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Candidate positioning and responsiveness to constituent opinion in the U.S. House of Representatives

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Abstract In this paper, I develop a survey-based measure of district ideology for the House of Representatives. I use this index to document and study ways in which patterns of candidate positioning depart from perfect representation. These findings help distinguish between competing theories of candidate positioning. My findings present evidence against theories that attribute divergence to the preferences of voters and the locations of primary constituencies. My findings are potentially consistent with the policy-motivation and resource theories, which attribute divergence to the polarization of political elites.

Keywords Candidate positioning · Median voter theorem

1 Introduction

In 1951, the political science profession officially endorsed a viewpoint that the existence of two competitive political parties with *distinct* policy positions was a necessary condition for effective representation (American Political Science Association 1950). This ideal of "responsible party government" was called into question soon after. Downs (1957) argued that this view was misguided—competition in two-candidate elections would incentivize the candidates to converge to the position of the median voter in their district. Hence, if congruence with the median voter's position is the benchmark, then the lack of distinct platforms could be seen as a sign of effective representation. Starting with Miller and Stokes' (1963) influential work, political scientists have evaluated the quality of political representation by the extent to which candidate positions match Downs's ideal.

Real elections, of course, do not entirely match either ideal. In line with Downsian competition, left-wing constituencies are associated with left-wing legislators. Yet representation is far from perfect. In line with the Responsible Party Government ideal, among constituencies with similar ideologies, we observe vast differences between the voting records of Democratic and Republican legislators.

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Providing an explanation for these stylized facts has led to many new theories of issue competition in two-candidate elections, and divergence and imperfect representation may be explained in a number of ways. The *policy-motivation* theory suggests that if one of the candidates has a valence advantage or if the electoral landscape is uncertain, policy-motivated candidates will diverge from the electoral center (Wittman 1983; Calvert 1985; Groseclose 2001; Serra 2010; Peress 2010). Policy-motivated candidates are constrained because they need to win the election in order to implement their preferred policies, but may be willing to trade off a lower probability of winning the election for a chance to move the policy outcome. The *base-mobilization* theory argues that if candidates can increase turnout among their core supporters by taking extreme positions, they may be incentivized to leave the electoral center (Adams and Merrill 2003; Adams et al. 2005; Peress 2011). Leaving the electoral center will entail a loss of support from moderate voters, but the increase in turnout among core supporters may make up for this loss.

Candidates may be able to raise more campaign funds when they take extreme positions due to the polarization of potential donors. The *resource* theory thus suggests that if candidates can "buy votes" through political advertising, the candidates may be incentivized to move away from the political center (Moon 2004; Schofield and Miller 2007; Lambie-Hanson forthcoming). Indeed, recent work points to the effectiveness of political advertising (Gerber and Green 2000; Huber and Arceneaux 2007). The *primary election* theory suggests that candidates may be pushed away from the center and toward their partisan constituencies by primaries (Adams and Merrill 2008; Serra 2011). Once again, the candidates face both a centripetal force pushing them towards moderate voters and a centrifugal force pushing them towards their core constituency. Finally, the *preference* theory suggests that the voting population is divided into districts in such a way that convergence to the political center in each district—as is predicted by the Downsian (Hotelling 1929; Downs 1957) or probabilistic voting model (Coughlin and Nitzan 1981; Banks and Duggan 2005)—implies polarized positions.

Distinguishing between these competing theories is important for understanding the causes of imperfect representation and for evaluating potential solutions to this problem. For example, consider recent attempts to reform California's electoral system through the introduction of the blanket primary and nonpartisan blanket primary. These reforms were considered largely because of their supposed ability to elect more moderate candidates (Silver 2009), but the prediction of greater moderation is predicated on the primary election theory of divergence. More generally, proposed electoral reforms being seriously considered include open primaries, contribution limits, public funding of campaigns, free media airtime, and term limits (Hacker and Pierson 2005). Support for these reforms, however, implicitly assumes a specific understanding of issue competition in two-party elections.

In this paper, I focus on distinguishing between competing theories of issue competition. To study this, I develop a survey-based ideology index. While many techniques for measuring constituent ideology exist, most suffer from a number of drawbacks. Election outcome-based measures have trouble capturing a second dimension of conflict and cannot capture the ideology of subpopulations. Survey-based measures are typically not available at a sufficiently disaggregated level because of limited sample sizes. I employ the National Annenberg Election Survey (NAES) to develop a survey-based measure of constituent ideology. My approach has a number of advantages over existing measures for testing theories of candidate positioning. First, I am able to determine the number of ideological dimensions and measure these multiple dimensions of ideology. Second, due to the large sample size available in the NAES, I am able to construct the index at the congressional district level. Third, my approach allows me to capture ideology among subpopulations (e.g., Democratic and Republican identifiers and Democratic and Republican primary voters).

To understand why each of these features is beneficial, consider the following issues that I will address. First, the voting behavior of elected officials is characterized by polarization (Poole and Rosenthal 1997) while public opinion is not (Fiorina 2005). However, it may be the case that while public opinion is not polarized, redistricting groups the voting population in such a way that there exists polarization *across* congressional districts (Carson et al. 2007). Alternatively, polarization may exist on a dimension of public opinion that cannot be captured by existing one-dimensional measures. For example, polarization may be most pronounced on social issues. In order to examine these claims, we of course need a multi-dimensional ideology index that is available at the congressional district level.

Second, while legislative candidates respond to the median voter in their district (Miller and Stokes 1963), we observe significant divergence in the positions of Democratic and Republican candidates (Wright and Berkman 1986; Ansolabehere et al. 2001a; Burden 2004). It has been hypothesized that this divergence arises from the need of candidates to accommodate their primary constituencies (Adams and Merrill 2008; Serra 2011). If this is the case, then we should observe candidates responding to their partisan identifiers as well as the median voter in their district. In order to examine this claim, we need an ideology index that can be computed for subpopulations within a district.

