Geography and Polarization

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Abstract

Using new data on roll-call votes and public opinion in U.S. state legislative districts, we explain how ideological polarization within districts can lead to legislative polarization. Many of the seemingly “moderate” districts in suburbs and smaller cities that switch hands between Democrats and Republicans are internally polarized. The ideological distance between Democrats and Republicans within these districts is often greater than the distance between liberal cities and conservative rural areas. We present a theoretical model in which intra-district ideological polarization causes candidates to be uncertain about the ideological location of the median voter, thereby reducing their incentives for platform moderation. We then demonstrate that in otherwise identical districts, the difference in roll-call voting behavior between Democratic and Republican state legislators is a function of within-district ideological heterogeneity. Accounting for the subtleties of political geography can help explain the juxtaposition of a polarized legislature and a moderate mass public. Our analysis encourages skepticism about redistricting reforms that aim to cure polarization by creating more heterogeneous districts.
Introduction

One of the enduring puzzles in the study of American politics is the juxtaposition of an increasingly polarized Congress with an apparently stable and centrist electorate (Fiorina 2010). After failing to find a link between polarization in Congress and the polarization of policy preferences in national surveys, researchers are turning away from the ideology of the mass public, looking instead at institutional features like primaries, agenda control in the legislature, and redistricting that may have led to increased Congressional polarization (Fiorina and Abrams 2008).

This paper brings attention back to the distribution of ideology in the mass public with new data and an alternative theoretical approach. First, drawing on the vast data collection efforts of Shor and McCarty (2011), we turn away from the traditional analysis of change over time in the U.S. Congress, focusing instead on the considerable cross-sectional variation in state legislative polarization. Figure 1 shows that, just as in Congress, nearly all state legislatures are polarized, and this division is increasing in most states over time. In fact, the level of polarization at the state legislative level is largely comparable to that of the US Congress, and in many states actually exceeds it.

A focus on state legislatures brings a number of advantage in addition to allowing us to leverage the tremendous cross-sectional variation in American state legislative districts, both between and within states. While we do not do so in this paper, in the future we plan to examine the role of state-level institutions in amplifying or mitigating the connection between opinion and legislative polarization. These institutions, including primaries, campaign finance rules, voting reforms and so forth, are more heterogenous across states and change more rapidly at the state level than they do for Congress as a whole.

Second, we mobilize a “super survey” created by Tausanovitch and Warshaw (2013) to characterize the distribution of ideological preferences not only within states, but also across and within state senate districts and even among partisan subgroups within those districts.

By joining these data sets together, we are able to focus squarely on an obvious blind spot in the literature on polarization: the geography of preferences. The focus on the overall national distribution of preferences—the dominant frame of previous work—is strangely misplaced in an electoral system with winner-take-all electoral districts. Legislative candidates should care only about the distribution of preferences in their own districts. If platforms of candidates and roll-call voting behavior of incumbents are responsive to the district median voter, ideological polarization across districts should correspond to polarization in roll-call voting. Indeed, we find some fragile cross-section evidence to this effect: the states with the largest ideological gap between voters in left-wing and right-wing districts also demonstrate
Figure 1: Legislative polarization, averaged across chambers, over time, as measured by the distance between party medians. All states are polarized and this division is increasing in most states over time.

the largest ideological distance between Democratic and Republican legislators.

Ideological polarization across districts within states is only part of the story, however, and only a prologue to this paper’s main contribution. In many states, a district-level version of Fiorina’s puzzle remains: there is a large density of districts where the median or average voter is quite moderate, but the voting behavior of the representative is extreme, and the legislature is far more sharply polarized than is the distribution of district medians.

To explain this, we develop a theory of within-district polarization. Building on the work of Calvert (1985) and Wittman (1983), we develop a model in which candidates with ideological preferences must choose platforms in the presence of uncertainty over the median voter. When candidates are uncertain about the ideological location of the median voter, they
shade their platforms toward their own—or their party’s—more extreme ideological preferences. Our key insight is that uncertainty about the median voter is driven in part by the ideological distribution of preferences in the district and the mapping of ideology to turnout from one election to the next. The intuition is that when there is a large mass of voters around the district median, even though turnout is volatile, the median voter on election day will be within a narrow range, and candidates cannot deviate very far from it. In contrast, when voters are more evenly distributed throughout the ideological spectrum or even polarized into a bimodal distribution, there is more uncertainty about the identity of the median voter on election day, and hence weaker incentives for the candidates to strategically suppress their own ideology in pursuit of victory.

