

Preference Aggregation, Representation, and Elected American Political Institutions*

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Do the elected American political institutions, namely Congress and the presidency, aggregate preferences in a manner consistent with liberal democratic ideals? This question touches on numerous theoretical debates about representation and the role of elections, and to answer it we scale observed roll call votes from the 109th and 110th Congresses, presidential support scores, and survey items asked of American voters. This exercise locates Senators, Representatives, the president, and voters in a single policy space, and with this space we show that the median American voter was very well represented by Senate and House chamber medians after the 2006 midterm elections. In contrast, the median American voter immediately prior to these elections was not well represented. This suggests that elections are instrumental in fostering what liberal democratic theory would label a fair aggregation of voter preferences. We also assess whether median voters across the fifty states are represented in Congress and whether elections within Congressional Districts fairly aggregate preferences, and we show that there are distortions in representation associated with party politics at the state and Congressional District levels.

1 Introduction

We consider a fundamental question about the elected American political institutions: do they work? By this we mean, do these institutions, namely the Congress and presidency in conjunction with the electoral rules that collectively generate Senators, Representatives, and a president, aggregate citizen preferences in a manner consistent with liberal democratic ideals?

Political institutions serve many functions beyond preference aggregation; for example, they socialize the individuals who staff them. Nonetheless, our assessment of elected American institutions focuses on preference aggregation because of the role that this concept plays in democratic theory. To be precise, the liberal view of democracy holds that individuals are the cornerstones of politics and that institutions should be designed so that they aggregate preferences in a way that is both “fair and efficient” (Miller 2002, p. 290). Evaluating a set of democratic institutions therefore necessitates studying how the institutions aggregate preferences and in particular whether the products of an aggregation process fairly reflect the inputs to it.

Any given set of democratic institutions may aggregate preferences fairly—i.e., the associated aggregation process yields an outcome that reflects an appropriately designated representative constituent—or it may fail to do so—i.e., the aggregation process leads to distortion between its outcome and a representative constituent. Thus, to discern whether the elected American political institutions fairly aggregate preferences, we must address the question, who precisely is represented by these institutions and, importantly, is this individual representative of Americans writ large? As we argue later in our discussion of Congress and to a more limited extent the presidency, a fair institutional preference aggregation process is one in which institutional output—in our case, the median member of the United States Senate and the median member of the United States House—closely corresponds to the median American voter. We argue, then, that if the median American voter is represented in Congress, elected American political institutions work.

We recognize, of course, that there are a variety of criteria that one could use to assess if a set of institutions works, i.e., do the institutions protect citizens from external threats, and we also recognize that there are many forms of representation (Pitkin 1967). Our interest here is substantive representation where a collection of citizens organized into a single constituency is said to be substantively represented by an elected official if this individual either adopts or simply acts upon policy preferences that are roughly similar to those of his or her constituents. One can also conceptualize of representation as flowing from the descriptive characteristics of elected officials, e.g., gender and race. Substantive and descriptive dimensions

of representation are not necessarily mutually exclusive (but see Epstein et al. (2007)), and we have chosen to focus on the former in light of its role in motivating the creation of democratic institutions.

We contribute to empirical literature on preference aggregation and representation by creating a preference map—in our case, a line—on which we locate key United States elected officials as well as voters. Locations in our map represent preferences in the political left-right or standard ideological spectrum, and in particular we simultaneously scale the opinions of voters and the president and the actual votes of U.S. Senators and members of the U.S. House of Representatives so that all of these individuals can be located in a single policy space. With this policy space we can characterize disparities, if they exist, between the location of the median American voter and the locations of various elected officials, say, the median Senator.

As detailed shortly, our scaling exercise allows us to draw conclusions about the proximities of voters to their representatives where proximities are defined in our policy space. In other words, scaling allows us to determine if a voter and her representative are close in an ideological sense. Previous literature on representation has not been able to assess representative-constituent proximities and has been forced to focus instead on the extent to which representatives' preferences are correlated with constituency preferences. Proximate preferences are correlated, but correlated preferences are not necessarily proximate (we provide an example of this later). Since, ultimately, evaluating the preference aggregation process in the United States process that takes voters and creates from them Congressional chamber medians requires assessing voter-legislator proximities, existing tools in the literature on representation are insufficient for our purposes.

It is important to recognize that the process of preference aggregation that connects voters to Congress contains multiple layers of aggregation: elections in individual states and Congressional Districts yield legislators and this is a form of preference aggregation; legislators combine to form state delegations and this is another aggregating step; and, finally, state delegations together staff Congressional chambers and this is the final step in the federal preference aggregation process. Thus, beyond answering our ultimate question about preference aggregation from voters to median members of Congressional chambers, we also delve into the layers of the voter-to-Congress aggregation process and assess whether median voters across the fifty states are represented in Congress; whether elections within Congressional Districts aggregate preferences; and, whether elections fix problems in representation, i.e., replace non-representative elected officials with ones who better reflect their constituents.

In brief, we show the following. First, the median Senate and House members from the 110th Congress (which came into existence in January, 2007) nicely represent the median American voter as of late 2006.

This contrasts with the lack of representation of the median American voter during the 109th Congress (January, 2005 - December, 2006). Our evidence—representation after elections but not before—suggests that elections facilitate voter representation, and we argue that Congress aggregated in a fair way the preferences of American voters as of the November, 2006 elections.

Second, and somewhat in contrast to the above, we show that both before and after the 2006 midterm elections, median state partisan voters were better represented in Congress than were median state voters. This is evident from Senators, who tend to be extreme compared to state median voters, from state-level House delegations, and from our limited Congressional District results. Thus, although the overall federal preference aggregation process works in accordance with liberal democratic ideals, the layers of this process do not function in such a clean way.

This—distortion in the layers that constitute the federal preference aggregation process but a lack of distortion at the end—is striking in light of Powell and Vanberg (2000), who argue from empirics that single-member district political systems (e.g., the United States) tend to be less representative than proportional representation systems. We suspect that what reconciles our results with those of Powell and Vanberg is the highly variegated nature of American federalism. We expand on this notion later, but for the moment it suffices to note that the implementation of federalism in the United States has produced fragmented governance with competing national, state, and county jurisdictions. One benefit of this arrangement, and we provide some evidence of this when we compare preference aggregation at the state level with preference aggregation at the national level, is that idiosyncrasies in any particular unit of government (i.e., one hypothetical Congressional District that produces a legislator who poorly represents her constituents) tend to get swamped or canceled out by the large number of competing units at the same or different levels.

In what follows, Section 2 discusses various theories of representation. Section 3 then describes how we engage our questions about preference aggregation and representation, and Section 4 presents our statistical model and describes the data we use to fit it. Section 5 contains results, and Section 6 concludes.

2 Voter Representation by Elected Officials

There are few questions as fundamental to democratic politics as those pertaining to preference aggregation, representation, and the role that citizens have (or do not have) in shaping their government. To the extent that representation is a feature of the United States polity, it presumably flows from the country's regular

elections that staff key institutional positions. Nonetheless, simply because regular elections occur does not mean that the products of these elections represent voters and that, in an aggregate sense, the average American is fairly represented in Congress or by the president.

2.1 Theoretical Literature on Representation

The standard argument as to why elected officials should be expected to represent their constituents can be found in Downs (1957); in particular Downs argues that candidate competition is sufficient to guarantee that a single-member electoral district is represented by an official who locates at the district's median voter. The literature on candidate competition, median convergence, and so forth is extensive (e.g., Calvert 1985; Wittman 1990; Alesina and Rosenthal 1996), and see Gerber and Lewis (2004) for a review. It is worth pointing out, though, that standard Downsian arguments say nothing about whether the median of a set of elected officials should represent an overall median voter.

Beyond theoretical work that is rooted in spatial voting (e.g., Enelow and Hinich 1984, 1990) and the median voter theorem (Black 1958), there are other reasons to think that elected officials should substantively represent their constituents.¹ Since elected officials are members of electorates themselves and presumably have been socialized under circumstances largely similar to those of their constituents, one might expect them to have views in common with such people (Erikson and Tedin 2001). And, elected officials may be representative of the public because they believe this to be a job responsibility (Miller and Stokes 1963).

Other theories, though, promote the virtues of a looser relationship between an electorate's aggregate preference and its representative. For example, some elected officials may regard themselves as independent trustees, tasked with forming expertise in policy areas that transcend the abilities of most members of the public. With this expertise elected officials make what they believe to be the best decisions on behalf of their electorates regardless of public opinion (Jacobs and Shapiro 2000; Canes-Wrone, Herron and Shotts 2001). There may be a middle ground wherein the extent of representation depends on the issue or the context in which an elected official finds herself. For example, on a very salient issue over which elected officials do not have private information, representatives may privilege their electorates. On a more obscure issue or on a issue where the expertise of elected officials dominates the information available to constituents, representatives may act like independent trustees (Wahlke et al. 1962). Finally, there may be a dynamic element to the relationship between representatives and constituents, e.g., representatives who have just

¹See Fairlie (1940*a,b*) for discussions of classic theories of representation.

been elected to a long term in office may be less responsive to their electorates than politicians facing an immediate and tough re-election challenge (Elling 1982).

Despite the incentives of candidate competition and what elected officials may believe about their job responsibilities, there are a variety of reasons to believe that representation of voters writ large is not a key feature of the United States. Federalism as implemented in the country divides governmental authority between national and state governments, it allocates most election-related functions to states, and consequently election laws and customs vary widely across the United States (e.g., Kimball 2003). Moreover, the contemporary campaign finance system in the United States protects incumbents from voter retribution and thus has the potential to weaken the relationship between elected officials and their constituents (Zimmerman and Rule 1998; Miller 1999). Finally, the fact that access to the ballot box is not universal (Keyssar 2000) and that certain types of voters tend to have unusually high invalid vote rates (Tomz and van Houweling 2003; Herron and Sekhon 2005) militate against representation and the liberal democratic ideal.

Thus, it is not obvious that the federal preference aggregation process in the United States—from voters in Congressional Districts, to states, and lastly to Congress—will produce fair outcomes where we define fair to mean that median constituents are represented. We draw on spatial voting theory for this characterization and note that, under suitable regularity conditions on voter preferences, the median among a set of voters is *the* representative voter. There are certainly other criteria one could propose for a fair preference aggregation, i.e., that the distribution of partisanship in Congress (i.e., the fraction of the chamber that is Democratic) matches the partisanship of the electorate (the fraction of voters who are Democratic). Nonetheless, if institutions are thought of as populated by individuals, and if individual voters are thought of as primary units, then it is natural to define fairness in terms of medians.

2.2 Empirical Evidence on Representation

Miller and Stokes (1963) were among the first to measure quantitatively the extent of congruence between United States Representatives and members of their districts. In particular, Miller and Stokes compared constituency opinions garnered from survey instruments with legislators' (as well as their opponents') opinions. They also measured the correlations between constituency opinions and legislators' roll call votes. Miller and Stokes uncovered evidence of representation more strongly on some issues (e.g., civil rights) than for others (e.g., foreign policy and social welfare) and found that election winners were more representative than election losers on matters of social welfare. Miller and Stokes have received substantial methodolog-

ical criticism on the grounds that the degree of actual correspondence between legislators and constituents cannot be correctly measured by a simple correlation coefficient (Achen 1977; Erikson 1978).

Achen (1978) revisited Miller and Stokes's analysis and investigated the extent of representation across three theoretically informed empirical measures of association: proximity (the distance between representatives and constituents), centrism (how well a representative minimizes this distance holding constant constituency opinion) variance), and responsiveness (how well a constituency's ideological leanings predict a representative's views). Achen argued that civil rights opinions were not more accurately represented than other issue dimensions and that winners were not more representative than losers in Congressional elections. In another critique of Miller and Stokes, Erikson (1978) found that, once sampling error is taken into account, the extent of representation is much greater than originally claimed.

One strand in the literature on representation focuses on correspondence (or the lack thereof) between public opinion and the policy choices made by elected officials. Accordingly, some scholars look to aggregate data to understand whether government policy outcomes can be attributed to public preferences, and there is evidence that a strong correspondence exists in this way (Stimson, MacKuen and Erikson 1995; Erikson, MacKuen and Stimson 2002) although it may be changing over time (Jacobs and Shapiro 1997; Monroe 1998; Ansolabehere, Snyder and Stewart 2001). Evidence also exists pointing to a balancing effect where too much policy in one ideological direction will move public sentiment in the opposite direction (Wlezien 1995, 1996; Erikson, MacKuen and Stimson 2002; Stimson 2004).

