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Rational Choice Theory and the Paradox of Not Voting

Timothy J. Feddersen

At least since Downs's (1957) seminal work *An Economic Theory of Democracy*, rational choice theorists have appreciated the "paradox of not voting." In a large election, the probability that an individual vote might change the election outcome is vanishingly small. If each person only votes for the purpose of influencing the election outcome, then even a small cost to vote—like a minor schedule conflict or mildly bad weather—should dissuade anyone from voting. Yet it seems that many people will put up with long lines, daunting registration requirements and even the threat of physical violence or arrest in order to vote. Given the central place of voting within political economy, the lack of an adequate rational choice model of large elections with costly voting presents an obvious problem.

For the most part, theorists have bypassed the turnout problem either by eliminating voters as strategic actors or by assuming that the decision to vote is independent of other strategic choices. The problem with the first approach is that the empirical literature on voting behavior provides considerable evidence of apparently strategic behavior. In primary elections, there is evidence that voters condition their vote choice on the viability of candidates (Abramson, Aldrich, Paolino and Rohde, 1992). In a seminal and comprehensive study, Cox (1997) shows that voting patterns and election outcomes are broadly consistent with patterns of behavior predicted by strategic voting models. For example, under plurality rule (in which the candidate with the most votes wins the election),

■ *Timothy J. Feddersen is Wendell Hobbs Professor of Managerial Economics and Decision Sciences, Kellogg School of Management, Northwestern University, Evanston, Illinois. His e-mail address is* ⟨*tfed@kellogg.northwestern.edu*⟩.

multicandidate contests generally boil down to a competition between two candidates.

The assumption that voters behave strategically in the voting booth but not when deciding to vote also seems to contradict empirical data. For example, voter turnout is inversely related to the costs of voting (Wolfinger and Rosenstone, 1980; Powell, 1986; Riker and Ordeshook, 1968). Factors that may impact the costs to vote and turnout include the weather, registration requirements, time required to think about the voting decision, distance to the polling place, and so on. Voter turnout is also correlated with education and income levels (Wolfinger and Rosenstone, 1980). If those with greater education or income have access to a better quality of information about candidates and issues, then game-theoretic models suggest that they should vote in greater numbers (Feddersen and Pesendorfer, 1996, 1999). Blais (2000), in an excellent review of the literature on turnout as it relates to rational choice models, finds that closeness of elections influences turnout. This finding suggests that voters participate because they hope to influence the ultimate outcome of the election. Excellent reviews of the empirical literature are available in Aldrich (1993), Matsusaka and Palda (1993), Blais (2000) and Mueller (2003).

Given the extensive evidence of apparently strategic voter behavior, it is unsettling that there is not a canonical rational choice model of voting in elections with costs to vote. But while a canonical model does not yet exist, the literature appears to be converging toward a "group-based" model of turnout, in which group members participate in elections either because they are directly coordinated and rewarded by leaders as in "mobilization" models or because they believe themselves to be ethically obliged to act in a manner that is consistent with the group's interest as in "ethical agent" models. To appreciate the development of group-based models, it will be useful to begin with a discussion of the decision-theoretic literature on voting, with a focus on the paradox of not voting. Then we will move to the game-theoretic and group-based models of voting. A conclusion highlights some of the problems that group-based models of voting must address.

The Decision-Theoretic Approach

The traditional starting point for the modern theory of voter turnout is the model of Riker and Ordeshook (1968), which crystallizes insights from the earlier literature such as Downs (1957) and Tullock (1967). Riker and Ordeshook analyze a model of an election with two candidates in which a single voter with preferences between the two candidates must decide whether to vote or abstain. The parameter $B > 0$ represents the utility difference to the voter between the event that the favored candidate is elected and the event that the other candidate wins. Let $C > 0$ be the cost of voting, and let $p_j \in [0, 1]$ be the probability that a single vote for candidate $j \in \{1, 2\}$ will change the outcome of the election in favor of j. We say

that p_j is the probability a vote is pivotal for candidate j. A voter who prefers candidate j should vote for j rather than abstain if and only if

$$p_jB - C > 0 \text{ or } p_j > C/B.$$

These inequalities can never be satisfied if the cost of voting C exceeds the utility difference of voting for a candidate B, so it is standard to assume that $B > C$, at least for many voters.

