

**Explaining Variation in the Degree of Electoral Competition in a Mature Democracy:  
U.S. Senate Elections, 1922-2004\***

Stanley L. Winer  
Carleton University

Lawrence W. Kenny  
University of Florida

Bernard Grofman  
University of California, Irvine

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**ABSTRACT**

The degree of electoral competition varies across space and time in all democracies. We present a model that explains why and how variation in the competitiveness of U.S. Senate elections arises as a result of the interaction of constraints on the ideological positioning of candidates and differences within and across state electorates. Using this framework, we show that the factors that pull candidate platforms apart, including greater heterogeneity within an electorate, and primaries that restrict the electorate to registered party members, also lead to an increase in the number of contests that are highly competitive. Empirical implementation of the model using data from almost all Senate elections from 1922 to 2004 leads to predictions about where Senate races will be highly competitive, confirms the comparative static properties of the model, and generally provides robust support for this understanding of the roots of variability in the degree of electoral competition.

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## 1 Introduction

Political competition in any mature democracy is a multi-faceted process. It involves the feasibility of party and candidate entry *across elections*, competition for votes among parties and candidates *in elections*, and competition within legislatures (or among officials at different levels of government) to set policies *between elections*. Here we limit ourselves to the second of these aspects of competition. Our focus is state level, two-party competition in direct elections to the U.S. Senate in the period 1922-2004.<sup>1</sup>

We develop a model that explains why and how the interaction of constraints on the ideological positioning of candidates and the differing character of state electorates leads to variation in the degree of competition in Senate races. In the theoretical framework that we develop, it turns out that the factors that pull candidate platforms apart in an electoral equilibrium, including greater ideological heterogeneity of the electorate, and primaries that restrict the electorate to registered members, also lead to an increase in the number of contests that are highly competitive. The empirical work provides robust support for these comparative static implications, as well as for the utility of the basic framework we construct.

As shown in Table 1, there is substantial variation in the degree of competition in U.S. Senate races that needs to be explained.<sup>2</sup> To construct the stylized facts recorded in this table, the Republican share of the votes received by the two major parties in Senate elections in each state are averaged over 12 year periods for each state from 1922 to 2004. The size distribution of the absolute difference from 0.5 of these state-time vote share averages is then determined. This distribution is reported in the first row of Table 1 for all elections, and in the second row only for 'open' elections in which there is no incumbent seeking reelection. (The data underlying the table are used in the

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<sup>1</sup> The 17th Amendment to the constitution providing for the direct election of Senators was approved in 1913 and elections were phased in over the next half dozen years.

<sup>2</sup> Various authors have studied the pattern of competitiveness in U.S. congressional elections. See especially Mayhew (1974) and the subsequent 'vanishing marginals' literature.

empirical work presented later, and are extensively discussed below.)

[Table 1 here]

In a fully competitive electoral process such as that described by the standard Downsian model, we should expect that on average over time the Democrats and Republicans will tend to split the vote. Thus a large deviation from one-half of the average, *ex post*, vote share is indicative of an unbalanced electoral contest, assuming that on average the *ex post* outcome reflects the *ex ante* nature of the contest. By this measure, a substantial portion of Senate elections were competitive in the 1922 to 2004 period. In the full sample, the winner received on average between 0.50 and 0.55 of the two party vote in almost 40 percent of the state-time cells; and the winner's vote share was between 0.55 and 0.60 in an additional 23 percent of the cells. In the open (no-incumbent) election subsample, the winner received on average between 0.50 and 0.55 of the two party vote in about 40 percent of the state-time cells, and between 0.55 and 0.60 percent in 31 percent of the cells. (Thus open elections were somewhat more competitive than were elections with an incumbent present.)

But we should also notice that over 30 percent of all observations in the table involve a Republican vote share that deviates from 1/2 by more than 0.1, including about 8 to 10 percent that deviate by more than 0.3. So there is considerable variation in competitiveness in the history of Senate races taken as a whole. Variation over time both within each 12 year time period and across periods is also evident in Table 1, with the part of the sample that pre-dates the Second World War involving many more open contests that were landslides than in the four periods beginning in 1958.<sup>3</sup>

There is only a limited body of work that attempts to explain historical variations in the degree of electoral competition in Congress (see, for example, Froman 1963, Bond 1983, Hibbing and Brandes 1983, and Koetzle 1998), although there is a large literature emphasizing factors that are idiosyncratic to particular contests, such as differences in candidate spending or experience. Another body of research takes variation in political competition as given and considers its consequences.

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<sup>3</sup> Later in the paper we will disaggregate data by region as well as by time period.

This includes substantial work on the relationship of 'closeness' in elections - measured basically the same way as is the degree of competitiveness in Table 1 - and voter turnout, such as Filer and Kenny (1980), Cox and Munger (1989), Endersby et al (2002) and Franklin (2004) among many others.<sup>4</sup> It also includes a small number of papers that consider how variation in the degree of competition, again defined as in Table 1, influences the nature or economic consequences of public policy, some using data from U.S. states (e.g., Levitt and Poterba 1999, or Besley et al 2007), some using data from other countries (e.g., Remmer and Wibbels 2000, and Ferris et al 2008).<sup>5</sup>

While it is of course important to understand the consequences of political competition, it is just as important to understand the reasons for its variability in the first place. To do so in the context of Senate elections, we proceed as follows: In the next section, two conflicting models are initially proposed, and then a synthesis of these two models is developed that captures salient characteristics of each. Our approach highlights the importance for variability in the degree of competition of the *interaction* of the ideological character of state electorates and constraints on the positions that local candidates may espouse. Such constraints on local candidates may stem from the threat of a primary challenge by someone in their own party who is closer to the position of the national party or local party activists, or they may simply reflect the reductions in financial support from the national party and its donors forthcoming for candidates who stray too far from platforms that these groups regard as acceptable.

In the first of these frameworks, the *National Party Model*, constraints on local candidates imposed by their national party are very tight. As a result, candidates adopt the same platform regardless of the state-specific character of the electorate, and most contests are uncompetitive. In a second, *Local Platform Model*, the constraints are very loose and elections are uniformly highly

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<sup>4</sup> A standard hypothesis in this literature is that closer (i.e., more competitive) elections, lead to larger voter turnout, an hypothesis that usually receives empirical confirmation.