Within studies of representation there is movement toward comparing voters' preferences with legislator roll call voting behavior, i.e., with legislator *ideal points*. For example, Ansolabehere, Snyder and Stewart (2001) scale the roll call votes of elected representatives and compare resulting ideal point estimates to district presidential vote shares; they find evidence of representation but it is uneven and varies depending on district and election characteristics over time. And, Clinton (2006) examines the relationship between legislator roll call voting behavior and Congressional District-level measures of voter ideology; he highlights the unevenness in legislator responsiveness to constituency preferences. Ansolabehere, Snyder and Stewart (2001) and Clinton (2006) use methodologies close to ours, as we now explain.

2.3 Representation and Ideal Points

If we conceptualize legislators as having ideal points that drive their roll call voting choices, then we should think similarly about voters. The advantage of thinking about preferences in terms of ideal points is that,

under suitable conditions, ideal points can be compared in a proximate sense. That is, we can ask if two ideal points are “close to” one another and thus can inquire about distances between legislators and voters rather than focusing on correlations. If we are interested in studying how well a set of institutions aggregates preferences, and if this leads us to study whether voters are substantively represented by their representatives, we need to be able to describe measures of proximity between voters and representatives.

Ideal points, drawn from the spatial theory of voting, are best thought of as reflecting preferred policy choices in a given policy space. If one were to conceptualize the American policy space as unidimensional and aligned left to right, then each voter and elected official can be thought of as having a unidimensional ideal point such that individuals with politically left views have ideal points smaller in a numerical sense than those with politically right views. Moreover, a given individual’s ideal point describes how left or right the individual believes government policy should be.

Individual ideal points, be they from representatives or voters, are latent insofar as they inform individuals’ choices but themselves are not directly observable. Empirically speaking, scholars use observed political choices (e.g., does a given individual support or not support abortion rights?) to estimate numeric ideal points on the real line. The statistical techniques used to do this borrow heavily from psychometrics, and psychometricians commonly employ what are called *item response* models to evaluate the test-taking capabilities of individuals who have answered numerous questions (called items) on a test. Relatedly, political researchers use observed political choices (parallel to test questions) to estimate the left-right locations of legislators or voters.

Ideal point estimates can only be measured or scaled in a relative fashion. For a psychometrician who uses an item response model to estimate intelligence rankings based on the outcomes of test questions, resulting estimates of test-taking abilities show how well a given student performs *relative to* his or her peers. For political researchers, estimates of left-right ideal points based on observed political choices show how much to the left or the right an individual is *relative to* other individuals.

Poole and Rosenthal (1997) revolutionized Congressional research by using item response models to estimate the relative ideological leanings of members of Congress using roll call voting choices, and work in this vein has yielded what are called NOMINATE scores. Relatedly, Ansolabehere, Snyder and Stewart (2001) scale ideal points for members of Congress using a technique devised by Heckman and Snyder (1997) along with an adjustment recommended by Groseclose et al. (1999) to allow for intertemporal comparability; Londregan (2000) builds an agenda model into an ideal point estimation framework; and, in recent years

substantial developments have been made in the estimation of ideal points that use Bayesian statistical methods to recast parameter estimation problems into missing data problems (Jackman 2001; Martin and Quinn 2002; Clinton, Jackman and Rivers 2004; Bafumi et al. 2005). Bayesian approaches to ideal point problems have been applied in many different contexts (e.g., Martin and Quinn 2002; Clinton, Jackman and Rivers 2004; Bailey 2007; Epstein et al. 2007; Martin and Quinn 2007). To date, however, no one has estimated ideal points for elected representatives and voters in their constituencies.²

A key limitation of ideal point estimation results from the fact that, as noted above, ideal points are only defined relatively. If, say, one has a set of ideal point estimates for members of the Senate and a set for members of the United States House, then these two sets of ideal points will not in general be comparable. When two sets of ideal points are not comparable, it is said that they do not reside in a common policy space. To address our motivating questions about preference aggregation and representation we need ideal point estimates for both elected officials and voters and, importantly, we need these ideal points to reside in a common policy space. We now describe the data that we use to scale or locate in a common policy space the president, Senators, Representatives, and a nationally representative collection of voters.

3 Data Requirements for Ideal Point Estimation

Ideal point estimation typically draws on responses to individual-level, binary choices. A binary choice is one that has two possible outcomes, often but not necessarily “yes” and “no.” Roll call votes fit this paradigm—if voting, a legislator can either vote in favor of a bill or against it—and survey questions can be binary as well if phrased in an appropriate way. Thus, to estimate legislator, presidential, and voter ideal points in a comparable way, we draw on three linked datasets, each of which contributes binary choices for different group of individuals.³

3.1 Binary Choices for Members of Congress

For members of the House and Senate, our set of binary choices consists of all recorded roll call votes cast during the 109th Congress (2005-2006) and all roll calls from the 110th Congress up through the end April, 2007.⁴ These roll call votes form the basis of the well-known NOMINATE scores for members of Congress.

²One attempt is Burden (2004), who proposes a method that links legislators and voters via observed election results.

³Scaling is not restricted to binary choices. See Treier and Jackman (2007) for example.

⁴Congressional roll call records were compiled by Keith Poole and Jeffrey Lewis. See <http://www.voteview.com> and <http://adric.sscnet.ucla.edu/rollcall>. Our final 110th Congress vote in the House took place on April 20, 2007

Some Congressional roll call votes are procedural (e.g., cloture votes in the Senate) and others are up-or-down votes on pieces of legislation. Furthermore, some recoded Congressional votes are on conference committee reports that, by construction, are voted on in both the House and the Senate. Because a conference committee vote is identical in both the House and the Senate, such votes allow us to link the ideal point estimates of Senators and Representatives. Intuitively speaking, a conference vote is like a test question that appears on two tests, one taken by members of the Senate and one by members of the House. The existence of conference votes allows us to scale Senators and House members relative to one another. Beyond conference votes, we treat all other Congressional roll calls as being unique to a given chamber.

In total there were 1210 recorded roll call votes in the 109th House; 645 votes in the 109th Senate; 244 usable (i.e., up through April, 2007) votes in the 110th House; and 135 such votes in the 110th Senate.⁵ We treat 14 conference votes from the 109th House and Senate as identical in both chambers, and there were no conference bills in the 110th Congress among the roll calls we analyze.⁶

3.2 Binary Choices for the President

Although the president is not a member of Congress and therefore does not vote on legislation or on procedural matters, *Congressional Quarterly* collects presidential positions on pieces of proposed legislation. As Poole and others have done, we treat these presidential positions as “votes” when they exist. This allows us to estimate the ideal point of President George W. Bush and, importantly, to locate Bush’s ideal point in the same policy space as that which contains the ideal points of members of Congress.

That the president during the 109th Congress took positions on legislation in both the Senate and the House means that George W. Bush helps link the ideal point estimates of Senators and Representatives. In the 109th Senate, *Congressional Quarterly* determined that the president took positions on 115 roll calls, approximately 18% of the recorded votes in the chamber. In the 109th House this figure is 86, approximately 7% of recorded votes. We do not use presidential positions for any of the votes in the 110th Congress.

and the final Senate vote on April 19, 2007.

⁵These numbers include unanimous or almost unanimous votes that shed little or no light on underlying preferences.

⁶The 109th Congress conference votes we used to link the 109th House and 109th Senate covered House Resolutions (HR) 3, 6, 1268, 2361, 2419, 2744, 2862, 2863, 2985, 3057, 4297, 4939, and 5631 and House Concurrent Resolution (HCR) 95. We isolated conference bills by searching for the word “conference” in the bills’ titles

3.3 Binary Choices for Voters

To estimate the ideal points of American voters, we use survey responses to questions posed by the Cooperative Congressional Election Study (CCES). The CCES was an Internet survey asked of over 33,000 individuals, it focused on representation and electoral competition, and it involved researchers from thirty-three institutions who contributed questions to be asked of CCES respondents.⁷ Each CCES participating institution was assigned an individual pool of respondents, and each pool was asked a set of institution-specific questions. Furthermore, all CCES respondents were asked a set of common questions, what in CCES parlance is called the “common content.” The CCES dataset used here is based on respondents from three different pools, those of Dartmouth College, Massachusetts Institute of Technology (MIT), and University of California, San Diego (UCSD).

For our CCES respondents—meaning respondents from the Dartmouth, MIT, and UCSD pools—we draw on questions from both the common content as well as institution-specific questions that we expect to be informed by respondents liberal (left) or conservative (right) predilections. The CCES questions that we consider dealt with a variety of issues including respondent self-reported positions on stem cell research, the minimum wage, the appropriate use of the United States military, immigration, and so forth.

The key to our use of the CCES is as follows. The Dartmouth and MIT institution-specific pools asked CCES respondents to take positions on roll call votes as if they were members of Congress; by design, some of these roll call votes took place in the Senate and some in the House. Moreover, the CCES common content included several questions that were based on actual roll calls from the 109th Congress.⁸ We treat CCES respondent positions on so-called roll call questions as if they were actual votes. And, we treat responses to CCES questions not linked to Congressional roll call votes as CCES-only votes, i.e., as votes that took place in a chamber that consists of CCES respondents only. CCES roll call questions allow us to link survey respondents and representatives while CCES-only questions give us more information on which to scale respondents.⁹

For example, CCES respondents were asked in the common content whether they thought it was reasonable for the United States military to be used to ensure an adequate supply of oil. CCES respondents either said it was reasonable or it was not, and we treat each respondent’s self-reported position on this military question as if it corresponded to a vote. There was not a corresponding Congressional roll call on the matter

⁷For more information on the CCES, see <http://web.mit.edu/polisci/port1/cces/index.html>.

⁸Beyond those in the common content, questions asked of the UCSD sample were not based on legislative roll calls.

⁹Each CCES respondent is assumed to have abstained on any question that he or she chose not to answer or never faced.

of using the United States military to ensure an oil supply, and thus the oil supply question can be thought of as a CCES-only vote just as many votes in the 109th House were House-only votes and many votes in the 109th Senate were Senate-only votes.

Whenever possible the order of our CCES roll call questions was randomized. This is most relevant to the Dartmouth pool which contained the majority of the CCES roll call questions; the order of the Dartmouth questions was always randomized. Furthermore, whenever possible the order of the “favor” or “oppose” response to roll call questions was randomized; “don’t know” was maintained as a third category.¹⁰

Our CCES respondents were also asked a variety of vote choice questions for state-level elections (e.g., gubernatorial races), and where possible we draw on these questions as well. For example, our New York CCES respondents were asked about the 2006 gubernatorial race in their state; this race featured Democrat Eliot Spitzer versus Republican John Faso, among other candidates. We treat a New York respondent’s position on the Spitzer-Faso race as a vote just as we treat the respondent’s position on stem cell research as a vote. CCES respondents outside of New York were not offered the chance to voice an opinion on the New York gubernatorial race, and a similar comment applies to gubernatorial and Senatorial races from across the fifty states. For a complete list of CCES questions used in this study see Appendix A.

The CCES was given to non-voters as well as voters and in theory this could allow us to distinguish ideal points of American voters and ideal points of American non-voters. Nonetheless, for sampling reasons discussed in Appendix B, we focus here on voters only. To the extent that CCES coverage of non-voters improves in the future, the research design described here will foster comparisons of voters and non-voters. This is an important issue because one might want to assess the elected American institutions by checking if they aggregate the preferences of Americans as opposed to the preferences of American voters. Initially, we believe, the latter is more important because voters are participants in the institution-generating process while non-voters are not.

3.4 Bridging Institutions

As implied by the discussion above, the key to our research design is bridging institutions and voters in a way that allows common space ideal point estimates to be generated. We invoke the word “bridging” as used by Bailey (2007), who compares ideal points of the president, Senators, Representatives, and Supreme Court Justices. Bailey scales the votes and positions of these actors using among other things items that

¹⁰The order of the roll call questions in the common content was not randomized.

cross institutions, i.e., Congressional legislation that incorporates a position on a Supreme Court case. This parallels our use of CCES roll call question, and Table 1 summarizes how we bridge institutions and voters.