Riker and Ordeshook (1968) do not provide an explicit formula for computing the probability that an individual's vote is pivotal. However, they do observe that in large elections, the probability a vote is pivotal is very small. Consider an election in which 5 million voters are expected to cast ballots and candidate 1's expected vote share is 50.1 percent, while candidate 2 is expected to receive 49.9 percent of the votes cast. Myerson (2000) develops a formula in which the number of people who vote is a random number drawn from a Poisson distribution with mean n.[1] According to Myerson's formula, the probability a vote is pivotal for candidate 2 is 8.1079×10^{-9}. Thus, the benefit to a voter who prefers candidate 2 must be more than 8 billion times greater than the cost to vote. For example, if voting costs \$.01, then the expected benefit of electing one's favored candidate must be greater than \$80 million dollars. Expected benefits at such levels seem unreasonable.

Riker and Ordeshook (1968) modify the calculus of voting by assuming that, in addition to a cost to vote, voters get a consumption benefit $D > 0$ from the act of voting. They propose that the D term may represent, for example, a payout from fulfilling one's civic obligation or duty to vote. The earlier inequality becomes

$$p_jB - C + D > 0.$$

[1] In Myerson (2000), the number of people who vote is a random number drawn from a Poisson distribution with mean n. Let σ_1 and σ_2 with $\sigma_1 + \sigma_2 = 1$ be the fraction of those voting who vote for candidate 1 and 2, respectively. Then $n\sigma_i$ is the expected number of people who vote for candidate $i \in \{1, 2\}$. Myerson provides the following formula for estimating the probability a vote is pivotal for candidate $j \in \{1, 2\}$:

$$p_j \approx \frac{e^{n(2\sqrt{\sigma_1\sigma_2}\sigma_1-\sigma_2)}}{4\sqrt{\pi n}\sqrt{\sigma_1\sigma_2}}\left(\frac{\sqrt{\sigma_1}+\sqrt{\sigma_2}}{\sqrt{\sigma_j}}\right).$$

A useful simplification of the formula occurs in the case when the total number of potential voters in a population is a Poisson random variable with expectation N and the total number of votes cast is a Poisson random variable with expectation n. Suppose that the number of votes expected to be cast for each candidate is the same, so that $n\sigma_1 = n\sigma_2 = n/2$. This scenario maximizes the probability a vote is pivotal. Expected turnout is n/N. According to Myerson's formula, the probability a vote is pivotal in this case reduces to

$$\frac{1}{\sqrt{2\pi n}}.$$

Assuming p_j is practically zero, a voter casts a ballot only if the consumption benefit of voting D exceeds the cost C. The addition of a consumption benefit of voting assumes away the paradox of not voting, as was soon pointed out by Ferejohn and Fiorina (1975).[2] Thus, the research agenda from this model became to explain why voters might receive a consumption benefit from voting.

Endogenizing Whether a Vote is Pivotal

Riker and Ordeshook (1968) took the probability a vote is pivotal in an election to be exogenous. Ledyard (1981, 1984) argued that the decision to vote should be embedded within a game. He looks at a model of a voting game in which voters must choose to vote for one of two candidates or else abstain. He assumes that voters only care about influencing the election outcome (that is, no consumption benefit to voting) and all voters have strictly positive costs to vote. He also adds candidates as strategic actors. He shows that when the two candidates take distinct positions, there must be positive turnout in equilibrium. The reason is clear. If nobody is voting, then the probability that a vote is pivotal is large and everyone has an incentive to vote. Ledyard does not characterize the magnitude of turnout when candidates have distinct positions. Ledyard also shows that, in large elections, candidates will converge to the median voter position and turnout will go to zero. While Ledyard's model makes a case for the efficiency of elections, it does not explain turnout.[3]