Third, is it well known that voting behavior in Congress exhibits a single dominant ideological dimension (Poole and Rosenthal 1997). In addition, there is evidence that at least two dimensions are required to capture the ideology of the electorate (Poole 2002; Layman and Carsey 2006). Theories of candidate positioning must be able to explain why we observe voter positions varying over two dimensions while candidate positions vary only along a single dimension. In order to examine this, we need an ideology index that is multi-dimensional.

My findings support a two-dimensional model of ideology for the electorate, with the first dimension primarily capturing economic conservatism and the second dimension primarily capturing social conservatism. My results generally conform with conventional wisdom—states such as Montana, Nebraska, and Wyoming are very economically conservative, but socially moderate. States such as Alabama, Kentucky, Louisiana, and West Virginia are economically moderate, but socially conservative.

My findings suggest that polarization in public opinion is not present at any of the levels of aggregation I examine. These results therefore cast doubt on the preference theory. I find that while candidates respond to constituent ideology, their responsiveness to Democratic and Republican identifiers is weak. My results therefore cast doubt on explanations of divergence and polarization among legislators that rely on local primary conditions. My results also indicate that congressional candidates are responsive to public opinion only along the economic dimension (the evidence for this is particularly strong for Republican candidates). This provides further evidence against the preference theory. Alternatively, the resource and policy-motivation theories are potentially consistent with this finding because the political elites that largely make up the population of donors (for the resource theory) and candidates (for the policy-motivation theory) have one-dimensional preferences.

Taken together, these results have implications for potential "solutions" to the representation problem because the appropriateness of the solution will depend on the causes of poor representation. Reforms relating to redistricting, turnout, and primary contests are unlikely to provide a cure for polarization in Congress (although this is not to say that these reforms would not produce other benefits). Reforms based on reducing the incumbency advantage (such as term limits) and reducing the link between fund-raising and position-taking by the candidates (such as campaign finance reform) are more likely to be effective.

2 Approaches to measuring ideology

There are two common approaches to creating an ideology index. The first approach uses election returns (Erikson et al. 1994; Ansolabehere et al. 2001b). This approach has the advantage that it (potentially) can be applied at various levels of aggregation. This approach has a number of drawbacks, however. It is difficult to capture multiple dimensions of ideology using this approach. This is particularly likely given the finding that variation in candidate positioning can be captured by a single ideological dimension (Ansolabehere et al. 2001b). Even under favorable assumptions, this approach can yield only an estimate of the median voter's position within a district. It does not allow us to measure polarization within a district or to examine candidate responsiveness to subpopulations (e.g., Democratic and Republican primary electorates).

The second approach relies on survey data to construct an ideology index (Enelow and Hinich 1984; Poole 2002; Treier and Hillygus 2009). This approach itself comes in two forms. The first asks voters to place themselves on an ideological scale (as the American National Election Study does). The second asks voters a large number of issue-related questions. Then, these questions can be pared down to a lower number of dimensions using principal component analysis (Enelow and Hinich 1984) or item response theory (Quinn 2004; Treier and Hillygus 2009).

The chief limitation of using survey data to construct an ideological index is that the sample sizes available in most surveys are not sufficient to construct the index at the desired levels of aggregation. For example, the American National Election Study typically has between 1,000 and 1,500 respondents for the ideological self-placement item. This would mean that an average congressional district estimate would be based on just two to three respondents. A second problem is that the surveys that have traditionally been available have not had enough useful items to ensure that the most important issues are captured and that the resulting estimators have desirable statistical properties.

I am able to overcome these problems by using the 2000 National Annenberg Election Study. Extremely large sample sizes mean that I can construct the index for units as small as a congressional district. Finally, in comparison to other surveys, the NAES has a large number of items relating to policy positions that are sufficient to tap the most important dimensions of public opinion.

3 Data

My approach relies on the rolling cross-section component of the 2000 NAES. This survey was conducted between December 14, 1999 and January 19, 2001. Each day, a random sample of households was added to the phone banks. The NAES attempted to contact these households for a maximum of 14 days. The rolling cross-section survey, fielded for 13 months, yielded an unusually large number of respondents, with $N = 58{,}373$. Using this survey, I am able to obtain accurate estimates of district ideology at aggregation levels as fine-grained as the congressional district. Within each congressional district, we observe an average of 135 respondents. In addition, I am able to consider subpopulations of Democratic and Republican party identifiers within congressional districts—within each congressional district, we observe an average of 42 Democratic identifiers and 38 Republican identifiers.

In order to construct the index, I searched for survey items that tapped respondent ideology. I excluded all items that did not involve the respondent's position on an issue exclusively. For example, I included a question on whether respondents favor handgun licensees,

but excluded a question that asked respondents to rate a candidate's intelligence. This is because I wanted to tap only ideological dimensions, as opposed to candidate "valence" dimensions.[1] I excluded a number of items that were asked of very few respondents. The 34 items used are listed in Table 1.

4 Empirical model

From the NAES, I obtained the matrix X where $X_{n,t}$ denotes the response of respondent n on item t, for $n = 1, 2, \ldots, N$ and $t = 1, 2, \ldots, T$. To determine the underlying ideological structure from X, I employed a principal components decomposition (Flury 1988; Jolliffe 1989). I decomposed the correlation matrix of the data, Ω, into $\Omega = \beta^T \Lambda \beta$, where $\beta^T \beta = I$, $\Lambda = \text{diag}\{\lambda_1, \lambda_2, \ldots, \lambda_J\}$, and $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_J$.

The first step was to compute the mean vector and covariance matrix of the data. The matrix X contained a significant number of missing observations. As is standard in the literature, I treated the data as "missing at random", but allowed for the possibility that the data were not "missing completely at random". I employed the EM algorithm to approximate the maximum likelihood estimate of the mean and covariance matrix of the data (Rubin 1987; King et al. 2001).