Table 1: Bridging Institutions and Voters

First Institution	Second Institution	Method
House	Senate	Conference roll calls
Congress	President	Presidential position taking
Congress	Voters	CCES roll call questions
President	Voters	CCES roll call questions

Beyond the methods detailed in the table, the CCES provides several additional opportunities for bridging. For example, on the common content CCES respondents were asked if overall they supported or did not support the policies of President George W. Bush. We assume that Bush supports himself, and Bush approval then bridges voters and the president.¹¹

4 Statistical Model

We combine observed Congressional roll calls, president positions, and CCES respondent votes, and this yields a set of 2,008 unique votes—here we use the word “votes” as shorthand for actual roll call votes, roll call questions, presidential positions, and so forth. The median CCES respondents votes on approximately 31 of these (sample mean of approximately 33) with an inter-quartile range of 25 to 43. In theory, a single vote could be voted on by all members of Congress, the president, and all CCES respondents. In practice, though, this does not happen: most of our votes are institution specific and voted on by either Senators, Representatives, or CCES respondents. The total number of votes in our dataset is 838,963.

We estimate a one-dimensional, Bayesian item response model based on the following formulation:

$$\Pr(y_{ij} = 1) = \text{logit}^{-1}(\alpha_i + \beta_i \theta_j) \quad (1)$$

where $y_{ij} \in \{0, 1\}$ denotes individual j 's choice on issue i ; α_i is the so-called difficulty parameter for issue i ; β_i is the so-called discrimination parameter for issue i ; and θ_j is individual j 's ideal point. By issue i we mean here roll call i or CCES survey question i (or both, if the CCES survey question asked respondents to take positions on a Congressional roll call). A roll call i could be a House-only vote, a Senate-only vote, a House-Senate conference vote, a House vote on which CCES respondents took positions,

¹¹Technically speaking, the CCES Bush approval question offered a four-point response. This is discussed in Appendix A.

a CCES question on which we have no House or Senate responses, and so forth. An individual j could be a Senator, a Representative, President George W. Bush, or a CCES respondent. We assume that ideal points are unidimensional, i.e., θ_j is a scalar. As reviewed in Levendusky, Pope and Jackman (2007), this type of unidimensionality is a standard assumption in both theoretical and empirical studies of presidential elections, Congressional elections, and studies of Congress.

There are three parameters in equation (1). The ideal point θ_j for individual j reveals the liberalness or conservativeness of an actor. Without loss of generality we orient our θ_j values so that relatively small values are associated with politically left preferences and relatively large values with politically right preferences. The discrimination parameter β_i reveals how well an item (e.g., a House roll call vote) discriminates between liberals and conservatives. The intuition behind β_i is as follows. If for a given vote i we have $\beta_i = 0$, then the probability that individual j votes in favor of issue i is not a function of j 's ideal point θ_j , i.e., $\beta_i = 0$ implies that ideology does not discriminate for issue i . If, though, $\beta_i > 0$, then larger ideal points (i.e., more conservative preferences) lead to greater probabilities of support on issue i for individuals with ideal points greater than zero. A similar statement applies when $\beta_i < 0$. The difficulty parameter on issue i , α_i , reveals the ideal point at which a legislator would be indifferent toward favoring or opposing the legislation.

The complete Bayesian item response model yields a posterior that is the product of a standard logit model likelihood—the likelihood is itself a product of probabilities based on all issues i over all individuals j —multiplied by a series of prior densities. We estimate our model using Martin and Quinn's MCMCpack function in the R statistical computing environment.¹² A handful of survey question asked of CCES respondents have more than two possible responses, and these items are collapsed to be dichotomous. See Appendix A for details.

Ideal points lack an absolute alignment, and we resolve such a reflection problem in two ways. First, we fix the ideal points of Senators Kennedy (a liberal from Massachusetts who was in the 109th and 110th Congress) and Santorum (a conservative from Pennsylvania who was in the 109th Congress only) to be -1.5 and 1.5, respectively. Second, we constrain selected Senators, Representatives, and CCES respondents to have positive or negative ideal points. These constraints ensure that our policy space is correctly oriented. Selected Senators and Representatives were chosen based on conventional wisdom about American politics and selected voters based on their responses to key CCES items.¹³

¹²See <http://mcmcpack.wustl.edu>.

¹³Our negative ideal point Senators are Boxer, Durbin, Feinstein, Kerry, and O'bama; positive ideal point Senators are Chambliss, Hatch, McCain, and Sununu. Negative ideal point Representatives are Conyers, Delahunt, Delauro, Dingell, Frank, Kucinich,

With respect to members of Congress, in accordance with Poole (2003) we assume that all legislators who were members of both the 109th and 110th Congresses had identical ideal points during the two sessions. This identifying assumption allows us to place the ideal points of new Congressional legislators (i.e., members of the 110th Congress who were not in office during the 109th Congress) in the policy space that contains CCES respondents, President Bush, and members of the 109th Congress.¹⁴ Finally, normal priors are assigned to ideal points, and multivariate normal, diffuse priors are assigned to difficulty and discrimination parameters.

We noted earlier that scholarship on representation often assesses correlations between voter and legislator preferences (e.g., Clinton 2006), and we argued that correlations between such preferences cannot tell us about whether institutions fairly aggregate preferences. Now that we have made explicit our model and notation, it is easy to see why this is the case. Consider the following hypothetical. Suppose that a given representative (call her R) reacts to her constituency (the median of which we call C) in a manner that seems normatively pleasing based on the tenets of liberal democratic theory, i.e., when the constituency becomes more liberal (θ_C gets smaller), the representative becomes more liberal as well (θ_R gets smaller). We and others who work on studies of representation would say in this scenario that the hypothetical representative and her constituents have highly correlated preferences. Does this imply that the representative is proximate to her constituency, i.e., that $\theta_C \approx \theta_R$? No. A representative's behavior can be perfectly correlated with her constituency's in the way described above even if the representative is non-representative in a proximate sense. Suppose, for example, that $\theta_R = \theta_C + 2$.

Proximate preferences are correlated preferences, but the latter are not necessarily the former. Since we ultimately care about whether voter preferences are "close to" representative preferences, correlation-based measures are not sufficient for our research objective. We need, therefore, ideal point estimates for both voters and elected officials.

Larson, Rangel, Schakowsky, and Waters; and, our positive ideal point Representatives are Bass, Blunt, Cole, Delay, Hastert, Inglis, Lahood, Sessions, and Shimkus. Negative and positive CCES respondents were chosen based on consistently liberal or conservative responses on ideological, party identification, presidential approval, Iraq war, and abortion positions.

¹⁴Because of a redistricting dispute which was eventually settled by the United States Supreme Court, we allow each member of the Georgia delegation to the U.S. House to have a new ideal point in the 110th Congress regardless of whether the individual was a new legislator as of January, 2007.

5 Results

The end product of estimating our Bayesian item response model is, among other things, a collection of distributions for the various ideal points that we care about. For instance, our model produces 500 draws from the posterior distribution of the ideal point of Senator Jim Webb, the elected Democratic Senator from Virginia who in November, 2006 defeated incumbent Republican Senator George Allen in a very tight and hotly contested race. The average of the 500 draws from the Webb posterior distribution is -0.428 , and this number represents our estimate of Webb's ideal point. A 95% credible interval for Webb's ideal point is $(-0.636, -0.208)$, and one can get a sense of the consequence of Webb's defeating Allen by examining Allen's estimated ideal point. This latter estimate is 1.52 with a 95% credible interval of $(1.38, 1.69)$. This large change—a 95% credible interval for the change is $(1.66, 2.25)$ and note that the interval does not include zero—reflects the replacement of a Republican Senator by a Democrat. Our item response model allows us to estimate the marginal posterior distribution of the ideal point of our institutional actors (e.g., all members of Congress) and our voters as well as the posterior distribution of various functions of these actors' ideal points (i.e., the median American voter or the median Senator).

5.1 Some Consistency Checks on Voter Ideal Point Estimates

Before discussing results, however, we consider a set of internal consistency checks on our data and the results of estimating our Bayesian statistical model. Insofar as the CCES is an Internet-based survey and is a relatively new contributor to political research, these checks constitute useful evidence that the survey results on which our results are based should be considered compelling.

5.1.1 Systematic Answers to Roll Call Questions

Our key roll call questions tend to be rather complicated, and we need to ensure among other things that CCES respondent answers to these questions are systematically generated as opposed to being dominated by noise or some other factor. To check for this, we estimated for each of our roll call questions a logistic regression model where support for a roll call was regressed against indicator variables for party identification and ideological self-placement. In all cases we found very strong and intuitive results (a complete set of results is available from the authors). For example, on the Patriot Act roll call question, CCES respondents who identified as Democrats were, *ceteris paribus*, unlikely to support the renewal of the Patriot

Act. Self-reported Republicans, *ceteris paribus*, had the opposite reaction. Similarly, CCES respondents who self-identified as liberals were disproportionately unlikely to support the Patriot Act, and self-reported conservatives were disproportionately likely to support it. We would not have uncovered results like these if CCES respondents had randomly chosen their roll call question answers; if respondents had consistently picked “favor” or “oppose” for reasons having nothing to do with policy preferences; or if they always voted in line with their own Senators and/or Representatives. We can thus say with very strong confidence that on our roll call questions, CCES respondents acted in a way that was consistent with their self-reported ideological positions.

5.1.2 Correlations between Estimated Ideal Points and Related Variables

Second, we calculated the correlation between the estimated ideal points of our CCES respondents and a seven point party identification measure from the common content; for the latter each CCES respondent was asked to rate himself or herself as a strong Democrat, weak Democrat, Democratic leaner, independent, Republican leaner, weak Republican, or strong Republican. The correlation between our estimated ideal points and the seven-point party identification variable was approximately 0.768. Similarly, we calculated the correlation between estimated CCES respondent ideal points and a five point ideology measure from the common content—this latter measure asked CCES respondents to rate their preferences as either “Very liberal,” “Liberal,” “Moderate,” “Conservative,” or “Very Conservative.” The correlation between estimated ideal points and five point ideology was approximately 0.747. These high numbers indicate that our scaling exercise is generating results that are consistent with other CCES respondent features. One might thus ask, if this is true, why is there a need to scale CCES respondents in the first place? The answer is to generate a common policy space for voters, legislators, and the president. We do not have seven point party identification responses for members of Congress, nor do we know their ideological self-placements, and thus we cannot compare seven point party identification levels of voters to corresponding responses from members of Congress.¹⁵

¹⁵Clinton (2006) faces the same dilemma. He resolves it by examining correlations between district-level measures of ideology and legislator ideal points. This practice allows Clinton to assess whether legislators react to constituency preferences, but it does not allow him to assess proximities between legislators and constituents.

5.1.3 Correlation between State Median Ideal Point and Bush 2004 Vote Share

Third, we calculated the correlation between George W. Bush's two-party vote share in the 2004 presidential election and the ideal point of the median voter in each state. If our ideal points are indeed capturing the political preferences of voters and if these preferences map into actual choices like observed votes made in a real election, then we should expect to see a positive correlation between observed Bush vote share at the state level and a state's median voter. The correlation between these two variables is approximately 0.538. Moreover, if we calculate this correlation when restricting our attention to the states that had at least 40 CCES respondents—we restrict our attention in this way because these states presumably have more accurate median voter estimates than some of our states with only a few CCES respondents—then the correlation between Bush two-party vote share and the ideal point of a state's median voter rises to approximately 0.758. Both of these numbers, particularly the latter, suggest that CCES respondents are providing meaningful answers to our questions, that their answers correspond to actual behaviors, and that our scaling model is capturing these answers in a compelling way.

5.2 Congress, the President, and Voters

Figure 1 shows the distribution of ideal points for voters, Senators (109th and 110th Congresses), Representatives (109th and 110th Congresses), and the president. All results from this point onward that in any way involve voters are weighted as described in Appendix B.

There are two Senate distributions in Figure 1 (they are purple, dotted for the 109th Senate and solid for the 110th) and two House distributions (green, dotted for 109th and solid for 110th). The voter preference distribution is solid grey, and various medians are noted in the figure as well. Throughout this section we use purple to denote the Senate and green the House, and when relevant we use dotted lines for chambers in the 109th Congress and solid lines for the 110th.