We then turn to an empirical analysis of roll-call votes of state legislators. Building on the work of McCarty, Poole and Rosenthal (2009), we match districts that are as similar as possible on all dimensions but partisan control, showing that 1) as in the U.S. Congress, there is considerable divergence in roll-call voting across otherwise identical districts controlled by Democrats and Republicans, and 2) this inter-district divergence is a function of within-district ideological polarization as well as more direct proxies for uncertainty over the identity of the district median voter.

We conclude with a discussion of the implications of these findings for the polarization literature. It is quite plausible that the rise of polarization in the U.S. Congress has also been driven by increasing within-district polarization associated with demographic and residential sorting in recent decades. Moreover, our results suggest skepticism about redistricting reforms aimed at creating more ideologically heterogeneous districts as a cure for legislative polarization McCarty, Poole and Rosenthal (2009); McGhee et al. (2013); Kousser, Phillips and Shor (2013).

1 Polarization Between and Within Districts: Stylized Facts

1.1 The geographic distribution of ideology within states

Tausanovitch and Warshaw (2013) have created a bridge between several surveys, allowing them to dramatically increase the size of survey samples within small geographic areas, making it possible for the first time to characterize not only the mean or median, but also the nature of the distribution of ideological preferences within states and even legislative districts. Using survey responses on a battery of policy questions in the super-survey, we create an ideological preference scale for over 350,000 respondents. We are then able to
characterize some basic features of the geographic distribution of ideology in the United States, summarized in Figure 2.

The states are ranked by the green dots, which correspond to the overall standard deviation of the ideology scale within states. The state with the largest ideological spread is Washington, and the state with the narrowest spread is West Virginia. Some of the most ideologically heterogeneous states are in the West: Washington, Colorado, Arizona, Wyoming, New Mexico, and California. Some of the least heterogeneous states are some of the very conservative states of the South, along with some of the very liberal states of the Northeast.

One might guess that the ideological polarization of states like Washington, Colorado, or Minnesota comes from the vast ideological gulf between Seattle, Denver/Boulder, or Minneapolis and the surrounding exurban and rural peripheries. A growing literature on ideological residential sorting (Nall 2012; Bishop 2009; Tam Cho, Gimpel and Hui 2013) suggests that Americans are increasingly sorting into ideologically homogeneous communities. Indeed,
the county-level correlation between population density and Democratic voting has steadily increased in every presidential election since the 1950s (Rodden 2013). Centers of American cities are overwhelmingly populated either by poor minorities or progressive, cosmopolitan whites, both of whom vote overwhelmingly for Democrats, while rural agricultural areas have become more conservative and Republican. A common claim is that this increasing residential segregation maps onto electoral districts, and along with the Southern realignment, accounts for the rise of legislative polarization. As urban districts become more liberal, and exurban and rural districts become more conservative, Downsian legislative candidates converge on median voters who are increasingly ideologically polarized.

There are some holes in this story. First, until very recently, urban and rural America have been losing population, and ideologically diverse suburbs have been gaining population (Mieszkowski and Mills 1993). Black-white racial segregation is dramatically declining (Cutler, Glaeser and Vigdor 1997), and Latinos are moving to suburbs and rural areas. Moreover, “rural” electoral districts are very rarely homogeneously conservative. For instance, there is a network of post-industrial small towns arrayed along the natural resource extraction points, canals, railroads, rivers, and lakes of the East and Midwest, and these contain dense clusters of relatively liberal minorities and blue-collar whites surrounded by rural, conservative whites in the agricultural areas (Rodden 2013). Some of these towns ended up with colleges and universities and the attendant leftists. In the West, many rural districts contains sizable native American and increasingly, Latino populations.

In short, residential ideological segregation is a reality, but it takes place in large part below the level of electoral districts. Figure 2 demonstrates the cross-state manifestation of this by plotting measures of within- and between-district ideological polarization. In order to capture between-district polarization, we take the median of our ideological scale within each state senate district, and calculate the standard deviation across all districts in the state. We plot this indicator with the orange dots in Figure 2. Next, in order to capture within-district polarization, we calculate the standard deviation of the ideological scale within each state senate district, and then average across the standard deviations of all districts in the state. This indicator is represented in blue in Figure 2.