<sup>5</sup> One may also note here the literature on the role of political competition in determining historical changes in which party is politically dominant (See, e.g., Merrill et al 2008).

competitive. The third, or *Mixed Influence Model*, is a more sophisticated mixture or combination of these two extremes. We show that it alone is consistent with both variability in the degree of competition in Senate races and with observed ideological heterogeneity within the caucus of each party's elected representatives. Empirical implementation of this model allows us to predict in which states contests will be highly competitive and in which states competition will favor one or another of the parties.

Comparative static properties of the Mixed Influence Model are investigated in section three. We show that changes in voter preferences or in the nature of primary elections that have the effect of pulling opposing platforms apart reduce the number of contests in which national constraints prevent candidates from adopting locally winning platforms. Thus, these developments lead to an increase in the number of states with more competitive elections.

We begin the empirical implementation of all three models in section four with a discussion of the data and the basic estimating equation we employ. Results follow in section five, including predictions concerning the number and ideological characteristic of states with highly competitive elections, tests of the comparative statics and various checks for robustness. Section six contains an overview of our findings and suggestions for follow-up research.

## **2 Modeling Variation in Party Competition**

Models of two-party competition can generally be classified into two categories - those in which candidate platforms converge, and those in which their platforms diverge. In most spatial voting models in the Downsian (1957) tradition, policy platforms converge on the one preferred by the median voter or, more generally, end up close to the 'center' of the ideal points of the mass of voters (see, for example, Coughlin 1992). In contrast, in the second type of model, candidates select platforms that straddle the median or are balanced around the center of the mass of voters. Here platform divergence is explained by the centrifugal incentives created by differences in each party's

support base (see, e.g., Adams et al 2006, or Schofield and Sened 2006) and, relatedly, by national party organizations and party activists 'punishing' defectors from the party line, perhaps by running candidates against them in party primaries or by denying them financial support. Divergence may also result from threats of third party or candidate entry (Palfrey 1994, Gerber and Morton 1998), which also operate to attenuate the incentives leading to the convergence emphasized by Downs.<sup>6</sup>

The evidence clearly favors this second, divergent platform perspective. In the post Second World War era, for example, the seminal work on roll call data of Poole and Rosenthal (1997) indicates that Republican senators have a more conservative record than Democratic senators from the *same* state. Consequently, the analysis which follows emphasizes models in which divergent platforms emerge in an electoral equilibrium. However, simply using a model of platform divergence is not enough to understand the stylized facts illustrated in Table 1. For in standard models of divergence, as in their convergent equilibrium counterparts, the expected degree of success of the two parties is more or less equal. In this paper, in addition, we emphasize the importance of constraints on a local candidate's ability to choose a winning platform. Considering the consequences of constraints on the ability of candidates to position themselves in a local election is a sensible way to begin to understand why candidates in two-party elections do not, on average, split the vote.<sup>7</sup>

As noted earlier, we proceed by considering three distinct models, all of which exhibit platform divergence since we regard that as the more realistic case. To keep the discussion as straightforward as possible, we shall assume that competition between candidates in any election takes place in one, ideological, dimension, and that in this dimension, the median ideal point in each

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<sup>6</sup> We may also note here that Downs himself (1957, 98) saw problems with convergence as a sensible electoral strategy: "Citizens see little point in voting if all choices are identical, so differences between platforms must be created to entice voters to the polls."

<sup>7</sup> The model that is closest to our own is Grofman et al (2000). But that paper looks exclusively at House contests and focuses not on competitiveness but on split ticket voting. We share the idea that local candidates are constrained by national parties and/or constituency specific constraints.

state is unique and different from the national median.<sup>8</sup> To make our analysis more concrete, we also assume that when unconstrained, the two opponents in any contest select platforms at the "one-quarter" and "three-quarter" positions in a uniform distribution of voter ideal points. For example, if the distribution ranges from 0 (very liberal) to 100 (very conservative), this implies that candidates will locate at 25 and 75. This assumption is consistent with the platforms that candidates select in Palfrey's (1984) model, in which opposing candidates are forced in opposite directions away from the median in order to counter the threat of entry.

We begin the analysis by considering the *National Party Model* in which each national political party requires that *every* one of its candidates run on the platform it alone chooses. Such a situation may arise because of the need for a national party to establish a coherent (national) platform, to keep the heterogeneity of successful candidate types within bounds so as to create an effective caucus in Congress after the election, or because activists with policy preferences are intolerant of candidates who do not toe the party line.<sup>9</sup>

Under this scenario, a party's candidates for Senate espouse the same platform in each Senate race, one which must differ from the locally optimal ("1/4, 3/4") platform in each state. There would then be virtually no competition in Senate elections. Allowing for idiosyncratic factors, Democratic candidates would win handily in nearly all elections in which the state median voter is more 'Democratic' than the national median voter, and would lose badly in most races in which the state median is more 'Republican' than the national one.

The evidence does not support such a model of dominant national parties. First, the data in Table 1 indicate that many Senate elections are more competitive than is implied by this view. Second, there is considerable within-party variation in the voting records of Democratic and of Republican senators in contrast to the total lack of within-party variation predicted by this dominant

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<sup>8</sup> Complexities caused by competition over multiple dimensions are beyond the scope of this paper.

<sup>9</sup> On the importance of homogeneity in the party caucus for party cohesion and strength in Congress see, for example, Aldrich et al (2007) and Winer et al (2008).

national party framework. Evidence of intra-party heterogeneity in Senate voting records can be found in the Poole- Rosenthal data (1997). It can also be found in the Americans for Democratic Action's (ADA) index of liberal voting record that is compiled annually for Congress.

Francis and Kenny (2000) report the average attendance-adjusted ADA scores for Senators by state and party for 1979-1997. We may for purposes of this paper transform these average ADA scores so that the most liberal position (ADA = 100) is given a value of 0 and the most conservative position (ADA = 0) is given a value of 100. (We shall continue to use such liberal to conservative scales at various points in our discussion). Then the Democratic senatorial averages for a state range from 10 in Minnesota to 67 in Mississippi. Similarly, the Republican means range from 21 in Connecticut to 100 in Arkansas. Moreover, there is substantial party overlap in these positions. In 10 states the average Republican score is lower (more liberal) than the highest average Democratic score of 67 (in Mississippi)<sup>10</sup>, and there are 22 states in which the average Democratic score was higher than the lowest average Republican score of 21 (in Connecticut).

