Geography, Uncertainty, and Polarization*

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April 7, 2014

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.

*Paper prepared for the Conference on the Causes and Consequences of Policy Uncertainty at Princeton University. An earlier version of the paper was presented at the 2013 Annual Meetings of the American Political Science Association. We thank Project Votesmart for access to NPAT survey data. The roll call data collection has been supported financially by the Russell Sage Foundation, the Princeton University Woodrow Wilson School, the Robert Wood Johnson Scholar in Health Policy program, and NSF Grants SES-1059716 and SES-1060092. Special thanks are due to Michelle Anderson and Peter Koppstein for running the roll-call data collection effort. We also thank the following for exemplary research assistance: Steve Rogers, Michael Barber, and Chad Levinson.

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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. Previous explanations for polarization focus, quite naturally, on variation across the nation as a whole, or on the average or median of traits of citizens in each district (McCarty, Poole and Rosenthal 2006; Jacobson 2004; Levendusky 2009). This work follows from a long literature on representation that builds on Black’s median voter theorem (Black 1948), which implies that the preferences of large groups can be characterized by that of the median individual.

The great majority of work in this area, however, finds that the median voter is an inadequate predictor of candidate or legislator positions (Ansolabehere, Snyder Jr and Stewart III 2001; Bafumi and Herron 2010; Clinton 2006; Miller and Stokes 1963). This paper builds on a nascent literature that focuses on the distribution of preferences across voters within districts rather than the median or mean (Gerber and Lewis 2004; Levendusky and Pope 2010). Our theory builds 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.

Existing research on polarization in the United States focuses primarily on attempting to explain a single time-series: the dramatic growth of polarization in the United States Congress (Poole and Rosenthal 1997). Unfortunately, the focus on Congress means that polarization is increasing along with many endogenous co-variates since the 1960s, and the time series may reflect strategic changes in agenda control by the parties. Moreover, most of the increase in polarization occurred prior to the years for which reliable estimates of voter ideology can be created at the district level. 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. As we demonstrate below, some states are even more polarized than the U.S. Congress, while others are much less so.

Our explanation for this heterogeneity focuses 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 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. In what
follows, our model of uncertainty over the median legislator will help resolve this puzzle.

After presenting our theory, we turn to an empirical analysis of roll-call votes of state
legislators. Building on the work of McCarty, Poole and Rosenthal (2009), we match dis-
tricts 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 diver-
gence 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). Finally, the utility of these results for explaining polarization suggest that future research on representation should take seriously the idea that other features of the distribution of preferences within districts may be important for determining legislator positions. Legislators do not answer to a single principle or compete with a fixed challenger (Besley 2007). They must balance competing strategic considerations as well as their own preferences in deciding what policy positions to uphold (Fiorina 1974).

**Polarization Between and Within Districts: Stylized Facts**

**The geographic distribution of ideology within states**

We begin by establishing some stylized facts that motivate the remainder of the paper. First, we examine the geographic distribution of ideology within states. One of the obstacles to previous research on this topic is that we have lacked good measures of the mass public’s ideology at the individual level in each state. However, 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 1.

We use these new data to examine three inter-related concepts. First, we measure the heterogeneity of each state’s ideology based on the standard deviation of citizens’ ideology within states. These estimates are shown with the green dots in Figure 1. The state

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1This scale corresponds closely to the measure of state ideology heterogeneity in Levendusky and Pope (2010).

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with the greatest ideological heterogeneity 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.

Next, 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 1. Finally, 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 1.

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. However, Figure 1 shows that between-district polarization is only weakly correlated with polarization in the mass public. Within-district polarization is far larger in magnitude than between-district polarization, and more closely associated with the mass public’s level of polarization. For instance, West Virginia’s low overall level of ideological polarization is explained not by the distance between liberal and conservative parts of the state— which is actually relatively large— but rather, by its unusually low level of ideological heterogeneity within districts. 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.
Where are the polarized districts?

Next, we examine the relationship between the ideology of the median voter in each district and its heterogeneity. Figure 2 plots our measure of the standard deviation of ideology for each state senate district on the horizontal axis, and our estimate of mean ideology of the district on the horizontal axis. The left side of the inverted U shape of the lowess plot in Figure 2 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 in
close elections 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 3 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).
(a) Precinct-level 2008 Obama vote share

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

Figure 3: 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 4. Figure 4 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 4, and these match up with kernel densities, displayed in Figure 4, 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 4 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 4 that the internal ideological distributions are sharply polarized.