Palfrey and Rosenthal (1983, 1985) follow up on the Ledyard paper by characterizing the magnitude of turnout in a voting game where candidate positions are fixed and different. Palfrey and Rosenthal (1983) analyze a voting game in which each voter must choose whether to cast a costly vote for his or her preferred candidate or to abstain. The costs to vote are identical for each voter. The authors look for the Nash equilibria of this game. They find two kinds of equilibria: low turnout and high turnout. To generate high turnout in equilibrium, it is necessary to generate a high probability of being pivotal. High pivot probabilities are achieved in equilibrium by having nearly identical numbers of voters supporting each candidate. For example, a high turnout equilibrium could be sustained if 2 million voters vote for candidate 1 and 2 million vote for candidate 2. Given that the variance on the actual number of voters for each candidate is low enough and that the expected number of votes for each candidate is almost the same, very high pivot probabilities can be sustained even with high turnout. A low turnout equilibrium is sustained by having supporters of each candidate randomize between

[2] Ferejohn and Fiorina (1975) present a theory of turnout in which voters participate in order to minimize the maximal regret they might experience by not voting—if their vote were pivotal.

[3] Myerson (2000) presents an elegant reformulation of Ledyard's model as a large Poisson game.

turning out to support their candidate with low probability and abstaining. This results in low pivot probabilities.

Palfrey and Rosenthal (1985) demonstrate that the introduction of uncertainty into their earlier model eliminates the high turnout equilibria. They assume that everyone in the population has a type defined by a cost to vote $c \in [0, 1]$ and a candidate preference $j \in \{1, 2\}$. For any given cost to vote, the actual number of voters with costs below that level is a random variable. They find symmetric Bayesian equilibria characterized by two cost points c_1 and c_2, such that all voters who prefer candidate j and whose cost is below c_j vote for candidate j, while all others abstain. As the size of the electorate gets large, the equilibrium cost cutpoints converge to zero and turnout converges to zero. The introduction of uncertainty ensures that even if the expected number of votes for each candidate is the same, as the expected number of votes gets large, the probability the election results in an exact tie goes to zero. It follows that in any equilibrium, the cost cutpoints must converge to zero as the population size grows. Hence, only low turnout equilibria exist for large populations.

Ultimately, the game-theoretic approach to costly voting tried to escape the paradox of not voting by showing that in equilibrium, election outcomes would be close and pivot probabilities higher than in the decision theoretic literature. But the introduction of uncertainty about the actual number of voters guarantees that even if elections are expected to be close, the probability a vote is pivotal will be very low and turnout should be near zero.

Abstention and Asymmetric Information

Feddersen and Pesendorfer (1996, 1999) take an alternative approach to explaining turnout. They assume that voting is costless and then explain why voters with strict preferences between two candidates might abstain.

Feddersen and Pesendorfer (1996) consider an electorate with three types of voters—partisans for candidate 1, partisans for candidate 2 and independents. Partisans always vote for their preferred candidate. There are two states of the world. In state 1, all independents prefer candidate 1 to candidate 2; in state 2, independents prefer candidate 2 to candidate 1. A fraction of the independents are perfectly informed about which state has occurred, and the others have no private information at all. The authors find Bayesian equilibria in which the uninformed independents will abstain with positive probability. Abstention by uninformed independents occurs at a level to balance out the expected difference between the partisans.

To gain an intuition for how this model works, consider the following example. Suppose there are four voters $\{v_1, v_2, v_a, v_i\}$. In state 1, all voters prefer that candidate 1 win the election. In state 2, voter v_1 continues to prefer that candidate 1 win the election, but voters v_2, v_a and v_i prefer that candidate 2 win the election.

Assume that state 1 is known to occur with high probability, so that all voters would choose to have candidate 1 elected if they don't have any additional information about the state and if they alone had to choose the winning candidate. Voters v_1, v_2 and v_a do not have any additional information; however, assume v_i knows which state has occurred. Finally, suppose that the group will use majority rule to elect one of the candidates. In case of a tie, a coin flip determines the winner.