All five of the pictured distributions in Figure 1 are bimodal, and this highlights the ideological divide present in contemporary American politics. In particular, the figure shows that in November, 2006 there were more liberals than conservatives and that there is less variability in the ideological leanings of voters compared to their elected leaders. The liberal bias in the electorate may reflect the strong anti-Republican sentiments that were held among many Americans in November, 2006 because of the increasingly unpopular Iraq War, the numerous scandals then facing Republicans, and/or the electorate's tendency toward policy

balancing. Either way, we take voter preferences as fixed; what determines them is beyond our scope.

*** Figure 1 about here ***

Figure 1 also labels the ideal points of the median American voter, the median Senator in the 109th and 110th Congresses, the median House member in each session, and, as already noted, President George W. Bush. The locations of these ideal points imply the following. First, prior to the November, 2006 elections the median Senator and House member were not representative of the median American voter. This follows from the fact that the ideal points labeled “S109” and “H109” were far to the right of the median American voter. Second, after the November, 2006 elections the Senate and House medians moved much closer to the median American voter. As pictured the Senate and House medians fall on either side of the median American voter. The changes between 109 and 110 chamber ideal points are statistically significant (details available from the authors), and this highlights an election-induced change in the composition of Congress.

Recall that the CCES was administered to respondents around the fall of 2006. And, recall that the 109th Congress was elected (essentially all of the House and approximately two-thirds of the Senate) in November, 2004. This sequence of events suggests that chamber medians from the 109th Congress were not synchronized with the median American voter on account of policy-related developments and information that came to light between January, 2005 and January, 2007. Such information could induce preference changes in the median American voter, but Senate and House medians would not adjust if, as we assume based on extant literature, Senator and Representative preferences do not vary temporally. With a new election, though, Congress was recalibrated due to replacement. The turnover rate between the 109th and 110th Congresses was approximately 10% in each chamber.¹⁶

5.2.1 Voter Bimodality

The bimodality of the voter ideal point distribution in Figure 1 is worth considering in depth, particularly in light of Fiorina (2006). It raises two related concerns about the CCES. First, is the CCES sample itself reliable? Second, and if so, is the bimodality in Figure 1 an accurate depiction of the true state of the current American electorate as of November, 2006 or is it better explained by measurement error?

With respect to the sample itself, Abramowitz (2007) shows that the complete set of CCES respondents

¹⁶It is natural to ask whether the gaps between 110th Congress chamber medians and the median American voter are large. They are certainly small compared to corresponding gaps from the 109th Congress, but at this time we cannot place the 110th Congress gaps in comparative perspective. As the research program on which our results are derived continues to develop (and, in particular, covers a larger set of elections), we will be able to address this issue in detail.

is very similar to the National Election Poll (NEP) sample of voters from November, 2006. There are, not surprisingly, some differences in the distribution of age and education across the CCES and NEP, but there is nothing sufficiently dramatic to suggest that the CCES sample is idiosyncratic in a troubling way. Abramowitz also compares the CCES to the 2004 National Election Study (NES), and he notes a number of similarities, e.g., that the correlations between party identification and ideological identification were very close across the two studies. Similarly, Jacobson (2007) compares the CCES to a telephone study conducted at by the Center for Survey Research at Indiana University; to the 2006 NEP; and, to a 2006 pilot survey conducted by the NES.¹⁷ Jacobson notes that the CCES overrepresents voters (this is why, as noted earlier, we do not estimate the ideal point of the median American non-voter), but, importantly, he finds very similar results for his analyses of vote choice and political preferences regardless of which of the four studies he relies on. Overall, then, outside of its overrepresentation of voters, there is no evidence that the CCES sample is problematic, and there is a wealth of evidence that the sample is highly similar to other survey samples.

With an apparently reliable sample, there are two natural explanations for the electorate's bimodal density curve. One is that the bimodality is an artifact of particular questions used in the CCES, and the second is that the bimodality is accurate and reflects a highly polarized electorate. Insofar as Jacobson finds evidence of the latter using CCES data and using the three surveys mentioned above, the claim that particular CCES questions are responsible for the bimodality in Figure 1 is not compelling. Furthermore, if it is true that the bimodality is an accurate depiction of true voter preferences, then we should be able to find variance in the degree of voter bimodality that is correlated with political extremism.

Consider, therefore, Figure 2, which describes three distributions of voter ideal points: the distribution of all voter ideal points (grey, as in the previous figure), the distribution of ideal points for voters who reported donating money to a candidate or party during the 2006 midterm elections (orange), and the distribution of ideal points for voters who reported not donating money (brown). What is clear from Figure 2 is that the donator ideal point distribution is more bimodal than the non-donator distribution. In particular, the two ideal point modes in the orange density are more extreme than the modes for voters which are in turn more extreme than the modes for non-donators. Relatedly, among the three distributions in Figure 2 the distribution with the greatest mass in the middle is the non-donator distribution.

¹⁷A complete 2006 NES does not exist. As reported by Jacobson (2007), the 2006 pilot survey interviewed 675 of 1,211 respondents from the 2004 NES. See www.electionstudies.org for details.

*** Figure 2 about here ***

Figure 2 indicates that a voter's degree of participation in politics as proxied for by donating to a political cause is correlated with his or her level of preference extremism. This is precisely what we would expect to see if the ideal point bimodality in Figure 1 were an accurate representation of true voter preferences.

Moreover, although the present study considers voters only, Abramowitz (2007) uses CCES data to study both voters and non-voters, and Abramowitz's scaling of issues for non-voters shows a unimodal distribution for them. These non-voters faced the same CCES survey questions as voters, of course, so the natural explanation for Abramowitz's finding is that voters tend to have more extreme preferences than non-voters. This piece of evidence in conjunction with the variance in bimodality for donators versus non-donators suggests that the explanation for the voter ideal point bimodality in Figure 1 is simply that, in the period surrounding the 2006 midterm elections, American voters were highly polarized and that, the more engaged a voter, the more polarized he or she tended to be. Since we study voters only, it is not surprising that we have uncovered a bimodal preference distribution.

Finally, consider the distribution of CCES responses to a seven-point party identification question that appeared on the CCES common content. In the seven point party identification question, each CCES respondent was asked to identify himself or herself as either a strong Democrat, weak Democrat, Democratic leaner, independent, Republican leaner, weak Republican, or strong Republican.¹⁸ The distribution of answers to this party identification question is clearly bimodal. See Figure 3.

*** Figure 3 about here ***

5.3 Congressional Districts

We have shown that the 2006 midterm elections improved representation for the median American voter. Is it also true that median voters in Congressional Districts were better represented after these elections? Our CCES data is not sufficiently numerous to allow us to estimate Congressional District medians. If, as we do below in our analysis of states, we were to rely on a standard of requiring at least 40 voters per district, this would necessitate a survey of at least 17,400. While the CCES is that large in total, our portion of the CCES that contained roll call questions is not.

Nonetheless, we can analyze for our sample of CCES voters the average distance between a voter and

¹⁸CCES respondents were given the opportunity to answer "Not Sure" to the party identification question, but only 31 respondents did so out of the 6134 respondents who were asked this question.

his or her representative in Congress. And, given that we have weights based on state characteristics that are normalized for state size, we can calculate average weighted distances between voters and their representatives for both the 109th and 110th Congresses. See Table 2 for results.

Table 2: Disparities between Representatives and Voters

Measure of Disparity	Congress	Value
Average Distance, Representative to Voter	109	-0.243
	110	-0.109
Average Absolute Distance, Representative to Voter	109	1.23
	110	1.23

Turning first to the top two rows of Table 2, we see that the average distance between representative and voter—where distance is defined as voter ideal point minus representative ideal point—decreased between the 109th and 110th Congresses. The average distance was negative in both Congresses, meaning that representatives were on average too politically conservative compared to their constituents, but it decreased in magnitude for the 110th. Thus, as of the inception of the 110th House, representatives were less excessively conservative after the 2006 midterm elections. This constitutes Congressional District-based evidence of an increase in representation that parallels our findings on the median American voter.

However, note that absolute differences between voters and their representatives did not decline between the 109th and 110th Congresses. This is evident in the bottom two rows of Table 2. The implication here is that the newly elected representatives in the 110th House leapfrogged over their constituents, so to speak, and ended up on average as excessively liberal relative to their constituents as their antecedents were excessively conservative. This suggests that contested House elections tend to feature two candidates equidistant from a district median as opposed to say, one extreme candidate and a challenger who adopts a median position.

This is an important point in light of American federalism. We see here that representation within Congressional Districts is systematically distorted insofar as competition between extreme candidates will not yield median outcomes. This distortion, though, is not sufficient so as to cause distortion at the level of the median member of Senate and House. We will return to this theme later after highlighting distortions in representation within individual states.

5.4 Congress and Voters in the States

States have a prominent role within American federalism. This is a result of, among other things, the Electoral College, the fact that each state sends two Senators to Congress regardless of state population, and the Tenth Amendment.

Moreover, states lie between preference aggregation at the Congressional District level and the Congressional chamber level. We have already seen evidence of distortion between voters and representatives within the former, and we now explore the preference aggregation process through the lens of states. We note that on account of districting there is no reason to expect that a state's median voter is represented by the median member of the state's House delegation. However, this does not apply to Senators who have entire states as constituencies.

*** Figure 4 about here ***

Our initial evidence of the relationship between voters and member of Congress, Senators in particular, is in Figure 4. This figure depicts the absolute gap between the two Senators in a state during the 110th Congress and the absolute gap between the state's median Republican and Democratic voters. As the figure makes clear, the greater the partisan gap for voters, the greater the Senator gap; this relationship (see the dashed regression lines in Figure 4) is statistically significant. Moreover, the relationship is different for states that have Senators from the same party compared to states with Senators from different parties; that is to say, the regression lines in Figure 4 have significantly different intercepts. We cannot explain why it is that some states have two senators from the same party and others do not, but we can say with confidence that Senators tend to track median partisan voters and that, the greater the separation in the latter, the greater the Senator separation.¹⁹ Our results are consistent with Gerber and Lewis's (2004) findings on legislators in Los Angeles County: the more heterogeneous a state as proxied for by the Democrat-Republican partisan gap, the greater the difference between resulting Senators. This suggests, as in Gerber and Lewis, that Senators are most representative in relatively homogeneous states.

Figures 5 and 6 show the ideal points of the median voter (denoted "M") for each state with at least 40 respondents. This restriction yields 36 states, and here we ignore smaller states because estimates from them are too unreliable. We see that states traditionally regarded as politically conservative (e.g., Indiana,

¹⁹We conjecture that states with greater differences between median partisan voters are disproportionately likely to have Senators of different parties. For the 110th Congress, the average absolute partisan difference of states with same-party Senators is 1.52 and those with different party Senators, 1.64. This ranking is consistent with our conjecture, but the sample size is too small to say anything definitive.

Mississippi, and Utah) have median voters far to the right. While the median voter seems a bit far to the left in several states (e.g., Colorado and Kentucky), in most instances left-leaning median voters are found in states traditionally regarded as liberal (e.g., Massachusetts, Minnesota, and Washington). Figures 5 and 6 also show the ideal points of each state's partisans (denoted "R" and "D" for Republicans and Democrats, respectively); the ideal points of each state's Senators (red open circles for Republicans and blue open circles for Democrats), and Democratic, Republican, and combined median house delegates (blue, red, and green closed circles, respectively) in the 109th and 110th Congresses.

Figures 5 and 6 show that within individual states there is little evidence of convergence to median voters among elected officials in the 109th Congress. In particular, the figure show that each state's Senators and median Democratic and Republican House delegates are far to the left and right, respectively, of the state's median voter. Indeed, it is rare to find a median House delegation (a solid green circle) proximate to a state's median voter. However, Democratic and Republican median partisan voters tend to be represented reasonably well by the Republican or Democratic median House delegates in their states. On the whole, median Republican House delegates are just to the right of median Republican voters and approximately half the time median Democratic House delegates are just to the left of median Democratic voters in the 109th congress.

*** Figures 5 and 6 about here ***

Clear shifts from the 109th (Figure 5) to the 110th (Figure 6) Congress are evident for the Senate seats that changed hands from Republican to Democratic (including Missouri, Ohio, Pennsylvania and Virginia—the two other states where such changes occurred, Montana and Rhode Island, are not pictured due to a paucity of CCES respondents). The somewhat more subtle changes in median House delegations are shown in Figure 7. In this latter figure, when a delegation moved insubstantially or not at all, a darkened dot represents the median Republican or Democratic delegate in the 109th and 110th Congresses. Where changes are substantial, an arrow points from the 109th Congress median Republican or Democratic ideal point to the corresponding ideal point for the 110th Congress.

