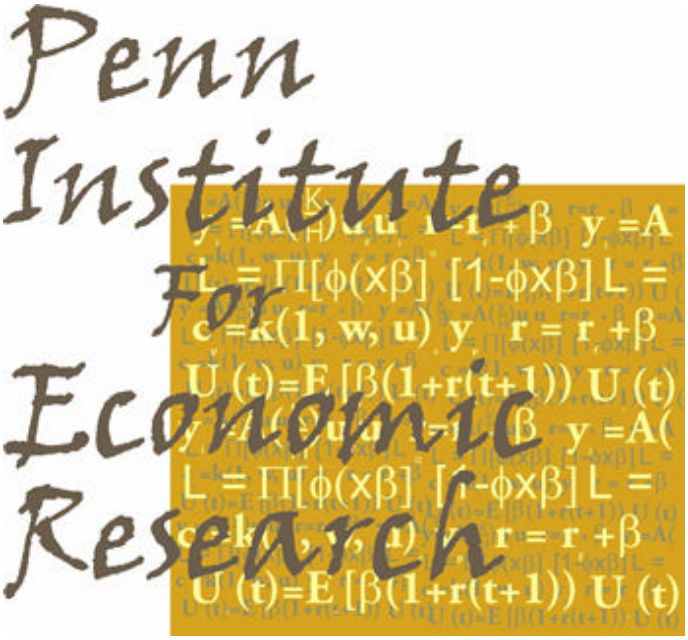

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Theory and Evidence from U. S. National Elections"

by

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Do Citizens Vote Sincerely (If They Vote at All)? Theory and Evidence from U.S. National Elections*

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ABSTRACT

Understanding citizens' electoral behavior (e.g., selective abstention and split-ticket voting), represents a fundamental step in the analysis of democratic institutions. In this paper, we assess the extent to which sincere voting can explain observed patterns of participation and voting in U.S. national elections. We propose a unified model of turnout and voting in presidential and congressional elections with heterogenous voters. We estimate the model using individual-level data for eight presidential election years (1972-2000). Our main findings can be summarized as follows. First, a non-negligible fraction of the American electorate does not vote sincerely, and only a relatively small fraction of observed split-ticket voting can be explained by sincere voting. Second, there is a systematic, positive relationship between information and turnout. Third, the American electorate has become relatively more polarized over time.

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1 Introduction

Voting is a cornerstone of democracy and citizens' participation and voting decisions in elections are fundamental inputs of the political process that shapes the policies adopted by democratic societies. Hence, understanding observed patterns of electoral turnout and voting represents a fundamental step in the political-economy analysis of democratic institutions.

Two prominent features emerge from data on U.S. national elections in presidential election years.[1] First, many citizens do not vote at all, and some "selectively abstain" (that is, they vote in one election but not in the other).[2] Second, often people vote a "split ticket" (that is, they vote for candidates of different parties for President and for Congress). Can these observed phenomena be the natural outcomes of the aggregation of individual decisions of citizens with heterogeneous ideological preferences? Or, in other words, to what extent can "sincere voting" account for observed patterns of participation and voting in U.S. national elections?

In this paper, we propose a systematic way to address these questions empirically. To achieve our goal, we propose a unified (spatial) model of turnout and voting in presidential and congressional elections, which we estimate using individual-level data for each U.S. presidential election year after 1970 (that is, 1972, 1976, 1980, 1984, 1988, 1992, 1996 and 2000). Our analysis incorporates several important dimensions of (observed and unobserved) heterogeneity among citizens. First of all, while the presidential election is nation-wide (that is, all citizens face the same set of candidates regardless of where they reside), congressional elections are held at the district level, so that citizens residing in different congressional districts face different sets of candidates. Citizens also differ with respect to their demographic characteristics and party affiliation. In addition, they may also differ along several unobserved attributes, like their ideological positions, their level of information about electoral candidates and their "type," where we distinguish between citizens who are "sincere" or

[1] In the United States, citizens are called to participate in national elections to elect the President and the members of Congress. While congressional elections occur every two years, the time between presidential elections is four years. We refer to an election year where both presidential and congressional elections occur simultaneously as a presidential election year.

[2] Typically, more people vote for President than for Congress.

"contrarian."

We model the behavior of a sincere citizen as the solution to a two-stage optimization problem, where in each election, the citizen first chooses whether to participate or to abstain, and then conditional on participating decides who to vote for. Since we consider an environment where citizens may be uncertain about candidates' positions and may therefore vote for the "wrong" candidate, our theory of turnout and voting is based on the premise that sincere citizens minimize their expected regret.

In our analysis, however, we also allow for the possibility that some citizens may make voting decisions that are inconsistent with this optimization problem. We refer to these citizens as "contrarian voters". Consistent with our main objective of quantifying the extent to which sincere voting can explain the data, we do not model the behavior of contrarian voters. Instead, we simply mechanically define contrarian voting as a residual category of behavior (that is, all instances of "deviations" from sincere voting), and ask what fractions of the observations (if any) fall within this category.

Our main findings can be summarized as follows. We find that between 1972 and 2000, the aggregate proportion of sincere citizens ranges from 82% to 93%. This implies that in every presidential election year a non-negligible fraction of the American electorate does not vote sincerely. More importantly, only a relatively small fraction (about 20% on average) of observed split-ticket voting can be explained by sincere voting in any given year, although this fraction has increased over time. We conclude that sincere voting alone cannot explain split-ticket voting. Other factors play an important role in citizens' decisions to split their vote in presidential and congressional elections.[3]

For each presidential election year, our empirical analysis generates estimates of the distributions of citizens' positions on the liberal-conservative ideological space, and the probability citizens are informed about electoral candidates. We find that citizens' demographic characteristics are systematically related both to their ideological positions and to their probability of being informed in interesting ways. For example, individuals with relatively low levels of education (i.e., without a high school degree), and individuals with relatively high lev-

[3]These factors may include equilibrium effects as in Alesina and Rosenthal (1996) and Chari, Jones and Marimon (1997).

els of education (i.e., with at least a college degree), are systematically more liberal than individuals with intermediate levels of education. Also, while in the 1970s women are less informed than men, in the 1980s and 1990s they become more informed than men. Overall, we find that while the 1970s are characterized by a process of relative convergence in citizens' ideological positions, this tendency is reversed in the two decades that follow, leading to a polarization of the American electorate.[4]

Our model implies a relationship between information and turnout. Since uninformed citizens are more likely to make "voting mistakes" and hence have larger expected regret from voting, they abstain more than informed citizens. Our analysis also provides an explanation for the fact that, in every presidential election year, we always observe more abstention in congressional elections than in the presidential election, and some selective abstention. Our estimates imply that the average regret from abstaining in the presidential election is always smaller than in a congressional election (or, in other words, citizens find it relatively more costly to make voting mistakes in the presidential election than in a congressional election). This result alone would lead to relatively more abstention in the presidential election. At the same time, however, our estimates also imply that the average expected regret from voting in the presidential election is always smaller than in a congressional election, and the second effect (which is due to the fact that, in general, there is more information, and hence less uncertainty, about presidential candidates than congressional candidates), always dominates.

Finally, we use the estimated model to evaluate the effects of three counterfactual experiments on electoral outcomes. In particular, for each presidential election year, we analyze the outcomes of presidential and congressional elections under three hypothetical scenarios where: (i) all citizens are sincere; (ii) all citizens are informed; and (iii) all citizens vote. Our analysis predicts that each of these three scenarios would lower the probability of divided government (that is, a situation where one party controls the presidency while the other party controls the majority of Congress).[5]

The remainder of the paper is organized as follows. In Section 2, we discuss the rela-

[4] McCarty, Poole and Rosenthal (1997) and Poole and Rosenthal (1997) document the existence of similar patterns for members of Congress.

[5] For an interesting analysis of divided government in post-war United States see Mayhew (1991).

tionship of our paper to the literature. In Section 3 we present the model. In Section 4 we describe the data and in Section 5 the econometric specification. Sections 6 contains the results of the empirical analysis. The results of the counterfactual experiments are described in Section 7 and concluding remarks are in Section 8.

2 Related Literature

Contrary to our approach, the existing literature has addressed the phenomena of turnout (and selective abstention) and split-ticket voting separately. We therefore discuss each literature in turn.

There is a vast theoretical literature on turnout.[6] The starting point of this literature is represented by the *calculus of voting model* of Downs (1957), Tullock (1967) and Riker and Ordershook (1968). The common premise of these theories is that voting is costly, and hence a rational citizen will vote only if the benefit of voting exceeds its cost; that is, if $pB+D > C$, where p is the probability the citizen's vote decides the election, B is the benefit associated with inducing the desired electoral outcome, D is the benefit from fulfilling the citizen's civic duty of voting and C is the cost of voting. Different theories, however, focus on different aspects of this basic framework. For example, while *pivotal voter models* (e.g., Feddersen and Pesendorfer (1996, 1999), Ledyard (1984), Palfrey and Rosenthal (1983, 1985)), focus on endogenizing the probability a citizen's vote is decisive (or pivotal), *rule-utilitarian models* (e.g., Coate and Conlin (2004), Feddersen and Sandroni (2002), Harsany (1980) and Morton (1991)), endogenize the notion of civic duty.[7] Another approach, adopted by Ferejohn and Fiorina (1974), is based on minmax regret theory. In particular, their theory of turnout is based on the idea that citizens may vote in order to avoid the regret they would experience if they were to abstain in a situation where their vote would have been decisive.[8]

[6] See, e.g., Aldrich (1993) for a survey. Note that several theories of turnout also admit the possibility of selective abstention.

[7] For a thorough review of rule-utilitarian models of turnout, see Coate and Conlin (2004). For another interesting model where civic duty is endogenous and can be influenced by party leaders, see Shachar and Nalebuff (1999).

[8] Another interesting approach to the study of turnout postulates that citizens are averse to ambiguity (Ghirardato and Katz (2002)). Hence, citizens may abstain in an election if the policy positions of both

In our analysis, we consider a model with a continuum of citizens where no vote is pivotal, and we model the direct benefits (including civic duty) and costs of voting. Also, our model relies on the premise that citizens minimize their expected regret, and the possibility of regret arises solely from citizens' uncertainty about candidates' positions.

The empirical literature on turnout in U.S. national elections is also vast.[9] A large part of this literature tries to identify factors that are systematically related to voters' participation in individual elections, by estimating reduced form specifications where turnout is regressed on voters' characteristics and elections' attributes (e.g., Wolfinger and Rosenstone (1980)). Another significant part focuses instead on either testing some of the predictions of the theories described above (e.g., Ferejohn and Fiorina (1975), Riker and Ordershook (1968) and Matsusaka and Palda (1993)), or estimating structural models derived from these theories (e.g., Coate and Conlin (2004), Hansen, Palfrey and Rosenthal (1987), Shachar and Nalebuff (1999)).[10] Palfrey and Poole (1987) estimate a joint model of participation and voting in a presidential election, and analyze the effects of citizens' ideology and information on their electoral choices.[11]

Turning our attention to the literature on split-ticket voting, theoretical models have focused mainly on the policy implications of divided government, and fall broadly within two categories. A first group of theories (see, e.g., Chari, Jones, and Marimon (1997) and Jacobson (1990)), postulate that there are different issues surrounding the presidential and the congressional elections, thus providing different (election specific) incentives for citizens and candidates. In an environment where citizens perceive Republican candidates to be relatively better at dealing with national policy issues and Democratic candidates to be relatively better at catering to their districts' needs, citizens will be relatively more likely to

candidates are ambiguous and "ambiguity complements" (that is, one candidate looks better than the other under some scenario, while the opposite is true under another scenario).

[9] See, e.g., Matsusaka and Palda (1999) for a survey.

[10] By and large, empirical evidence based on individual-level data shows that the probability of being pivotal does not affect turnout. Other factors related to the direct benefits and costs of voting are however important.