The following strategy profile is a perfect Bayesian Nash equilibrium in this example. Decisions for two of the voters are straightforward. Voter v_1 votes for candidate 1, because v_1 prefers candidate 1 in both states of the world. Voter v_i votes for candidate 1 when state 1 has occurred and votes for candidate 2 otherwise. The more complicated cases involve the decisions of voters v_2 and v_a, who do not know which state has occurred. Voter v_2 will reason as follows: if state 1 has occurred, then voter v_2 knows that candidate 1 will be elected (or at worst in a tie) because of receiving the votes of v_1 and v_i, so voting for candidate 2 does not matter. However, if state 2 occurs, voter v_2 would prefer candidate 2 and also knows that candidate 2 will receive a vote from voter v_i. The only time the v_2 vote matters is when v_i has voted for candidate 2. In this situation, v_2 strictly prefers to vote for candidate 2.

Now consider the strategy of voter v_a. Voter v_a understands that voter v_1 will always support candidate 1 and voter v_2 will always support candidate 2, while voter v_i supports candidate 1 in state 1 and candidate 2 in state 2. In this situation, voter v_a ensures that the proper candidate wins with probability one by abstaining. If voter v_a did not abstain, and instead followed the logic of voter v_2, the result could be that when state 1 has occurred, there are two votes for candidate 1 (voter v_1 and v_i) and two votes for candidate 2 (voters v_2 and v_a) and, thus, a chance that the candidate preferred by voter v_a would lose.

This illustration of the model is far from exhaustive, since the full model allows each of these four types to be groups of voters, rather than just four individual votes, but it should help to clarify some of the themes of this model. The model suggests why in equilibrium, uninformed independent voters will abstain. In versions of the model with many voters, the uninformed vote at a level that balances out the votes of partisans so that the informed independent voter is more likely to be decisive. Because uninformed independents abstain and informed independents vote, the model provides an informational explanation for why better-educated individuals are more likely to vote. As the fraction of informed independents decreases, the effect is to decrease turnout and the margin of victory. Thus, closeness and turnout are correlated in the model.

In Feddersen and Pesendorfer (1999), the authors generalize their earlier model. They show that when there is a continuum of preference types and a "fine" state space, there will be almost no abstention. The state space is fine if there are states in which a fully informed electorate would be almost perfectly split. However, Feddersen and Pesendorfer argue that it is hard to interpret a fine state space as corresponding to some empirical phenomena. They suggest that "coarse" state spaces may be more characteristic of low information elections. When the state

space is coarse, the more general model can produce the same kinds of comparative statics as in the 1996 paper.

In both papers, there is no cost to vote. If costs to vote are introduced, then only low turnout equilibria would exist for exactly the same reasons as in the earlier papers: in an election with many voters, no individual voter has a reason to believe his or her ballot will be pivotal. Thus, these papers do not provide a solution to the paradox of not voting, but they do suggest a mechanism linking closeness, turnout and information that depends on the relative magnitude of different events rather than on the absolute probability that a vote is pivotal.

A Group-Based Voting Model of Mobilization

To generate voter turnout in costly elections, we must have some kind of consumption benefit for voting. Within the rational choice research agenda, there are two formally similar but conceptually distinct approaches that can both explain turnout and provide comparative statics consistent with strategic behavior. In both approaches, potential voters are understood to belong to groups of like-minded people who have the same preferences over the candidates. In both approaches, voters cast a ballot if and only if they receive consumption benefits from doing so—the probability an individual vote is pivotal is not relevant. Rather, the focus is on explaining changes in consumption benefits.

Mobilization models assume that groups of ideologically similar voters are coordinated by leaders who share their policy preferences. Each leader determines the level of turnout within his group by allocating costly resources to voters. It is as if leaders buy the votes of followers. As examples of such groups, one might think of unions, environmental groups or churches in which members share a common policy perspective and which have an existing organizational structure including leaders who communicate directly with members and members who meet regularly with one another.

