear at odds with the idea that democracies punish leaders who lose wars, the leader in this set-up is not culpable for the war since the game begins with war already under way. Therefore, it is reasonable that citizens will not necessarily punish the leader for losses (Croco 2011).

individual voters with private payoffs since she would need to raise the payoff of three citizens to over 15 to earn the bonus. In contrast, an autocrat only needs to increase the payoff of one voter directly with a 16-point payoff. The leader targets one citizen by keeping her out of the conflict and giving her an additional 16 points if the group wins the conflict. In turn, that citizen always votes for the bonus.

The probability of winning the conflict would not change under this equilibrium; the autocratic leader merely has to pay out more in private goods. The initial endowment in expectation is 10 and there remains a .464 probability of winning the conflict and getting the additional payoff of 16, for a total expected payoff of [17.4] for the citizen in the winning coalition. However, each citizen only has a one-sixth chance of being in the winning coalition, so the expected payoff for all citizens is [2.9].

Therefore, if communication is allowed, citizens in an autocracy increase their expected payoff while the leader's expected payoff decreases. In trying to maximize her payoff, the autocratic leader creates an incentive structure that ignores information about the initial endowments of group members. Communication will not change the autocratic group's probability of winning the conflict. This result is not surprising, given what the coup-proofing literature says about the ineffective arrangement of autocratic militaries (Biddle and Zirkle 1996; Pilster and Böhmelt 2011; Quinlivan 1999).

Autocracies, with or without communication, and democracies without communication should win the same percentage of conflicts. However, if citizens in a democracy use communication to condition the leader's bonus on sending the players with the best chance of winning, the democracy increases its win percentage over autocracies. Moreover, communication should increase public good investment in democracies.

HYPOTHESES

The model yields the following hypotheses:

- H1: *Democratic leaders will invest more winnings in public goods than autocratic leaders.*
- H2: *Autocratic leaders on average will receive a higher payoff than democratic leaders.*
- H3: *Allowing communication raises the average payoffs of democratic leaders but lowers the average payoffs of autocratic leaders.*
- H4: *The average payoff of citizens in democracies will be higher than in autocracies.*
- H5: *Allowing communication raises the average payoffs of citizens in both autocracies and democracies.*
- H6: *When communication is allowed, democracies will win more conflicts than autocracies.*

H7: *When allowing communication, citizens in democracies will be more likely to truthfully reveal their endowment than citizens in an autocracy.*

EXPERIMENTAL DESIGN

The game was programmed in z-Tree and run in New York University's Center for Experimental Social Science (CESS) (Fischbacher 2007). A total of 259 subjects were recruited through CESS's undergraduate recruitment pool and participated in 13 sessions of the experiment. Most sessions included 21 subjects, but two sessions included only 14. There were seven sessions held under autocratic rules and six held under democratic rules. Sessions were either held back to back or on successive days with a coin flip determining which set of rules the first session would be held under, with the next receiving the opposite treatment.

Before the first round of the experiment, subjects were randomly assigned to groups of seven and a leader was randomly selected from each group.¹³ To prevent super-game effects, the groups and the citizens' player numbers were reassigned each round, but the leaders chosen in the first round remained leaders throughout the experiment. The experiment lasted 18 rounds.

At the beginning of each round, subjects were informed whether their leader needed two or four votes to earn the bonus and were privately told their own initial endowment for the round. Next, the leader selected up to five players for the conflict, which was described to the subjects as a game of chance with an opportunity to win points for the group. The leader was reminded that any players selected would lose their endowment. The leader's selections were revealed to all members of the group before the group was informed if it won the additional points. If the group won at least three battlefields, the leader distributed points to individual players or put them into a public good, described as a "multiplier fund." After the leader distributed the points, players were informed of their payoffs for the round. Players then voted on whether to give the leader the bonus, and the result of the vote was revealed to all group members. The leader was awarded a bonus of 25 points if she earned two or four votes, depending on whether the manipulation was autocratic or democratic.¹⁴

After the ninth round, communication was added to the experiment. After their endowment was revealed, the citizens had a chance to indicate to the leader their endowment. A box was displayed on their screens in which

¹³Mintz, Redd, and Vedlitz (2006) express concerns about the difficulty of generalizing results obtained from student subjects to the behavior of real-world national security decision makers. Although not examining political leaders, Belot, Miller, and Duch (2010) provide evidence that differences between student pools and nonstudent pools are fairly minor.

¹⁴The full experimental instructions can be found in the online Appendix C.

they could select 0, 5, 10, or 15, and they were informed that their selection would be shown to the group before the leader decided which subjects to send to the conflict. Subjects were instructed to choose 0 if they wished to communicate no information to the leader and were further informed that what they indicated in the box was not required to be truthful. The final nine rounds of the experiment were played with this communication mechanism in place.