[11] See also Bartels (1996).

vote for the Republican candidate in the presidential election and the Democratic candidate in the congressional election.[12] In a second group of theories (see, e.g., Alesina and Rosenthal (1995, 1996) and Fiorina (1992)), split-ticket voting may emerge as the optimal choice of moderate voters seeking to induce governments to implement moderate policies. Since the policy-making process entails some compromise between the executive and the legislature, citizens with relatively moderate positions will vote for candidates of different parties for President and Congress in an attempt to moderate the final policy outcome.[13]

These theoretical models offer useful insights about the relationship between split-ticket voting and divided government, and generate interesting predictions that are by and large consistent with aggregate stylized facts.[14] Since a fundamental premise of these models is that split-ticket voting is inherently an equilibrium phenomenon, we believe it is important to ask whether equilibrium considerations (either within and/or across elections) are really needed to explain individual-level data, or whether observed split-ticket voting may be the outcome of sincere citizens' optimal behavior. The results of our empirical analysis clearly indicate that this is not the case, thus providing indirect support for alternative explanations of split-ticket voting.

The empirical literature on split-ticket voting in U.S. national elections focuses primarily on testing various predictions of the theories described above. The results of these studies, that rely almost entirely on reduced form empirical models, are for the most part mixed.[15]

[12] While in Jacobson (1990) citizens treat the presidential and congressional elections as separate, and divided government is simply a by-product of the fact that different issues are relevant in the two elections, in Chari, Jones and Marimon (1997) split-ticket voting and divided government are equilibrium results of the strategic interaction among voters from different districts.

[13] In Fiorina (1992), voters internalize the institutional setting in which policies are decided, and vote (sincerely) over the four possible policy outcomes of divided and united governments. In Alesina and Rosenthal (1996), on the other hand, split-ticket voting is an equilibrium outcome induced by the strategic behavior of voters.

[14] Note, however, that the model by Chari, Jones and Marimon (1997) cannot explain situations of divided government with a Democratic President and a Republican Congress (e.g., Clinton's second term).

[15] For example, Alvarez and Schousen (1993) test the implications of both Fiorina's and Jacobson's models and find a relatively greater support for the latter in the data. Born (1994) also finds evidence against some of the implications of Fiorina's model. Mattei and Howes (2000) find that only a few sophisticated voters

Mebane (2000) estimates two equilibrium structural models based on Alesina and Rosenthal (1996) and Fiorina (1992), respectively, and shows that the Alesina-Rosenthal model outperforms the one by Fiorina in its ability to fit the data.

3 The Model

We model citizens' participation and voting decisions in a *presidential election year*: that is, a situation where presidential and congressional elections occur simultaneously. While the presidential election is nation-wide (that is, all citizens face the same set of candidates regardless of where they reside), congressional elections are held at the district level (that is, citizens residing in different congressional districts face different sets of candidates).[16]

We let $h \in \{1, ..., m\}$ denote an electoral district, P the presidential election, H the congressional election in district h, and $e \in \{P, \{H\}_{h=1}^{m}\}$ a generic election.[17] In each election, there are two candidates running for office: a Republican candidate, R_e, and a Democratic candidate, D_e, and we let $c \in \{R_P, D_P, \{R_H, D_H\}_{h=1}^{m}\}$ denote a generic candidate.[18] Each candidate c is characterized by a (given) position $y_c \in Y = [-1, 1]$, where Y denotes the (unidimensional) liberal-conservative ideological space, and is either an incumbent or a challenger. We let I_c be an indicator that takes the value one if candidate c is an incumbent and zero otherwise. We refer to an election where neither candidate is an incumbent as an open election.

There is a continuum of *ex-ante* heterogeneous citizens (with mass one) and we let j denote a generic citizen. Citizens differ along several dimensions. Each citizen j resides in

split their tickets with the intent of "balancing" the government, while most of split-ticket voting is related to incumbency and citizens' perceptions about incumbents and, more generally, candidates' attributes (see also Burden and Kimball (1998)).

[16] Consistent with the existing literature on split-ticket voting, we restrict attention to House elections, which are held every election year for every district. Hence, each citizen faces both a presidential election as well as a House election. Senate elections, on the other hand, are staggered and only about a third of all states have a Senate election in any given election year.

[17] The total number of U.S. congressional districts is $m = 435$.

[18] We ignore the fact that in some elections independent candidates may also be running and we exclude from our analysis elections where only one candidate runs unopposed.

district h_j and has demographic characteristics x_j, which include the citizen's age, race, gender, education, and income. Citizens also differ with respect to their general attitude toward political parties and may either feel an attachment to a specific party or no attachment at all. Following the literature, we refer to feelings of partisan attachment as *party identification* and let $k_j = d, r, i$ denote citizen j's party identification, where d, r and i indicate citizens that identify themselves as democrats, republicans and independents, respectively.

Citizens can either be informed about electoral candidates or uninformed. The information potentially available to citizens depends on the election. Incumbents who run for reelection to a seat in Congress as well as presidential candidates (regardless of their incumbency status) have public records of their activities while in office.[19] Therefore, it seems reasonable to assume that their positions can in principle be known before an election. Challengers who run for a congressional seat, on the other hand, typically do not have comparable records.[20] To capture this asymmetry, we assume that challengers are drawn from populations of potential candidates with distribution functions $\{F_h^D(y_{D_H}), F_h^R(y_{R_H})\}_{h=1}^m$ defined over Y, where, for each election H, $y_{D_H} < y_{R_H}$. Hence, before the elections, the only information potentially available on challengers who run for Congress are the distributions of their positions, which we allow to differ by party and electoral district.

Based on these considerations, we assume that if a citizen residing in district h is *informed*, she knows y_{R_P}, y_{D_P}, $I_{R_H} y_{R_H}$, $I_{D_H} y_{D_H}$, $(1 - I_{R_H})F_h^R(y_{R_H})$, $(1 - I_{D_H})F_h^D(y_{D_H})$.[21] If, on the other hand, the citizen is *uninformed*, we assume she has uniform priors over the possible positions of candidates running for elections, and we let $G_P^R(y_{R_P})$, $G_P^D(y_{D_P})$, $G_h^R(y_{R_H})$ and $G_h^D(y_{D_H})$ denote the (uniform) distributions of the citizen's priors over the position of the Republican and the Democratic candidate in the presidential and the congressional

[19] For example, the history of roll call voting by each member of Congress is readily available.

[20] Although many individuals who run for Congress have prior experience in public offices at the local or state level (see, e.g., Diermeier, Keane and Merlo (2004)), public records of their activities either do not exist or are not easily accessible.

[21] Note that for each election H, either there is an incumbent Republican running against a Democratic challenger (i.e., $I_{R_H} = 1$ and $I_{D_H} = 0$), or there is a Democratic incumbent running against a Republican challenger (i.e., $I_{R_H} = 0$ and $I_{D_H} = 1$), or the election is open (i.e., $I_{R_H} = 0$ and $I_{D_H} = 0$).

election (in her district), respectively. Consistent with basic stylized facts about American politics (which we assume to be known even by uninformed voters), we impose the following restrictions on these distributions:[22] (i) the support of $G_P^D(y_{D_P})$ is $[-1, 0]$ and the support of $G_P^R(y_{R_P})$ is $[0, 1]$; and (ii) the support of both $G_h^R(y_{R_H})$ and $G_h^D(y_{D_H})$ is the entire ideological space $Y = [-1, 1]$, but $y_{D_H} < y_{R_H}$ for each congressional election H.

By letting Δ_j denote the information set of a citizen j residing in district h, and λ_j be an indicator that takes the value one if citizen j is informed and zero if she is uninformed, we have that:

$$\Delta_j = \begin{cases} (y_{R_P}, y_{D_P}, I_{R_H} y_{R_H}, I_{D_H} y_{D_H}, (1 - I_{R_H}) F_h^R(y_{R_H}), (1 - I_{D_H}) F_h^D(y_{D_H})) & if \quad \lambda_j = 1 \\ (G_P^R(y_{R_P}), G_P^D(y_{D_P}), G_h^R(y_{R_H}), G_h^D(y_{R_H})) & if \quad \lambda_j = 0 \end{cases} \tag{1}$$

Citizens are heterogeneous with respect to their ideological positions which determine their (induced) preferences over candidates. Consistent with a long tradition in political economy, we assume citizens' preferences over the liberal-conservative ideological space are single-peaked and their utility from voting for a candidate decreases with the distance between the candidate's position and their own. We specify the *ex-post* payoff a citizen j obtains from voting for a generic candidate c as

$$u_c^j = u(y_j(x_j, k_j), y_c) \tag{2}$$

where $u(\cdot)$ is single-peaked at $y_j(\cdot)$ and is a decreasing function of the distance between $y_j(\cdot)$ and y_c, and $y_j(x_j, k_j) \in Y$ denotes citizen j's position in the liberal-conservative ideological space, which we allow to depend on j's demographic characteristics and party identification.[23] We let $F_y(y \mid x, k)$ denote the distribution of citizens' positions. We also specify citizen j's *ex-post* payoff from voting for candidate a as opposed to b in a generic election e as

$$U_a^j = u_a^j - u_b^j \tag{3}$$

[22] These restrictions guarantee that in any election the Republican candidate is relatively more conservative than the Democratic candidate, and the whithin party variation of the positions of presidential candidates is smaller than that of congressional candidates for both parties. See, for example, Poole and Rosenthal (1997).

[23] Note that u_c^j is an indirect utility function.

where a and b are the two candidates competing in election e, $a, b \in \{R_e, D_e\}$. Obviously, $U_b^j = -U_a^j$.

Since the positions of candidates in an election may be uncertain and citizens differ with respect to their information, we also specify citizen j's von Neumann-Morgenstern *ex-ante* payoff from voting for candidate a as opposed to b in a generic election e as

$$W_a^j = E[U_a^j \mid \Delta_j]. \tag{4}$$

Again, it is obvious that $W_b^j = -W_a^j$.

A direct implication of the presence of uncertainty about candidates' positions is the possibility of *ex-post* regret generated by voting for the "wrong" candidate. By letting $v_e^j \in \{a, b\}$ denote citizen j's voting decision in election e, $1\{\cdot\}$ be an indicator function that takes the value one if the expression within braces is true and zero otherwise, and $M_c^j \geq 0$ denote citizen j's expected regret (or mistake) from voting for candidate $c \in \{a, b\}$ in election e, we have:[24]

$$M_c^j = 1\{v_e^j = c\} \cdot E[1\{U_c^j < 0\} \cdot (-U_c^j) \mid \Delta_j]. \tag{5}$$

Clearly, if a citizen does not vote the expected regret from voting is zero.[25] Citizens may, however, feel an obligation to vote and we let $\theta_e^j \geq 0$ denote citizen j's cost (or regret) from abstaining in election e, which we allow to differ across citizens and elections.[26] We let $Q_\theta^e(\theta)$ denote the distribution of θ_e^j in the citizenry.

The last dimension of citizens' heterogeneity we consider is their *type*, where citizens are either "sincere" or "contrarian". We model the electoral participation and voting decisions of a *sincere* citizen as the solution to a two-stage optimization problem, where in each election, the citizen first chooses whether to participate or to abstain, and then conditional

[24] Note that it is clear that U_a^j, U_b^j, W_a^j, W_b^j, M_b^j and M_b^j are specific to election e. Hence, we suppress the index e to simplify notation.

[25] As pointed out in Section 2, voting models typically specify a direct cost of voting. In our model, this cost is given by the expected regret from voting.

[26] In the literature, the utility loss from not participating in an election is typically related to a citizen's sense of civic duty (see our discussion in Section 2).

on participating decides who to vote for. Our theory of participation and voting is based on the premise that sincere citizens minimize their expected regret.