Figure 2 shows that these are very different concepts. Within- and between-district polarization are uncorrelated. Between-district polarization displays much greater variation across states, and it is only weakly correlated with overall ideological polarization. With the exception of one state (Florida), within-district polarization is far larger in magnitude than between-district polarization, and more closely associated with overall polarization. For instance, the ideological distance between respondents was relatively small in a wide range of legislative districts throughout West Virginia, even though the distance between more
liberal and conservative parts of the state is rather large relative to other states. Some of the ideologically polarized Western states do demonstrate relatively large ideological distance between the medians of their liberal urban districts and conservative rural districts, but the bigger story is the fact that voters are ideologically far apart within a wide cross-section of districts.

1.2 Where are the polarized districts?

Figure 3 plots the standard deviation of ideology for each state senate district on the horizontal axis, and the overall ideology of the district on the horizontal axis. The left side of the inverted U shape of the lowess plot in Figure 3 shows that the far-left urban enclaves are ideologically relatively homogeneous. The same is true for the conservative exurban and suburban districts on the right side of the plot.

The most internally polarized districts are those in the middle of the ideological spectrum. In other words, the districts with the most moderate ideological means— the “purple” districts where the presidential vote share is most evenly split— are the places where the electorate is most deeply polarized. These are the districts that switch back and forth between parties and determine which party controls the state legislature.

To see this more clearly, it is useful to take a closer look at the distribution of ideology in a highly polarized state. The panel on the left of Figure 4 displays our estimates of ideological means across the Colorado state senate districts, and the panel on the right displays the within-district standard deviation of the ideological scale. It shows that most
of the ideologically “moderate” districts in the state, colored in shades or purple on the left, are also among the most internally polarized (darker shades of orange on the right).

![Image](image_url)

(a) Mean ideology, CO State Senate districts  
(b) Ideological heterogeneity, CO State Senate districts

Figure 4: The distribution of votes and ideology in Colorado

We can gain further insight into the geography of these internally polarized districts by looking at precinct-level election results in Figure 5. Figure 5(a) zooms in on the pivotal “purple” Denver-Boulder suburban corridor, representing the centroids of precincts with colored dots. The numbers of the districts with the most ideologically moderate means are displayed in Figure 5(a), and these match up with kernel densities, displayed in Figure 5(b), of the distribution of our ideological scale within each corresponding district.

The Denver area is typical of many other U.S. metropolitan areas. Just outside the city center is a ring of ideologically moderate suburbs where the Obama vote share was slightly above 50 percent, and we see in Figure 5(a) that in some of them, for instance 19, 20, and 21, most of the precincts themselves are varying shades of purple. Nevertheless, we see in Figure 5(b) that the internal ideological distributions are sharply polarized.
(a) Precinct-level 2008 Obama vote share

(b) Within-district distribution of ideology, pivotal districts

Figure 5: Within-district distributions of votes and ideology, selected Colorado Senate districts
Figure 5 also portrays another genus of internally polarized district. Districts 15 and 16 are examples of more sparsely populated districts that contain sizable, residentially segregated pockets of both Democrats and Republicans. This phenomenon is most often found when exurban or rural conservative areas contain concentrated pockets of liberal Democrats, such as college towns, ski towns, 19th century manufacturing or natural resource extraction centers, or concentrations of racial minorities.

1.3 Does ideological polarization correspond to legislative polarization?

These data enable a new approach to what is becoming a classic question in American politics: does ideological polarization in the mass public correspond to ideological polarization in legislatures? The current literature answers with a tentative “no,” based on time series analysis of the U.S. Congress, where legislative polarization has grown but the ideological distance between Democrats and Republicans in the mass public has not.

As discussed above, Shor and McCarty (2011) have estimated ideal points of members of state legislatures from a large data set of roll-call votes covering several years. As a first cut, let us examine the shapes of the cross-district distributions of ideology and roll-call votes. If legislative polarization is a function of ideological polarization across districts, we might expect to see the familiar bimodal distribution of legislator ideal points mirrored in the distribution of ideology across districts.