The next step was to compute estimates of each respondent's ideology. If there were no missing observations, then we could compute respondent n's ideology along dimension j using

$$f_{j,n} = \beta_{j,1} X_{n,1} + \beta_{j,2} X_{n,2} + \cdots + \beta_{j,T} X_{n,T}$$

Here, $f_{j,n}$ denotes individual n's ideological position on the jth dimension and $\beta_{j,t}$ denotes the factor loading of issue t on dimension j. Because there are missing observations, I applied multiple imputation to obtain draws of $f_{j,n}$. I then computed the ideology index over various levels of aggregation. For example, to compute the estimate of the median voter's ideology in congressional district k along the jth dimension, I computed the median value of $f_{j,n}$ among the subset of individual's residing in congressional district k. The final step was producing a measure of uncertainty. There were multiple stages in the estimation procedure and I wanted to have measures that accounted for uncertainty at each of these stages. I accomplished this using the non-parametric bootstrap. I created $R = 20$ samples, with replacement, from the empirical distribution of respondents. I then recomputed all quantities of interest among all simulated data sets. The standard deviation of a quantity among all these simulated data sets then became the estimated standard error.

5 Results

The principal components decomposition extracts a small number of dimensions from a dataset of larger dimensionality. The dimensions are chosen to maximize the variance in the original dataset explained by these small number of dimensions. The eigenvalues from this decomposition determine how much variance is explained by each factor in the decomposition. Figure 1 contains a scree plot, which reports the proportion of variance explained by each dimension. The first dimension explains 17.0 % of the variance while the second

[1] This highlights an added advantage of survey-based methods over election outcome-based methods—we can separate ideological dimensions from 'valence' dimensions of candidate evaluation.

Table 1 Factor loadings. Standard errors are in parentheses. Coefficients larger than 0.4 in magnitude are highlighted in bold

Question	Factor 1	Factor 2
1 Favor Cutting Taxes or Strengthening Social Security	**−0.444 (0.195)**	−0.101 (0.011)
2 Federal Government Should Reduce Top Bracket Taxes	−0.286 (0.125)	−0.262 (0.009)
3 Federal Government Should Adopt Flat Tax	−0.212 (0.099)	−0.165 (0.013)
4 Federal Government Should Spend on Social Security	**0.513 (0.223)**	−0.222 (0.006)
5 Favor Investing Social Security in Stock Market	−0.224 (0.093)	−0.137 (0.015)
6 Favor School Vouchers	−0.134 (0.055)	**−0.519 (0.013)**
7 Federal Government Should Give School Vouchers	−0.181 (0.078)	**−0.552 (0.008)**
8 Federal Government Should Spend on Spending on Schools	**0.589 (0.258)**	−0.089 (0.009)
9 Federal Government Should Spend on Healthcare for Uninsured	**0.660 (0.286)**	−0.130 (0.007)
10 Federal Government Should Spend on Medicare	**0.561 (0.248)**	−0.218 (0.010)
11 Favor Universal Healthcare for Children	**0.615 (0.268)**	−0.071 (0.007)
12 Favor Right to Sue HMOs	0.162 (0.075)	0.048 (0.015)
13 Federal Government Should Expend Effort to Protect Patients' Rights	**0.578 (0.249)**	−0.135 (0.013)
14 Federal Government Should Spend on Medicaid	**0.607 (0.266)**	−0.190 (0.012)
15 Federal Government Should Restrict Abortion	−0.197 (0.087)	**−0.601 (0.007)**
16 Federal Government Should Ban Abortion	−0.160 (0.077)	**−0.605 (0.008)**
17 Favor Death Penalty	−0.251 (0.107)	−0.026 (0.009)
18 Favor Handgun Licenses	0.303 (0.132)	0.175 (0.011)
19 Federal Government Should Expend Effort to Restrict Gun Purchases	**0.535 (0.233)**	0.040 (0.008)
20 Federal Government Should Limit Contributions to Parties	0.245 (0.110)	0.064 (0.011)
21 Favor Soft Money Ban	0.055 (0.009)	0.136 (0.014)
22 Federal Government Should Spend on Public Campaign Financing	0.229 (0.010)	−0.026 (0.014)
23 Federal Government Should Spend on Missile Defense	−0.163 (0.012)	**−0.437 (0.013)**
24 Federal Government Should Spend on Military	−0.261 (0.007)	−0.362 (0.011)
25 Federal Government Should use Military for Foreign Civil Wars	0.193 (0.011)	−0.154 (0.014)
26 Favor Gays in Military	0.385 (0.008)	0.346 (0.010)
27 Federal Government Should Expend Effort to Stop Job Discrimination Against Gays	**0.583 (0.004)**	0.055 (0.009)
28 Federal Government Should Expend Effort to Stop Job Discrimination Against Blacks	**0.600 (0.004)**	−0.144 (0.009)
29 Federal Government Should Expend Effort to Stop Job Discrimination Against Women	**0.632 (0.005)**	−0.151 (0.012)
30 Federal Government Should Reduce Income Differences	**0.434 (0.007)**	−0.175 (0.013)
31 Federal Government Should Spend on Aid to Mothers with Young Children	**0.562 (0.007)**	−0.233 (0.008)
32 Federal Government Should Expend Effort to Protect Environment	**0.591 (0.006)**	0.027 (0.011)
33 Federal Government Should Expend Effort to Eliminate Many Business Regulations	0.131 (0.011)	−0.223 (0.015)
34 Federal Government Should Allow School Prayer	−0.067 (0.010)	**−0.532 (0.007)**