Consider a generic election $e \in \{P, H\}$ with candidates a and b running, $a, b \in \{R_e, D_e\}$, and a generic sincere citizen j residing in district h. Let $p_e^j \in \{0, 1\}$ denote citizen j's participation decision in election e, where $p_e^j = 0$ indicates abstention and $p_e^j = 1$ participation. Suppose citizen j participates in election e. Then she chooses to vote for the candidate that minimizes her expected regret from voting. If we let $v_e^{j*} \in \{a, b\}$ denote citizen j's optimal voting decision in election e, we have that:

$$v_e^{j*} = \begin{cases} a & if \quad M_a^j < M_b^j \\ b & if \quad M_a^j > M_b^j \end{cases} \tag{6}$$

and in the event that $M_a^j = M_b^j$ the citizen randomizes between the two candidates with equal probability.

This leads to our first proposition:

Proposition 1 *If a sincere citizen j residing in district h participates in election $e \in \{P, H\}$ where candidates a and b are running, $a, b \in \{R_e, D_e\}$, her optimal voting decision is given by:*

$$v_e^{j*} = \begin{cases} a & if \quad W_a^j > 0 \\ b & if \quad W_a^j < 0 \end{cases}$$

If $W_a^j = 0$, citizen j randomizes between the two candidates with equal probability.

Proof. To prove the result we have to show that for any citizen j and any election e, voting for a candidate c associated with the smallest expected regret is equivalent to voting for the candidate associated with the largest relative expected payoff.

Without loss of generality, suppose citizen j votes for candidate a. We show that $M_a^j < M_b^j$ if and only if $W_a^j > 0$. Note that since $U_b^j = -U_a^j$, using equation (5) we can rewrite $M_a^j < M_b^j$ as

$$E[1\{U_a^j < 0\} \cdot (-U_a^j) \mid \Delta_j] < E[1\{U_a^j > 0\} \cdot U_a^j \mid \Delta_j]$$

or

$$E[1\{U_a^j < 0\} \cdot U_a^j \mid \Delta_j] + E[1\{U_a^j > 0\} \cdot U_a^j \mid \Delta_j] > 0$$

which is equivalent to $W_a^j > 0$ since, using equation (4), we have that

$$W_a^j = E[U_a^j \mid \Delta_j] = E[1\{U_a^j < 0\} \cdot U_a^j \mid \Delta_j] + E[1\{U_a^j > 0\} \cdot U_a^j \mid \Delta_j].$$

■

Proposition 1 states that if a sincere citizen participates in an election, she votes for the candidate associated with the highest expected payoff. Hence, expected regret minimization and expected utility maximization are equivalent, in the sense that they induce the same voting behavior.

Without loss of generality, suppose $v_e^{j*} = c \in \{a, b\}$, and denote the expected regret associated with the optimal voting decision in election e by

$$M_c^{j*} = E[1\{U_c^j < 0\} \cdot (-U_c^j) \mid \Delta_j]. \tag{7}$$

If we let $p_e^{j*} \in \{0, 1\}$ denote citizen j's optimal participation decision in election e, we can now state our second proposition:

Proposition 2 *The optimal participation decision in election $e \in \{P, H\}$ of a sincere citizen j residing in district h is given by:*

$$p_e^{j*} = \begin{cases} 0 & if \quad M_c^{j*} > \theta_e^j \\ 1 & if \quad M_c^{j*} < \theta_e^j \end{cases}$$

If $M_c^{j*} = \theta_e^j$, citizen j randomizes between abstaining and participating in election e with equal probability.

The proof of Proposition 2 follows trivially from backwards induction and Proposition 1.[27]

In our analysis, we also allow for the possibility that some citizens make voting decisions that are inconsistent with the optimization problem we just described and we refer to these citizens as *contrarian voters*. In particular, we define a citizen to be contrarian in an election if she votes against her immediate preferences; that is, she votes for the candidate opposite

[27] Note that M_c^{j*} is specific to election e.

to the one that would maximize her expected payoff from voting sincerely.[28] Consistent with our notation, we say that citizen j residing in district h is a contrarian voter in election $e \in \{P, H\}$ where candidates a and b are running, $a, b \in \{R_e, D_e\}$, if either she votes for candidate a when $W_a^j < 0$ or votes for candidate b when $W_a^j > 0$. Note that by definition contrarian voters never abstain.

As pointed out in the introduction, the main goal of the paper is to quantify the extent to which sincere voting can explain observed participation and voting decisions in national (presidential and congressional) elections. To achieve this goal, we simply define contrarian voting as all instances of "deviations" from what sincere citizens would do in an election. In other words, we model contrarian voting as a residual category of behavior without attempting in any way to explain why such deviations could come about, or what are the underlying primitives that would rationalize such behavior.

Note that our model of the participation and voting decisions of sincere citizens can clearly account for citizens abstaining in either one or both elections. This is the case since candidates' positions as well as citizens' information and (possibly) their attitude toward abstention are different in presidential and congressional elections.

Moreover, the model can in principle generate split-ticket voting as the optimal choice of sincere citizens. To illustrate this point, consider the following example. Suppose for simplicity that all citizens in a given district h know the positions of the two candidates running in the presidential election P as well as the positions of the two candidates running in the congressional election H, and these positions are as follows: $y_{D_H} < y_{D_P} < y_{R_H} < y_{R_P}$. Suppose further that $\theta_P^j = \theta_H^j = \theta > 0$ for all citizens. Then, all sincere citizens with positions in the interval $((y_{D_H} + y_{R_H})/2, (y_{D_P} + y_{R_P})/2)$ will choose to participate in both elections and vote for the Democratic presidential candidate and for the Republican congressional candidate.

[28] As discussed in Section 2, the literature typically refers to strategic voting as an individual's optimal response to other citizens' voting choices when the individual takes into consideration the probability of being pivotal. Our analysis abstracts from such (game-theoretic) considerations. However, our definition of contrarian voting is somewhat related to Riker's (1986) definition of strategic voting as "voting contrary to one's immediate tastes in order to obtain an advantage in the long run."

Clearly, the extent to which split-ticket voting (and all other voting patterns that are observed in the data) can be explained by sincere voting depends on the distribution of the actual configurations of the relative positions of candidates competing in presidential and congressional elections, as well as the distribution of citizens' positions, and is therefore an empirical question.

4 Data

We consider all presidential election years after 1970 and let $t \in \{1972, 1976, 1980, 1984, 1988, 1992, 1996, 2000\}$ denote a generic year. For each presidential election, Table 1 lists the names of the Democratic and Republican candidates. Entries in bold denote the winner of each presidential election (column 2) and the party who obtained the majority of the House of representatives in each year (column 3). For each of the eight presidential election years we consider, our empirical analysis relies on two sources of data: the American National Election Studies (NES) and the Poole and Rosenthal NOMINATE Common Space Scores.[29]

For each relevant year, the NES contains detailed, individual-level information on the participation and voting decisions in presidential and congressional elections of a representative (cross-section) sample of the American voting-age population.[30] We let $N_t = \{1, ..., n_t\}$ denote the sample of citizens in presidential election year t, where n_t is the sample size.[31] For each individual in the sample, $j \in N_t$, we observe the congressional district where he or she resides, h_j, the identity of the Democratic and the Republican candidate competing for

[29] Both data sets are available online at http://www.umich.edu/~nes and http://voteview.uh.edu/basic .htm, respectively.

[30] For thorough discussions of potential limitations of the survey data on participation and voting in the NES see, e.g., Anderson and Silver (1986), Palfrey and Poole (1985), Wolfinger and Rosenstone (1980) and Wright (1993). Note, however, that the NES represent the best and most widely used source of individual-level data on electoral participation and voting.

[31] Consistent with our theoretical analysis, we drop from our sample individuals who reside in Washington D.C. (since they do not face congressional elections) and those who face uncontested congressional elections (since they do not have the option of voting either for the Republican or the Democratic candidate). After eliminating observations with missing variables, the sample sizes in each presidential election year are equal to 1634 in 1972, 1368 in 1976, 888 in 1980, 1407 in 1984, 1112 in 1988, 1531 in 1992, 1170 in 1996 and 1016 in 2000.

election in his or her congressional district, $(D_{H_j}, R_{H_j})_t$, and whether any of the candidates is an incumbent in that district, $(I_{D_{H_j}}, I_{R_{H_j}})_t$. For each of the two elections (presidential and congressional) faced by each individual, the NES also contains (self-reported) information on whether the individual abstains in the election, votes for the Democratic candidate or votes for the Republican candidate. We let $V_P^j \in \{A, R, D\}$ and $V_{H_j}^j \in \{A, R, D\}$ denote citizen j's choices in the presidential and congressional election, respectively, where A denotes abstention and D or R indicate that the citizen voted for the Democratic or the Republican candidate, respectively. We refer to $V^j = (V_P^j, V_{H_j}^j) \in \Omega = \{AA,\ AD,\ AR,\ DA,\ RA,\ DD,\ DR,\ RD,\ RR\}$ as citizen j's observed voting profile. The sample distribution of voting profiles for each of the years we consider is reported in Table 2.

For each sample N_t, the NES also contains detailed information on individual demographic characteristics and (self-reported) party identification. In our analysis, we consider the following variables: the variable *Age* denotes an individual's age; *Black* is a race indicator variable that equals one if an individual is black; *Lowedu* is a dummy variable denoting whether an individual does not have a high school degree; *Highedu* is a dummy variable denoting whether an individual has a college degree; *Female* is a gender indicator variable that is equal to one if an individual is a woman; *Lowinc* is a dummy variable denoting whether an individual's family income is lower than median family income; and *Dem*, *Rep* and *Ind* are three (mutually exclusive) dummy variables denoting whether an individual considers him or herself to be a democrat, a republican or an independent, respectively.[32] Using the notation we introduced to describe our model, we have that $x_j^t = (Age_j,\ Black_j,\ Lowedu_j,\ Highedu_j,\ Female_j,\ Lowinc_j)_t$ and $k_j^t = (Dem_j,\ Rep_j,\ Ind_j)_t$. The sample averages of all the variables for each of the years we consider are reported in Table 3.

To estimate our model we also need to construct measures of the citizens' information sets in any presidential election year t. In other words, we have to describe the information

[32] Consistent with most of the empirical literature on voting (see, e.g., McCarty, Poole and Rosenthal (1997) and Petrocik (1989)), we classify individuals who state self to be independent leaning democrats as democrats and independent leaning republicans as republicans. However, we also estimated our model after changing this classification and treating such individuals as independents. This change has little effect on our main empirical results.

potentially available to citizens concerning the candidates competing in any election that is relevant for them (i.e., the presidential election and the congressional election in their district) in any given t. Consider a generic district h with congressional election H. Part of the information is whether an incumbent is running in the congressional election, which is captured by the variables $(I_{D_H}, I_{R_H})_t$ described above. The remaining information concerns the positions of the candidates running in the presidential election, $(y_{R_P}, y_{D_P})_t$, the position of the incumbent (if any) running in the congressional election, $(I_{R_H} y_{R_H}, I_{D_H} y_{D_H})_t$, and the distributions of the populations of potential congressional candidates from which challengers are drawn $((1 - I_{R_H})F_h^R(y_{R_H}),\ (1 - I_{D_H})F_h^D(y_{D_H}))_t$. To obtain measures of the positions of candidates competing in presidential and congressional elections, we use the Poole and Rosenthal NOMINATE Common Space Scores.

Using data on roll call voting by each member of Congress and support to roll call votes by each President, Poole and Rosenthal developed a methodology to estimate the positions of all politicians who ever served either as Presidents or members of Congress, on the liberal-conservative ideological (common) space $[-1, 1]$.[33] These estimates, which are comparable across politicians and across time, are contained in their NOMINATE Common Space Scores data set.[34] These estimates provide the measures of (y_{R_P}, y_{D_P}) and $(I_{R_H} y_{R_H}, I_{D_H} y_{D_H})_{h=1}^m$ we use in our empirical analysis for each relevant year.[35] In addition, for each presiden-

[33]For a discussion of potential limitations of the methodology proposed by Poole and Rosenthal see, e.g., Heckman and Snyder (1997). For a comparison of alternative estimation procedures see Clinton et al. (2001). Note, however, that none of the other procedures has been used to generate a comprehensive data set similar to the one by Poole and Rosenthal.