Subjects were paid a show-up fee of 12 dollars. Subjects received additional payment according to a random round payoff mechanism (Morton and Williams 2010:382). Two rounds were randomly selected and used to calculate the subject’s payoff from the experiment. The subjects earned an average of \$4.70 during the experiment for a total of \$16.70 (including the show-up fee).

RESULTS

I begin by addressing how leaders distribute points after winning the conflict. On average, democrats invested 41.9 points in the public good, compared to 26.5 for autocrats. Both types of leaders had higher public good expenditures than expected from the model, but, as predicted, democrats spent more on the public good than autocrats. The most straightforward method to test for a difference in mean investment in the public good would be a standard *t*-test. However, that test cannot be used because leaders have multiple rounds in which they won conflicts, giving them multiple investments in the public good and requiring the data to be clustered at the level of the individual leader. Therefore, I use a clustered *t*-test, presenting the results in Table 2 (Harrell 2010). As predicted by Hypothesis 1, the results show that democratic leaders tend to invest significantly more points in the public good than autocratic leaders.

I use a Tobit regression to account for the effect of communication and the interaction between communication and democracy. A Tobit regression is necessary because a substantial portion of the public good investments are either left-censored, that is, the leaders invested 0, or right-censored, that is, the leaders invested 100. As displayed in Table 3, Model 1, a change

TABLE 2 Clustered *t*-Test for the Level of Public Goods the Leader Invested in After Winning the Conflict

| Variable | Effect | SE of Effect | <i>Z</i> | <i>p</i> > <i>z</i> |
|-----------|--------|--------------|----------|-----------------------|
| Democracy | 15.4 | 6.6 | 2.33 | .019 |

Note. Standard errors are clustered at the individual level. *n* (autocracy) = 142; 18 clusters. *n* (democracy) = 133; 16 clusters.

TABLE 3 Tobit Regressions and Margin Effects with Public Good Investment by the Leaders After Winning a Conflict as the Dependent Variable in Model 1, Round Payoff of the Leaders as the Dependent Variable in Model 2, and Round Payoff of the Citizens as the Dependent Variable in Model 3

| | Model 1 Public Good Investment | Model 2 Leader Round Payoff | Model 3 Citizen Round Payoff |
|--|-----------------------------------|--------------------------------|---------------------------------|
| Democracy | 14.303 (0.220) | -13.477*** (0.002) | 2.397*** (0.000) |
| Communication | -3.977 (0.711) | -0.351 (0.926) | 0.316 (0.695) |
| Dem × Comm | 21.481 (0.241) | -14.560*** (0.001) | 3.741*** (0.000) |
| log period | 7.872 (0.244) | 6.194*** (0.004) | 0.123 (0.776) |
| Endowment | | 1.975*** (0.000) | 1.906*** (0.000) |
| Won Conflict | | 73.867*** (0.000) | 25.838*** (0.000) |
| Constant | 5.838 (0.636) | -5.383 (0.251) | -15.388*** (0.000) |
| Observations | 275 | 666 | 3978 |
| Clusters | 35 | 37 | 222 |
| Left-censored | 65 | 117 | 1651 |
| Right-censored | 38 | 0 | 0 |
| Marginal Effects after Winning Conflict: | | | |
| Dem no Comm | 9.043 (7.620) | -13.474*** (4.285) | 2.10*** (0.598) |
| Dem w/ Comm | 16.162 (11.844) | -14.205*** (2.723) | 3.03*** (0.797) |
| Comm for Auth | -2.364 (6.353) | -0.351 (3.757) | 0.272 (0.694) |
| Comm for Dem | 4.755 (10.363) | -1.082 (2.884) | 1.204 (0.779) |

Note. All standard errors are clustered at the individual level. * $p < .10$, ** $p < .05$, *** $p < .01$.

from autocracy to democracy leads to an average increase in public goods investment of about 9 points with no communication and of over 16 points with communication. However, despite these large average increases, large standard errors prevent these results from reaching standard levels of statistical significance. Taken together, the strong statistical significance presented in Table 2 and the large, though insignificant, coefficients in Table 3, Model 1, provide evidence that democrats place more points in the public good than autocrats.