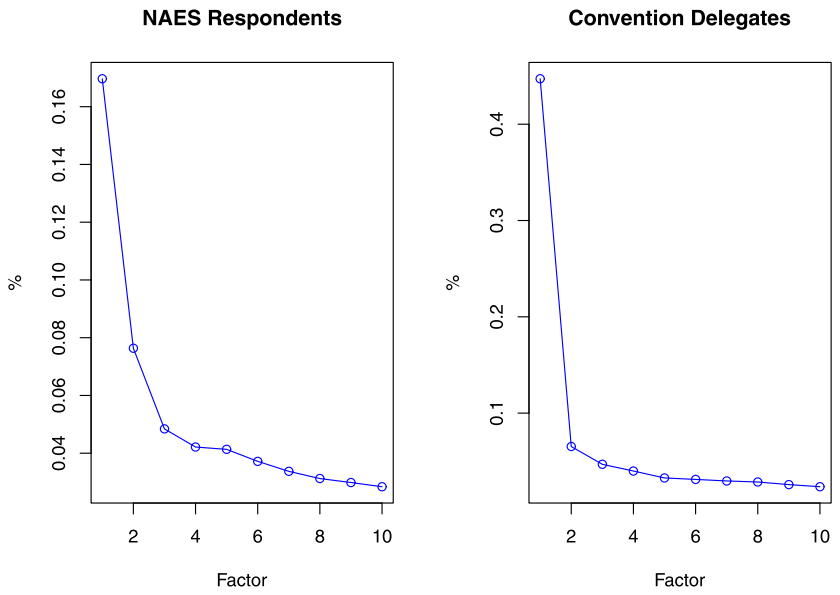


Fig. 1 Dimensionality scree plot. The first panel reports results for the NAES respondents while the second panel reports results for respondents to the 1992 Convention Delegate Study

dimension explains 7.6 % of it. All remaining dimensions explain less than 5 % of the variance. We can see that the plot levels off after the second dimension. Thus, employing the "elbow rule", I would argue that the data are most supportive of a two-dimensional model.

For comparison, I also report a scree plot for a principal components decomposition of 25 issue items in the 1992 Convention Delegate Study.[2] Here, the "elbow" rule clearly suggests a one-dimensional model. Similar results have been obtained for House members (Poole and Rosenthal 1997) and congressional candidates (Ansolabehere et al. 2001b). Together, these results indicate that (at least) two dimensions of ideology are needed to characterize American public opinion while one dimension of ideology is needed to characterize the opinions of political elites.

Table 1 summarizes the factor loadings from the principal components decomposition for the first two dimensions. I highlighted in bold coefficients that were larger than 0.4 in absolute value, in order to identify items that load highly on each dimension. The signs of these coefficients determine whether each item is associated with left-wing or right-wing views along that dimension. Respondents who favored spending on social programs and education, favored patients rights, favored gun control, favored anti-discrimination legislation, and favored protecting the environment were more likely to have low scores in the first dimension. Respondents who favored school vouchers, were opposed to abortion, were pro-military, opposed gays in the military, and favored school prayer were likely to have high scores in the second dimension. The first dimension might be best described as primarily an economic left–right dimension. The second dimension might be best described as primarily a social conservatism dimension.

[2] I used the most recent Convention Delegate Study that was publicly available.

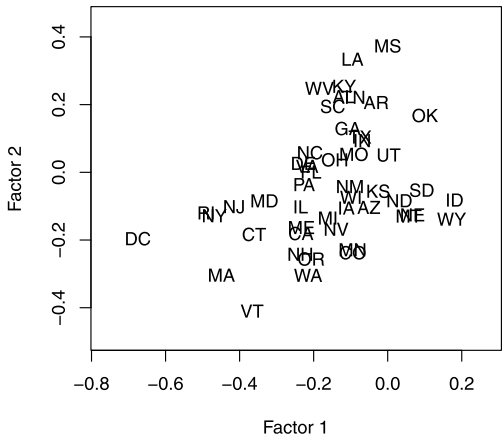


Fig. 2 Ideology in the states

I next report an ideology index based on the median voter ideology in each state along each dimension—Fig. 2 plots the ideology of the states in a two-dimensional space. In this figure and throughout, higher values of the index denote economic and social conservatism and lower values denote economic and social liberalism. The results here generally conform to conventional wisdom. States such as Wyoming, Idaho, North Dakota, and Oklahoma, are farthest to the right on the first dimension, while the District of Columbia, Rhode Island, New York, and Massachusetts are farthest to the left along the first dimension. States such as Mississippi, Louisiana, and West Virginia, are the most socially conservative. Many southern states, such as Tennessee, Alabama, Kentucky, and South Carolina, are somewhat right of center along the economic dimension, but are far right of center on the social dimension. States such as Montana, Nebraska, and Colorado are economically conservative, but socially liberal.

In order to further reflect on the validity or the index, I compared my index to two alternative measures. The first measure was based on the ideological self-placement item in the NAES. The item asked respondents to place themselves on a 1 to 5 liberal–conservative scale. I used the within unit mean within each state and congressional district to create this measure. The second measure was based on voting patterns in the 2000 U.S. presidential election. I based this measure on the right-wing vote share—the number of Bush votes plus the number of Buchanan votes, divided by the total number of votes. For congressional districts, my dataset did not separate out Buchanan votes, so I instead used the total number of votes minus the number of Gore and Nader votes, divided by the total number of votes.

I found that there was quite a high degree of correlation between these indices and the first dimension of the ideology index. For congressional districts, the correlation between the self-identification index and the first ideological dimension was $r = 75$ % and the correlation between the election outcome-based index and the first ideological dimension was $r = 80$ %. The correlation between these measures and the second dimension index was substantially lower—the correlation was $r = 56$ % for the self-identification index and $r = 20$ % for the election outcome-based index. These results suggest that election outcome-based measures would primarily tap economic ideology while self-identification measures would tap some combination of economic and social ideology.[3]

[3]Treier and Hillygus (2009) reach a similar conclusion about self-identification measures.