[34]Details about the methodology and the data are available on-line at http://voteview.uh.edu/basic.htm. See also Poole and Rosenthal (1999) at http://voteview.uh.edu/prapsd99.pdf. Note that the Poole and Rosenthal NOMINATE data set also contains estimates of the positions of politicians on a second dimension, which we do not use in our analysis. In fact, according to Poole and Rosenthal (1997), after 1970 the second dimension has become irrelevant and "roll call voting again became largey a matter of positioning on a single, liberal-conservative dimension" (p. 5).

[35]Note that Michael Dukakis, the Democratic presidential candidate in 1988, who at the time was the governor of Massachussets, is the only relevant politician in our analysis for whom there is no estimate in the Poole and Rosenthal data set. Following Gaines and Segal (1988), we approximate Dukakis' position on the liberal-conservative ideological space with that of the Democratic Massachussets senator in 1988 (Ted

tial election year, we use the empirical distributions of these estimates for Democratic and Republican members of Congress as our measures of $(F_h^D(y_{D_H}))_{h=1}^m$ and $(F_h^R(y_{R_H}))_{h=1}^m$, respectively. In particular, we assume that $F_h^D(\cdot) = F_L^D(\cdot)$ and $F_h^R(\cdot) = F_L^R(\cdot)$ for all $h \in L$, where $L \in \{Northeast, Midwest, West, South\}$ denotes a region of the United States. This specification allows us to capture important geographic differences among congressional candidates for each party, while at the same time allowing us to accurately characterize each empirical distribution function.[36] Table 4 contains the positions of all presidential candidates and the average positions of Democratic and Republican representatives by region for each of the years we consider.[37]

5 Econometric Specification

In this section, we describe the general specification of the econometric model, the parameters that need to be estimated and the estimation procedure. Since for each of the eight presidential election years we consider (1972-2000) the procedure we use to estimate our model and the model specification are the same, in what follows we suppress all time subscripts that refer to a particular year.

In the model described in Section 3, citizens' participation and voting decisions in presidential and congressional elections are deterministic. Given the vector of individual attributes $(h_j, x_j, k_j, y_j, \lambda_j, \Delta_j, \theta_P^j, \theta_{H_j}^j)$ Propositions 1 and 2 fully characterize the optimal behavior of any sincere citizen j. Analogously, the behavior of contrarian voters is also characterized by a deterministic relation. As described in Section 4, our data contains information on district of residence, demographic characteristics, party identification and the

Kennedy).

[36] Note that it would be unfeasible to characterize non-parametrically a separate distribution function for each party in each state (let alone each district), since the number of representatives of either party in each state in any given year is small.

[37] Recall that if citizens are uninformed, their priors over the possible positions of candidates in the presidential and congressional elections are given by the uniform distributions G_P^R, G_P^D, G_H^R, G_H^D that we described in Section 3. Note that the mean priors are equal to -0.5 and 0.5 for the Democratic and the Republican presidential candidates, respectively, and -0.33 and 0.33 for the Democratic and the Republican congressional candidates, respectively.

information potentially available on presidential and congressional candidates for a representative sample N of citizens (that is, we observe $(h_j, x_j, k_j, \Delta_j)_{j \in N}$). However, for any citizen $j \in N$ we do not observe the citizen's position, y_j, whether the citizen is informed or uninformed, λ_j, the citizen's costs of abstaining, θ_P^j and $\theta_{H_j}^j$, and the citizen's type (i.e., whether the citizen is sincere or contrarian). Hence, from the point of view of the econometrician, the observed behavior of each citizen is probabilistic, and to estimate our model we need to specify the distribution of unobserved heterogeneity in the population.

We assume that the distribution of citizens' positions $F_y(y \mid x, k)$ is a Beta distribution over the support $Y = [-1, 1]$.[38] A Beta distribution is fully characterized by two parameters, $\alpha, \beta > 0$, and to capture the (possible) dependence of the distribution of citizens' positions on their demographic characteristics, $x = (Age, Black, Lowedu, Highedu, Female, Lowinc)$, and party identification, $k = (Dem, Rep, Ind)$, we adopt the following specification:[39]

$$\begin{aligned} \alpha &= \exp(\alpha_1 Dem + \alpha_2 Rep + \alpha_3 Ind + \alpha_4 Age + \alpha_5 Black \\ &\quad + \alpha_6 Lowedu + \alpha_7 Highedu + \alpha_8 Female + \alpha_9 Lowinc) \end{aligned}$$

and

$$\beta = \exp(\beta_1 Dem + \beta_2 Rep + \beta_3 Ind).$$

We also allow the probability a citizen is informed, $\pi_\lambda = \Pr(\lambda = 1)$, to depend on the citizen's demographic characteristics and party identification and we specify this probability to have the following logistic form:

$$\pi_\lambda = \frac{\exp(\gamma)}{1 + \exp(\gamma)}$$

where

$$\begin{aligned} \gamma &= \gamma_1 Dem + \gamma_2 Rep + \gamma_3 Ind + \gamma_4 Age + \gamma_5 Black \\ &\quad + \gamma_6 Lowedu + \gamma_7 Highedu + \gamma_8 Female + \gamma_9 Lowinc \end{aligned}$$

[38] The family of Beta distributions is the most flexible family of parametric distributions for continuous random variables with a finite support (see, e.g., Johnson and Kotz 1970; vol. 1, pp. 37-56).

[39] Note that, to simplify notation, we suppress the subscript j from all variables.

Turning our attention to citizens' attitudes toward abstention, we specify the distribution of citizens' costs of abstaining in the presidential elections $Q_\theta^P(\theta)$ to be a log-normal distribution with parameters (μ_1, σ). Similarly, we specify the distribution of citizens' costs of abstaining in a congressional election $Q_\theta^H(\theta)$ to be log-normal with parameters (μ_2, σ) for all H.[40]

Recall that the primary goal of our analysis is to quantify the extent to which sincere voting can explain observed voting profiles. To this end we introduce contrarian voting only as a device to account for deviations from the way sincere citizens would vote in two (presidential and congressional) simultaneous elections. Since we do not observe citizens' positions in the ideological space, it turns out that in order to identify what is the smallest fraction of contrarian voters that is needed to explain the data, we only need to consider individual deviations in at most one election. We therefore assume that each citizen is either sincere (with probability $1 - \pi_s$), contrarian in the presidential election (with probability $\pi_s(1 - \pi_H)$), or contrarian in the congressional election (with probability $\pi_s \pi_H$). We allow these probabilities to depend on citizens' positions and to differ by citizens' party identification. In particular, we specify π_s and π_H to have the following logistic forms:

$$\pi_s = \frac{\exp((\delta_1 + \delta_2 y)Dem + (\delta_3 + \delta_4 y)Rep + (\delta_5 + \delta_6 y)Ind)}{1 + \exp((\delta_1 + \delta_2 y)Dem + (\delta_3 + \delta_4 y)Rep + (\delta_5 + \delta_6 y)Ind)}$$

and

$$\pi_H = \frac{\exp(\delta_7 Dem + \delta_8 Rep + \delta_9 Ind)}{1 + \exp(\delta_7 Dem + \delta_8 Rep + \delta_9 Ind)}$$

Finally, we specify the utility function $u(\cdot)$ to have a quadratic form:

$$u(y, y_c) = -(y - y_c)^2$$

We estimate our model by maximum likelihood. The contribution to the likelihood of each observation in the sample is equal to the probability of observing the (endogenous) voting

[40] Allowing the variance parameters in the two distributions to differ does not change any of the estimates of the other parameters while decreasing the precision of the estimates of the variance parameters. Hence, we restrict σ to be the same in both distributions (a restriction that cannot be rejected at conventional statistical levels for any of the years we consider).

profile $V \in \Omega = \{AA,\ AD,\ AR,\ DA,\ RA,\ DD,\ DR,\ RD,\ RR\}$, conditional on the vector of (exogenous) characteristics $Z = (h, x, k, \Delta)$, given the vector of the model's parameters $\phi = (\alpha_1, ..., \alpha_9, \beta_1, ..., \beta_3, \gamma_1, ..., \gamma_9, \delta_1, ..., \delta_9, \mu_1, \mu_2, \sigma)$. Using the characterizations in Section 3 and the specification of the distribution of the unobserved heterogeneity described above, the likelihood function can easily be derived (and is therefore omitted).

6 Results

In this section, we summarize our estimates and our main empirical findings, discussing each component of our analysis in turn. The maximum likelihood estimates (and standard errors) of the model parameters for each of the eight presidential election years we consider (1972-2000) are reported in Table 5.

6.1 Goodness-of-Fit

Before presenting the main results of our empirical analysis, we assess the fit of our estimated model. For each presidential election year $t \in \{1972,\ 1976,\ 1980,\ 1984,\ 1988, 1992,\ 1996,\ 2000\}$, in Table 6 we compare the distribution of the voting profiles predicted by the model to the empirical distribution, both for the overall sample and for each group of citizens with different party identification (i.e., democrats, republicans and independents). To assess how well the model fits the data we use Pearson's chi-square goodness-of-fit test:

$$n_t \sum_{V \in \Omega} \frac{[f_t(V) - \widehat{f}_t(V)]^2}{\widehat{f}_t(V)} \sim \chi^2_8,$$

where $f_t(V)$ denotes the empirical frequency of the voting profile $V \in \Omega = \{AA,\ AD,\ AR,\ DA,\ RA,\ DD,\ DR,\ RD,\ RR\}$ in year t, $\widehat{f}_t(V)$ denotes the frequency of that voting profile predicted by the estimated model, and n_t is the number of observations in year t.[41] As we can see from Table 6, the model tracks observed citizens' participation and voting decisions in every presidential election year remarkably well, and each goodness-of-fit test cannot reject the model at conventional significance levels.

[41] Note that the goodness-of-fit test has eight degrees of freedom. This is, however, an upper bound because it does not take into account that the parameters in the model are estimated.

6.2 Citizens' Preferences, Information and Types

Our empirical analysis allows us to obtain estimates of the distributions of (unobserved) citizens' positions on the liberal-conservative ideological space $[-1, 1]$. Note that the estimation of these distributions, which are defined over the same space as the distributions of candidates' positions, relies only on citizens' observed participation and voting decisions, conditional on citizens' characteristics and the identity of the candidates running in the elections they face.[42]

Several interesting results emerge from the estimated distributions of citizen's positions $F_y^t(y \mid x^t, k^t)$ where $t = 1972, 1976, 1980, 1984, 1988, 1992, 1996, 2000$.[43] Citizens' demographic characteristics are systematically related to their ideological positions. *Ceteris paribus*, citizens become more conservative as they grow older; blacks tend to be more liberal than non-blacks; individuals with relatively low levels of education (i.e., without a high school degree) and individuals with relatively high levels of education (i.e., with at least a college degree) are more liberal than individuals with intermediate levels of education; women tend to be more liberal than men; and individuals whose income is below the median tend to be more liberal than those with higher levels of income. By and large, these findings hold for each of the years we consider.[44]

For each presidential election year, in Figure 1 we plot the estimated aggregate distribu-

[42]Note that the NES contains a variable that measures citizens' self-reported placements on a liberal-conservative 7-point scale, which is widely used in the empirical literature (see, e.g., Mebane (2000) and Poole and Rosenthal (1984)). There are several problems with using this variable as a measure of citizens' positions. For instance, interpersonal comparisons are problematic, since different people may interpret the scale differently. Moreover, estimates of the distribution of citizens' positions based on this variable are not comparable with the distribution of congressional candidates' positions and across time.

[43]Recall that the distribution of citizens' position in any given year t is characterized by the parameters $(\alpha_1, ..., \alpha_9)_t$ and $(\beta_1, ..., \beta_3)_t$. To interpret the estimates of the parameters associated with citizens' demographic characteristics, note that, *ceteris paribus*, a positive α coefficient shifts the distribution of citizens' positions to the right (i.e., toward more conservative positions), while a negative coefficient shifts it to the left (i.e., toward more liberal positions).