Uhlaner (1989) constructs a mobilization model in which voters are assumed to get two kinds of benefits from voting: a consumption benefit from voting and an "investment benefit" corresponding roughly to the earlier concept of a probability that a vote is decisive multiplied by the utility benefit of one candidate over the others. As in Riker and Ordeshook (1968), voters participate because of consumption benefits. However, unlike Riker and Ordeshook, the consumption benefits are determined in part by group leaders. Uhlaner's model illustrates the incentives for group leaders to generate turnout for candidates that take positions the leaders prefer and that, as a consequence, candidates have incentives to take positions to generate such turnout.

Uhlaner (1989) implicitly sets up a game between voters, leaders and candidates, but does not derive equilibrium results. Morton (1987, 1991) analyzes a game-theoretic mobilization model with a continuum of voters and many leaders.

Each leader controls the votes of a fraction of the electorate and can increase the proportion of his fraction that votes at increasing cost. The winner of the election is the candidate that receives the most votes. The game between leaders is similar in some respects to a game among a relatively small number of voters with costs to vote—the central difference being that in the mobilization game, leaders have a continuum of pure strategies. As in voting games with costly voting, Morton (1991) finds that if at least one leader strictly prefers one of the candidates, then there is an equilibrium with positive turnout. Morton does not characterize the magnitude of turnout.[4]

Shachar and Nalebuff (1999) examine a model of turnout in U.S. presidential elections. To capture the mechanics of the electoral college, their model is built on two leaders—one for each party—in each of 50 states. Again, leaders determine how much effort to expend to mobilize the voters in their group. Since leaders can affect the behavior of measurable fractions of the population, the probability that a change in effort by a leader can impact an election is positive even in elections with many individual voters.

Turnout occurs in group-based models with costly voting for the same basic reason that it occurs in costly voting games with a small number of voters. In equilibrium, leaders who mobilize their supporters at positive cost must increase the probability that their preferred candidate wins the election as a result. As in the costly voting game, if no leader is mobilizing any supporters, then a single group leader can mobilize a small fraction of supporters and elect that group's preferred candidate at minimal cost.

In the voting game models with individual voters, turnout in equilibrium goes to zero as the number of voters gets large. Mobilization models assume a relatively small number of groups so that each group leader controls a measurable fraction of the electorate and, in equilibrium, remains able to change the election outcome with high probability.

The biggest difficulty for mobilization models is explaining how leaders affect the micro-level decision-making of voters. The proponents of mobilization models do not argue that group leaders actually pay voters directly for votes. Such an explanation would be problematic, at least in the United States, because vote buying is illegal and the secret ballot makes it impossible to determine how someone votes—which is not to say that vote buying does not happen, but that it is relatively rare and not at a level sufficient to explain large-scale turnout. Instead, the mobilization theorists suggest that group leaders modulate social pressure by group members upon each other. For example, Uhlaner (1989, p. 392) writes: "Intermediary elites can increase turnout by increasing the consumption benefits of action to their members, whether by providing money, fixing sidewalks, or increasing the normative stakes." Similarly, Shachar and Nalebuff (1999, p. 535) write: "We

[4] Also see Schram (1991) for a group-based model of turnout and discussion of empirical support for the mobilization thesis.

believe the social pressure is very important. There is a contagion effect. The more people in a social network that encourage a person to vote, the more likely that person is to vote and to encourage others to do the same."

Mobilization models that rely on social pressure explanations or on "increasing the normative stakes" don't explicitly model how leaders generate social pressure or increase the normative stakes. Social pressure presumably relies on followers to reward and punish each other at the direction of a leader. However, if exerting social pressure is costly to followers, it is not clear how this solves the problem, since followers will have the same incentive to shirk on exerting social pressure that they do to shirk on voting in the first place. Furthermore, social pressure explanations would seem to require that voters be embedded in networks in which people monitor the voting behavior of others—one cannot punish another for not voting if the first is not aware of the voting behavior of the second. While such monitoring may be present in certain tightly knit communities, it seems unlikely to be widespread enough to explain a substantial fraction of the observed turnout. Finally, if the principle driver of participation is not direct social sanction but rather moral suasion, then the key determinant of participation centers on whether the leader can provide a compelling moral argument. So while mobilization models can provide the correct comparative statics, they are not sufficient at the micro level to explain the individual's decision to vote.