6 Candidate positioning

Perhaps the most important application of measuring ideology is to the study of candidate positioning. A major finding in the representation literature is that representation is far from perfect. Here, I consider three departures from perfect representation and describe the implications for theories of candidate positioning. First, while public opinion is not polarized, voting behavior in Congress is polarized. Second, although candidates respond to the median voter in their district, we observe candidates from the Democratic and Republican parties taking divergent positions. Third, constituent ideology exhibits two dominant dimensions while voting behavior in Congress exhibits a single dominant dimension. Examining each of these in turn is useful in distinguishing between competing theories of candidate positioning.

6.1 Polarization

I define polarization as the lack of individuals having moderate opinions. Specifically, given a measure of ideology, I say that the distribution exhibits *polarization* if it has two distinct, separated modes that encompass most of the data. A distribution of ideology that is bimodal would be polarized. A distribution of ideology that is unimodal would not be polarized.

While my definition of polarization is consistent with Fiorina's (2005) definition, another definition is widely used in the literature. Alternatively, we may say that public opinion (or voting behavior in Congress) is *polarized by party* if the average positions of members of each party are different (McCarty et al. 2006). I prefer to call this *inter-party divergence* to distinguish it from the former concept. In particular, I define inter-party divergence as the absolute value of the difference between the average position of Democratic party identifiers and Republican party identifiers.

Note further that the implications for polarization in the literature depend on which definition is used. While Fiorina (2005) finds little evidence for polarization, Abramowitz and Saunders (2006) find that significant inter-party divergence exists. Levendusky (2009) finds that inter-party divergence in the electorate has increased over time (no such pattern has been documented for polarization in the electorate). Finally, voting behavior in Congress has experienced both increasing polarization and increasing inter-party divergence (McCarty et al. 2006).

Both concepts suggest a possible source of imperfect representation. If public opinion is polarized across districts, then convergence of the candidates (as is predicted by the Downsian and probabilistic voting models) will lead to a polarized legislature. If inter-party divergence exists in public opinion and primary elections exert a centrifugal force on the candidates, then electoral forces will lead to inter-party divergence in the legislature. Hence, both concepts need to be studied to understand imperfect representation because identifying patterns in each aids in distinguishing among competing theories of candidate positioning. This subsection will focus on polarization while I focus on inter-party divergence in the next subsection.

One of the major puzzles in the representation literature is that voting behavior in Congress exhibits polarization while public opinion does not. Poole and Rosenthal (1997) have documented that the distribution of legislator ideal points is highly bimodal. Contrarily, Fiorina (2005) has found that most Americans hold moderate positions on issues including abortion and tolerance of homosexuality. Few Americans, for example, hold the position that abortion should completely illegal or legal in all circumstances. Polarization among the voting population could certainly be one cause of polarization in Congress. According

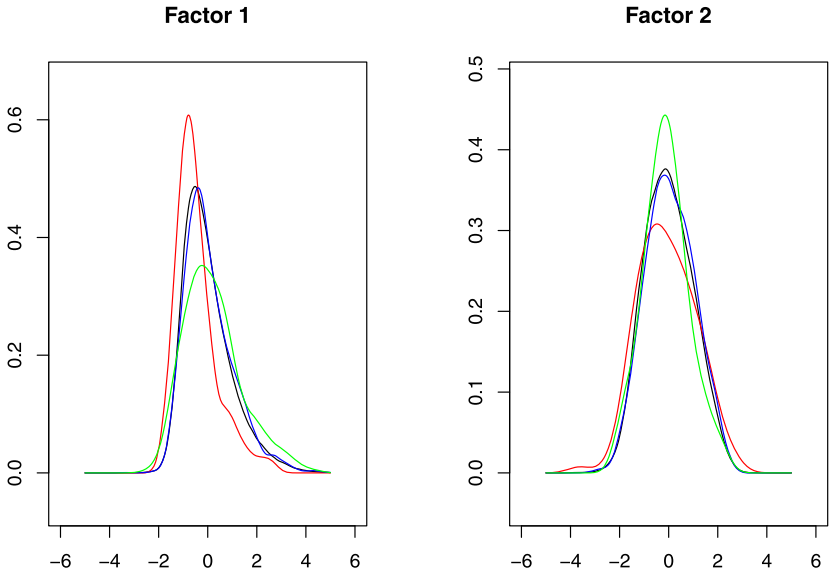


Fig. 3 Kernel density plots of ideology in the U.S. and selected states. The black density indicates the United States as a whole, the red density indicates Washington, DC, the blue density indicates Ohio, and the green density indicates Wyoming (Color figure online)

to the probabilistic voting model, polarization could occur if the median (or mean) voter is polarized across political jurisdictions (congressional districts or states). My goal in this subsection is then to look for these forms of polarization.

Let us begin by looking at the distribution of individual ideology. Figure 3 plots estimates of the individual first and second dimension ideology distributions. There is no evidence of polarization here. Looking within the states, I did not find any evidence of polarization either. I investigated plots of the ideology distribution in all the states in the sample and found that none of the states exhibited polarization along either the first or second dimension. Similarly, I investigated polarization within congressional districts using similar plots, and was unable to find any evidence of polarization. The first panel of Fig. 4 reports the contours of a kernel density estimate of first and second dimension ideology. Here, we again find that the distribution of ideology is unimodal. In the second panel of Fig. 4, we find that there is quite a bit of overlap in the preferences of Democratic and Republican primary and caucus voters.

I next investigated polarization across the states and congressional districts. The results can be seen in Figs. 2 and 5. Here, we again fail so see any evidence of polarization. Most of the states and congressional districts are located in the center of the distribution, while few are located at the extremes. We can comfortably reject the theory that the polarization of elected officials is caused by polarization at the congressional district level. Taken alone, these results provide evidence against the preference theory of divergence, but are potentially consistent with the competing theories.