*** Figure 7 about here ***

Figure 7 shows that, on average, Democratic and Republican House delegations became more conservative in the 110th Congress. Of the 18 states whose Democratic delegations underwent substantial ideological change, 13 moved in a more conservative direction and only five became more liberal. Similarly, 16 of the 20 Republican delegations that shifted moved in a conservative direction. Why would delegations move

rightward after an election with a strong pro-Democratic tide? Consider that many of the Republicans who lost re-election battles and many of the Democrats who won seats were moderates from swing districts. That is, moderates were removed from the Republican delegations, shifting these delegations rightward, while moderates were added to the Democratic delegations, shifting them in this same direction. This left Republican partisans less well represented while many Democratic partisans benefited.

Does this mean that, overall, the House moved in a conservative direction after the 2006 midterm elections? No. Figure 8 replaces the medians of Republican or Democratic House delegations with medians of entire delegations. Again, arrows from one (green) circle to another represent a change (if any) in the median ideal point of a state's House delegation from the 109th to the 110th Congress. Darkened dots represent delegations with little or no change. Of the states that moved, all but one delegation moved in a liberal direction. The exception—Michigan—experienced very little change. Thus, in about half of the American states analyzed here, the 2006 midterm election succeeded in narrowing the ideological proximity between House delegations and median Democratic voters, and in several states, Arizona, Colorado, Iowa, Kansas, and Minnesota, the House delegation moved to a position held by the median voter.²⁰

*** Figure 8 about here ***

One implication of these delegation shifts is that, put simply, parties matter. There remains a simmering debate among Congressional scholars over the extent to which parties in legislators exert agenda control and induce non-median outcomes (e.g., Cox and McCubbins 1993; Krehbiel 1998; Jenkins 1999; Herron and Wiseman 2007). With respect to representation at the state level, it is clear that this debate does not have much traction. Districting notwithstanding, Republican and Democratic partisans are better represented by Republican and Democratic House delegations than the median voter is represented by the median House delegate across states. A similar statement applies to Senators.

Figure 9 reveals more about the importance that political parties have on representation in the states. Among other things, this figure shows the distribution of ideal points for Republicans (red), Democrats (blue), and all voters (black) in states with more than 40 CCES respondents. It is clear from Figure 9 that the distributions of states' electorates are more unimodal than is the national distribution of voter ideal points shown in Figure 1.²¹ Arizona, Maryland, New Jersey, and New Mexico, for example, have quite unimodal

²⁰Like Michigan, New York does not follow these patterns although it does move in the leftward direction. New York is notable because the ideal point of the median House delegate starts to the left of the state's median Democrat and continues to move leftward (moving it further from the median Democrat but in the liberal direction).

²¹As an aside, this constitutes additional evidence that CCES questions are not themselves responsible for the voter bimodality in Figure 1.

distributions although a number of states show some evidence of bimodality, Iowa and South Carolina being good examples of the latter. There is nothing inconsistent about the fact that, as of November, 2006, some states had unimodal ideal point distributions whereas the nation had a bimodal distribution. If voters self-select into states that match their political predispositions or if predispositions are informed by state political culture, then we would expect to see more preference unity within states than across states.

*** Figure 9 about here ***

Figure 9 also shows for each state the locations of the overall median voter (black dotted line), the median Republican voter (red), the median Democratic voter (blue), and the ideal points of Senators (tall, vertical lines, colored red for Republican and blue for Democratic) and Representatives (short, vertical lines, red for Republican and blue for Democratic) in each state for the 109th (bottom of each state figure) and 110th (top) Congresses. In addition, the weighted number of Republican and Democratic CCES respondents from each state are listed below the state abbreviations in the top left hand corner of each state plot (red for Republican voters, blue for Democratic voters); the total number of voters is noted in black.

Roughly speaking, we see from Figure 9 that legislators' ideal points are usually closer to the ideal points of Republican or Democratic median voters than they are to state median voters. That is, members of Congress, both Senators and Representatives, are more representative of state partisans than they are of state medians. We know that House districting policies cannot explain this because the Senate is not redistricted every ten years. In fact, as we see from the taller vertical lines in Figure 9, Senators appear about as extreme as do members of the U.S. House. What this suggests is that the nature of contemporary American elections, including the primary election system and the role that parties play in it, produce relatively extreme legislators.

What might explain the seemingly contradictory results we have adduced thus far, i.e., explain how the median American voter is represented in Congress even though median state voters are not represented by Senators and state House delegations? The answer to this query must lie in the preference aggregation process, and this suggests that American federalism plays a key role. The various states covered in Figure 9 (not to mention the 14 not pictured) have varying districting processes, varying election rules, and varying election administration practices. It seems plausible, if not almost certain, that some such rules and practices are biased in favor of Democrats and others, Republicans. However, when aggregated to the national level, such biases, at least as of November, 2006, canceled each other out. One might think of this as a law of large numbers for federalism: the more levels and units over which a political institution aggregates preferences,

the less the influence of each individual unit.

The lack of multiple units for aggregation may explain the extreme location of the president in our earlier discussion of distribution of voter preferences — see Figure 1. *Prima facie*, the president's ideal point should correspond with the ideal point of the median American insofar as the constituency of the president is the entire country. Nonetheless, the Electoral College presumably distorts the relationship between the median American voter and the president, and furthermore the preference aggregation process that generates the president is subject to much greater variance than that which produces chamber medians in Congress. As such, we expect to observe less correspondence between the president and the median American voter than between the median American voter and Congressional medians, and based on a single instance of a president this is indeed what we see.

Another notable feature of American federalism is the lack of coordination across states. Some have decried this, particularly with respect to election administration. Voting machine technologies, for example, vary considerably across states and in most cases even within states. Nonetheless, one benefit of this uncoordinated approach to governance is that biases in representation should be relatively uncorrelated state to state. Each state, that is, can be thought of as a laboratory to itself (Volden 2006). What, in contrast, would coordinated biases look like? Suppose, hypothetically, that every state in the union used electronic voting and suppose that electronic voting benefited Republican candidates. In this hypothetical situation, aggregation of legislators to the Congressional chamber level would not remove biases in representation: if every district were too Republican due to a biased voting technology, then the median of all districts (i.e., the chamber median) would be too Republican as well.

6 Conclusion

We began by posing the question, do the elected American institutions work, and by this we meant, do they aggregate preferences in a way consistent with liberal democratic ideals? The answer to this question as of the inception of the 110th Congress (early 2007) is yes. Of course there are many ways to assess the extent to which democratic institutions work, and ours is only one piece of a large puzzle. Nonetheless, liberal democratic theory places a significant emphasis on the importance of preference aggregation, and hence the piece we are focusing on is a sizable one.

The research described here follows scholars who have sought to understand the extent to which sub-

stantive representation by elected officials is a feature of the United States polity. Since the behavioral revolution in political science scholars interested in this issue have relied heavily on survey data, but what has been lacking is a common space in which to locate the preferences of elected leaders and members of the public. We have provided such a space based on our leveraging a new survey instrument.

In our research we have drawn on survey responses from one cross-section of American voters, roll call votes from two Congresses, and Congressional support scores for one president. Looking toward the future, we plan to develop further this research project in several dimensions. First, we are already in the process of re-interviewing some of our survey respondents who contributed to our dataset and adding new respondents to our collection of voters as well; this will allow us to consider temporal dynamics of the median American voter and to determine if, as of the forthcoming 2008 general election, we see congruence between the median American and the median Senator and House member. Second, we will continue to add Congressional roll call votes to our set of scalable items; this will increase the precision of our estimates. Third, we are linking our future survey plans voters to an ongoing project described in Bertelli et al. (2007). To summarize briefly, Bertelli et al. propose to link the preferences of members of Congress to the preferences of administrative agencies by posing “roll call questions” to bureaucrats as we did to voters. Our collaboration with Bertelli et al. is designed to incorporate roll call questions that are common to both voters, members of Congress, and bureaucrats, and this will allow us to add bureaucrats to our preference map. Fourth, as of January, 2009 we will begin to assess the extent to which a new president reflects voter preferences. We have no leverage on presidential dynamics as of this paper’s writing, but this will change soon. Fifth and finally, we plan to survey governors and in some fashion to incorporate governor preferences into our project. Governors are similar to senators insofar as they have identical constituencies, but they are different because they do not vote in Congress. The normative arguments about representation that we have invoked when discussing federal elected officials apply to governors as well.²²

A remaining lacuna, though, is the absence of non-voters in our analysis. Ideally we would like to estimate the median American voter’s ideal point as well as the median American non-voter’s ideal point—our analysis is silent at the moment on whether these ideal points are different and the extent to which non-voters are represented by federal elected officials. What is holding us up in this area is the limited coverage of non-voters in our survey instrument. This instrument, as we have described at length, is new and still being developed, and we expect that its ability to cover non-voters will greatly improve in the future.

²²We thank Shigeo Hirano for suggesting that we pursue governor preferences.

Over time, then, the research program we have described here will provide a detailed and nuanced perspective on the way that American institutions aggregate preferences and satisfy democratic ideals. As the project expands in a temporal and substantive way, it will offer answers to fundamental questions about representation in the United States and the conditions under which representation happens and when it does not.

A Details on CCES Questions

Table 3 lists the CCES questions that we use in our scaling exercise. Common content questions (denoted CC) were asked of all CCES respondents, but, as indicated in the table, many of our questions were unique to the Dartmouth pool (denoted DM), the MIT pool, and/or the UCSD pool. Note that the question identifying names in Table 3 are the official question identifiers from the CCES codebook. MIT questions, as is evident from the table, often have different style names than other questions; when necessary we adjusted MIT names so that they corresponded to common content, Dartmouth, or UCSD pool names.

When a CCES had more than two possible answers, i.e., four point George W. Bush approval, we pooled responses so that all questions were binary. When a question had an odd number of responses, we treated centrist or middle answers as abstentions.

Table 3 contains a number of questions about whether a particular issue violates the First Amendment. These questions could allow linking of voter preferences to Supreme Court Justice preferences in the future.

Table 3: CCES Questions

Question Identifier	Pool	Subject
partbirthself	CC	For or against partial birth abortion
stemself	CC	For or against federal funding for stem cell research
immself	CC	For or against immigrants becoming citizens
minwageself	CC	For or against increasing the minimum wage
captaxself	CC	For or against extending capital gains tax cuts
caftaself	CC	For or against Central American Free Trade Area
postq6	CC	Vote choice, governor
postq7	CC	Vote choice, Senator
postq9.lg	CC	Vote choice, lieutenant governor
postq9.ag	CC	Vote choice, attorney general
postq9.ss	CC	Vote choice, secretary of state
postq9.st	CC	Vote choice, state treasurer
iraqmistake	CC	Whether invading Iraq was mistake