Figure 6: Distributions of roll-call votes and district ideology

![Figure 6: Distributions of roll-call votes and district ideology](image)

Figure 6 displays kernel densities of standardized versions of both measures across all
state upper chambers: there is sharp divergence between the roll-call votes of Democrats and Republicans, but the distribution of ideology across districts has a single peak. The disjuncture is even more extreme when one examines these distributions separately for each state. Thus Fiorina’s (2010) puzzle reappears at the district level: there is a large density of moderate districts, but in many states the middle of the ideological distribution is not well represented in state legislatures.

Next, we examine cross-state variation in the polarization of legislatures using the difference in party medians introduced in Figure 1 above. In Figure 7, we plot this measure of legislative polarization against the between- and within-district measures of ideological polarization introduced above. Indeed, there is correspondence between ideological polarization in the mass public and the polarization of roll-call votes in the legislature. Yet contrary to conventional wisdom, the relationship is stronger for within-district polarization than for between-district polarization. The states with the highest levels of within-district polarization, like California, Colorado, and Washington, are those with the highest levels of legislative polarization.

These stylized facts motivate the remainder of the paper. In the middle of each states’ distribution of districts lies a set of pivotal districts that are ideologically moderate on average, but where voters are polarized within. Moreover, this within-district ideological polarization is a good predictor of polarization in state legislatures.

But given the logic of the median voter, why would electoral competition in these pivotal but polarized districts generate such polarized legislative representation? The remainder of the paper develops a simple intuition: when turnout is variable and difficult to predict, a heterogeneous internal distribution of ideology, such as the distributions displayed in Figure

(a) Legislative polarization and between-district ideological polarization

(b) Legislative polarization and within-district ideological polarization

Figure 7: Legislative polarization and ideological polarization

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above, creates uncertainty over the spatial location of the median voter. When a district is internally polarized, a moderate shift in the mapping of ideology to turnout—perhaps driven by national or statewide trends—can lead to a substantial shift in the location of the median voter. Relative to a district with a large density of moderates in the middle of the internal distribution, candidates in such internally polarized districts face weaker incentives for platform convergence.

2 The Model

Following Wittman (1983) and Calvert (1985), assume that there are two political parties who have policy preferences on a single dimension. Let $\theta_L < \theta_R$ be the ideal points of party $L$ and $R$ respectively. The preferences of party $L$ are given by a concave utility function $u_L(x)$ where $u_L$ is maximized at zero for $x = \theta_L$ and decreasing in $x > \theta_L$. Similarly, the utility of party $R$ is given by $u_R(x)$ which is maximized at $x = \theta_R$ and increasing for $x < \theta_R$.\(^1\)

We assume that the parties are uncertain about the distribution of voter preferences. But they share common beliefs that the ideal point of the median (and decisive) voter $m$ is given by probability function $F$ where $F(\theta_L) = 0$ and $F(\theta_R) = 1$.\(^2\) We assume that the median voter has single-peaked preferences around $m$.

Prior to the election, parties $L$ and $R$ commit to platforms $x_L$ and $x_R$.\(^3\) Voter $m$ votes for the party with the closest platform. Therefore, party $L$ wins if and only if $m \leq \frac{x_L + x_R}{2}$. Therefore, we may write the payoffs for the parties as follows:

$$U_L(x_L, x_R) = F\left(\frac{x_L + x_R}{2}\right) u_L(x_L) + \left[1 - F\left(\frac{x_L + x_R}{2}\right)\right] u_L(x_R) \quad (1)$$

and

$$U_R(x_L, x_R) = F\left(\frac{x_L + x_R}{2}\right) u_R(x_L) + \left[1 - F\left(\frac{x_L + x_R}{2}\right)\right] u_R(x_R) \quad (2)$$

The first order conditions for optimal platforms are

$$F\left(\frac{x_L + x_R}{2}\right) u'_L(x_L) + \frac{1}{2} \left[F'\left(\frac{x_L + x_R}{2}\right)\right] (u_L(x_L) - u_L(x_R)) = 0 \quad (3)$$

$$\left[1 - F\left(\frac{x_L + x_R}{2}\right)\right] u'_R(x_R) + \frac{1}{2} \left[F'\left(\frac{x_L + x_R}{2}\right)\right] (u_R(x_L) - u_R(x_R)) = 0 \quad (4)$$

\(^1\)Outcomes outside the interval $[\theta_L, \theta_R]$ involve dominated strategies.

\(^2\)That the median voter lies between the two party ideal points simplifies the discussion below.