[44]These findings are similar to the results of Degan (2003) who estimates a dynamic model of voting in two consecutive presidential elections.

tions of citizens' positions, and in Figure 2 we plot these distributions by party identification. As we can see from these figures, the 1970s seem to be characterized by a process of relative convergence in citizens' ideological positions. This tendency, however, is reversed in the two decades that follow, leading to a polarization of the American electorate. Interestingly, while the estimated distributions of the ideological positions of citizens who define themselves as democrats, independent or republicans are always ordered in the expected way on the liberal-conservative space, the overlap of the supports of these distributions is substantial, and the relative positions of the independents and the "partisans" (i.e., democrats and republicans) change over time.

Our findings about the evolution of the distribution of citizens' positions over time parallel the results of McCarty, Poole and Rosenthal (1997) and Poole and Rosenthal (1997) about the changes in the distribution of representatives' positions in the post-war period. They find that starting in the mid 1970s, this distribution has become increasingly bimodal.

Turning our attention to the probability citizens' are informed about electoral candidates, we find significant relationships between an individual's demographic characteristics and his or her probability of being informed.[45] In particular, for each of the years we consider, our estimates imply that older and more educated individuals tend to be more informed than their younger and less educated counterparts, respectively; blacks are less informed than non-blacks; and individuals whose income is below the median tend to be less informed than those with higher levels of income. Interestingly, while in the 1970s women are less informed than men, in the 1980s and 1990s they become more informed than men (although gender differences in information are not always statistically significant).

In Table 7, we report our estimates of the proportion of informed citizens both at the aggregate level and by party identification from 1972 to 2000. While we find no evidence of a trend in information over time (either decreasing or increasing), our findings indicate that republicans are systematically more informed than democrats (except in the 2000 election). Furthermore, partisans are always more informed than independents.

For each presidential election year, our empirical analysis also allows us to quantify the

[45] Recall that in any given year t, the probability a citizen is informed is characterized by the parameters $(\gamma_1, ..., \gamma_9)_t$.

distribution of (unobserved) citizens' types, by estimating the probability that each individual is either sincere, contrarian in the presidential election, or contrarian in the congressional election in his or her district.[46] Table 8 contains the estimated proportions of sincere individuals in the citizenry both at the aggregate level and by party identification for each of the years we consider. Several interesting observations emerge from this table. The aggregate proportion of sincere citizens ranges from 82% to 93%. This implies that in every election year a non-negligible fraction of the American electorate does not behave sincerely. The aggregate proportion of sincere citizens, however, steadily increases over time, although no similar trend can be detected within groups of citizens that differ by their party identification.

In Table 9, we report our estimates of the proportions of contrarian voters in presidential and congressional elections both at the aggregate level and by party identification for each presidential election year. For any given election, the proportion of contrarian voters is relative to the population of citizens who vote in the election (that is, citizens who abstain are excluded from the calculation). As we can see from this table, it is generally the case that the proportion of contrarian voters is higher in congressional elections than in the presidential election. Also, by and large, contrarian voters are relatively more prevalent among independents than either among democrats or republicans. Overall, a significant fraction of the population of voters in each presidential election year does not vote sincerely.

6.3 Turnout and Selective Abstention

Our model implies a positive relationship between information and turnout. Since uninformed citizens are more likely to make "voting mistakes" and hence have larger expected regret from voting, they abstain more than informed citizens. To illustrate this relationship, we present Table 10, where we report the proportions of informed and uninformed citizens who abstain in the presidential election, abstain in the congressional election, and abstain in both elections, implied by our model.

The difference in the participation behavior of informed and uninformed citizens is most noticeable in presidential elections, where informed citizens (who know the positions of the presidential candidates and hence have no expected regret from voting) never abstain. Un-

[46] For any given t, these probabilities are characterized by the parameters $(\delta_1, ..., \delta_9)_t$.

informed citizens, on the other hand, are uncertain about the positions of the presidential candidates, and may therefore optimally choose to abstain if their expected regret from voting is larger than their regret from abstaining.[47] According to our estimates, the proportion of uninformed citizens who abstain in a presidential election varies between 42% and 65%, depending on the year. Uninformed citizens abstain more than informed ones also in congressional elections, but since even informed citizens face some uncertainty about the positions of congressional challengers, abstention rates are positive also among informed citizens. Consistent with what we observe in the data, our estimated model predicts that in each presidential election year abstention is higher in congressional elections than in the presidential election, and some individuals selectively abstain in one election but vote in the other.

To understand these findings, note that our estimates imply that the average regret from abstaining in the presidential election is always smaller than in a congressional election (or, in other words, citizens find it relatively more costly to make voting mistakes in the presidential election than in a congressional election). This result alone would lead to relatively more abstention in the presidential election. At the same time, however, our estimates also imply that the average expected regret from voting in the presidential election is always smaller than in a congressional election, and the second effect (which is due to the fact that, in general, there is more information, and hence less uncertainty, about presidential candidates than congressional candidates), always dominates.

When combined with our previous findings that independents are systematically less informed than democrats, who are in turn less informed than republicans (see Table 7), these results also explain the fact that, in every presidential election year, independents are relatively more likely to abstain than partisan citizens (see Table 6), and democrats are relatively more likely to abstain than republicans.[48]

[47] Recall that in any given year $t \in \{1972, 1976, 1980, 1984, 1988, 1992, 1996, 2000\}$, the distributions of the citizens' costs of abstaining in the presidential and congressional elections are characterized by the parametrs $(\mu_1, \mu_2, \sigma)_t$.

[48] Note that in standard spatial models of voting (e.g., Downs (1957), Enelow and Hinich (1984) and Riker and Ordeshook (1968)), abstention typically arises either out of "indifference" (when the two candidates are equally distant from a citizen's ideal point), or out of "alienation" (when they are both too distant from a

The pivotal voter model of Feddersen and Pesendorfer (1996) also generates a positive relationship between information and turnout. They consider an environment with asymmetric information where some voters are uncertain about the realization of a state variable that affects the utility of all voters. Their analysis shows that uninformed voters may strictly prefer to abstain rather than vote for either candidate even when they are not indifferent between the two candidates and voting is costless. In their model, voters condition their actions not only on their information, but also on what they can infer about the state of the world in the event their vote is pivotal. Hence, it may be an equilibrium for the uninformed voters to abstain and to let the informed voters decide the electoral outcome.[49] Although the two models are very different, both in our analysis and in that of Feddersen and Pesendorfer, voters take into account the consequence of voting for the "wrong" candidate, and this may lead to abstention.

Palfrey and Poole (1987) develop an index of voter information and find it is significantly related to ideological extremism and voting behavior in presidential elections.[50] In particular, they find that individuals with a high level of information tend to be more extreme than those with low levels and are much more likely to vote. Both of these findings are consistent with our empirical results.

6.4 Split-Ticket Voting

Our analysis allows us to estimate the probability sincere citizens split their vote in presidential and congressional elections. Hence, we can assess empirically the extent to which the split-ticket voting observed in the data can be explained by sincere voting. For each of the eight presidential election years we consider, in Table 11 we compare the amount of split-ticket voting observed in the data (i.e., the percentage of voters who split their vote conditional on voting in both elections), to the one predicted by the estimated model, both at the aggregate level and by party identification. In Table 12, we then decompose split-ticket

citizen's ideal point). This is not the case in our model. Also note that explanations of abstention based on indiffirence and/or alienation are typically not supported by the data (e.g., Poole and Rosenthal (1984)).

[49] See also Feddersen and Pesendorfer (1999).

[50] Their index of voter information in the 1980 presidential election is based on NES data about voter perceptions of candidates' positions on several issues measured on a 7-point scale.

voting, by reporting the proportion of split-ticket voters who are sincere and contrarian, respectively.

Several interesting findings emerge from these tables. As we can see from Table 11, the estimated model accurately predicts split-ticket voting in each presidential election year both at the aggregate level and by party identification, and captures the aggregate downward trend observed in the data. Consistent with what we observe, our analysis implies that independents are always relatively more likely to split their vote than partisans, but no clear pattern emerges in the comparison between democrats and republicans.

Turning to Table 12, we find that sincere voting can only account for a relatively small percentage of observed split-ticket voting in each presidential election year. During our sample period, our estimated model implies that, on average, sincere voters account for only about 22% of the overall population of split-ticket voters (about 20%, 22% and 28% among democrats, republicans and independents, respectively). The extent of split-ticket voting by sincere citizens, however, is substantially higher in the later part of the sample (1988-2000) than in earlier years (1972-1984), both at the aggregate level and by party identification.[51]

Overall, we conclude that sincere voting alone cannot explain split-ticket voting. Other considerations, like perhaps the desire to "balance" the government as suggested by Alesina and Rosenthal (1996), or the existence of budgetary externalities within a federal system as suggested by Chari, Jones and Marimon (1999), play an important role in citizens' decisions to split their vote in presidential and congressional elections.

For each presidential election year, in Figure 3 we plot the estimated aggregate distribution of split-ticket voters on the liberal-conservative ideological space, relative to the distribution of citizens' positions (that is, each picture depicts the density of citizens' positions and the fraction of split-ticket voters for each ideological position in a given year). As we can see from this figure, the distribution of split-ticket voters in any presidential election year has three modes, denoting that citizens whose ideological positions are relatively extreme on either side of the liberal-conservative space, and citizens with "middle-of-the-road" positions, are more likely to split their vote. Interestingly, our estimates imply that sincere

[51] It will be interesting to see whether our 2000 estimate represents the beginning of another "regime" that may persist over time, or simply be due to some specific circumsatnces of the 2000 election.

split-ticket voters account for the mass in the middle, while contrarian split-ticket voters are in the tails of the distribution.

To summarize, our findings indicate that there are two types of split-ticket voters in each presidential election year: contrarian split-ticket voters with relatively extreme ideological positions, and sincere split-ticket voters with relatively moderate positions. Furthermore, sincere voters account for a small minority of all split-ticket voters in any given year. It is interesting to relate our empirical findings to Alesina and Rosenthal (1996) balancing theory of split-ticket voting, where the desire of citizens with relatively moderate positions to induce the government to adopt moderate policies, leads them to strategically split their vote in presidential and congressional elections. In contrast, we find that split-ticket voting may be the natural (sincere) choice for citizens with relatively moderate positions.

We conclude this section by investigating the relationship between information and split-ticket voting. For each of the eight presidential election years we consider, in Table 13 we report the estimated proportion of informed and uninformed citizens who, conditional on voting in both elections, split their vote in presidential and congressional elections. We find that, by and large, uninformed voters are more likely to split their vote than informed voters. This finding is somewhat consistent with the results of Palfrey and Poole (1987), who find that the voting behavior of uninformed voters in presidential elections exhibits more (apparent) randomness and is therefore less predictable than that of informed voters.

7 Counterfactual Experiments

An appealing feature of our approach is that we can use the estimated model to evaluate the effects of various counterfactual experiments on citizens' participation and voting decisions in presidential and congressional elections, and on the electoral outcomes they induce. Here, we consider three experiments where we analyze the outcomes of presidential and congressional elections for each of the presidential election years in our sample period, under three hypothetical scenarios where: (i) all citizens are sincere; (ii) all citizens are informed; and (iii) all citizens vote.[52]

[52] Using the notation of our model, the three experiments correspond to situations where for all citizens (i) $\pi_s = 0$; (ii) $\pi_\lambda = 1$; and (iii) $\theta_P = \theta_H = +\infty$, respectively.

The results of these experiments are reported in Table 14, where for each year, entries in bold denote either the actual winner of the presidential election (column 2) or the party who actually obtained the majority of the House of representatives (column 3), and entries who are underlined denote the electoral outcomes implied by the experiments.