Table 3: CCES Questions

Question Identifier	Pool	Subject
miluse.oil	CC	Whether the military should be used to ensure oil supply
miluse.tcamp	CC	Whether the military should be used to destroy terrorist camp
miluse.civilwar	CC	Whether the military should intervene in genocide or civil war
miluse.allies	CC	Whether the military should be used to protect American allies
miluse.un	CC	Whether the military should be used to help United Nations
miluse.none	CC	Whether the military should never be used
gwbapp	CC	Approval of President George W. Bush
abortopinion	CC	Abortion opinion
environ.statement	CC	Weighing the environment versus economy
ssprop	CC	Favor or oppose social security privatization
ideo5	CC	Personal ideology
pr.youvote patriot	DM	Patriot Act roll call (HR 3199)
pr.youvotebankruptcy	DM	Bankruptcy roll call (S 256)
pr.youvote guns	DM	Gun control roll call (S 397)
pr.house repimmig	DM	Immigration roll call (not linked)
pr.rcalito	DM	Samuel Alito confirmation roll call (PN 1059)
pr.rcinternetgamble	DM	Internet gambling roll call (HR 4411)
pr.rcmalpractice	DM	Malpractice reform roll call (HR 5)
pr.rcobesity	DM	Obesity roll call (HR 554)
pr.rcoverseasabortion	DM	Overseas abortion roll call (H AMDT 209 to HR 1815)
pr.rcshiao	DM	Terry Schiavo roll call (S 686)
pr.rcdod	DM	Supplemental defense department funding (HR 1268)
pr.rclineitemveto	DM	Line item veto roll call (HR 4890)
pr.rcminorabortion	DM	Minor abortion roll call (S 403)
pr.rcoil	DM	Coastal oil drilling roll call (H AMDT 842 to HR 5386)
pr.rcroberts	DM	John Roberts confirmation roll call (PN 801)
pr.priv	DM	Give up freedom/privacy to track terrorists
pr.firstam.campaigncont	DM	Limiting contributions to campaigns violates 1st Amdt.
pr.firstam.employees	DM	Punishing employees for on-the-job-speech violates 1st Amdt.
pr.firstam.fedfunds	DM	No federal funds to schools that prohibit military recruiting violates 1st Amdt.
pr.firstam.hallucinogen	DM	Prohibiting hallucinogenic tea in religious rituals violates 1st Amdt.
pr.firstam.monument	DM	Federal government displaying Ten Commandants violates 1st Amdt.
pr.firstam.pinmates	DM	Denying inmates newspapers, magazines violates 1st Amdt.
pr.commerce	DM	Can Congress regulate local cultivation of marijuana
pr.knockfirst	DM	Allow evidence in court obtained without 'knock first' procedure
pr.dpenalty	DM	Death penalty Constitutional for juveniles
q2	MIT	For or against increasing border security
q3	MIT	For or against bankruptcy changes
q4	MIT	For or against renewing Patriot Act
q5	MIT	For or against reducing use of foreign oil
q6	MIT	Economic ideology
q7	MIT	Moral and social ideology
q12	MIT	Party preferred to hold majority in United States House
immignum	MIT	Whether to change the number of legal immigrants
q19_hmo	MIT	Good or bad to have HMO and medical insurance competition

Table 3: CCES Questions

Question Identifier	Pool	Subject
q19_pres	MIT	Good or bad to have a prescription drug benefit in Medicare
q19_subs	MIT	Good or bad to have a health care subsidy for elderly people
q19_cheap	MIT	Good or bad to prohibit the importing of inexpensive drugs from Canada
pr.iraqworthit	UCSD	Iraq war worth the cost
pr.timetable	UCSD	Should United States have a timetable for withdrawing from Iraq
pr.bushhonest	UCSD	Is George W. Bush honest and trustworthy
pr.misled	UCSD	Did George W. Bush mislead public about Iraq war
pr.stayiraq	UCSD	Should United States stay in Iraq or leave immediately

B Weighting CCES Respondents

The CCES surveyed thousands of respondents, and each institution-specific pool was allocated 1,000 respondents who were known as matched respondents.²³ The total number of surveyed respondents for each institution-specific pool was larger than 1,000, and in this paper we use the larger, extended set of respondents from the Dartmouth, MIT, and UCSD pools.²⁴ In total the Dartmouth extended pool consists of 2846 respondents, the MIT extended pool 1953 respondents, and the UCSD extended pool 3424 respondents.

Among CCES respondents in the extended Dartmouth, MIT, and UCSD pools, each individual reported voting in the 2006 midterm elections (6149 individuals), reported not voting (544), or reported not knowing whether he or she voted (12). There were also 1518 CCES respondents in our extended pool who either were not asked about voting participation or who skipped the voting participation question. The CCES voting question was called *postq3*, and there is no doubt that CCES vastly underrepresents non-voters.

Our scaling exercise includes all extended CCES respondents, regardless of whether they reported voting or not. However, after we estimate ideal points for CCES respondents, members of Congress, and the president, we continue with calculations using voters only.

We generate weights for our CCES respondents who voted as follows. For each state, we consult the National Election Pool (NEP) exit poll.²⁵ Within states we calculated weighted gender, race (white, African-American, Latino), income, party identification (Democrat, Republican, Independent, and other), three point

²³Such matched respondents were those who corresponded to randomly selected individuals from a marketing database that was representative of American adults. This matching process is irrelevant to the CCES sample used here.

²⁴The larger set of individuals consists of the matched CCES respondents plus those who were not matched. See fn. 23.

²⁵Data from the 2006 NEP were downloaded from http://www.ropercenter.uconn.edu/data_access/data/datasets/exitpolls_2006.html.

ideology (liberal, moderate, conservative), education, and four point Bush approval rates. Each of these variables matches up with a CCES question, although in the case of the income variable merging of income classes was necessary so that the NEP and CCES income ranges align. We then merged for each state the weighted NEP voter data with governor and Senate voting results for those states that had gubernatorial and Senate races in November, 2006.

For states that do not appear in the 2006 NEP we used 2004 NEP data. Weights were trimmed at 3.5 before being normalized so that they reflect state population sizes. Because of the final normalization some weights exceed 3.5 (approximately 5.3% of them). Illinois has the largest average weight among the fifty state, approximately 2.57. Otherwise, the states look rather uniform as measured by average CCES voter weight (complete details are available from the authors).

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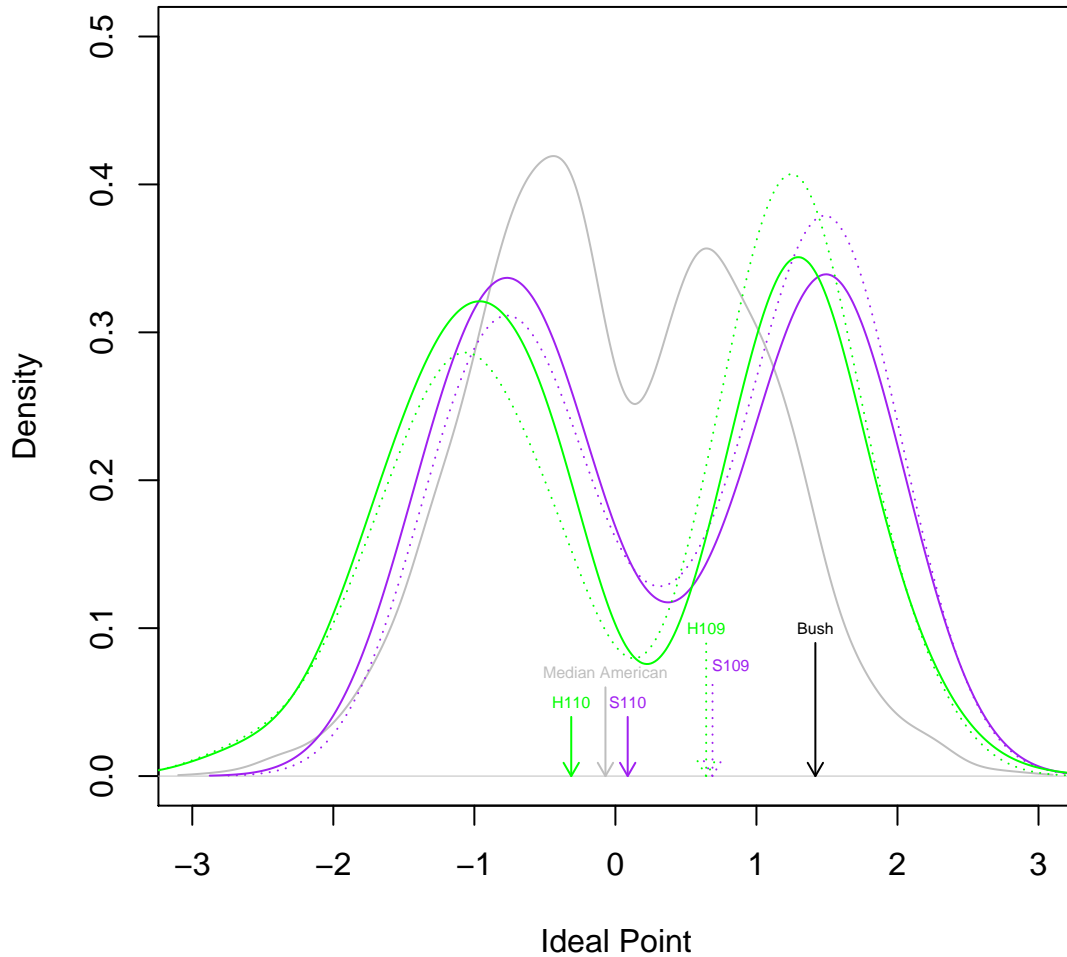
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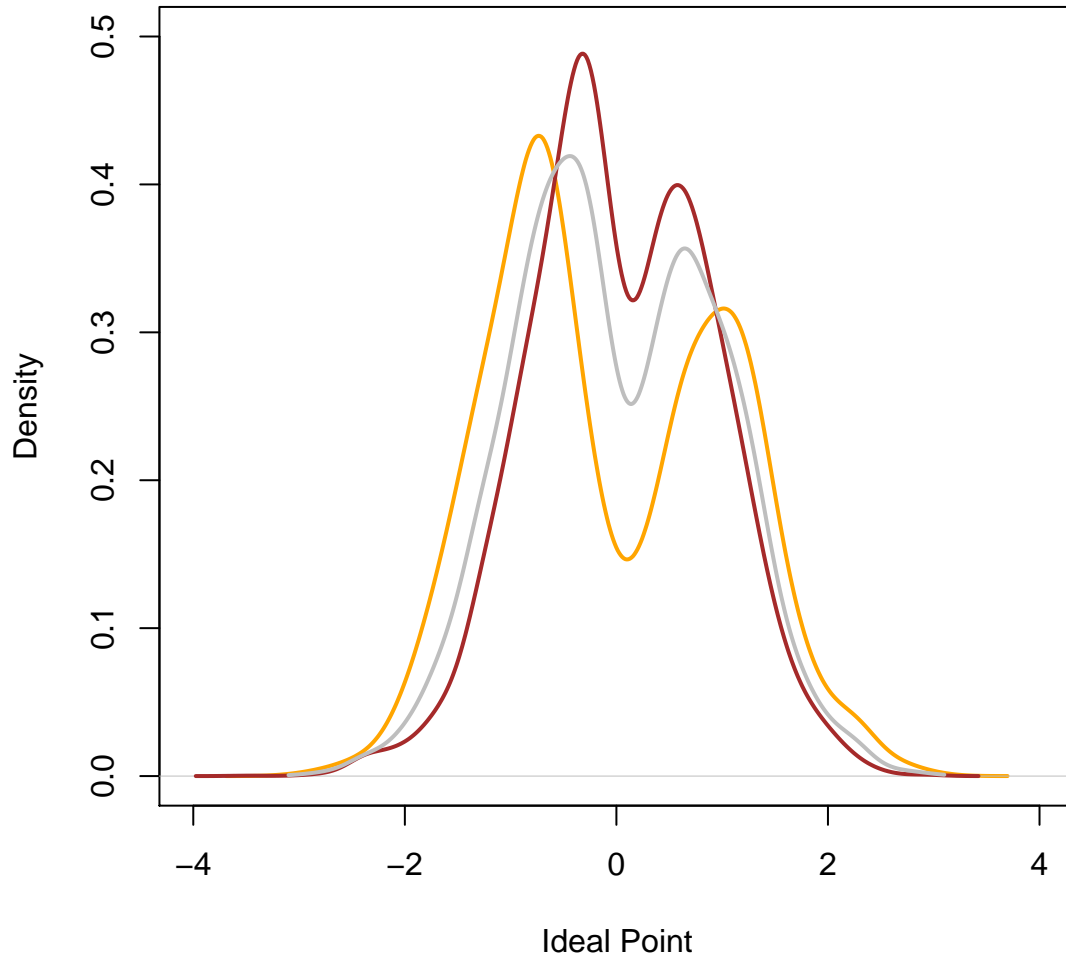
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Figure 1: Voters and Institutions