Group-Based Ethical Voter Models

There is considerable evidence that voters are motivated to vote by a sense of civic duty (Blais, 2000). In addition, there is evidence that voters base their vote choice not on how they are doing personally but on "sociotropic" assessments about the overall macroeconomic health of the economy (Kinder and Kiewiet, 1979; Markus, 1988). Sociotropic voters are thought to be motivated by altruistic or ethical concerns for the welfare of others rather than narrowly defined self-interest.

Ethical voter models provide a calculus of civic duty. In group-based ethical voter models, each voter has preferences over election outcomes where election outcomes are defined broadly to include not only which candidate wins the election but also how many people vote in the election. In some models, voter preferences are explicitly assumed to be sociotropic, but in others the extent to which preferences are "ethical" is not determined. However, the reason for applying the appellation "ethical" to these models is not that voter preferences over outcomes satisfy some normative criteria. Rather, agents are described as ethical for two reasons. First, ethical agents evaluate alternative behavioral rules in a Kantian manner by comparing the outcomes that would occur if everyone who shares their preferences were to act according to the same rule. Second, they receive a positive payoff for acting according to a behavioral rule they determine is best given their preferences and their evaluation of alternative rules.

Harsanyi (1977, 1992) carefully formalizes an ethical voter model.[5] Harsanyi (1977) considers a model in which some agents are rule utilitarians—that is, agents who receive an additional payoff for acting according to a strategy profile with the property that if everyone acts according to this strategy, social welfare (the sum of utilities) will be maximized. Harsanyi provides an example of an election with two candidates and costly voting. One of the candidates is assumed to maximize social welfare if elected, and a fixed fraction of the population is assumed to be voting for the socially inferior candidate. In Harsanyi's framework, a rule specifies the voters who cast a ballot and implies a cost to vote and a probability of winning for the welfare-maximizing candidate. Rule utilitarians get a payoff larger than their cost of voting if they act according to the welfare-maximizing rule. In this model, turnout will occur if the fraction of rule utilitarians in the population is large enough. Harsanyi's model provides a micro-level explanation for turnout that depends not only on the relative magnitude of the cost to vote and the payoff for acting ethically, but also upon the level of support for the inferior candidate.

However, Harsanyi's rule utilitarian model relies on the assumption that a candidate that is inferior by assumption is receiving a substantial fraction of the votes. If all rule utilitarians agree on which candidate is best, then it is not clear why an inferior candidate should receive any votes.

Feddersen and Sandroni (2002) endogenize support for both candidates by introducing preference diversity into the Harsanyi framework while preserving Harsanyi's Kantian calculus of duty. They assume a continuum of voters that can be partitioned into two types: those who believe that candidate 1 will produce a better outcome and those who believe candidate 2 is better. As in Harsanyi's model, voting is costly and each voter has a cost drawn from an interval bounded above zero and below some maximum costs. Ceterus paribus, all voters prefer election outcomes with lower social cost of voting to outcomes with higher social costs. Each of the groups is further partitioned into ethical voters and abstainers. Ethical voters receive a payoff greater than their cost of voting for acting ethically. All other voters abstain because their cost to vote is positive and a single vote is never pivotal.

The analysis in Feddersen and Sandroni (2002) focuses on determining the ethical rule for ethical voters of each type. A rule is defined as a cost cutpoint for a type such that all voters of the given type with costs to vote below the cutpoint have an ethical duty to vote for their preferred candidate, while those with costs to vote above the cutpoint have a duty to abstain. Taking as given the behavior of agents with different preference types, agents evaluate rules for their type according to their preferences over the social outcomes produced by the rule. A behavior profile is *consistent* if the behavior of each agent follows from the agent's preferred rule (that is, the rule that produces the best outcome from that agent's perspective if all voters sharing that type act according to that rule). The pair of cost cutpoints

[5] See Margolis (1982) for a less formal ethics-based model of participation.

defined by a consistent profile are identical to the cutpoints that would be chosen in equilibrium in a game in which the turnout for each group was determined by a leader maximizing social welfare for his or her group.