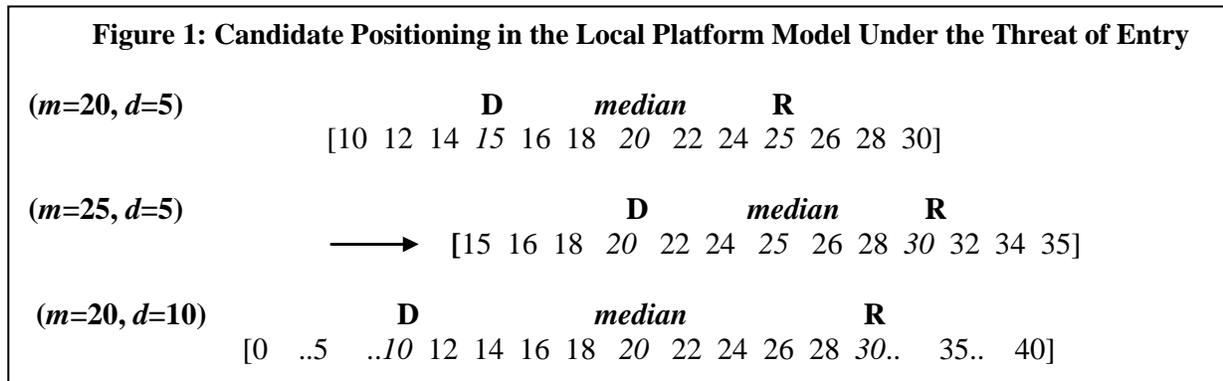
In stark contrast to a National Party Model, the next - *Local Platform Model* - assumes that each party's candidate in any state is able to freely adjust his or her platform to reflect the distribution of ideal points in the state. This allows the party's candidate to be fully competitive in each contest, thereby raising the national party's odds of having a Senate majority.

To draw out the implications of this second model, we require some additional structure. Now let the distribution of voter ideal points in state  $i$  range from  $(m_i - 2d_i)$  to  $(m_i + 2d_i)$ , where  $m_i$  is the ideological ideal point of the median voter, and  $d_i$  measures the dispersion of preferred positions in the state. Then, following Palfrey's solution, if the Democratic candidate represents the state's more liberal voters, he or she will select the platform that is one quarter up the distribution at  $(m_i - d_i)$ , and the unconstrained Republican candidate will select the position that is three quarters up the

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<sup>10</sup> These states and their left to right scores are MN 65, ND 65, IL 55, ME 53, PA 52, OR 45, RI 43, VT 38, MD 29, CT 21.

state's distribution, at  $(m_i + d_i)$ . The election is fully competitive, with each candidate having a 0.5 probability of winning. For example, if  $m_i$  equals 20 and  $d_i$  equals 5, as shown in Figure 1 below, then the distribution of ideological ideal points in state  $i$  ranges from 10 to 30. The Democrat runs on an ideology of  $\mathbf{D} = 15$ , and the Republican candidate selects  $\mathbf{R} = 25$ :



If the median voter's preferred ideology rises by  $\Delta = 5$  say (i.e.,  $m_i$  rises by  $\Delta$ ) with no change in the dispersion  $d_i$ , the interval  $[(m_i - 2d_i), (m_i + 2d_i)]$  shifts to the right by 5, to [15, 35] as indicated in the figure. As a result, each candidate's platform rises by the same amount, with the candidates now locating at  $\mathbf{D} = 20$  and  $\mathbf{R} = 30$ , while both candidate's probability of winning remains at 1/2.

What is the nature of competition in the country as a whole in such a model where local candidates can adapt as required to local conditions? In this framework, there will be substantial geographical variation in voting records, in accord with the facts based on ADA rankings presented earlier, with similar findings were we to use Poole-Rosenthal DW-NOMINATE values. But also, *all* elections will be highly competitive, seats will change hands frequently, and the parties will split the vote. This is *not* in accord with the stylized facts illustrated in Table 1.

In the third, and we think more realistic framework – *the Mixed Influence Model* - which combines national constraints and local competitive pressures, candidates can stray from national party positions, but candidates who stray too far are less successful. As we pointed our earlier, there can be various reasons for candidates of a party not doing well in some states. The national party and

its activists may withhold support to help the party put forward a more cohesive national message, to make the party's caucus in Congress more effective by limiting disagreement among elected members, or (especially in the case of activists) to keep the candidate true to the party's "ideals."<sup>11</sup> The candidate may regain national and activist support by adopting a platform that is closer to the national party's platform, but the candidate's platform is then farther from the state median voter, lowering his or her odds of winning.<sup>12</sup>

In which states are Senate races not competitive? Returning to the policy space described in Figure 1, suppose that support from the national Republican party is withdrawn if the candidate's position is, say, less than 30. If the dispersion parameter  $d$  equals 10, then the state median ideology at which this constraint begins to bind ( $m_i^*$ ) is where  $m_i^* + 10 = 30$ , implying that  $m_i^* = 20$ . Thus in liberal states where  $m_i < 20$ , the Republican candidate will be disadvantaged because she cannot adapt easily to the nature of the distribution of voters in the state. In more conservative states, on the other hand, Republican candidates can select their 'winning' or optimal platform with little interference from the national party or from party activists. Similarly Democratic candidates are expected to have little success in the most conservative states.

In this Mixed Influence Model, contests in the most liberal and most conservative states should not be competitive. In moderate or in-between states, where neither party's constraints bind, contests will be very competitive and seats will change hands frequently. In addition, as in the Local Party framework, elected senators will be ideologically diverse if the states are. Thus this framework may be consistent with the facts in Table 1 as well as with intra-party heterogeneity in the Senate. The empirical analysis we conduct below allows us to determine whether or not the Mixed Influence

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<sup>11</sup> A further reason for the constraint is that swing voters, exposed to messages from the national party, may not believe that a Republican candidate, for example, is as liberal as he or she claims to be. Of course the constraint may not be absolute:

<sup>12</sup> Cf. Esiasson (1999). Another possibility for the local candidate is to substitute personal funds for party funds. In that case, we should expect that candidates facing a relatively hostile national party will also tend to self-finance to a greater extent. Or, at the extreme we may see independent largely self-financed candidacies, such as that of Ross Perot.