\(^3\)In equilibrium, it must be the case that $x_L \leq x_R$ otherwise each party would prefer to lose to the other.
The second-order conditions will be met if $F$ is never too convex. It is straightforward to establish that convergence is not an equilibrium. Suppose $x_L = x_R$, then the first-order conditions become

$$\frac{1}{2} u_L'(x) = 0$$  \hspace{1cm} (5)$$

$$\frac{1}{2} u_R'(x_R) = 0$$  \hspace{1cm} (6)$$

But since $\theta_L < \theta_R$, these equations cannot hold simultaneously. It is also easy to see that $x_L = \theta_L$ and $x_R = \theta_R$ is never an equilibrium. In this case, the first-order conditions would become

$$- \frac{1}{2} \left[ F'(\frac{\theta_L + \theta_R}{2}) \right] u_L(\theta_R) = 0$$  \hspace{1cm} (7)$$

$$\frac{1}{2} \left[ F'(\frac{\theta_L + \theta_R}{2}) \right] u_R(\theta_L) = 0$$  \hspace{1cm} (8)$$

But these equations cannot hold as the left-hand side of the first expression is strictly positive and the left-hand side of the second is strictly negative. Therefore, the only candidate equilibrium is one where $\theta_L < x^*_L < x^*_R < \theta_R$.

This analysis establishes that when there is uncertainty about the median voter, the candidates will diverge. If the median voter is known with certainty, then candidates will converge as predicted by Downs. We can establish the direct relationship between uncertainty and polarization by re-writing the first-order conditions as:

$$\frac{F'(\frac{x_L + x_R}{2})}{F(\frac{x_L + x_R}{2})} = \frac{-2u_L'(x_L)}{u_L(x_L) - u_R(x_R)}$$  \hspace{1cm} (9)$$

$$\frac{F'(\frac{x_L + x_R}{2})}{1 - F(\frac{x_L + x_R}{2})} = \frac{2u_R'(x_R)}{u_R(x_R) - u_L(x_L)}$$  \hspace{1cm} (10)$$

The left-hand sides on both equations get larger as the candidates converge. So the amount of divergence depends on two features of the distribution of $m$, $F'_{\frac{c}{F}}$ and $F'_{\frac{1-F}{1-F}}$ at the cutpoint between platforms. For a very large family of distributions $F'_{\frac{c}{F}}$ and $F'_{\frac{1-F}{1-F}}$ is decreasing in the variance of $m$ when evaluated near the center of the distribution (as we would expect in a competitive election). This fact suggests the following empirical strategy. We would like to estimate the following model:

$$\text{divergence}_i = \alpha + \beta \text{var}_m + \gamma Z_i + \epsilon_i$$  \hspace{1cm} (11)$$
where divergence$_i$ is the distance between the two-candidates in district $i$, varm$_i$ is the variance of the median voter in district $i$, and $Z_i$ is a set of control variables. The theoretical model suggests that $\beta > 0$. Unfortunately, we only observe the winning candidates of the elections. So instead we use two alternative strategies. First, following McCarty, Poole and Rosenthal (2009) and Shor and McCarty (2011) we use matching techniques to estimate the average district divergence of for districts with different levels of varm$_i$. In a second stage, we show that estimates of $AIDD$ are higher for districts with larger values of varm$_i$. This is estimated by a regressions of the form:

$$x_i = \alpha + \beta_1 \text{varm}_i + \beta_2 \text{REP}_i + \beta_3 \text{varm}_i \text{REP}_i + \gamma Z_i + \epsilon_i \quad (12)$$

where $x_i$ is the ideological position of the incumbent in district $i$ and Party$_i$ is an indicator that equals 1 if the incumbent is a Republican and −1 if she is a Democrat. If varm has a polarizing effect, $\beta_3 > 0$ as it moves Republicans to the right and Democrats to the left.\(^4\)

3 An Empirical Exploration of Within-District Divergence

As we indicated in the last section, the lack of observations of losing challengers complicates our analysis.\(^5\) We follow the approach of McCarty et al (2009), who decompose partisan polarization into roughly two components. The first part, which they term intradistrict divergence is simply the difference between how Democratic and Republican legislators would represent the same district. The remainder, which they term sorting, closely related to what we refer to above as between-district polarization, is the result of the propensity for Democrats to represent liberal districts and for Republicans to represent conservative ones.