Figure 4 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.
Figure 4: Within-district distributions of votes and ideology, selected Colorado Senate districts
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 5: Distributions of roll-call votes and district ideology

Figure 5 displays kernel densities 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, which we define here as the distance in ideal point estimates between the mean Democrat and the mean Republican in the legislature. In Figure 6, we plot the degree 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. Not only is legislative polarization correlated with between-district ideological polarization, but the states with the highest levels of within-district polarization, like California, Colorado, and Washington, are also clearly those with the highest levels of legislative polarization. In the states like West Virginia and Louisiana, where public opinion is not very polarized within districts, the Democrats and Republicans in the legislature are not very distinctive.
Figure 6: Legislative polarization and ideological polarization
These stylized facts motivate the remainder of the paper. In the middle of each states’ distribution of districts lies a set of potentially 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 4 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 polarized districts face weaker incentives for platform convergence.

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 $x < \theta_R$.\textsuperscript{2}

\textsuperscript{2}Outcomes outside the interval $[\theta_L, \theta_R]$ involve dominated strategies.
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 \( F(\theta_R) = 1. \) 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 \( x_R. \) 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:

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

and

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

The first order conditions for optimal platforms are

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

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

The second-order conditions will be met is \( F \) 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

\[^{3}\text{That the median voter lies between the two party ideal points simplifies the discussion below.}\]

\[^{4}\text{In equilibrium, it must be the case that } x_L \leq x_R \text{ otherwise each party would prefer to lose to the other.}\]
\[ \frac{1}{2} u'_L(x) = 0 \]  

(5)

\[ \frac{1}{2} u'_R(x_R) = 0 \]  

(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

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

(7)

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

(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:

\[
\frac{F' \left( \frac{\theta_L + \theta_R}{2} \right)}{F \left( \frac{\theta_L + \theta_R}{2} \right)} = \frac{-2u'_L(x_L)}{u_L(x_L) - u_L(x_R)}
\]

(9)
\[
\frac{F' \left( \frac{x_L + x_R}{2} \right)}{1 - F \left( \frac{x_L + x_R}{2} \right)} = \frac{2u'_R(x_R)}{u_R(x_R) - u_R(x_L)}
\] (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 \(m\), \(\frac{F'}{F}\) and \(\frac{F'}{1-F}\) at the cutpoint between platforms. For a very large family of distributions \(\frac{F'}{F}\) and \(\frac{F'}{1-F}\) 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:

\[
divergence_i = \alpha + \beta varm_i + \gamma Z_i + \epsilon_i
\] (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, 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:

\[
x_i = \alpha + \beta_1 varm_i + \beta_2 REP_i + \beta_3 varm_i REP_i + \gamma Z_i + \epsilon_i
\] (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.\(^5\)

\(^5\)The control variables will include a measure of the expected position of the median voter. In the
Second, following McCarty, Poole and Rosenthal (2009) and Shor and McCarty (2011) we use matching techniques to estimate the *average district divergence* for districts with different levels of $var_m$.

**An Empirical Exploration of Within-District Divergence**

As we indicated in the last section, the lack of observations of losing challengers complicates our analysis. 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

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

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 function $f$ and that $p(z)$ is the probability that a districts with characteristics $z$ elects a Republican. The term $\bar{p}$ is the average probability of electing a Republican. The average difference between a Republican and Democrat representing a district with characteristics $z$, matching analysis, the expected median is one of the covariates on which we match.
\[ E(x \mid R, z) - E(x \mid D, z) \], 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 the AIDD is the coefficient on \( R \).

Our claim is that the average intradistrict divergence is a function of uncertainty over the location of the median voter within districts. This follows directly from the Wittman-Calvert model. For the purposes of our empirical analysis, the key assumption is that uncertainty over the position of the median is greater in more heterogenous districts. Legislators are familiar with the distributions of preferences in their district, but uncertainty stems from many sources. Changing preferences, turnout, and changes in the composition of the districts can all have an effect. These “shocks” may be non-independent, inducing uncertainty over the median even in large samples.\(^6\) However, in homogenous electorates, even large shocks will fail to move the median voter. In more heterogenous electorates, small shocks may be sufficient. For this reason, within-district ideological heterogeneity is a good proxy for

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\(^6\)According to the Wittman-Calvert model, even a small amount of uncertainty can induce divergence, so even if shocks are independent, candidates will diverge.
uncertainty over the median voter.