Our main findings can be summarized as follows. First, had all citizens behaved sincerely in each of the presidential election years we consider, our analysis predicts that we would have observed fewer instances of divided government.[53] This finding is consistent with our previous result that most split-ticket voting is due to contrarian voters. Hence, if all citizens were to behave sincerely, relatively fewer citizens would split their vote, and the same party would be more likely to win both in the presidential and the congressional elections.

Second, similar results (although not necessarily in the same elections and for the same years) obtain if all citizens are informed or if nobody abstains. Again, the intuition for these findings is provided by our previous results. Consider first the effect of an exogenous increase in information (i.e., the experiment where all citizens are informed). Since informed citizens are relatively less likely to split their ticket (see Table 13), relatively fewer citizens will split their vote, and hence the same party will be more likely to win both in the presidential and the congressional elections. There is, however, another effect due to the fact that informed citizens are also more likely to vote. The overall result will therefore depend on the relative magnitudes of the effects of information on the behavior of citizens with different demographic characteristics, ideological positions and party identification, and will in general differ over time.

Consider now the effect of an exogenous increase in turnout (i.e., the experiment where all citizens vote). Since by definition only sincere citizens may abstain, eliminating abstention will increase the proportion of sincere voters and hence decrease the amount of split-ticket voting relative to other voting profiles. At the same time, however, eliminating abstention will also increase the proportion of uninformed voters, who are more likely to split their vote.

[53] According to our estimated model, the Republican party would have gained control of the House in 1972 and 1984, while the Democratic party would have preserved its control of the House during Clinton's second term in office. However, our analysis also predicts that Gore would have won the presidency in the 2000 election, but without changing the Republican predominance in the House.

Thus, the overall result will once again depend on the relative sizes of the different effects, which will in general differ across different years.

8 Concluding Remarks

Understanding citizens' electoral behavior represents a fundamental step in the analysis of democratic institutions. In this paper, we have addressed a simple, yet important, question about observed patterns of participation and voting in U.S. national elections: Do citizens vote sincerely? Or in other words, to what extent can sincere voting account for what we see in the data? To address this question we have proposed a unified model of turnout and voting in presidential and congressional elections with heterogenous voters, based on the notion that citizens minimize their expected regret. We have estimated the model using individual-level data for each U.S. presidential election year form 1972 to 2000. We have found that in every presidential election year a non-negligible fraction of the American electorate does not vote sincerely, and only a relatively small fraction of observed split-ticket voting can be explained by sincere voting.

Our empirical analysis has also allowed us to investigate the evolution of the distribution of citizens' ideological positions and their information about electoral candidates over time. We have found a systematic, positive relationship between information and turnout. Furthermore, our findings indicate that the American electorate has become relatively more polarized over time.

It is important to observe that we have deliberately chosen to keep our model of the behavior of sincere citizens extremely simple. In fact, consistent with the primary goal of our analysis, we have "stacked the deck" against sincere voting by focusing solely on the extent to which differences in ideological preferences and information can explain observed differences in turnout and voting in presidential and congressional elections. Clearly, other factors like, for example, differences in candidates' competence, citizens' preferences over candidates' personal traits (e.g., charisma), or candidates' positions on policy dimensions other than the liberal-conservative one, may play an important role in explaining the data and may very well account for what we have labelled as "contrarian" behavior. We plan to explore these issues in future work.

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Table 1 : Electoral outcomes

Year	Presidential Election	Congressional Elections
1972	McGovern v **Nixon**	**D** v R
1976	**Carter** v Ford	**D** v R
1980	Carter v **Reagan**	**D** v R
1984	Mondale v **Reagan**	**D** v R
1988	Dukakis v **Bush Sr.**	**D** v R
1992	**Clinton** v Bush Sr.	**D** v R
1996	**Clinton** v Dole	D v **R**
2000	Gore v **Bush Jr.**	D v **R**

Table 2: Sample distributions of voting profiles

Voting Profiles	1972	1976	1980	1984	1988	1992	1996	2000
AA	26.68%	28.07%	31.76%	27.43%	31.12%	29.52%	26.50%	27.46%
AD	0.98%	0.15%	0.34%	0.07%	0.18%	0.13%	0.17%	0.00%
AR	0.31%	0.15%	0.11%	0.28%	0.00%	0.00%	0.68%	0.10%
DA	1.96%	3.14%	1.91%	2.35%	1.89%	4.25%	2.65%	4.92%
RA	3.43%	2.27%	1.35%	2.63%	2.97%	2.81%	1.11%	3.94%
DD	20.69%	25.73%	19.48%	23.03%	26.17%	30.70%	30.43%	28.84%
DR	3.49%	6.58%	6.19%	4.05%	3.51%	6.21%	8.72%	5.61%
RD	14.01%	9.87%	10.92%	12.15%	9.71%	7.25%	2.74%	4.23%
RR	28.46%	24.05%	27.93%	28.00%	24.46%	19.14%	27.01%	24.90%

Table 3: Sample averages

Year	Age	Black	Lowedu	Highedu	Female	Lowinc	Dem	Rep	Ind
1972	44.3	0.07	0.36	0.15	0.56	0.61	0.48	0.40	0.12
1976	46.0	0.08	0.29	0.16	0.60	0.53	0.50	0.36	0.14
1980	44.7	0.09	0.23	0.17	0.55	0.52	0.48	0.38	0.14
1984	43.3	0.09	0.19	0.19	0.55	0.57	0.47	0.42	0.11
1988	44.6	0.10	0.18	0.21	0.55	0.56	0.45	0.43	0.12
1992	45.7	0.14	0.20	0.24	0.54	0.61	0.51	0.37	0.12
1996	48.0	0.10	0.13	0.29	0.54	0.58	0.52	0.40	0.08
2000	47.3	0.10	0.10	0.31	0.54	0.55	0.51	0.38	0.11

Table 4: Candidates' positions

Year	President	House: Northeast		House: Midwest		House: West		House: South	
		Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Democratic candidates									
1972	-0.521	-0.388	0.128	-0.372	0.138	-0.403	0.150	-0.090	0.208
1976	-0.510	-0.373	0.131	-0.345	0.162	-0.360	0.198	-0.106	0.207
1980	-0.510	-0.367	0.129	-0.350	0.165	-0.391	0.198	-0.103	0.212
1984	-0.488	-0.357	0.115	-0.339	0.160	-0.399	0.126	-0.137	0.177
1988	-0.494	-0.362	0.113	-0.326	0.159	-0.386	0.142	-0.146	0.160
1992	-0.456	-0.364	0.120	-0.301	0.163	-0.375	0.141	-0.209	0.177
1996	-0.456	-0.376	0.107	-0.334	0.145	-0.398	0.130	-0.269	0.164
2000	-0.290	-0.363	0.105	-0.330	0.138	-0.364	0.123	-0.255	0.147
Republican candidates									
1972	0.388	0.148	0.129	0.284	0.157	0.276	0.160	0.312	0.117
1976	0.358	0.125	0.153	0.269	0.137	0.361	0.170	0.324	0.130
1980	0.568	0.163	0.160	0.314	0.144	0.402	0.153	0.373	0.131
1984	0.568	0.202	0.170	0.319	0.112	0.432	0.121	0.385	0.092
1988	0.546	0.206	0.169	0.325	0.125	0.435	0.132	0.384	0.114
1992	0.546	0.238	0.122	0.372	0.121	0.448	0.111	0.402	0.111
1996	0.331	0.263	0.122	0.398	0.117	0.443	0.123	0.429	0.119
2000	0.399	0.257	0.112	0.382	0.121	0.448	0.140	0.409	0.113

Table 5 : Maximum-likelihood parameter estimates and standard errors

φ	1972		1976		1980		1984		1988		1992		1996		2000	
	estimate	std. err.	estimate	std. err.	estimate	std. err.	estimate	std. err.	estimate	std. err.	estimate	std. err.	estimate	std. err.	estimate	std. err.
α_1	1.306	0.257	1.326	0.262	1.303	0.198	1.152	0.288	1.669	0.307	2.504	0.214	1.399	0.241	2.681	0.230
α_2	1.747	0.195	1.906	0.339	2.678	0.294	2.285	0.248	3.230	0.205	3.056	0.245	2.126	0.221	2.456	0.307
α_3	1.688	0.210	1.869	0.264	2.746	0.249	2.579	0.264	2.594	0.383	2.499	0.235	2.106	0.258	3.863	0.430
α_4	0.037	0.133	0.080	0.130	0.004	0.080	0.214	0.135	0.022	0.118	-0.057	0.092	-0.145	0.131	0.243	0.103
α_5	-0.362	0.109	-0.094	0.083	-0.151	0.100	-0.337	0.094	-0.158	0.086	-0.086	0.047	-0.196	0.082	-0.346	0.074
α_6	0.000	0.055	-0.058	0.053	-0.044	0.058	-0.157	0.061	0.069	0.050	0.078	0.038	-0.051	0.066	0.019	0.058
α_7	-0.056	0.071	0.049	0.064	0.019	0.067	-0.075	0.059	-0.004	0.041	0.000	0.046	-0.040	0.053	-0.088	0.043
α_8	-0.048	0.045	0.085	0.043	-0.051	0.047	-0.056	0.044	-0.028	0.036	0.032	0.028	-0.038	0.043	-0.064	0.035
α_9	-0.072	0.052	0.043	0.048	-0.126	0.049	-0.114	0.048	-0.053	0.040	0.009	0.027	0.084	0.049	-0.062	0.040
β_1	1.821	0.217	2.057	0.221	1.708	0.166	1.645	0.225	2.200	0.261	3.008	0.193	2.111	0.195	2.978	0.198
β_2	0.826	0.253	1.383	0.417	1.943	0.355	1.434	0.304	2.710	0.208	2.587	0.256	1.401	0.267	1.848	0.350
β_3	1.323	0.219	1.835	0.273	2.379	0.250	2.242	0.260	2.679	0.342	2.694	0.227	2.092	0.251	3.767	0.427
γ_1	-0.539	0.399	-1.461	0.428	-3.397	0.658	-1.365	0.441	-2.765	0.568	-1.002	0.304	-3.734	0.713	-1.652	0.414
γ_2	-0.545	0.455	-1.237	0.573	-2.073	0.622	-1.849	0.526	-1.850	0.403	-1.204	0.294	-2.423	0.610	-2.812	0.525
γ_3	-1.682	0.551	-1.984	0.496	-3.189	0.705	-1.596	0.372	-2.719	0.483	-2.186	0.347	-3.967	0.784	-2.687	0.436
γ_4	2.921	0.693	4.641	0.737	5.917	1.036	4.844	0.735	6.054	0.763	4.312	0.480	7.040	1.119	5.255	0.725
γ_5	-1.678	1.276	-0.563	0.621	-3.741	2.954	-2.626	1.428	-1.295	0.829	-0.209	0.284	-1.332	1.031	-1.420	0.766
γ_6	-1.274	0.309	-1.391	0.315	-3.010	1.035	-1.983	0.378	-1.761	0.382	-1.649	0.231	-4.573	1.884	-1.636	0.409
γ_7	0.984	0.303	1.153	0.315	1.187	0.409	0.962	0.277	1.651	0.301	0.971	0.197	1.022	0.340	1.281	0.253
γ_8	-0.044	0.229	-0.499	0.226	0.319	0.342	0.231	0.210	0.312	0.238	0.245	0.155	0.196	0.330	-0.121	0.217
γ_9	-1.470	0.259	-0.919	0.268	-0.701	0.343	-1.070	0.237	-1.017	0.238	-0.730	0.169	-1.604	0.390	-1.027	0.235
δ_1	-2.196	0.486	-4.866	1.244	-4.822	2.210	-3.933	1.063	-6.260	3.548	-9.725	4.012	-7.141	2.261	-4.003	1.042
δ_2	-2.428	1.015	-7.037	2.221	-7.498	4.123	-4.743	1.790	-8.559	6.033	-19.058	9.429	-9.535	3.685	-4.192	3.211
δ_3	-5.159	1.871	-4.302	1.824	-12.043	14.711	-7.034	2.099	-8.025	2.301	-9.149	3.386	-4.572	1.693	-4.354	1.885
δ_4	5.921	2.728	5.845	3.291	21.487	28.233	10.508	3.548	17.401	6.145	20.329	9.208	4.605	3.093	5.561	3.677
δ_5	-4.745	1.590	-5.280	2.032	-13.783	11.084	-9.985	4.104	-2.892	1.433	-8.387	3.436	-4.262	2.072	-2.042	0.414
δ_6	9.389	3.499	15.506	7.277	37.600	31.620	25.703	11.340	-8.890	5.295	-23.915	10.698	-8.866	5.677	-1.252	4.604
δ_7	-1.538	0.263	0.194	0.218	0.241	0.250	0.246	0.234	0.267	0.359	1.271	0.349	2.768	0.526	0.380	0.519
δ_8	1.470	0.311	0.666	0.305	1.886	0.475	2.892	0.473	1.371	0.343	0.925	0.293	-1.804	0.674	1.531	0.492
δ_9	1.226	0.427	0.317	0.393	1.407	0.664	2.101	0.748	-3.068	1.452	-0.125	0.524	5.697	8.912	-1.260	1.202
μ_1	-5.401	0.013	-4.558	0.785	-3.955	0.044	-5.365	0.051	-4.617	0.941	-4.637	0.253	-4.785	0.584	-3.819	0.032
μ_2	-3.553	0.012	-3.544	0.042	-3.207	0.068	-3.762	0.083	-3.499	0.042	-3.718	0.066	-3.437	0.067	-3.092	0.082
σ	0.033	1.409	0.229	1.306	0.143	1.346	0.172	1.448	0.249	1.155	0.356	1.134	0.305	1.180	0.042	2.007