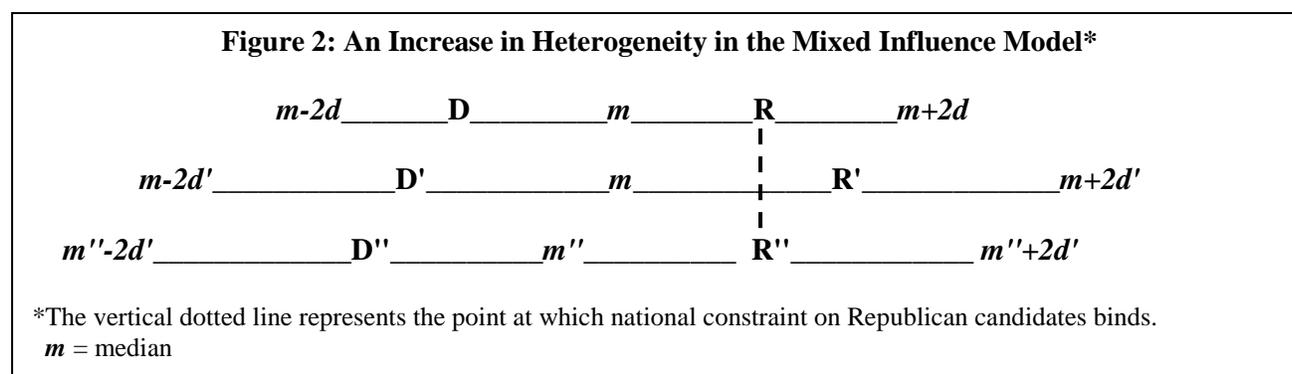
Model provides a useful explanation of the pattern of electoral competition in Senate races, or whether one of the other two models is more appropriate. Before we explain how this is done, we derive two comparative static properties of the Mixed Influence Model. Testing these predictions will provide additional evidence about the value of that framework in understanding the pattern of electoral competition in different settings.

### 3 Comparative Statics: Heterogeneity and Primaries

The extent of competition in the Mixed Influence Model depends on the heterogeneity of voter preferences and on rules governing a state's nomination process, as well as on the length of the tether placed on local candidates by national parties. We investigate the impact of heterogeneity and the nature of primary elections in this section.

#### 3.1 Heterogeneity

We first consider what happens if ideological heterogeneity generally increases. Begin with the situation for a particular state described in the first row of Figure 2, where the median is  $m$  and the dispersion parameter is  $d$ . We assume that in this state, the national party constraint represented by the vertical dotted line just binds at the optimal position for the Republican indicated by **R**:



Suppose now that heterogeneity increases in the sense that the dispersion of ideal points increases from  $d$  to  $d'$ , as shown in the second row of the figure. The Republican in the state we are

considering then becomes unconstrained, as indicated by the fact that the optimal Republican position  $\mathbf{R}'$  is now to the right of the dotted line.

What happens to Republican candidates in general if heterogeneity is increased in all states? As indicated by the third row in Figure 2, it is clear that the same national constraint will bite (e.g., at a point like  $\mathbf{R}''$ ) only when the median in a state is equal to  $m'' < m$ . Thus, compared to the situation before  $d$  increased, there will be an additional set of states with medians in the interval  $[m - m'']$  where Republican candidates may take positions that are unconstrained by the national party. The argument with respect to Democratic candidates is analogous, so that compared to the situation before heterogeneity generally increased, there is now a larger number of states where elections will be highly competitive.

Neither the National Party or Local Platform models exhibit this property of responsiveness of competition to changes in ideological heterogeneity. In the former, all elections involve an unbalanced win for one of the parties, and in the latter they are always completely competitive. Finding that a rise in the heterogeneity of voter preferences leads to an increase in the number of highly competitive states would help to substantiate the usefulness of the Mixed Influence Model as a basis for studying variation in the degree of political competition.

### 3.2 *Primaries*

We turn to consider party primaries, which introduce a second stage into the electoral process. A candidate must win his or her party's nomination before battling the other party's nominee in the general election. In an open primary, a party's members, independents, and often members of the other party are allowed to participate in selecting the party's nominee. In contrast, only a party's members, who are generally more extreme than the electorate as a whole, are allowed to vote in a closed primary.

It has long been hypothesized that the necessity of pleasing distinct sets of voters in a primary pulls candidates away from the median of the electorate as a whole. (See, for example, Coleman

1971, 1972 and Aranson and Ordeshook 1972). Since the set of voters that candidates face in an open primary is broader than for a closed primary, one should expect that effect to be more muted in states with open primaries. And indeed, Gerber and Morton (1998), Grofman and Brunell (2001), and Heckelman (2004) among others confirm that allowing independents and members of the other party to vote in a party's primary results, as expected, in smaller party differences in ideology.

We may conclude that closing an open primary is analogous in its effects on local party platforms to an increase in heterogeneity in the electorate – opposing platforms become more polarized and thus less likely to be bound by national party positions. It then follows that in the Mixed Influence Model, we should expect states with closed primaries to have more highly competitive elections than do states with open primaries.

An interesting complication concerns whether the primary has one stage, or potentially has two stages if a runoff is required when no candidate gets, say, a majority of the vote. In most of the South, senatorial party primaries in recent times have operated under majority runoff rules. Runoffs make it even more likely that the primary winner will take a less extreme position relative to the *party* median, which in turn should increase the likelihood that the election in such a state will be highly competitive.

#### **4 Estimation**

The Mixed Influence Model, as well as the alternatives to it that we have considered, may all be implemented by estimating a regression explaining the share of the vote for one of the two major parties in Senate elections, using the ideological character of state electorates as the key explanatory variable. Without loss of generality, we focus on the two party vote for Republican candidates. If the Mixed Influence Model is correct, there should be at least three regions in the ideological dimension which combine to explain variation in the Republican vote share: one where the Democratic candidate is likely to win, one where the Republican is likely to win, and a highly competitive or

middle region of some length in-between the other two, where both parties' candidates more or less share the vote. If the National Party model is correct, the middle region will be relatively small, while if the Local Party Model applies it will be relatively very large. The estimation method described in detail below determines the size of these three regions that together provide the best explanation of observed variation in the Republican vote share. By varying the sample employed, this estimation will also allow us to evaluate the comparative static predictions of the Mixed Influence Model.