We use two measures of ideological heterogeneity. The first and most straightforward was already displayed in some of the graphs above: the standard deviation of preferences in the electorate (Gerber and Lewis 2004; Levendusky and Pope 2010). We estimate this measure for every state senate district in the country using the large dataset of citizens’ ideal points from Tausanovitch and Warshaw (2013). The second measure is a more direct measure of the uncertainty over the median voter in each district. In order to measure uncertainty over the median, we bootstrapped 20 different samples from each district and fixed the number of respondents at 40 in each district.\(^7\) This allows us to hold variation in sampling error fixed across districts. In each simulation, we estimated the median ideal point in each district. Then, across all the simulations, we estimated the standard deviation of the median. This measure captures uncertainty over the median voter in each district.\(^8\)

We present our empirical results in Table 1. Results using the heterogeneity measure are presented in columns 1 and 2, while the results using the measure of uncertainty over the median are presented in column 3 and 4. Also, columns 1 and 3 use measures that include voters only, whereas columns 2 and 4 use the entire district-level sample.

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 most ideologically homogeneous. To get a better

\(^7\)We were only able to calculate this measure of uncertainty for districts where had more than 40 respondents in our data, which forced us to drop about 50% of state senate districts.

\(^8\)Note that this measure is a function of the percentage of “moderate” voters in each district that lie near the median.
idea of the size, of the effect, consider the first column of Table 1. A 1 standard deviation reduction in the voter heterogeneity - the standard deviation of the distribution of voters-leads to a reduction of .35 in the average interdistrict divergence. Figure 7(a) shows what this means more vividly. A district with heterogeneity less than one can expect to be represented by a moderate, regardless of party. In stark contrast, districts with heterogeneity of 1.75 can expect to be represented by a legislator who is from the extremes of their party.

One possible objection to this result is that it may be endogenous. State legislators are themselves in charge of the districting process in many states. It could be the case that more extreme legislators have more heterogenous districts because they designed the districts this way. There is reason to doubt this alternative explanation for our results. If this were the case, then it seems that moderates are being relegated to unsafe districts- precisely the opposite of what you would expect if moderates are able to leverage their pivotal position in the legislative process. However, we cannot a priori rule out the idea that districting is playing a role in producing these results. as a robustness check, we limit the sample to only those states with non-partisan districting commissions. Table 2 reports the results of this analysis. Our results with regard to our first measure of heterogeneity are robust to this limitation of our sample. However, our results with respect to our second measure are no longer significant. Although we suspect that this is due to lower variability in this measure, we cannot decisively rule out a role for gerrymandering.

Because these functional forms used in the above analysis 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
Table 1: Uncertainty/Legislator Score Models (OLS)

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<th>Legislator Score</th>
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<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<td>0.32***</td>
<td>0.35***</td>
<td>0.36***</td>
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<tr>
<td>R Pres Vote 2008</td>
<td>1.26***</td>
<td>1.29***</td>
<td>1.19***</td>
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</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.08)</td>
<td>(0.11)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Heterogeneity Voters * R</td>
<td>1.19***</td>
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<tr>
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<tr>
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<td>−0.02</td>
<td>−0.08**</td>
<td>−0.10**</td>
<td>−0.13***</td>
</tr>
<tr>
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<td>(0.05)</td>
<td>(0.03)</td>
<td>(0.05)</td>
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<tr>
<td>R Pres Vote 2008 * R</td>
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<td>0.31*</td>
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<td>Observations</td>
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<td>3,550</td>
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<td>R²</td>
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<td>0.82</td>
<td>0.83</td>
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<tr>
<td>Adjusted R²</td>
<td>0.83</td>
<td>0.82</td>
<td>0.83</td>
<td>0.82</td>
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<tr>
<td>Residual Std. Error</td>
<td>0.38 (df = 3542)</td>
<td>0.38 (df = 5862)</td>
<td>0.39 (df = 3542)</td>
<td>0.38 (df = 5862)</td>
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Note: *p<0.1; **p<0.05; ***p<0.01
Table 2: Heterogeneity/Legislator Score Models (OLS) - Commissions Only + IA