One might speculate that polarization across congressional districts would be concentrated in large states. One could argue that control of the districting process would lead the parties to create safe seats for incumbents (Cox and Katz 2002). Creating safe seats would entail creating districts with many Democrats or many Republicans, whose median voter would be ideologically extreme (Carson et al. 2007). Practiced to an extreme, this process

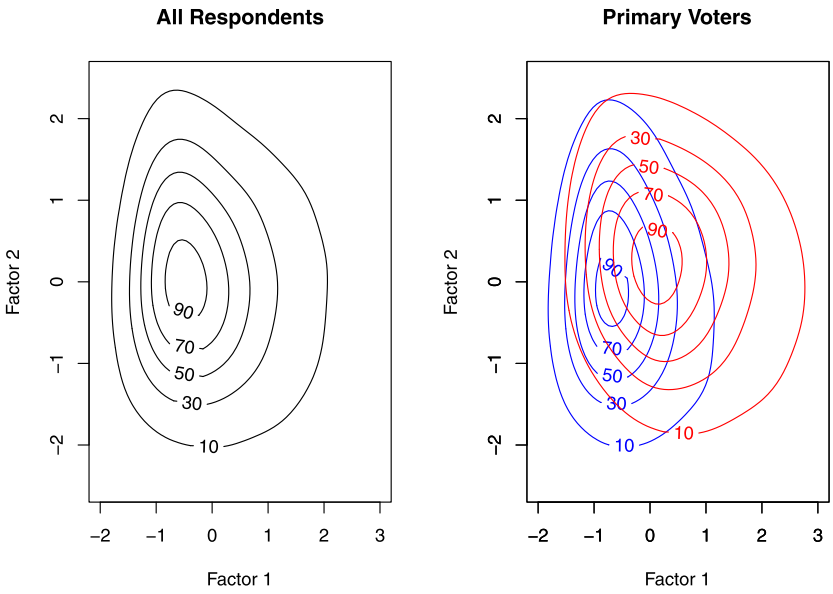
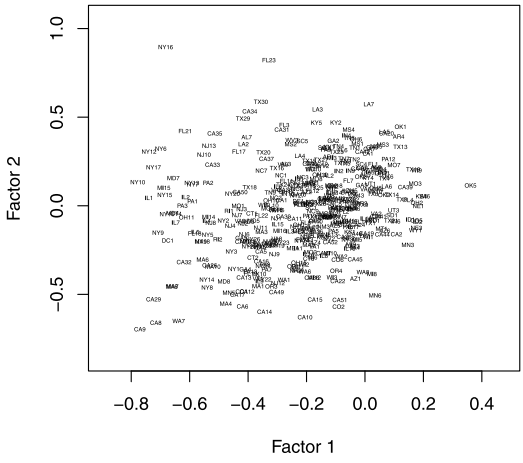


Fig. 4 Two-dimensional ideology distribution. The first panel reports the contours for NAES respondents and the second panel reports the contours for Democratic (in blue) and Republican (in red) primary and caucus voters (Color figure online)

Fig. 5 Ideology in congressional districts



could create districts wherein the median voter is polarized, leading even the preference theory to predict a polarized distribution of elected candidates. Since large states (which are, of course, assigned a larger number congressional seats) afford the most leeway in redistricting, polarization may be concentrated or most pronounced in large states. In Fig. 6, I plotted the ideology of congressional districts for the four states with the largest number of congressional districts. Once again, I failed to find any evidence of polarization. My analysis therefore suggests that polarization of the median voter across districts is absent even in larger states, where the districting mechanism is most likely to operate.

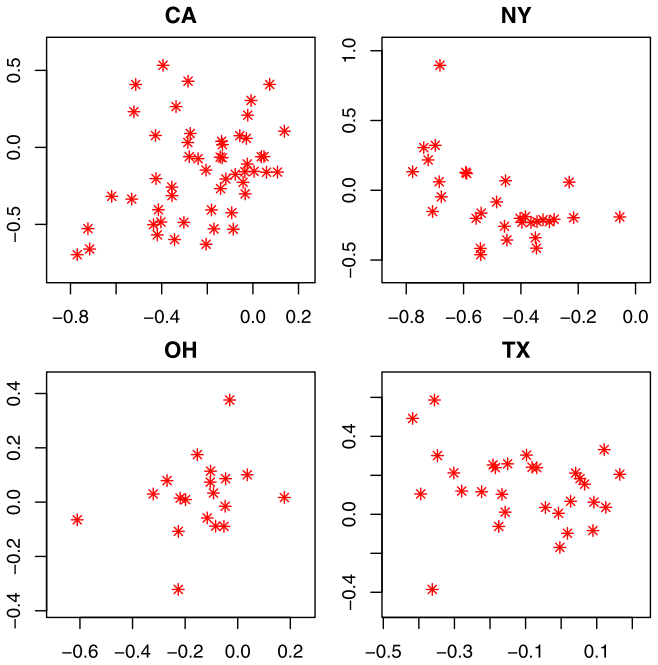


Fig. 6 Two-dimensional ideology of congressional districts in selected states

6.2 Responsiveness to local primary conditions

A second important finding in the literature is that Democratic and Republican candidates typically take divergent policy positions (Wright and Berkman 1986; Ansolabehere et al. 2001a; Burden 2004). This divergence is often attributed to the effect of primaries. A widely noted fact is that inter-party divergence in Congress has increased over time (Poole and Rosenthal 1997). Greater inter-party divergence among the electorate has been hypothesized as a cause. That is, the primary electorates have drifted apart over time, which has led the average position of the candidates they select to drift apart over time. This argument can work even if the greater inter-party divergence is not caused by increasing extremity in the electorate, but caused by identifiers sorting into the "correct" parties over time, as Levendusky (2009) argues.