Next, I address whether regime type affects the payoff for the leader. On average, democratic leaders earned 36.5 points per round while autocratic leaders earned 48.6. The Tobit regression presented in Model 2 of Table 3 confirms that these differences are significant. Turning to the marginal effects, a change from an autocracy to a democracy costs the leader an average of approximately 13.5 points without communication or 14.2 points with communication. Both of these estimates are highly

significant.¹⁵ Autocrats do better than democrats because they keep more points for themselves after winning the conflict on average, but also because it is much easier for them to win the vote, regardless of the outcome of the conflict.¹⁶

Meanwhile, Hypothesis 3 did not fare as well. Adding communication for a democracy did not significantly increase the payoff of the leader. In fact, the change from no communication to communication lowered democratic leaders' payoffs on average. However, consistent with Hypothesis 3's prediction about autocracies, moving from an autocracy with no communication to an autocracy with communication had no effect on the payoff of the leader. Also of interest in Model 2, Table 3 is the significant and positive coefficient on Log (Period), which suggests that leaders learned to maximize their payoff as the game progressed. This evidence of learning is unsurprising, given the complexity of the game.

The final sets of results related to the domestic distribution of resources addresses the payoffs of the citizens. Overall, citizens in democracies averaged about 2.5 points more per round than citizens in autocracies (10.9 to 8.25). Model 3 in Table 3 presents a Tobit model with the citizen's round payoff as the dependent variable with the marginal effects in the lower portion of the table.¹⁷ As predicted by Hypothesis 4, citizens in democracies earn more on average than citizens in autocracies. When the group won the conflict, democratic citizens averaged about 2.1 points more than autocratic citizens without communication and about 3 points more with communication.

Little support was found for the predictions of Hypothesis 5. In democracies that won the conflict, there is an increase in round payoffs of about 1.2 points on average when communication is allowed. However, this result falls short of statistical significance. Hypothesis 5 was not supported for autocracies. A change from no communication to communication does increase the round payoffs of citizens in autocracies, but only slightly.

Next, I examine the effect of democracy and communication on the probability of winning the conflict. Overall, Table 4 demonstrates there were only small differences in the percentage of conflicts won by regime type and communication.¹⁸ Thus, the results do not support Hypothesis 6, which predicted that democracies with communication would win a higher percentage of conflicts than any other combination of regime type and communication.

¹⁵Although not presented here, when the group did not win the conflict, the marginal effect of democracy was somewhat smaller but remained negative and significant.

¹⁶These results can be found in online Appendices A and B.

¹⁷Final Endowment is the endowment of the citizen after the conflict. Consequently, if the citizen was selected for the conflict, this variable is set to 0. If the citizen was not sent to the conflict, the citizen retains her initial endowment. The marginal effects were calculated with Final Endowment set to its mean of 3.31.

¹⁸A logistic regression, not presented here, confirms that these differences are not significant.

TABLE 4 Winning by Democracy and Communication

| | Democracy | | Autocracy | |
|----------|------------------|---------------|------------------|---------------|
| | No Communication | Communication | No Communication | Communication |
| Won | 64 (43.8%) | 69 (44.8%) | 69 (45.7%) | 73 (45.9%) |
| Conflict | 82 (56.2%) | 85 (55.2%) | 82 (54.3%) | 86 (54.1%) |
| Total | 146 | 154 | 151 | 159 |

While democracies did not win more often, there is some evidence that democracies incentivize citizens to organize more efficiently than autocracies when communication is allowed. Citizens in democracies stated their true endowment in 51.4% of the rounds while citizens in autocracies stated their true endowment 46.7% of the time. To test if this difference is significant, I employ a logistic regression with the dependent variable specified as whether the citizen revealed her true endowment in a given time period. I drop the cases when the true endowment was 5 because subjects had no strategic incentive to conceal this, given it is the lowest possible endowment; in fact, for both democracies and autocracies, subject receiving an endowment of 5 revealed this truthfully much more frequently than the other two possible endowments.

Table 5 presents the results of this logistic regression and the marginal effects.¹⁹ The marginal effect of a change from an autocratic to a democratic group is a nearly 8 percentage point increase in the probability that a citizen with a high endowment will reveal that endowment truthfully. While this result is not statistically significant, it does provide evidence that democratic leaders were, on average, getting better information about the distribution of endowments in their groups.²⁰ However, as the previous result demonstrated, they were unable to translate this advantage into a higher percentage of wins in the conflict. Furthermore, as the experiment continued, subjects were less willing to reveal their endowment truthfully. This is likely because the equilibrium in which subjects were truthful was difficult to sustain over time.

DISCUSSION

Overall, the results related to Hypotheses 1, 2, and 4 strongly support the domestic aspects of selectorate theory. Selectorate theory predicts that leaders of democracies, needing a higher percentage of support to stay

¹⁹In this table, the variable Log(Period) represents the natural log of the number of periods after communication was allowed.
²⁰The *p* value on the marginal effect of democracy is .102.