Table 6 : Distributions of voting profiles and goodness-of-fit-tests

Voting	1972		1976		1980		1984		1988		1992		1996		2000	
profiles	Model	Data	Model	Data	Model	Data	Model	Data	Model	Data	Model	Data	Model	Data	Model	Data
All																
AA	25.74%	26.68%	27.13%	28.07%	30.54%	31.76%	26.04%	27.43%	29.69%	31.12%	28.52%	29.52%	25.11%	26.50%	26.05%	27.46%
AD	0.98%	0.98%	0.35%	0.15%	0.18%	0.34%	0.32%	0.07%	0.17%	0.18%	0.17%	0.13%	0.45%	0.17%	0.24%	0.00%
AR	0.44%	0.31%	0.18%	0.15%	0.36%	0.11%	0.36%	0.28%	0.17%	0.00%	0.17%	0.00%	0.44%	0.68%	0.26%	0.10%
DA	1.73%	1.96%	2.85%	3.14%	1.35%	1.91%	2.15%	2.35%	2.40%	1.89%	4.00%	4.25%	2.22%	2.65%	4.68%	4.92%
RA	4.35%	3.43%	2.71%	2.27%	2.24%	1.35%	3.32%	2.63%	3.42%	2.97%	4.10%	2.81%	1.80%	1.11%	4.35%	3.94%
DD	21.39%	20.69%	26.05%	25.73%	20.28%	19.48%	23.69%	23.03%	26.16%	26.17%	31.28%	30.70%	30.75%	30.43%	29.76%	28.84%
DR	3.28%	3.49%	6.48%	6.58%	6.17%	6.19%	4.04%	4.05%	3.56%	3.51%	5.98%	6.21%	8.58%	8.72%	6.17%	5.61%
RD	13.49%	14.01%	10.08%	9.87%	11.20%	10.92%	11.80%	12.15%	9.39%	9.71%	6.98%	7.25%	3.91%	2.74%	4.05%	4.23%
RR	28.60%	28.46%	24.17%	24.05%	27.66%	27.93%	28.27%	28.00%	25.03%	24.46%	18.81%	19.14%	26.75%	27.01%	24.44%	24.90%
χ^2 test	5.85		3.68		8.65		6.75		4.81		10.26		12.82		5.74	
p-value	0.6640		0.8847		0.3727		0.5638		0.7777		0.2472		0.1182		0.6763	
Democrats																
AA	25.85%	27.32%	26.45%	26.96%	32.07%	32.39%	24.20%	26.56%	30.11%	31.49%	24.82%	25.03%	26.03%	27.50%	25.15%	25.19%
AD	1.29%	1.78%	0.06%	0.00%	0.30%	0.70%	0.29%	0.15%	0.15%	0.20%	0.19%	0.13%	0.67%	0.16%	0.05%	0.00%
AR	0.64%	0.25%	0.31%	0.14%	0.43%	0.23%	0.52%	0.15%	0.14%	0.00%	0.06%	0.00%	0.17%	0.00%	0.34%	0.00%
DA	2.81%	3.05%	4.19%	4.49%	2.31%	3.05%	3.77%	3.49%	4.26%	3.17%	6.58%	6.90%	3.62%	4.58%	7.44%	8.14%
RA	4.25%	2.54%	1.59%	1.74%	1.24%	0.70%	1.68%	1.21%	0.75%	0.59%	0.90%	0.64%	0.44%	0.00%	0.98%	1.16%
DD	39.05%	37.61%	44.88%	44.78%	38.20%	37.09%	46.28%	45.68%	50.85%	51.09%	54.11%	53.64%	53.32%	52.86%	52.60%	52.13%
DR	3.76%	4.19%	8.04%	8.41%	9.87%	10.09%	7.35%	7.59%	4.99%	5.15%	7.88%	8.30%	11.22%	11.29%	7.59%	7.56%
RD	14.72%	15.63%	8.56%	8.12%	7.83%	7.75%	6.68%	6.83%	4.72%	4.95%	3.12%	3.32%	2.33%	1.15%	1.43%	1.36%
RR	7.62%	7.62%	5.91%	5.36%	7.74%	7.98%	9.22%	8.35%	4.03%	3.37%	2.34%	2.04%	2.20%	2.45%	4.41%	4.46%
χ^2 test	10.76		1.95		4.83		5.36		3.34		2.02		12.04		2.57	
p-value	0.2157		0.7756		0.7756		0.7185		0.9112		0.9804		0.1494		0.9584	
Republicans																
AA	18.67%	18.24%	19.87%	20.73%	18.26%	20.90%	21.58%	21.75%	23.50%	24.01%	24.05%	26.14%	16.83%	18.36%	18.27%	21.03%
AD	0.34%	0.00%	0.37%	0.00%	0.02%	0.00%	0.20%	0.00%	0.22%	0.21%	0.13%	0.00%	0.10%	0.00%	0.29%	0.00%
AR	0.24%	0.15%	0.06%	0.20%	0.25%	0.00%	0.23%	0.51%	0.15%	0.00%	0.18%	0.00%	0.39%	1.30%	0.03%	0.00%
DA	0.37%	1.08%	0.65%	1.22%	0.25%	0.30%	0.44%	1.01%	0.46%	0.42%	0.73%	0.70%	0.50%	0.43%	0.81%	1.03%
RA	4.24%	4.64%	4.27%	3.25%	2.90%	1.49%	5.08%	4.22%	4.93%	5.01%	8.53%	5.61%	3.49%	2.38%	8.16%	7.18%
DD	3.71%	3.55%	4.77%	4.07%	3.01%	2.39%	2.53%	1.69%	3.10%	3.97%	4.61%	4.39%	4.92%	4.97%	5.04%	3.33%
DR	2.62%	2.47%	4.55%	4.27%	2.57%	2.69%	1.01%	0.84%	2.62%	2.30%	3.57%	3.33%	5.66%	5.83%	4.06%	3.08%
RD	12.29%	12.36%	11.68%	11.99%	15.26%	14.33%	17.19%	17.71%	14.08%	13.36%	12.67%	12.81%	6.13%	4.54%	8.26%	8.72%
RR	57.52%	57.50%	53.78%	54.27%	57.48%	57.91%	51.73%	52.28%	50.95%	50.73%	45.52%	47.02%	61.99%	62.20%	55.08%	55.64%
χ^2 test	11.49		7.99		5.15		10.29		2.33		8.94		14.65		6.89	
p-value	0.1754		0.4344		0.7414		0.2452		0.9692		0.3474		0.0663		0.5485	
Independents																
AA	48.16%	51.50%	48.86%	51.61%	57.82%	58.27%	50.92%	52.90%	51.19%	56.25%	59.15%	60.11%	59.19%	59.38%	57.88%	60.91%
AD	1.87%	1.00%	1.34%	1.08%	0.21%	0.00%	0.92%	0.00%	0.12%	0.00%	0.19%	0.56%	0.70%	1.04%	0.91%	0.00%
AR	0.32%	1.00%	0.05%	0.00%	0.42%	0.00%	0.15%	0.00%	0.34%	0.00%	0.56%	0.00%	2.40%	2.08%	0.71%	0.91%
DA	1.85%	0.50%	3.69%	3.23%	1.06%	2.36%	1.74%	2.58%	2.35%	2.34%	3.09%	3.93%	1.63%	1.04%	5.41%	3.64%
RA	5.06%	3.00%	2.75%	1.61%	3.87%	3.15%	3.54%	2.58%	8.33%	4.69%	4.04%	3.37%	2.29%	2.08%	6.64%	5.45%
DD	9.09%	9.50%	12.49%	12.37%	5.73%	5.51%	8.62%	8.39%	15.09%	10.94%	16.23%	14.04%	11.62%	10.42%	10.26%	10.00%
DR	3.55%	4.00%	5.79%	5.91%	3.28%	2.36%	1.58%	1.29%	1.46%	1.56%	5.29%	6.18%	5.90%	6.25%	6.96%	5.45%
RD	12.51%	13.00%	11.48%	10.75%	11.76%	12.60%	13.01%	13.55%	10.27%	14.84%	5.73%	6.74%	3.26%	4.17%	1.45%	1.82%
RR	17.59%	16.50%	13.55%	13.44%	15.86%	15.75%	19.52%	18.71%	10.84%	9.38%	5.74%	5.06%	13.01%	13.54%	9.78%	11.82%
χ^2 test	8.06		1.56		3.42		2.99		7.59		4.22		0.82		3.04	
p-value	0.4276		0.9917		0.9053		0.9349		0.4745		0.8367		0.9991		0.9318	

Table 7: Proportions of informed citizens

Year	All	Democrats	Republicans	Independents
1972	37%	36%	45%	17%
1976	43%	39%	55%	28%
1980	35%	23%	56%	21%
1984	44%	45%	46%	36%
1988	47%	37%	63%	33%
1992	57%	59%	62%	28%
1996	38%	25%	59%	18%
2000	46%	53%	41%	27%

Table 8: Proportions of sincere citizens

Year	All	Democrats	Republicans	Independents
1972	82%	79%	85%	83%
1976	85%	85%	86%	83%
1980	85%	83%	86%	88%
1984	85%	87%	87%	88%
1988	89%	92%	88%	83%
1992	90%	91%	88%	89%
1996	90%	88%	93%	92%
2000	93%	95%	90%	89%

Table 9: Proportions of contrarian voters

Year	All		Democrats		Republicans		Independents	
	P	H	P	H	P	H	P	H
1972	13%	11%	24%	6%	3%	14%	8%	29%
1976	8%	13%	9%	12%	6%	12%	15%	22%
1980	7%	16%	11%	15%	2%	15%	6%	25%
1984	5%	17%	8%	11%	1%	22%	3%	25%
1988	6%	10%	5%	7%	3%	13%	33%	2%
1992	4%	12%	3%	10%	5%	13%	14%	15%
1996	4%	10%	1%	16%	7%	1%	0%	22%
2000	4%	8%	2%	4%	2%	12%	21%	8%