Further evidence about the usefulness of the Mixed Model as a basis for understanding variation in competitiveness is provided by the estimated sign and relative size of the slope coefficients attached to each estimated region of competitiveness. Consider a state that falls into the first region, on the liberal end of the ideological spectrum, where Democrats are expected to win. Since Republican candidates in such heavily Democratic states are pressured by the national party to take more conservative positions than would be optimal in state-wide elections, Republican candidates will have more success when this state becomes *more* conservative. This follows because the conservative platform dictated by the national party or its activists is now closer to a viable platform for a Republican candidate. The implication of this logic is that the coefficient on an index of ideology for the first ideological region should be positive, assuming that ideology is indexed (as it will be) in such a way that an *increase* in the index means that a state's voters are becoming more conservative.

In more moderate or centrist states, the optimal local candidate platform in the Mixed Model is close enough to that of the national party that there is little pressure to modify it, and thus Senate races in such states are predicted to be fully competitive. Here Republican candidates for Senate should not fare much better in moderately Republican states than in moderately Democratic ones. Thus the coefficient on an index of ideology for moderate states in this middle, highly competitive region should be close to zero, or at least very small relative to the coefficient on the first region and, as we shall see, relative to that applying to the third region as well.

The third segment applies to the most conservative states. Here Democratic candidates are unable to select the most viable platforms due to pressure from the Democratic national party or its activists. (It may also be that the voters will not believe Democratic candidate claims to be very conservative.<sup>13</sup>) Thus as voters here become *more* conservative, the Democratic candidates' restricted platforms will depart even further from the platform that maximizes their chances of winning, allowing Republican candidates to enjoy even greater success. Hence we should expect the coefficient on this third region to be positive and larger than that on the middle region.

After introducing some important details concerning the data and about the indexes of state voter ideology that are used as explanatory variables, we explain how the location of the three regions of varying competitiveness can be estimated along with their coefficients, and how the comparative static predictions concerning heterogeneity and primaries may be tested.

#### ***4.1 The data and the dependent variable***

We obtained state-level data on election returns for presidential and U.S. Senate elections between 1922 and 2004 from *Congressional Quarterly's Guide to U.S. Elections* (4th edition, 2001) and from *America Votes*. Voting for the presidential candidate forms the basis for two alternative measures of the ideological preferences of voters in a state, as outlined below. Senate elections furnish the vote share data we seek to explain with these measures of ideology. The 1922 start date is determined by the availability of data. The 17<sup>th</sup> Amendment to the Constitution, which mandated the election of senators by direct popular vote, was adopted in 1913, and elections were phased in over the next half dozen years.

These data are aggregated into seven 12 year time periods: 1922-33, 1934-45, 1946-57, 1958-69, 1970-81, 1982-93, and 1994-2004. Aggregation over time reduces the noise in the various election variables. It also makes it possible to relate vote-share outcomes in Senate elections with a measure of ideology based on presidential voting patterns in a 12 year time period, even though two

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<sup>13</sup> The same caveat applies of course to Republican candidates in very liberal states.

thirds of the Senate elections occurred in a non-presidential election year.

The data reflect the entry into the union of Alaska and Hawaii in 1959. In addition, we also take note of the fact that Louisiana instituted a combined party primary system in 1975 in which candidates from all parties competed in a common primary. If a candidate received a majority of the votes cast in the primary, the general election was canceled. Due to the departure from the two stage party-nomination, general-election process used in all other instances, elections in Louisiana are dropped for the last three periods. Thus, as indicated in the first column of Table 1, the complete sample consists of 48 states over the first three periods, 50 states for the fourth period and 49 states for the remaining three periods, yielding 341 state-time observations. This main sample is partitioned in various ways introduced below to check for robustness of the results.

Between 1922 and the end of 2004, there were 1473 general elections for a U.S. Senate seat. A third party candidate won 14 of these elections, which are not used in the calculation of the measures of the success of Republican candidates against Democratic opponents in the general elections. For each Senate election, the Republican share in the total number of votes cast for the Democratic and Republican candidates was determined. Our dependent variable, *REPUBLICAN SENATE SHARE*, equals the average Republican vote share in all the Senate elections in each 12 year time period in each state.<sup>14</sup> It has a mean of 0.46 and ranges from 0 to 0.82. These averages are based on four to seven Senate elections in a state over a 12 year period. With two senators each elected every six years, nearly three-quarters of the 341 state-time cells are based on averages over four Senate elections. Additional elections to fill mid-term vacancies resulted in five to seven elections in a quarter of the data cells.

#### **4.2 Measuring ideological preferences**

We employ two alternative measures of the ideology of the state's electorate to explain variation in the vote share of Republican candidates in state Senate races. Each of these is based on how much

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<sup>14</sup> In Table 1, we considered the variation in  $|REPUBLICAN SENATE SHARE - 0.5|$ .

support the voters of a state provided the Republican presidential candidates in the 3 presidential elections in each of the 12 year state-time cells.<sup>15</sup> Since a given percentage vote for the Republican presidential candidate in any state may have different meanings in national Democratic landslides (e.g., 1964), close elections (e.g., 1960, 2000), and Republican landslides (e.g., 1972), both measures of the ideology of a state's voters place each state on the national *distribution* of support for Republican presidential candidates in each presidential election.

One measure utilizes the state's *rank* in the distribution of the shares of the two party vote cast for the Republican presidential candidate in a particular presidential election. For example, in the 2004 presidential election, Massachusetts had the smallest share of votes cast for George W. Bush (0.37) and was coded as 0.02 (=1/50). Utah cast the largest share for Bush (0.73) and was coded as 1(=50/50). Using a rank relative to the number of states included in that election's returns also allows us to control for loss of observations due to third party success and to control for a gain of observations because of the entry of Alaska and Hawaii into the union in 1959. *REPUBLICAN PRESIDENTIAL RANK* is the average of the state's rank in all the presidential elections in the time period. In each state-time cell, this mean is based on 3 presidential elections except in the 6 cells in which a third party candidate received a majority of votes in one of the elections.

Use of the explanatory variable *REPUBLICAN PRESIDENTIAL RANK* assumes that the states are equally spaced in liberal-conservative space. An alternative measure of state ideology that does not have that property is based on the *position* of a state's Republican share of the two party vote between the largest and smallest state Republican shares in some election  $e$ :

$$REPUBLICAN PRESIDENTIAL POSITION_e = \frac{state's\ Rep.\ vote\ share_e - the\ minimum\ Rep.\ share_e}{maximum\ Rep.\ share_e - minimum\ Rep.\ share_e}$$

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<sup>15</sup>Six state presidential outcomes in which a third party candidate received a majority of the state's votes were deleted. These include WI in 1924; AL, MS, and SC in 1948; and AL and MS in 1968.