TABLE 5 Logistic Regression and Marginal Effects with Truth as the Dependent Variable

| | |
|-------------------------|---------------------|
| Model 1 | |
| <i>Truth</i> | |
| Democracy | 0.326 (0.107) |
| Log(Period) | −0.163** (0.022) |
| Constant | −0.295* (0.080) |
| Observations | 1416 |
| Clusters | 222 |
| <i>Marginal Effects</i> | |
| Democracy | 0.079 (0.049) |
| Log(Period) | 0.039** (0.017) |

Note. Only endowments of 10 and 15 are included, and the standard errors are clustered at the individual level.
* $p < .10$, ** $p < .05$, *** $p < .01$.

in power, will invest more in public goods than leaders of autocracies. Autocrats, meanwhile, can keep more of their group’s wealth for themselves since they need to use so little to buy off enough supporters to win the vote. As predicted, democratic leaders spent more on public goods than autocratic leaders after the group won the conflict. Furthermore, autocratic leaders averaged higher payoffs. Meanwhile, citizens in democracies received higher payoffs per round than citizens in autocracies. Taken together, these findings show that citizens are better off under democracies than autocracies, as the higher allocations of public goods translated into higher payoffs. Leaders of autocracies, meanwhile, better captured their states’ resources for their own private use than leaders of democracies; they keep a higher share of the winnings from conflict for themselves and win the bonus, a proxy for retaining political power, more easily.

These results are especially striking when we consider that the experimental protocol is a difficult test of selectorate theory. Because the experiment was not modeled as a repeated game, the loyalty norm, a key aspect of selectorate theory, was excluded (Bueno de Mesquita et al. 2005:65–68). When W/S is small, that is, in an autocracy, members of the selectorate are easily replaced and thus fear exclusion from future coalitions if they fail to support the current leader. The chance of exclusion from a future leader’s selectorate generates loyalty to the current leader, allowing the leader to provide minimal private goods to the current coalition members. In this experiment, loyalty norms are not in play because groups were changed prior to every period and citizen player numbers’ reassigned.

Autocratic leaders in the experiment, thus, have no a priori knowledge of who is likely to support them, potentially causing them to overinvest in public and private goods to secure support. Despite this potential bias against the theory, the findings support selectorate theory's main predictions.

The hypotheses related to communication found little support. No support was found for Hypothesis 6, which stated that under communication, democracies would win a higher percentage of conflicts than autocracies. However, modest support was found for the seventh hypothesis. On average, citizens in democracies were approximately 8% more likely to reveal their true endowment than citizens in autocracies. While it did not translate into conflict wins, this increased willingness to reveal their true endowment does suggest that democratic institutions provide incentives that help democracies organize more efficiently than autocracies.

Communication also had little effect on payoffs. In contrast to Hypothesis 4's prediction, allowing communication decreased democratic leaders' average payoff. Likewise, Hypothesis 5's prediction that communication would increase the payoffs of citizens did not bear out either, though the payoffs of citizens in democracies did increase on average. It is likely that the effect of communication in the experiment was small because the method to implement it was too weak. Merely allowing citizens to reveal their endowment appears insufficient to allow citizens and leaders to coordinate on the strategy proposed in the formal model.

CONCLUSION

This article tested the domestic aspect of selectorate theory using a laboratory experiment. In line with the theory's main prediction, democratic leaders in the experiment supplied more public goods than autocratic leaders. As predicted, the larger winning coalition randomly assigned to different leaders prompted democratic leaders to rely on public goods to build support. This is the first laboratory test to provide support for selectorate theory's prediction that leaders of polities with larger winning coalitions invest more heavily in public goods. Consistent with that finding, autocratic leaders kept more of their group's wealth for themselves, and citizens in autocracies received lower payoffs than citizens in democracies.

This article also addresses the finding in the International Relations literature that democracies win wars more often than autocracies. Combining aspects of international conflict and domestic politics, I presented a model that predicted that when citizens can communicate their skill set, it becomes possible for democracies to organize more efficiently than autocracies and to win more conflicts. Because democratic leaders provide a higher level of public goods than autocratic leaders, citizens in democracies are incentivized to contribute to the war effort while citizens in autocracies are not. The

experiment produced some evidence that democracies can organize more efficiently, but was unable to show that democracies increase their chances of winning wars through efficient communication. While experimental work is becoming more common in International Relations, this is one of the first game theoretical laboratory experiments to include aspects of both domestic politics and foreign policy.

Overall, two key points emerge from this study. First, I provide micro-foundational support that democratic institutions compel leaders to invest in public goods at a higher rate than autocratic institutions, leaving citizens better off. Second, I argue that democratic institutions allow societies to organize more efficiently. Under an autocracy, citizens know they are unlikely to receive any benefit from winning a war so they have little incentive to voluntarily join the war effort or to incur costs associated with the fighting. In contrast, citizens of a democracy know that their leader will reinvest spoils of war back into society through public goods to ensure reelection. Thus, citizens are more willing to accept the costs of fighting, leading to an advantage for democracies in war.

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