A necessary condition for this mechanism is that there is indeed a relationship between the primary electorate and the candidates' positions. Adams and Merrill (2008) and Serra (2011) present models of elections as a two-stage process where candidates must first compete in primaries and the winning candidate from each major party's primary competes in a general election. These models generate predictions for the relationship between the positions of the primary and general electorates and the positions of the candidates. Like the Downsian and probabilistic voting models, these models predict that the candidates' positions will respond to the median voter in the general electorate, but these models also imply that the candidates' positions will respond to the median voter in their primary constituency. More specifically, if the primary election theory is correct, when the position of the median voter is held constant, a more left-wing Democratic primary constituency should encourage the Democratic candidate to take a more left-wing position. Similarly, a more right-wing

Republican primary constituency should encourage the Republican candidate to take a more right-wing position. I note that these are necessary conditions for the primary election theory to be correct—they are not sufficient conditions. Here, I will test whether these necessary conditions are satisfied using my ideology index.

We may think of measuring the Democratic (Republican) primary constituency's position using NAES respondents who reported voting in the Democratic (Republican) primary. The drawback of this approach is that for many of the respondents, primary voting behavior is not available.[4] Instead, I measure the location of the Democratic (Republican) primary constituency using the preferences of Democratic (Republican) identifiers. We can check the reasonability of this assumption by comparing the distribution of ideology for primary voters and identifiers among those respondents who answered both items. We can preform this check because even though we do not have enough NAES respondents to compute the median ideology of primary voters within congressional districts, we do have enough NAES respondents to examine the aggregate relationship between primary voting and party identification. I found that there was a near-perfect correspondence between these variables.[5]

I obtained estimates of positions of House candidates using data provided by Ansolabehere et al. (2001b) and Burden (2004).[6] Ansolabehere et al.'s estimates are derived from candidates' responses to the National Political Awareness Test in 1996 and 1998. Burden's estimates are based on a one-item survey sent to all House candidates in 2000. This survey asked all House members to place themselves on a liberal-conservative continuum ranging from 0 to 100.[7] As one might expect, neither the NPAT nor Burden's survey obtained complete cooperation, but I report results for both surveys because the reasons for nonresponse are likely to be different. The NPAT was intended to inform voters of the positions of the candidates while Burden's survey was intended solely for research purposes, so House members had less of a reason to believe that their responses to Burden's survey would be seen by their constituents.

To assess responsiveness to the median voter and the median primary voter, I report results of OLS regressions for which the dependent variables are measures of the candidates' positions and the independent variables are measures of the median voter's and median primary voter's positions along the first and second dimensions. The results are given in Table 2. Notice that district ideology on the first dimension is highly significant. Based on its magnitude, we can see that it is far more important in influencing candidate positioning than any of the other variables. I find that candidates respond in their position-taking to the median voter in their district. As is commonly found in the literature, I find that Democratic candidates are more responsive to the median voter along the first dimension. While candidates do diverge, the extent to which they diverge is not affected by the location of their primary constituencies. Hence, the lack of a positive and statistically significant coefficient on primary constituent ideology provides evidence against the claim that local primary conditions are an important contributor to candidate divergence.

[4] Primary voting behavior is not available for many of the respondents because they were surveyed before the primary election or because the item was not asked for these respondents.

[5] For example, one might speculate that Democratic and Republican primary voters would be more extreme than Democratic and Republican identifiers, but this pattern was not found in the NAES data.

[6] An advantage of using the 2000 NAES here (as opposed more recent studies) is that we are able to link the NAES data to the locations of both incumbents and challengers.

[7] For Ansolabehere et al.'s data, I employed the authors' index including imputed values. For Burden's data, I imputed data for candidates that served in the 107th House using their W-Nominate scores.

Table 2 Candidate responsiveness. In each column, the dependent variable is a measure of candidate positions. All models are estimated using OLS. Standard errors are in parentheses. One star indicates statistical significance at the 5 % level, two stars indicates statistical significance at the 1 % level, and three stars indicates statistical significance at the 0.1 % level

	NPAT Dem.	NPAT Rep.	Burden Dem.	Burden Rep.
Constant	0.366*** (0.024)	0.799*** (0.018)	49.016*** (3.153)	81.003*** (1.957)
Dist. Ideology (first dimension)	0.275*** (0.047)	0.219*** (0.041)	34.554*** (6.132)	23.878*** (4.777)
Dem. Ideology (first dimension)	0.045 (0.053)	–	2.140 (7.127)	–
Rep. Ideology (first dimension)	–	0.015 (0.028)	–	2.957 (3.178)
Dist. Ideology (second dimension)	0.051 (0.056)	0.117** (0.038)	12.481 (7.160)	5.854 (4.495)
Dem. Ideology (second dimension)	0.055 (0.043)	–	0.114 (5.669)	–
Rep. Ideology (second dimension)	–	−0.036 (0.031)	–	−1.193 (3.676)
R-Squared	0.242	0.163	0.254	0.173
N	350	362	299	289

The finding that the positions of candidates do not respond to local primary conditions may at first seem puzzling, but the relative moderation of primary constituencies provides an explanation. Most legislators are much more extreme than the average voter in their constituency, while Democratic and Republican primary voters are only somewhat more extreme than voters overall (Bafumi and Herron 2010; Stone and Simas 2010). The fact that primary constituencies are less extreme than the candidates suggests that the primary election theory will have a difficult time explaining the degree of divergence observed even if it can explain the presence of some divergence. Consequently, a different centrifugal force must be pulling the candidates away from the political center. The policy-motivation, base-mobilization, and resource theories all suggest potential centrifugal forces. If any of these forces are already in operation, then primaries may not exert an additional pull away from the political center. For example, policy-motivated candidates will attempt to pull policy in their preferred direction, subject to the constraint that they win the election. If candidates have extreme personal ideal points, then the primary electorate will not exert an additional pull because the candidates have already moved as far as they can from the political center. Alternatively, the primary electorate may exert only a small additional pull on the candidates' positions which may be difficult to detect using statistical analysis, in which case primaries could be viewed a providing a small centrifugal pull on candidate positions, but not a sufficiently strong one to explain the patterns of divergence we observe in the data.