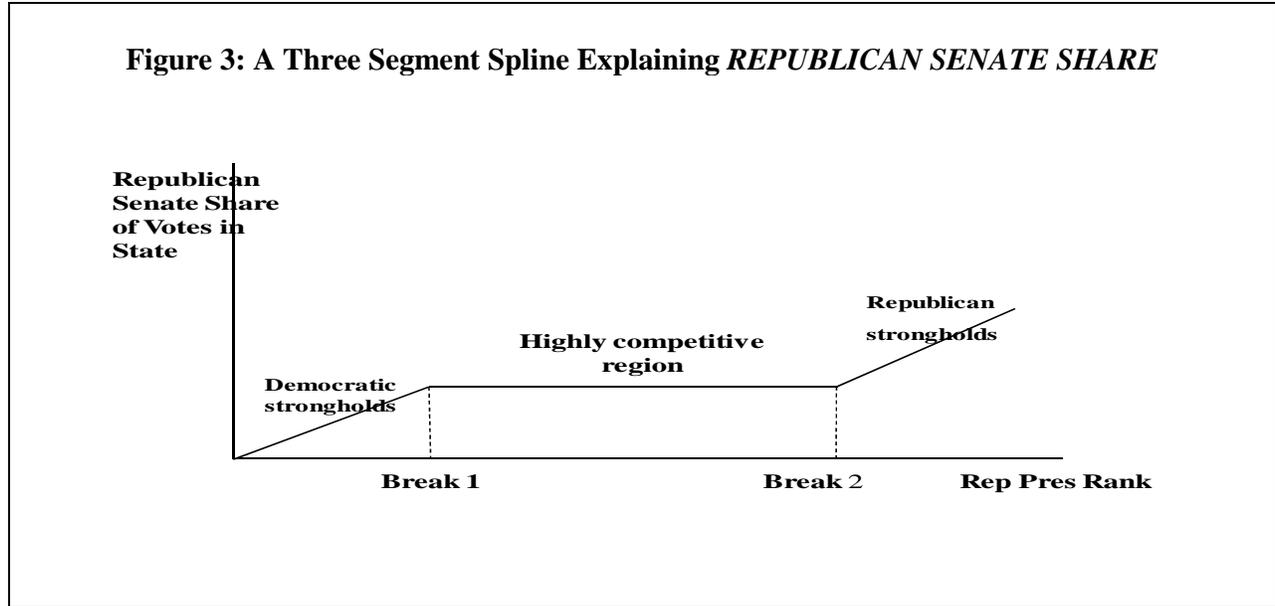
In any election  $e$ , this variable ranges from 0, in the state that had the smallest share of votes cast for the Republican candidate, to 1 in the state that provided the most support to the Republican nominee. *REPUBLICAN PRESIDENTIAL POSITION*, the alternative to *REPUBLICAN PRESIDENTIAL RANK* that we employ as an index of ideology, is the average value of this variable over the presidential elections in each state in any 12 year time period. It has a mean of 0.55 and ranges from 0 to 1. The correlation between it and *REPUBLICAN PRESIDENTIAL RANK* is 0.86.

### 4.3 The estimating equation

We are now ready to estimate the length of the three regions of varying competitiveness we have identified, along with the coefficients that reflect the effect on the vote share of marginal changes in the ideological character of a state. To do so, we employ a three segment spline explaining the Republican vote share. This is a linear and piecewise continuous function that changes slope at two break points on the domain of *REPUBLICAN PRESIDENTIAL RANK*, or alternatively on the domain of *REPUBLICAN PRESIDENTIAL POSITION*, labeled below as *BREAK1* and *BREAK2*. To see how the spline allows us to proceed, let *REPUBLICAN PRESIDENTIAL RANK* be denoted by *REP PRES RANK*, and define the segments of the spline as follows:

$$\begin{array}{ll}
 1^{st} \text{ SPLINE SEGMENT} = \text{REP PRES RANK} & \text{if } \text{REP PRES RANK} < \text{BREAK1} \\
 1^{st} \text{ SPLINE SEGMENT} = \text{BREAK1} & \text{if } \text{BREAK1} \leq \text{REP PRES RANK} \\
 2^{nd} \text{ SPLINE SEGMENT} = 0 & \text{if } \text{REP PRES RANK} < \text{BREAK1} \\
 2^{nd} \text{ SPLINE SEGMENT} = (\text{REP PRES RANK} - \text{BREAK1}) & \text{if } \text{BREAK1} \leq \text{REP PRES RANK} < \text{BREAK2} \\
 2^{nd} \text{ SPLINE SEGMENT} = (\text{BREAK2} - \text{BREAK1}) & \text{if } \text{BREAK2} \leq \text{REP PRES RANK} \\
 3^{rd} \text{ SPLINE SEGMENT} = 0 & \text{if } \text{REP PRES RANK} < \text{BREAK2} \\
 3^{rd} \text{ SPLINE SEGMENT} = (\text{REP PRES RANK} - \text{BREAK2}) & \text{if } \text{BREAK2} \leq \text{REP PRES RANK}.
 \end{array}$$

The spline that uses *REPUBLICAN PRESIDENTIAL POSITION* is defined analogously. In either case, the resulting spline will look like the one depicted in Figure 3:



The general regression that incorporates the spline and allows its estimation is:

$$\begin{aligned} \text{REPUBLICAN SENATE SHARE} = & \alpha + \beta_1 (\text{1}^{\text{st}} \text{ SPLINE SEGMENT}) \\ & + \beta_2 (\text{2}^{\text{nd}} \text{ SPLINE SEGMENT}) + \beta_3 (\text{3}^{\text{rd}} \text{ SPLINE SEGMENT}) \end{aligned} \quad (1)$$

If the Mixed Influence model applies, the coefficients on the first and third spline segments,  $\beta_1$  and  $\beta_3$  respectively, are expected to be positive, and the coefficient on the second segment,  $\beta_2$ , is expected to be zero or at most small in relation to the others.