<table>
<thead>
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<td>(0.14)</td>
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<tr>
<td>Heterogeneity Voters</td>
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<td></td>
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<tr>
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<tr>
<td>Uncertainty Voters</td>
<td></td>
<td></td>
<td></td>
<td>0.08</td>
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<tr>
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<td></td>
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</tr>
<tr>
<td>Uncertainty Citizens</td>
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<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>-0.20</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>(0.13)</td>
</tr>
<tr>
<td>Median Citizen Ideology</td>
<td>0.21***</td>
<td>0.22***</td>
<td>0.21***</td>
<td>0.25***</td>
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<td>(0.05)</td>
<td>(0.04)</td>
<td>(0.05)</td>
<td>(0.04)</td>
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<tr>
<td>R Pres Vote 2008</td>
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<td>0.87***</td>
<td>0.88***</td>
<td>0.59***</td>
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<td>(0.22)</td>
<td>(0.15)</td>
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<tr>
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<td>1.64***</td>
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<tr>
<td>Heterogeneity Citizens * R</td>
<td></td>
<td></td>
<td>1.42***</td>
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<td></td>
<td>(0.18)</td>
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</tr>
<tr>
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<td>0.05</td>
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<tr>
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<td>(0.17)</td>
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<tr>
<td>Uncertainty Citizens * R</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.89***</td>
</tr>
<tr>
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<td>(0.17)</td>
</tr>
<tr>
<td>Citizen Ideology * R</td>
<td>0.24***</td>
<td>0.02</td>
<td>0.16*</td>
<td>-0.01</td>
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<td></td>
<td>(0.08)</td>
<td>(0.06)</td>
<td>(0.08)</td>
<td>(0.06)</td>
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<tr>
<td>R Pres Vote 2008 * R</td>
<td>0.02</td>
<td>0.34</td>
<td>0.34</td>
<td>0.65***</td>
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<td>(0.36)</td>
<td>(0.25)</td>
<td>(0.36)</td>
<td>(0.25)</td>
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<tr>
<td>Constant</td>
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<td>-1.19***</td>
<td>-1.01***</td>
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<td>(0.18)</td>
<td>(0.16)</td>
<td>(0.09)</td>
<td>(0.07)</td>
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</table>

Observations  1,233  1,678  1,233  1,678  
R²             0.85    0.85    0.84    0.85    
Adjusted R²    0.85    0.85    0.84    0.85    
Residual Std. Error 0.37 (df = 1225) 0.36 (df = 1670) 0.38 (df = 1225) 0.36 (df = 1670)

Note:  *p<0.1; **p<0.05; ***p<0.01
Figure 7: Predicted values of the gap between Democrats and Republicans as a Function of District Heterogeneity

the bias-corrected estimator developed by Abadie and Imbens (2002) and implemented in R using the Matching package (Sekhon 2013). 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 3 contains the results.

<table>
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<tr>
<th></th>
<th>N.Obs</th>
<th>N.Rep</th>
<th>AIDD</th>
<th>SE</th>
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<td>Overall</td>
<td>8257</td>
<td>4208</td>
<td>1.27</td>
<td>0.01</td>
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<tr>
<td>High Heterogeneity Citizens</td>
<td>3437</td>
<td>2075</td>
<td>1.38</td>
<td>0.02</td>
</tr>
<tr>
<td>Low Heterogeneity Citizens</td>
<td>3442</td>
<td>1483</td>
<td>1.10</td>
<td>0.03</td>
</tr>
<tr>
<td>High Heterogeneity Voters</td>
<td>1958</td>
<td>1185</td>
<td>1.38</td>
<td>0.03</td>
</tr>
<tr>
<td>Low Heterogeneity Voters</td>
<td>1963</td>
<td>934</td>
<td>1.20</td>
<td>0.03</td>
</tr>
<tr>
<td>High Uncertainty Citizens</td>
<td>3437</td>
<td>2106</td>
<td>1.32</td>
<td>0.02</td>
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<tr>
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<td>3442</td>
<td>1452</td>
<td>1.17</td>
<td>0.03</td>
</tr>
<tr>
<td>High Uncertainty Voters</td>
<td>1959</td>
<td>1223</td>
<td>1.32</td>
<td>0.03</td>
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<tr>
<td>Low Uncertainty Voters</td>
<td>1962</td>
<td>896</td>
<td>1.26</td>
<td>0.03</td>
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</table>

Table 3: Matching Estimates of the AIDD (Average Treatment Effect)

The matching approach tells a similar story. Average intradistrict divergence is greater among matched districts that are more heterogeneous or have greater uncertainty about the
median voters, and among those that contain more homogeneous electorates.

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 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


Kousser, Thad, Justin H. Phillips and Boris Shor. 2013. “Reform and Representation: Assessing Californias Top-Two Primary and Redistricting Commission.”.