An alternative explanation for why local primary conditions do not appear to affect candidate positioning is that primary elections may exert a centrifugal force only when they are competitive. Since only a small proportion of House primary elections are competitive—Ansolabehere et al. (2006) report that 11.0 % of House primary elections were competitive between 1960 and 2000[8]—any such centrifugal force would affect only a small fraction of

[8] A primary election was defined to be competitive if the winning candidate received less than 60 % of the vote.

races. Serra's (2011) formal model in fact predicts that primaries will cause greater inter-party divergence when they are competitive, although Serra's definition of competitiveness is quite different from Ansolabehere et al.'s and instead relates to the availability of a high quality primary challenger. Under this alternative view of primary elections, the primary election theory of divergence is wrong because the condition under which it generates divergence—the availability of a high quality challenger—is met only in a small percentage House races, and therefore the theory cannot explain the observed prevalence of inter-party divergence.

6.3 Dimensionality

A key finding of Poole and Rosenthal (1997) is that voting behavior in Congress exhibits a single dominant ideological dimension, yet my findings indicate that public opinion exhibits (at least) two dominant ideological dimensions. Hence, representation must entail a dimensionality reduction. We can see some evidence of this in Table 2—the larger coefficients on first dimension district ideology indicate that candidates for office respond more strongly to the first dimension preferences of their constituents than to their second dimension preferences. In fact, in three of the four regressions, second dimension preferences are not statistically significant.

The difference in dimensionality between public opinion and candidate positions is hard to account for using the preference theory. The preference theory suggests that the winning candidate will position at the median voter's location in each district. In Fig. 5 in particular, we see that congressional district medians differ over both the economic and social dimensions. Since the preference theory suggests that the winning candidate will adopt the position of the median voter, the preference theory has difficulty explaining the observed differences in dimensionality between voters and winning candidates.

Contrarily, the policy-motivation and resource theories can potentially explain this phenomenon. These theories posit that candidate positions respond to both public opinion and elite opinion. The policy-motivation theory suggests that candidates will diverge away from the median voter and towards their personal policy preferences (Wittman 1983; Groseclose 2001). The resource theory suggests that candidates will diverge away from the median voter and towards the preferences of their donors (Moon 2004). Both candidates for office and large donors are groups of political elites, whose preferences can be proxied for as in the second panel of Fig. 1. These results indicate that elite opinion is one-dimensional. Consequently, these two theories can potentially explain the difference in dimensionality between public opinion and candidate positions. Given the results in the second panel of Fig. 4, the base-mobilization theory is harder to reconcile with dimensionality reduction, as the preferences of voters from both parties over the second dimension are quite varied.[9]

7 Discussion

In this paper, I developed a measure of constituent ideology at the congressional district level, which can be used to distinguish among competing theories of candidate positioning. My results are least favorable to the preference and primary theories—both theories have difficulty coping with patterns observed in the data. We do not find polarization at the congressional district level, and this is true even in the largest states, where redistricting

[9] See Adams et al. (2005, 2010), and Peress (2011) for further evidence regarding the base-mobilization theory.

efforts have the most leeway to divide the state into polarized regions. Moreover, while public opinion is characterized by at least two dimensions, voting behavior in Congress can be characterized by a single ideological dimension, which responds mostly to economic issues. Both of these facts provide evidence against the preference theory of divergence. While inter-party divergence is present at both the voter and candidate level, primary elections do not seem to be a major contributor to inter-party divergence at the candidate level, providing evidence against the primary election theory of divergence.

The results are more favorable to the policy-motivation and resource theories—both provide an explanation for the various patterns found in the data. Consider first the policy-motivation theory, and consider Groseclose's (2001) formalization of the theory. Groseclose assumes that candidates care about holding office and care about policy outcomes. In his framework, the left-wing and right-wing candidates take divergent positions in equilibrium. The probability that the left-wing candidate wins varies with the left-wing candidate's valence advantage. We will sometimes observe extreme left-wing candidates winning and we will sometimes observe extreme right-wing candidates winning. This prediction holds regardless of the location or shape of the distribution of voter ideology. His model thus predicts that even when candidates care about their reelection prospects, we will observe divergent candidate positions and polarized elected candidates, even though voters are not themselves polarized, either within or across districts. Beyond these facts, the theory does not predict a strong relationship between the locations of primary constituencies and candidate positions, and suggests that dimensionality reduction will occur because candidate positions will respond to elite preferences (which are largely one-dimensional) as well as constituent preferences. A similar argument can be made for the resource theory, using, for example, Moon's (2004) formulation.

These findings have implications for the effectiveness of proposed solutions to the representation problem. The policy-motivation theory suggests that fidelity to the median voter is likely to be high when elections feature little uncertainty (Calvert 1985) and candidates of similar quality (Groseclose 2001). While uncertainty may be hard to manipulate by electoral design, the imposition of term limits may be effective in improving issue representation by eliminating the advantage held by incumbent candidates. The resource theory suggests that representation will be improved if the candidates' mobilization and advertising operations are made less effective. If this is the case, reforms aimed at limiting campaign contributions directly to the candidates may improve representation, even if they do not reduce the amount of money in politics, because they reduce the effectiveness of campaign spending by hindering coordination between the candidates and the source of the money. Contrarily, the lack of support for the primary election theory suggests that reforms such as open primaries, blanket primaries, and nonpartisan blanket primaries are unlikely to be effective in improving issue representation because the extremity of primary constituencies does not have a strong effect on the positions that congressional candidates take.

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