The length of each spline segment is estimated in practice by choosing the points *BREAK1* and *BREAK2* in (1) that minimize the mean squared error of the regression, assuming that the two break points are equidistant from 0.5 in the ranking of states from zero to one. This last assumption greatly simplifies the estimation procedure, since it allows us to search over just 41 values for *BREAK1* (ranging from 0.05 to 0.45 in increments of 0.01) for each reported regression, with *BREAK2* equaling  $[0.5 + (0.5 - \text{BREAK1})]$ . If the two break points are not assumed to be equidistant from 0.5, estimating both break points would involve searching over 41 values for *BREAK1* (0.05-0.45) for each of 41 values for *BREAK2* (0.55-0.95), for a total of 1,681 searches for each reported

regression. Since there are many subsamples over which estimation is required, we think that assuming the break points are equidistant from 0.5 is a reasonable approach to the estimation problem.

Neither of the two indexes of a state's ideological location in the distribution across all states take into account the ebbs and flows over time in the success of the two parties. We use time period dummies to capture any such time-specific effects. In addition, because it is well known that an incumbent has a considerable advantage, in each election a variable was created that equals 1 if the Republican candidate was an incumbent, -1 if the Democratic candidate was an incumbent, and 0 if neither candidate was a major party incumbent so that the Senate seat was 'open'. *REPUBLICAN INCUMBENT ADVANTAGE* is the average of this variable in all the state's elections during a given 12 year time period, and this variable is also added to the spline equation in selected samples. It has a mean of -0.09 and ranges between -1 and 1. It is expected to be positively related to Republican electoral success.

#### **4.4 Robustness and realignment**

In addition to estimating equation (1) using alternative indexes of ideology with the full sample of 341 state-time cells for Senate elections with and without incumbents from 1922 to 2004, we estimate various versions of the spline equation using just open seat elections. This reduces the sample size to 252 observations. By considering only open seat elections, we allow for the possibility of omitted interaction between incumbency effects and our estimates of the spline regions. We also test the robustness of our results using various other subsamples. One subsample consists only of the five time periods after the Second World War, thus omitting the Great Depression and the war years, and hence the influence on our regression results of these dramatic events. As outlined in detail later, estimation over other subsamples permits the testing of comparative static predictions.

Concerns about the possible influence of the southern states and of political realignment on our estimation results lead us to consider specific regionally defined subsamples. The Republican

party was formed with a strong anti-slavery platform, and as a result the Republican party for many years after reconstruction ended was unable to garner any sizeable support among (white) southern voters. The national Democratic party in the 1960's began to support voter registration for blacks, the elimination of the poll tax and the literacy test, and the establishment of other safeguards for black rights, which led to the defection of many white southerners to the Republican party. Excluding all southern state observations is one way we employ to deal with estimation problems that might arise from including these states, which switched from providing strong support to the Democratic party to providing strong support to the Republican party.

But there is a better way to deal with political realignment. While this fact is not fully appreciated because most analyses take the southern states, or at least the states of the old Confederacy, as a group, it is clear from the data that not every southern state experienced a sizeable political realignment. As a practical matter, we may say that a major realignment occurred if the state's rank in those supporting Republican presidential candidates changed by at least 20 states. By this criterion, the following southern states are classified as having experienced a major realignment in the 1922-2004 period toward the Republican party: MS (rank changing by 34 states), SC (32), AL (28), GA (25), TX (23), NC (21), FL (20), and VA (20). This includes six of the seven deep-south states of the old Confederacy, missing only Louisiana, whose non-partisan primary and runoff rule may have held back realignment in a Republican direction, and which missed inclusion under our 20 state rank change by just a whisker. It is the border states where realignment effects are less clear.<sup>16</sup>

Similarly, some non-southern states have gone through or are undergoing a substantial political realignment. OK (40), UT (28), and AZ (22) are classified as switching to the Republican party. By the same criterion, VT (rank changing by -31), MA (-24), MI (-24), PA (-24), and NY (-22)

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<sup>16</sup> Three southern states were not counted as having experienced a major realignment. Louisiana's rank changed by 19 states, while Arkansas and Tennessee experienced only a 14 state change in rank. Furthermore, we note that Arkansas and Louisiana have not (yet) transitioned into solidly Republican states; the Republican presidential candidate won in only half the presidential elections after the state "switched" parties.

are also classified as having experienced a major realignment from the Republican party to the Democratic party.

In a long-run equilibrium, political realignment does not cause problems for the estimation of any version of equation (1). To take the example of the South, up through the early 1960s the meager support provided by voters for Republican presidential candidates was matched by the minimal support given to Republican Senate candidates. After the southern realignment was completed, both Republican presidential candidates and Republican Senate candidates did very well in the South. But we do need to be concerned with the potential impact of realignment in transitional periods when we examine the determinants of the degree of political competitiveness. In the South, for example, it often took several years for voter support for Republican Senate candidates to catch up with voter support for presidential candidates (see Aistrup 1996). Thus in the south during these transitional years, the strong support provided Republican presidential candidates was not matched by the strong support for Republican Senate candidates found in other "Republican" states.

Accordingly, a second method of dealing with realignment we employ is to omit transitional years from the sample rather than simply omit the South which experienced the greatest realignment. In this second method of dealing with realignment, the transition is defined as beginning when the state's presidential vote first puts it in the top half of states supporting the "new" party, and ending when the state elects a senator from the new party. In four states (AZ, TX, UT, and VT), the transition was immediate and the state embraced the new party in both presidential and Senate elections in the same year. Florida is typical of the remaining 12 states in this subsample. The state first was in the top half of the states' support for Republican presidential candidates in 1960. Subsequently the first Senate race to be won by the Republican candidate was in 1968, eight years after the transition began. Thus we eliminated the transition races in Florida by dropping this state's Senate elections for the period 1960-1967 from the dataset. In total, 36 Senate races are dropped

when calculating the average fraction of the two party vote garnered by Republican candidates in the state-time cells.

## 5 Empirical Results

Estimates of the spline explaining the outcome of Senate elections for various samples are reported in Tables 2 to 7. Tables 6 and 7 deal specifically with the evaluation of the comparative static predictions of the Mixed Influence Model.

We consider the results in Tables 2 to 5 first. Each of these tables contains three regressions based respectively on: (1) the full sample; (2) the sample excluding the 11 southern states of the Confederacy; and (3) the sample that excludes transitional Senate elections in the 12 states that experienced a major political realignment in our sample. Tables 2 and 3 utilize *REPUBLICAN PRESIDENTIAL RANK* as the index of ideological character of states, and Tables 4 and 5 rely on the alternative index *REPUBLICAN PRESIDENTIAL POSITION*. Regressions based on only open seat Senate elections, in which there are no incumbents seeking reelection, are reported in Tables 2 and 4. The regressions in Tables 3 and 5 include data for both open seat elections and Senate elections in which there were incumbents seeking reelection.