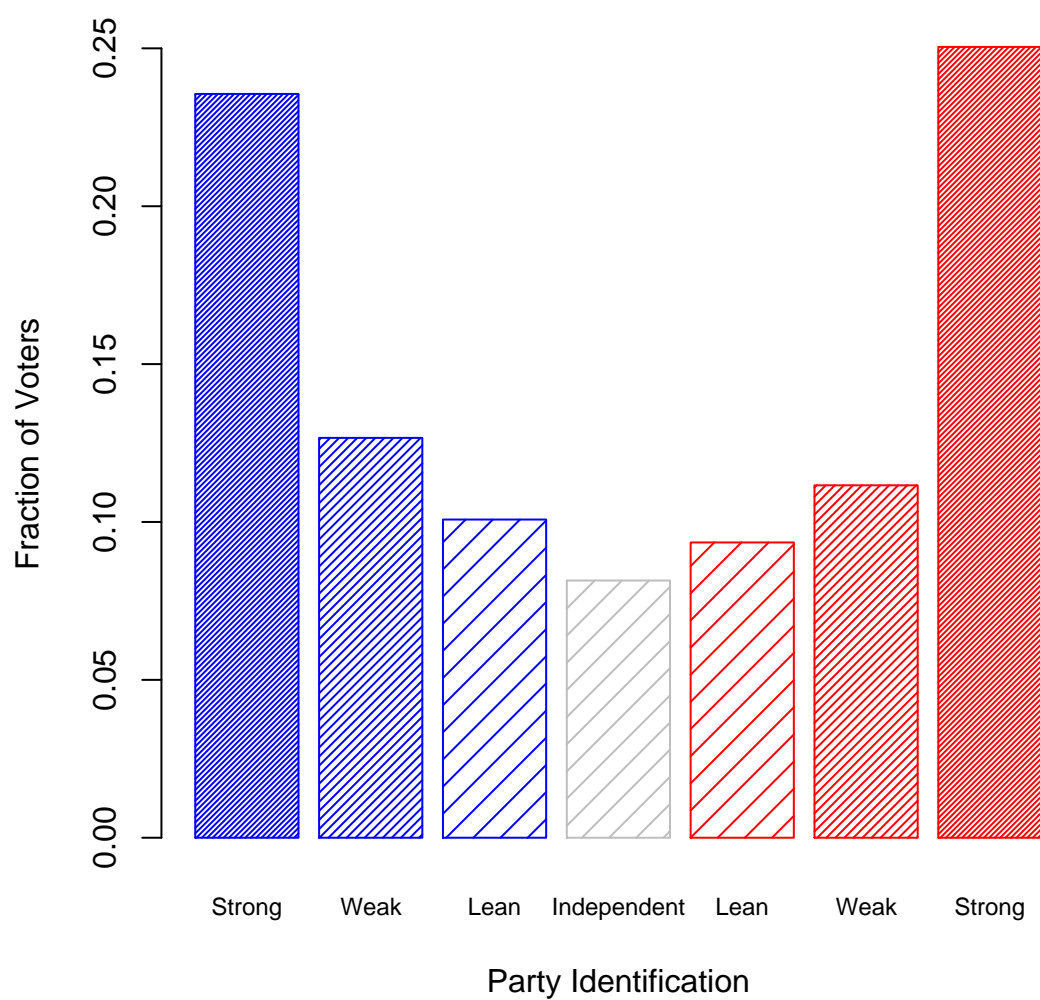
Note: The grey density line describes the distribution of voter ideal points; the dotted (solid) purple density line describes the distribution of Senator ideal points in the 109th (110th) Congress while the dotted (solid) green density line shows this distribution for Representatives in the 109th (110th) Congress. Senate and House medians are denoted “S” and “H,” respectively, with a congress number appended. The ideal point of President George W. Bush is denoted with “Bush.”

Figure 2: Voters by Donation Status



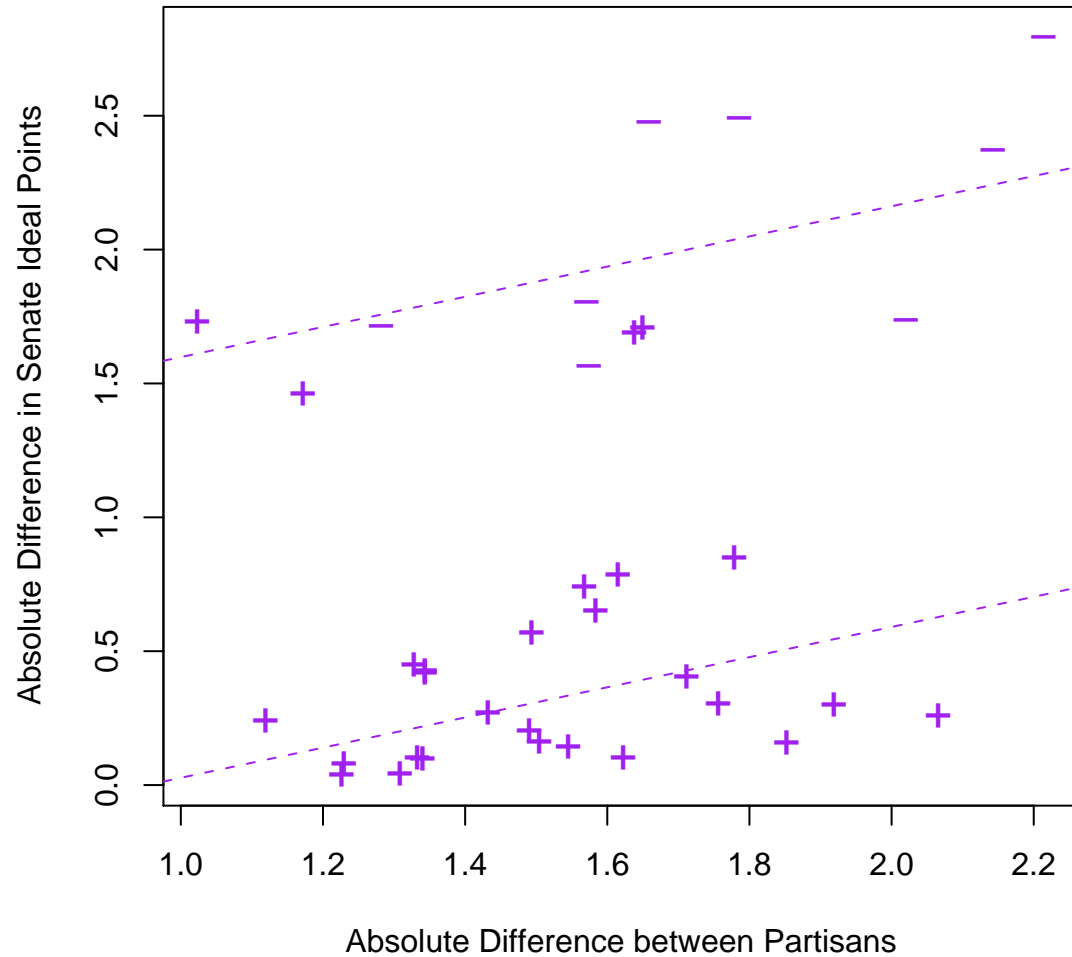
Note: The grey density line describes the distribution of voter ideal points; the orange line the distribution of ideal points of voters who reported donating money to a candidate or party during the 2006 election period; and, the brown line the distribution of non-donor ideal points.

Figure 3: Party Identification of CCES Voters



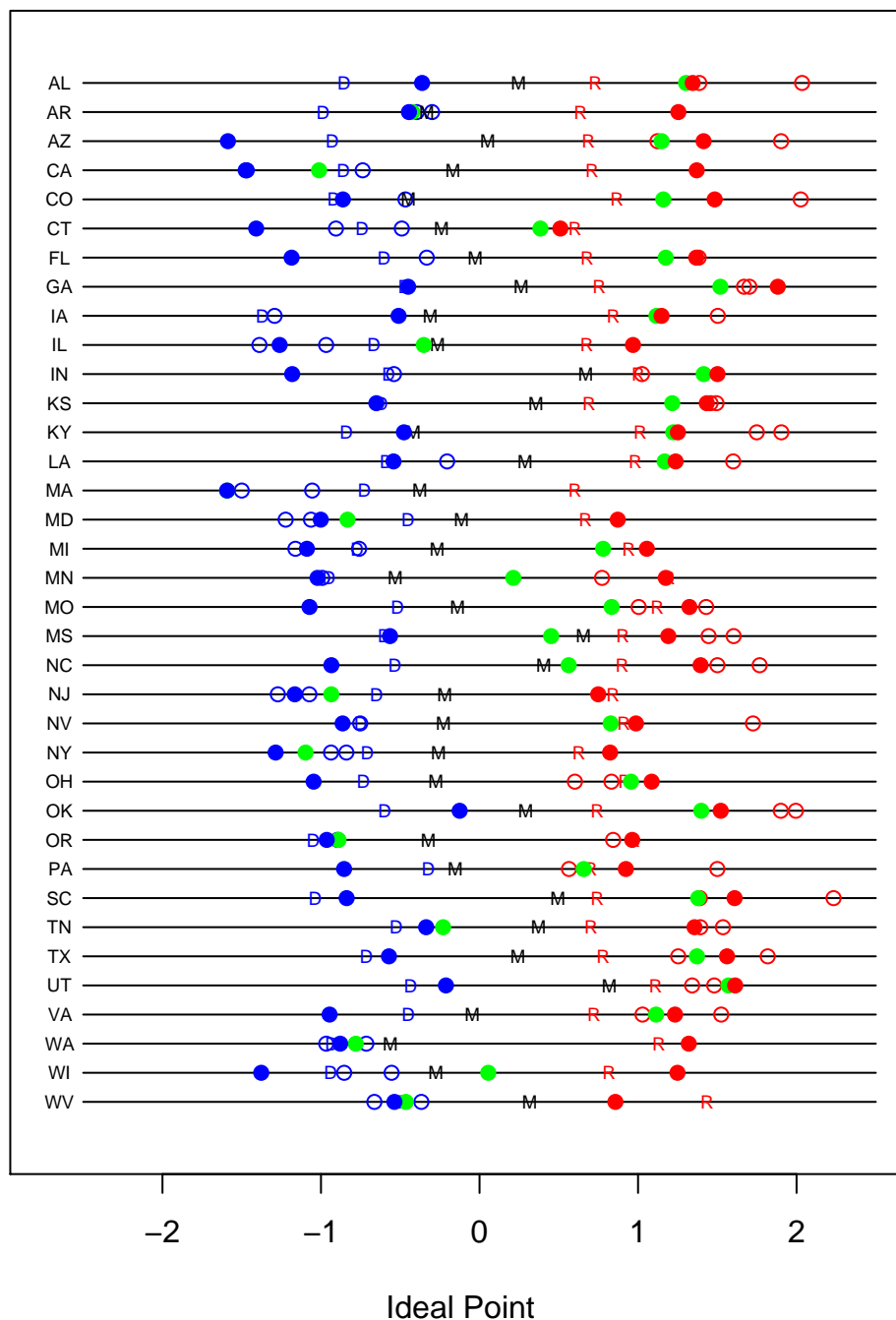
Note: Figure describes the distribution of party identification for 6103 CCES voters. Democratic identifiers are to the left of the independent bar, and Republican identifiers are to the right.

Figure 4: Differences in Senator Ideal Points



Note: Figure describes the relationship between the absolute difference in Senator ideal points and the absolute difference between a state's median Republican and median Democratic voter. States denoted with purple "+" signs have Senators in the same party; states with purple "-" signs have Senators of different parties.