To formalize the distinction between divergence and sorting, we can write the difference in party mean ideal points as

$$E(x | R) - E(x | D) = \int \left[ E(x | R, z) \frac{p(z)}{p} - E(x | D, z) \frac{1-p(z)}{1-p} \right] f(z)dz$$

where $x$ is an ideal point, $R$ and $D$ are indicators for the party of the representative, and $z$ is a vector of district characteristics. We assume that $z$ is distributed according to density

\(^4\)The control variables will include a measure of the expected position of the median voter. In the matching analysis, the expected median is one of the covariates on which we match.

\(^5\)In the next draft we will include analysis of the difference between candidates within districts on the ideological scales that Adam Bonica has constructed from campaign finance records, as well as differences in NPAT responses where available.
function \( f \) and that \( p(z) \) is the probability that a districts with characteristics \( z \) elects a Republican. The term \( p \) is the average probability of electing a Republican. The average difference between a Republican and Democrat representing a district with characteristics \( z \),

\[ E(x \mid R, z) - E(x \mid D, z), \]

captures the intradistrict divergence, while variation in \( p(z) \) captures the sorting effect.

Estimating the AIDD is analogous to estimating the average treatment effect of the non-random assignment of party affiliations to representatives. There is a large literature discussing alternative methods of estimation for this type of analysis. For now we assume that the assignment of party affiliations is based on observables in the vector \( z \). If we assume linearity for the conditional mean functions, i.e.,

\[ E(x \mid R, z) = \beta_1 + \beta_2 R + \beta_3 x, \]

we can estimate the AIDD as the OLS estimate of \( \beta_2 \). But following the suggestion of Wooldridge (2002), we include interactions of \( R \) with \( z \) in mean deviations to allow for some forms of non-linearity. Mean deviating \( z \) before interacting with \( R \) insures that that the AIDD is the coefficient on \( R \).

Our claim is that the average intradistrict divergence is a function of within-district ideological heterogeneity, which we have measured as the standard deviation of district ideology. The results of this model are presented in the first column of Table 1. We have also estimated a model in which ideological heterogeneity is measured as the percentage of voters in each district who are “moderate” in that they fall within one half of one standard deviation of the statewide median. These results are presented in the second column of Table 1, and are not sensitive to various ways of differentiating between moderates and extremists.

The key findings are communicated in Figures 8 and 9. No matter which measure we use, average intradistrict divergence is clearly a function of ideological heterogeneity in the district. Controlling for mean ideology, presidential vote, and a variety of demographic covariates, the difference between the roll-call voting behavior of Democrats and Republicans within states is largest in districts that are most heterogeneous, and smallest in districts that have the largest densities of moderates.
Table 1: Effect of Heterogeneity and Moderate Voters on AIDD

<table>
<thead>
<tr>
<th></th>
<th>Heterogeneity</th>
<th>Moderate Voters</th>
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<tbody>
<tr>
<td>Republican</td>
<td>1.090</td>
<td>1.107</td>
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<tr>
<td></td>
<td>(0.0106)</td>
<td>(0.0106)</td>
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<tr>
<td>Hetero x Rep</td>
<td>0.989</td>
<td></td>
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<tr>
<td></td>
<td>(0.0745)</td>
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<td>Heterogeneity</td>
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<tr>
<td></td>
<td>(0.0508)</td>
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<td>Mean District Ideology</td>
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<td></td>
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<td>(0.0291)</td>
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<td>Ideology x Rep</td>
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<td>-0.0842</td>
</tr>
<tr>
<td></td>
<td>(0.0450)</td>
<td>(0.0452)</td>
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<tr>
<td>Repub Pres Vote</td>
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<td>0.481</td>
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<tr>
<td></td>
<td>(0.0797)</td>
<td>(0.0805)</td>
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<tr>
<td>Pres Vote x Rep</td>
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</tr>
<tr>
<td></td>
<td>(0.108)</td>
<td>(0.109)</td>
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<tr>
<td>Percent Moderates x Rep</td>
<td>-1.191</td>
<td></td>
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<tr>
<td></td>
<td>(0.133)</td>
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<tr>
<td>Percent Moderates</td>
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<tr>
<td>R-Squared</td>
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<td>0.834</td>
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Standard errors in parentheses
Continuous variables are mean deviated
Figure 8: **AIDD as a Function of Heterogeneity of District Voters**  The figure shows how the divergence between Democratic and Republican legislators changes as district heterogeneity is increased from its mean minus two standard deviations to the mean plus two standard deviations. Based on estimates from Table 1.