Feddersen and Sandroni (2002) analyze the comparative statics on consistent behavior profiles and show that their model will deliver comparative statics on turnout and margin of victory that are consistent with empirical findings. Turnout and margin of victory are positively correlated but not because of changes in pivot probabilities. Instead, as the relative size of the two groups of voters become more equal, turnout increases for both the larger and smaller group and margin of victory decreases. Turnout is also decreasing in costs to vote. However, unlike mobilization models, leaders, social pressure or selective incentives play no role.

A variety of empirical work provides support for group-based models. The earlier discussion has mentioned the empirical work demonstrating correlations between turnout and costs to vote, margin of victory and civic duty, all of which can be interpreted in group-based terms mentioned above, along with the evidence that effort by elites can increase turnout mentioned in the mobilization section. There is a large empirical literature on mobilization and turnout that readers may be interested in as well.[6] Hill and Leighley (1996) examines the roll of parties and find that mobilization efforts by parties can impact turnout. Leighley (1996) reviews the literature on group membership and mobilization. She finds that mobilization due to intentional efforts by group leaders are restricted to explicitly political groups, while unintentional mobilization occurs as a consequence of membership in both political and nonpolitical groups. In addition, recent work by Coate and Conlin (2002) presents empirical evidence supporting group-based turnout models from a Texas referendum.[7]

Conclusion

The mobilization and ethical agent models have similar formal structures but rest on different conceptual grounds. Basic technical and conceptual questions remain for both approaches. A central problem centers on the existence of equilibria. If, as is done in both the mobilization and ethical voter models above, the strategy space for leaders is continuous, then the existence of equilibria or consistent profiles is not assured. In group-based models, if the strategy space is finite, then there still may not be equilibria in pure strategies. Unfortunately, mixed strategy equilibria present conceptual problems for group-based models.

In a mixed strategy equilibrium, each leader knows the distribution over pure

[6] See Pollock (1982) and Verba and Nie (1972) for earlier work on mobilization and participation.

[7] See also Schram (1991, 1992) and Schram and Sonnemans (1996a, b) for empirical and experimental evidence in support of the importance of groups in explaining turnout. Thanks to Becky Morton for bringing Schram's work to my attention.

strategies employed by the other, but does not know which particular strategy has been chosen. This setup requires that leaders can convey instructions to followers without the instructions being overheard by the other leader. The possibility of such private communications seems remote in the setting of a large election. The problem is compounded in the ethical agent model because no leader exists to coordinate the voters. All voters of the same type act according to a rule that instructs each whether they are to vote or not. Even if a rule required a measurable fraction of voters to randomize, it is still the case that, without a coordinating device, each voter's randomization would be independent. Since there is a continuum of voters, a rule that requires independent randomizations is outcome equivalent to a rule that does not. Thus, if there is no pair of rules that is each a best response to the other, there is no consistent behavioral profile.[8]

Finally, and perhaps most importantly, neither the mobilization nor ethical agent models provide an explanation for how people join or identify with their groups in the first place. Imagine first that the decision to join a group is independent of political concerns, which may hold true of certain groups (perhaps labor unions), or that the decision to have certain ethical preferences transcends daily political choices and is in that sense independent of political concerns. In these cases, we could be comfortable treating groups and ethics as exogenous to the models. But if the choice to join a group is independent of political concerns, why should we expect group members to have similar policy preferences? On the other hand, if the decision to join a group is partly a function of a desire to affect political outcomes, then the decision to join or to identify with a group should be endogenized. A group-based model of voting, whether based on mobilization or on ethics, must ultimately come to grips with the questions of why people join groups.

[8] Feddersen and Sandroni (2002) provide sufficient conditions for pure strategy equilibria in the case of two groups of voters, however, no results are offered for the case of multiple groups.

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