Figure 5: State Median Voters and Members of the 109th Congress



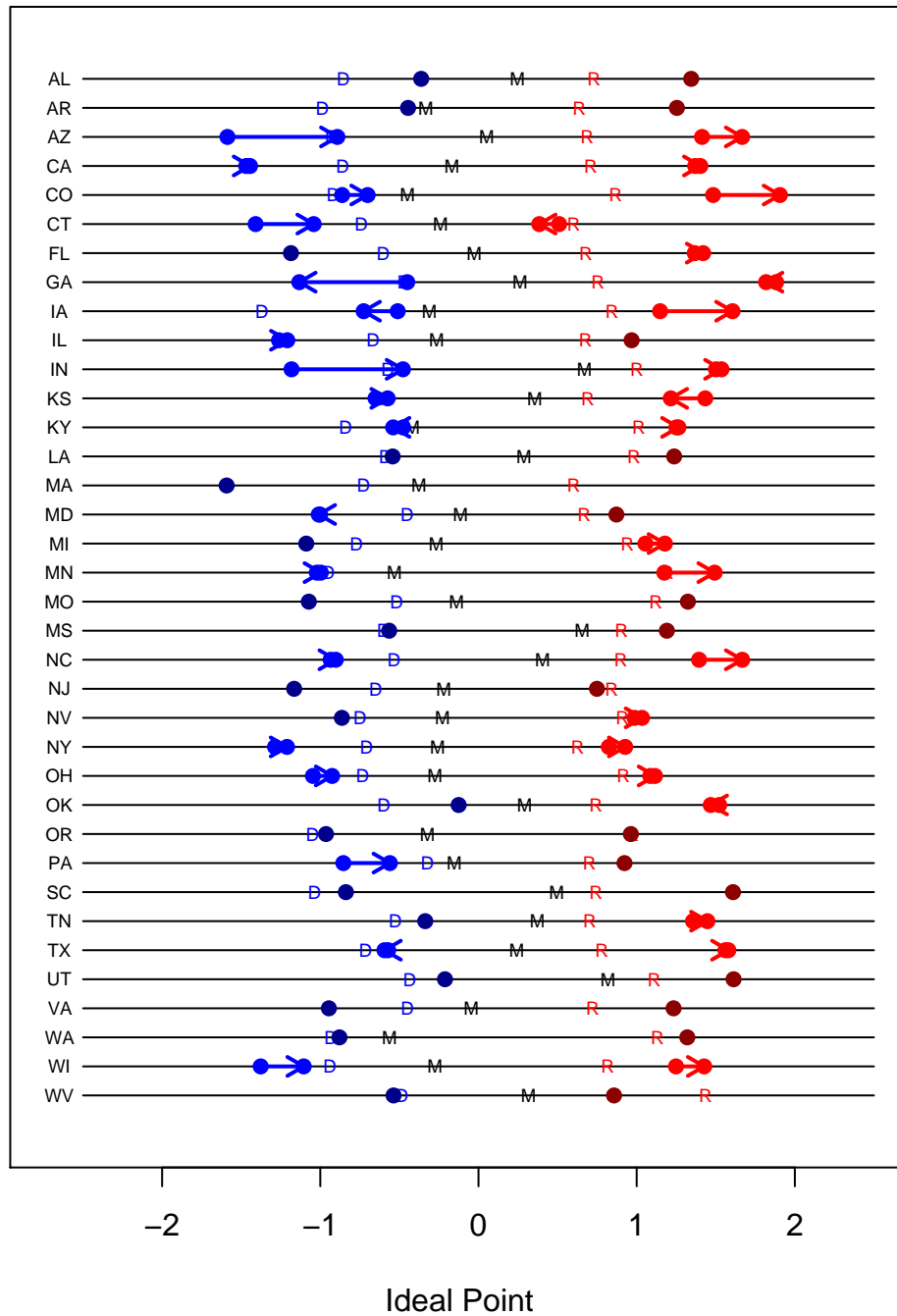
Note: Each line corresponds to a state with at least 40 voters, and states are listed alphabetically. The symbol “M” denotes a state median voter; “D” and “R” represent the median Democrat and Republican voter, respectively; each solid blue dot denotes the median of a state’s Democratic House delegation while each solid red dot denotes the median of a state’s Republican House delegation; each solid green dot represents the median of the entire delegation; and, open circles denote Senators (red for Republicans, blue for Democrats, and orange for independents).²⁶

Figure 6: State Median Voters and Members of the 110th Congress



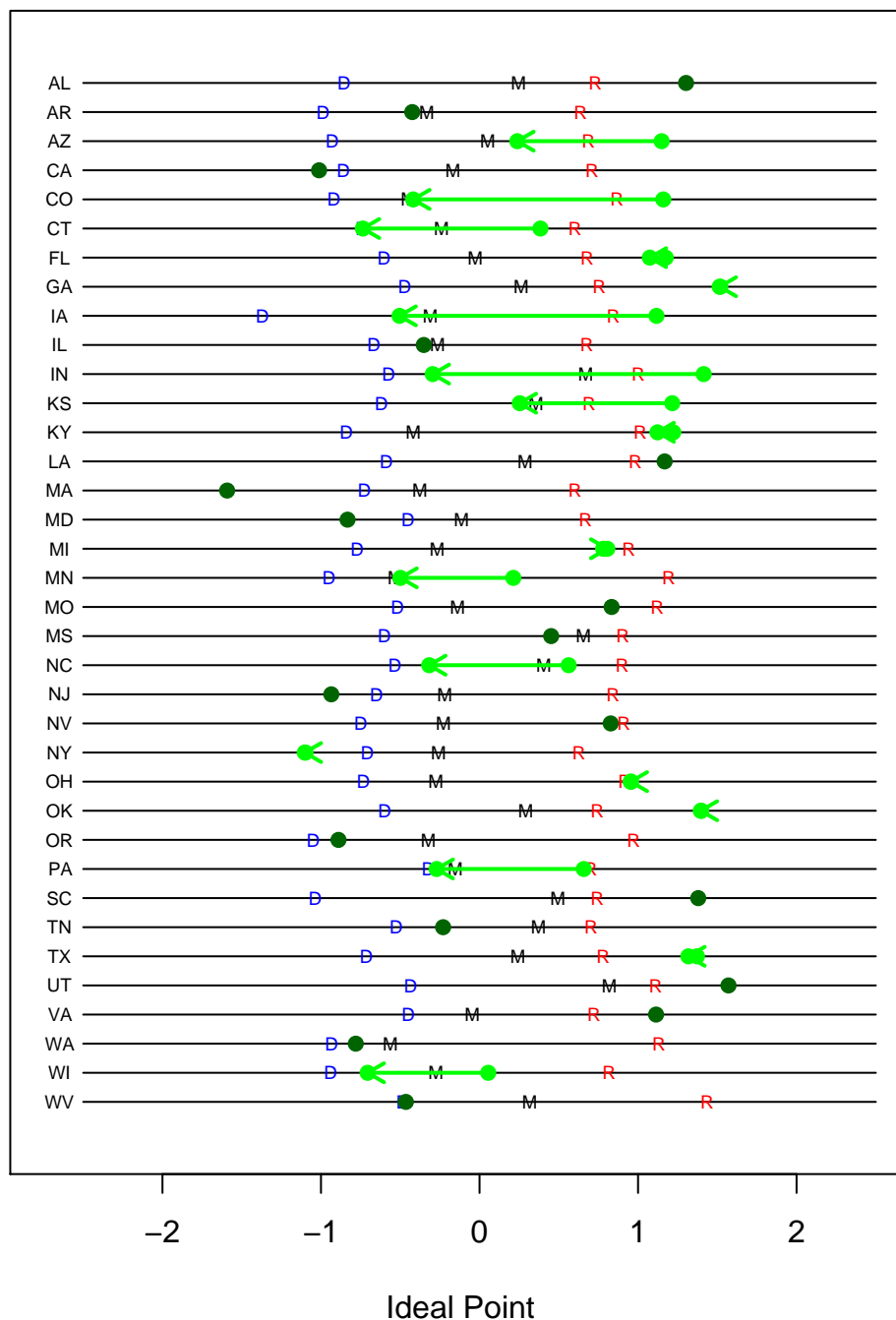
Note: Each line corresponds to a state with at least 40 voters, and states are listed alphabetically. The symbol “M” denotes a state median voter; “D” and “R” represent the median Democrat and Republican, respectively; each solid blue dot denotes the median of a state’s Democratic House delegation while each solid red dot denotes the median of a state’s Republican House delegation; each solid green dot represents the median of the entire delegation; and open circles denote Senators (red for Republicans, blue for Democrats, and orange for independents).

Figure 7: Shifts in House Partisan Delegation Ideal Points from 109th to 110th Congress



Note: Each line corresponds to a state with at least 40 voters, and states are listed alphabetically. The symbol “M” denotes a state median voter; “D” and “R” represent the median Democrat and Republican, respectively; an arrow pointing from one solid blue dot to another denotes the shift in the median of a state’s Democratic House delegation from the 109th to the 110th congress; and an arrow pointing from one solid red dot to another denotes the shift in the median of a state’s Republican House delegation from the 109th to the 110th congress. Darkened dots represent delegations with no or insubstantial change.

Figure 8: Shifts in House Delegation Ideal Points from 109th to 110th Congress



Note: Each line corresponds to a state with at least 40 voters, and states are listed alphabetically. The symbol “M” denotes a state median voter; “D” and “R” represent the median Democrat and Republican, respectively; an arrow pointing from one solid green dot to another denotes the shift in the median of a state’s House delegation from the 109th to the 110th congress. Darkened dots represent delegations with no or insubstantial change.

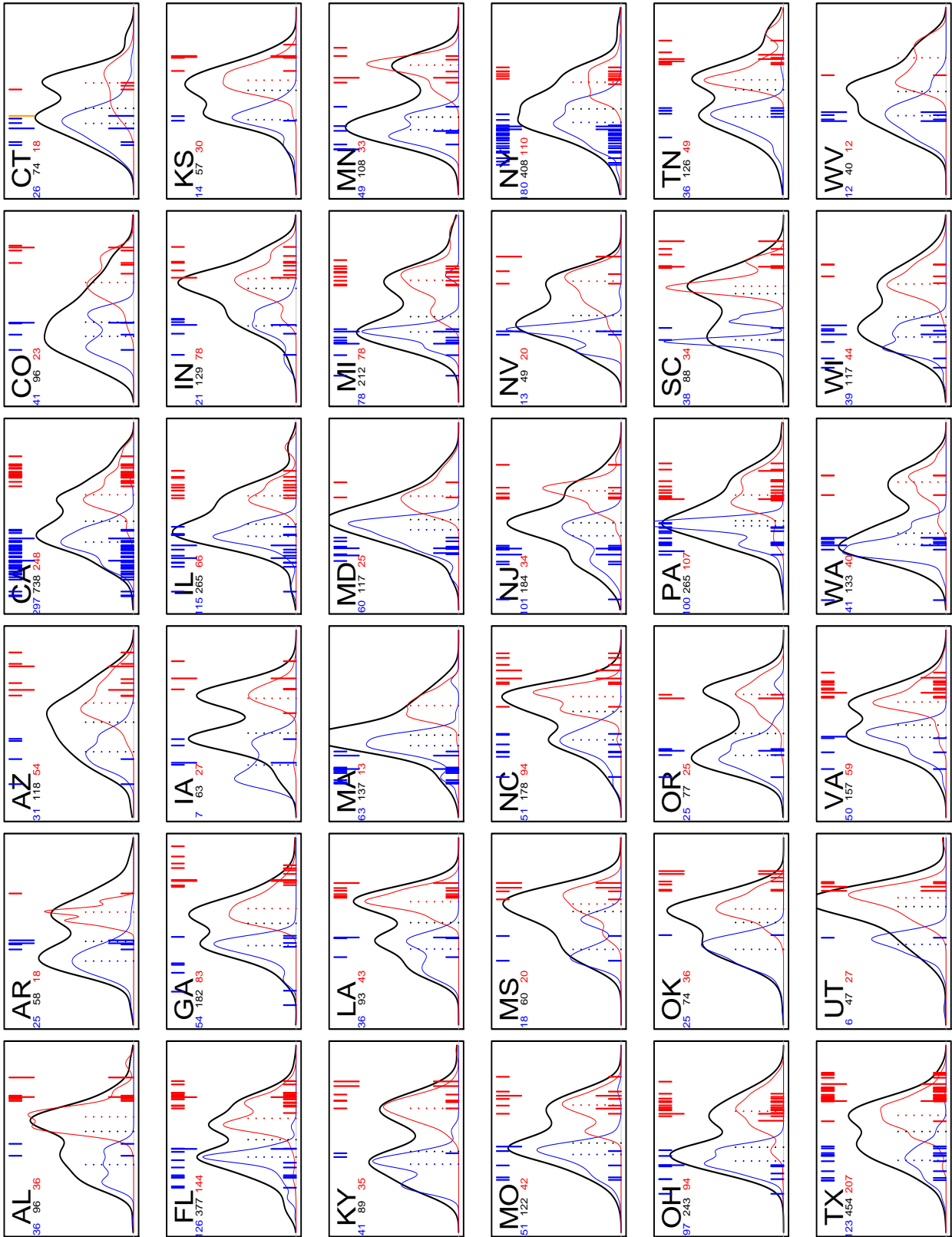


Figure 9: Voters and Legislators in Large States

Note: Shows states with at least 40 voters. The color black denotes all voters, blue denotes Democrats, and red denotes Republicans. Smoothed densities depict voter ideal points; dotted lines are median voters; tall, vertical lines denote ideal points of Senators (bottom of plot for 109th Congress and top for 110th); and, short, vertical lines denote House member ideal points (109th at bottom at 110th at top).