Figure 9: **AIDD as a Function of Percent of Moderate Voters**  The figure shows how the divergence between Democratic and Republican legislators changes as the percentage district moderates (those within .5 standard deviations of the state mean) is increased from its mean minus two standard deviations to the mean plus two standard deviations. Based on estimates from Table 1.
Because these functional forms are somewhat restrictive, we also use matching estimators to calculate the AIDD. Intuitively, these estimators match observations from a control and treatment group that share similar characteristics \( z \) and then compute the average difference in roll-call voting behavior for the matched set. We use the bias-corrected estimator developed by Abadie and Imbens (2002) and implemented in STATA (Abadie, Drukker, Herr, and Imbens 2001). But unlike the regression models, we are not able to estimate the AIDD as continuous function of district heterogeneity. Therefore, we use matching to estimate the AIDD on different subgroups of districts.

<table>
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<th>N</th>
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<tbody>
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<td>1</td>
<td>Overall</td>
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</tr>
<tr>
<td>2</td>
<td>High Heterogeneity</td>
<td>3155</td>
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</tr>
<tr>
<td>3</td>
<td>Low Heterogeneity</td>
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<td>High Uncertainty</td>
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<td>5</td>
<td>Low Uncertainty</td>
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<tr>
<td>6</td>
<td>High Moderates (.5 SD of state median)</td>
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<td>1.18</td>
</tr>
<tr>
<td>7</td>
<td>Low Moderates (.5 SD of state median)</td>
<td>3171</td>
<td>1.39</td>
</tr>
<tr>
<td>8</td>
<td>High Moderates (.25 SD of state median)</td>
<td>3143</td>
<td>1.22</td>
</tr>
<tr>
<td>9</td>
<td>Low Moderates (.25 SD of state median)</td>
<td>3152</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Table 2: Matching Estimates of AIDD

The matching approach tells a similar story. Average inradistrict divergence is greater among matched districts that are more heterogeneous, and among those that contain fewer moderates.

4 Discussion and Conclusion

Our key findings can be summarized as follows. Partisan polarization within state legislatures emerges in large part from the fact that Democrats and Republicans represent districts with similar mean characteristics very differently. We have discovered that these differences are especially large in districts that are most internally polarized. Further, we have discovered that these internally polarized districts are especially prevalent in the ideologically “centrist” places that most frequently change partisan hands in the course of electoral competition.

In other words, districts that are moderate on average often do not contain large densities of moderates. When candidates compete in these internally polarized districts in suburbs and outside of metropolitan areas, they face weak incentives to adopt moderate platforms and build up moderate roll-call voting records. Aggregating up to the level of states, we have shown that the states with the highest levels of within-district ideological polarization...
are also those with the highest levels of partisan polarization in the legislature.

Our large-sample super-survey only covers recent years, and we are not in a position to examine the evolution of ideological polarization over time within U.S. Congressional districts. Yet our analysis may shed light on the paradox of a polarizing Congress representing a stable and centrist electorate. A possible explanation is that as cities and very rural areas have depopulated, ideological extremists from both sides have converged on suburbs and exurbs where jobs and housing are most plentiful, and the internal polarization of the pivotal Congressional districts has increased even though the overall distribution of ideology across individuals has been stable. In other words, ideological moderates may be distributed less efficiently across districts than in the past. In fact, some of the most internally polarized districts are those with the most rapidly growing and changing populations. Likewise, some of the most polarized states are those that have experienced the most rapid population growth and demographic change in recent decades, for example in the West and sun belt, and as can be seen in Figure 1 above, legislative polarization is growing most rapidly in these states. This is worthy of further analysis.

Finally, our analysis has implications for debates about redistricting reform. A common claim is that polarization emerges because districts have become too homogeneous, as like-minded Americans have moved into similar communities and politicians have drawn incumbent-protecting gerrymanders. Some reformers advocate the creation of more heterogeneous districts, like California’s sprawling and diverse state senate districts, in order to enhance political competition and encourage the emergence of moderate candidates. This paper turns this conventional wisdom on its head. When control of the legislature hinges on cutthroat competition within internally polarized winner-take-all districts, candidates and parties do not necessarily face incentives for policy moderation.
References