Table 10: Abstension probabilities

Year	Abstain for President		Abstain for Congress		Abstain in both elections	
	Informed	Uninformed	Informed	Uninformed	Informed	Uninformed
1972	0.00%	42.49%	2.14%	48.78%	0.00%	40.29%
1976	0.00%	47.67%	2.82%	54.47%	0.00%	46.76%
1980	0.00%	46.36%	1.82%	50.18%	0.00%	45.56%
1984	0.00%	47.98%	2.25%	54.86%	0.00%	46.73%
1988	0.00%	58.26%	2.79%	65.99%	0.00%	57.54%
1992	0.00%	64.80%	4.83%	77.23%	0.00%	64.05%
1996	0.00%	41.94%	1.68%	46.12%	0.00%	40.58%
2000	0.00%	50.51%	0.41%	66.04%	0.00%	49.62%

Table 11: Split-ticket voting

Year	All		Democrats		Republicans		Independents	
	Model	Data	Model	Data	Model	Data	Model	Data
1972	25.12%	26.26%	28.36%	30.47%	19.59%	19.55%	37.58%	39.53%
1976	24.80%	24.83%	24.63%	24.78%	21.70%	21.80%	39.89%	39.24%
1980	26.59%	26.55%	27.82%	28.24%	22.77%	22.18%	41.05%	41.30%
1984	23.37%	23.79%	20.17%	20.97%	25.12%	25.23%	34.14%	33.85%
1988	20.19%	20.70%	15.04%	15.64%	23.60%	22.25%	31.16%	44.68%
1992	20.55%	21.26%	16.31%	17.27%	24.47%	23.90%	33.39%	40.35%
1996	17.85%	16.62%	19.62%	18.36%	14.98%	13.37%	27.12%	30.30%
2000	15.87%	15.48%	13.66%	13.61%	17.01%	16.67%	29.55%	25.00%

Table 12: Distributions of split-ticket voters

Year	All		Democrats		Republicans		Independents	
	Sincere	Contrarian	Sincere	Contrarian	Sincere	Contrarian	Sincere	Contrarian
1972	10.89%	89.11%	11.40%	88.60%	11.63%	88.37%	10.89%	0.06%
1976	16.56%	83.44%	15.37%	84.63%	17.58%	82.42%	18.24%	81.76%
1980	15.90%	84.10%	9.51%	90.49%	21.76%	78.24%	22.74%	77.26%
1984	10.41%	89.59%	12.11%	87.89%	6.47%	93.53%	22.23%	77.77%
1988	26.28%	73.72%	18.91%	81.09%	30.57%	69.43%	27.47%	72.53%
1992	24.51%	75.49%	21.81%	78.19%	27.38%	72.62%	22.86%	77.14%
1996	25.50%	74.50%	12.21%	87.79%	44.13%	55.87%	34.96%	65.04%
2000	42.26%	57.74%	59.91%	40.09%	19.83%	80.17%	70.00%	30.00%

Table 13: Split-ticket voting by information status

Year	Split-ticket voting	
	Informed	Uninformed
1972	22.79%	28.09%
1976	22.46%	29.49%
1980	23.44%	29.60%
1984	19.38%	31.01%
1988	18.63%	26.49%
1992	17.02%	42.33%
1996	18.66%	17.21%
2000	16.28%	15.45%

Table 14: Counterfactual experiments

Year	All citizens sincere		All citizens informed		All citizens vote	
	P	H	P	H	P	H
1972	McGovern v **Nixon**	**D** v R	McGovern v **Nixon**	**D** v R	McGovern v **Nixon**	**D** v R
1976	**Carter** v Ford	**D** v R	**Carter** v Ford	**D** v R	**Carter** v Ford	**D** v R
1980	Carter v **Reagan**	**D** v R	Carter v **Reagan**	**D** v R	Carter v **Reagan**	**D** v R
1984	Mondale v **Reagan**	**D** v R	Mondale v **Reagan**	**D** v R	Mondale v **Reagan**	**D** v R
1988	Dukakis v **Bush Sr.**	**D** v R	Dukakis v **Bush Sr.**	**D** v R	Dukakis v **Bush Sr.**	**D** v R
1992	**Clinton** v Bush Sr.	**D** v R	**Clinton** v Bush Sr.	**D** v R	**Clinton** v Bush Sr.	**D** v R
1996	**Clinton** v Dole	D v **R**	**Clinton** v Dole	D v **R**	**Clinton** v Dole	D v **R**
2000	Gore v **Bush Jr.**	D v **R**	Gore v **Bush Jr.**	D v **R**	Gore v **Bush Jr.**	D v **R**

Figure 1 : Distributions of citizens' positions

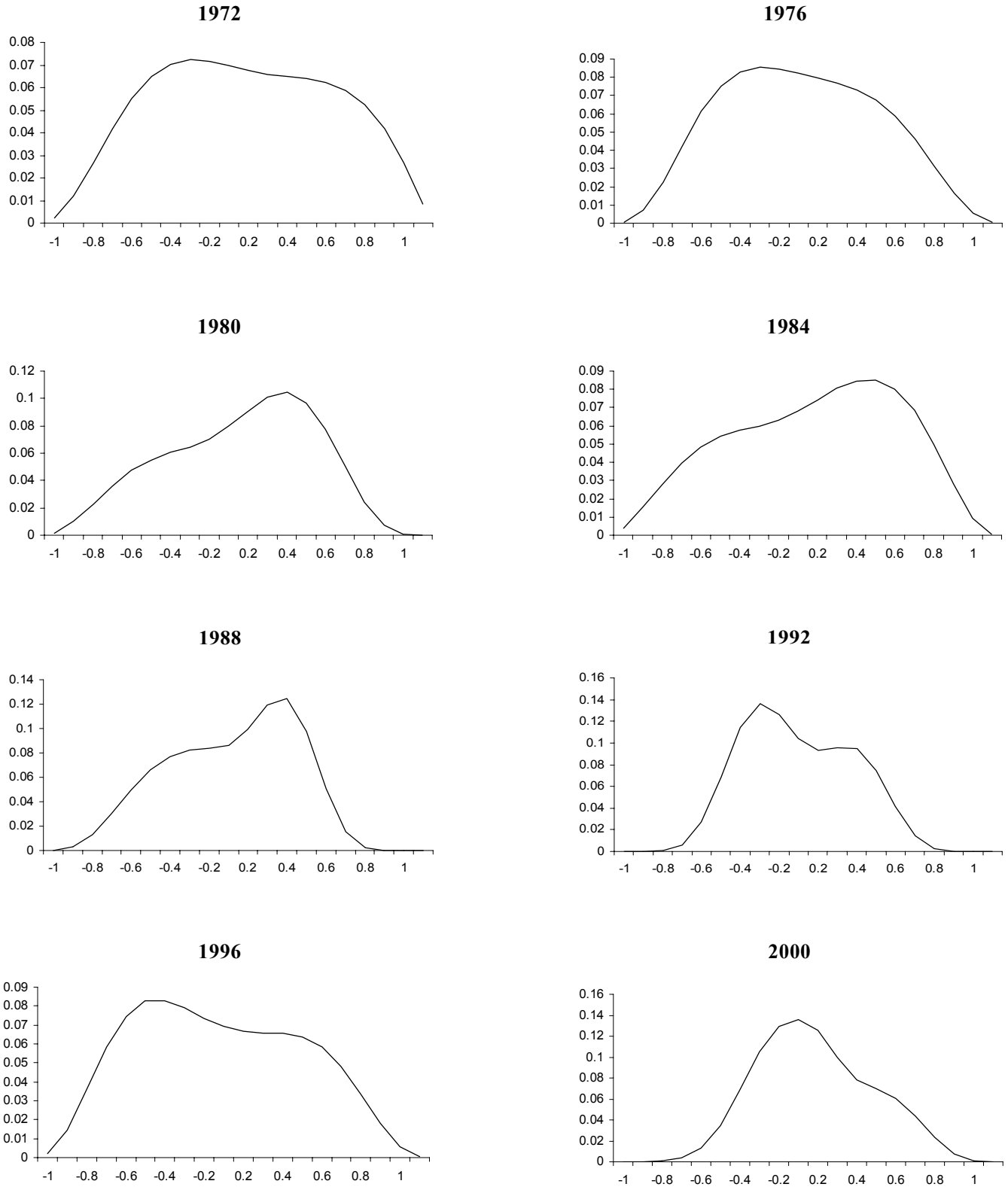

Figure 2 : Distributions of citizens' positions by party identification

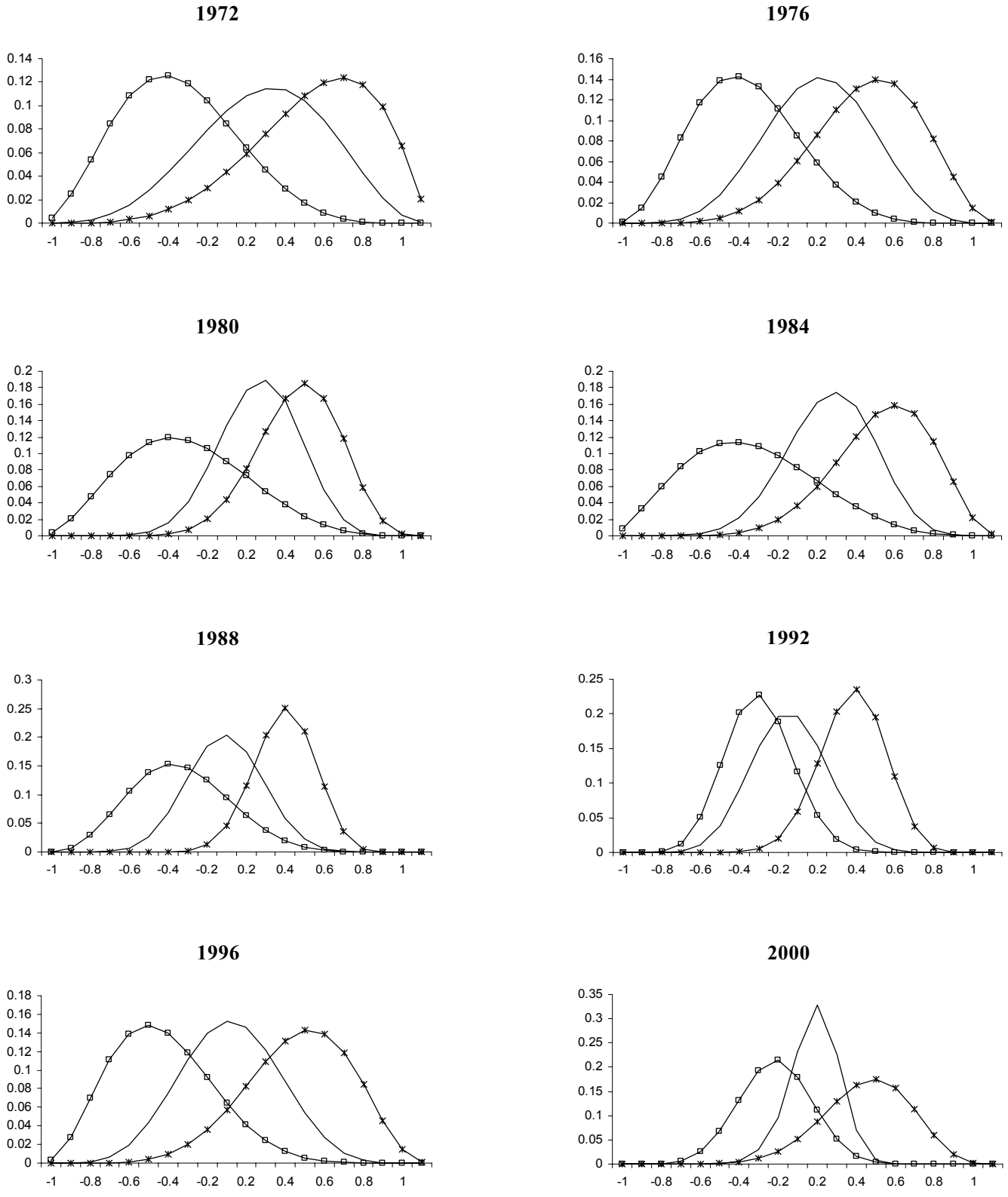

Figure 3 : Distributions of split-ticket voters