[Tables 2 to 5 here]

As noted earlier, we also estimated regressions in which the sample was limited to the post war era, 1946 to 2004. Since these regressions are virtually identical to those based on data for all time periods from 1922, we do not report them here.

Turning then to the results in Table 2, we see at the outset that as expected, the coefficients on *REPUBLICAN INCUMBENT ADVANTAGE* are positive and highly significant. Incumbents are estimated to have a sizeable advantage in Senate regressions. The Republican vote share is estimated to be 0.113 to 0.156 higher in elections in which a Republican senator was seeking re-election (*REPUBLICAN INCUMBENT ADVANTAGE* = 1) than in elections with no incumbent. Similarly the

Republican vote share is 0.113-0.156 lower in races with an incumbent Democratic senator (*REPUBLICAN INCUMBENT ADVANTAGE* = -1) than in races with no incumbent.

Our key results concern the estimated break points that define the regions of the spline in equation (1) and the associated slope coefficients. To better understand the spline results, let us consider the first regression in Table 2. When *REPUBLICAN PRESIDENTIAL RANK* is used as an explanatory variable, the estimated break points are 0.20 and 0.80. That is, in terms of the measure of ideology of state voters, the highly competitive region ranges from 0.20 to 0.80. Since *REPUBLICAN PRESIDENTIAL RANK* is constructed under the assumption that the states are equally spaced, this implies that competitive races occur in 60 percent (0.80 - 0.20) of the states, so that contests in 30 (0.60×50) states are competitive. The slope on this rank variable equals 1.620 when *REPUBLICAN PRESIDENTIAL RANK* is less than 0.20; it equals 0.186 when the ranking falls between 0.20 and 0.80; and it equals 0.384 when the rank is greater than 0.80.

The first segment pertains to the approximately 10 states in "Democratic territory", where Republican candidates are not expected to fare well due to the loss of support from the national Republican party or party activists if the candidate adopts a viable, relatively liberal platform. Here, as *REPUBLICAN PRESIDENTIAL RANK* rises, the state's electorate becomes more supportive of Republican policies and the Republican national party's constraint becomes less binding, which should lead to greater success of Republican candidates in Senate races. And in fact, the results show that this prediction has strong support. The coefficient on the first spline segment (1.620) is positive and statistically significant. The value of the coefficient implies that an increase in *REPUBLICAN PRESIDENTIAL RANK* from its lowest value (0.02) to the first break point (0.20) results in a 0.292 (=1.620×0.18) rise in the Republican vote share in Senate elections.

The second segment should correspond to a region of competitive races, with very little national party influence, and where we expect activist concerns about ideological purity to be muted. In this case, changes in the ideology of the state's voters should have little influence on Republican

success in Senate elections. As pointed out above, there are 30 relatively moderate states in this segment. The coefficient on the middle spline segment (0.186) is statistically significant and is smaller than the coefficient on the first spline segment (1.620). The increase in *REPUBLICAN PRESIDENTIAL RANK* over the entire the middle segment, from 0.20 to 0.80, is estimated to cause the Republican vote share in Senate elections to rise by 0.112 ( $=0.186 \times [0.80 - 0.20]$ ). So Republican Senate candidates do receive slightly more support in moderately Republican states than in moderately Democratic states. But the effect here is about 9 times ( $1.620 / 0.186$ ) smaller than it is for the much less competitive region on the left.

The third segment reflects a region of Republican dominance. Here it is clear from the results that Democratic candidates are unable to adjust their platforms to become sufficiently more Republican as the electorate becomes more conservative, resulting in greater Republican success in Senate races. We see that the coefficient on the third spline segment is positive, as predicted, and is statistically significant. An increase in the third segment from 0.80 to 1.00 is associated with a 0.077 ( $=0.384 \times 0.20$ ) rise in the Republican vote share. And again, the coefficient on this less competitive part of the spline is substantially larger than that for the middle region, by a factor of about two.

We shall now summarize the twelve regressions in Tables 2 to 5. These regressions fit the data well, and there is robust support for the Mixed Influence Model: in the open seat sample as well as in the total sample of open seats plus contests with an incumbent; with both measures of support for Republican presidential candidate; when southern states are excluded; and when transitional Senate elections are not used.

There is remarkable consistency in the estimates of the two break points, where the spline changes slope, when the presidential support measure based on state ranks (*REPUBLICAN PRESIDENTIAL RANK*) is used to measure ideological preferences of voters. Five of the six estimates of the first break point lie between 0.19 and 0.21, implying that the second break point falls between 0.79 and 0.81. Since this rank-based measure of ideological preference assumes states are

equally spaced in the ideological dimension, these estimates imply that there are 29 to 31 states ( $= (BREAK2 - BREAK1) \times 50$ ) in the highly competitive, middle spline region.

In the regressions that use the state's position captured by *REPUBLICAN PRESIDENTIAL POSITION*, however, there is considerable variation in the estimated first break point: 0.05, 0.05, 0.16, 0.23, 0.44, and 0.45. Since with this measure of presidential support states are not equally spaced, the number of them in the middle region must be calculated from the frequency distribution of *REPUBLICAN PRESIDENTIAL POSITION*. The resulting estimates of the number of states with highly competitive Senate races - 48, 48, 44, 38, 8, and 7 - based on the *POSITION* measure tend to be larger than the estimates based on the *RANK* measure.

Looking across all twelve regressions, the coefficients on the first spline segment, representing Democratic dominance, are all positive, as predicted by the Mixed Influence framework. Ten of the 12 coefficients are statistically significant at the 0.05 level, and one is significant at the 0.10 level under a one-tailed test. These results provide strong support to the hypothesis that the advantage of Democratic candidates over Republican candidates for the Senate in Democratic strongholds erodes as the state becomes more Republican.<sup>17</sup> Ten of the twelve coefficients for the third spline segment, corresponding to the region of Republican dominance, also have the predicted positive sign. Eight of these coefficients are significantly positive. The lack of support for the prediction is confined to four regressions in Tables 3 and 5 that include contests with incumbents seeking reelection as well as open seat elections.

All the coefficients on the middle spline segment are positive. Under a two-tailed test, nine coefficients are statistically significant at the 0.05 level, two are significant at the 0.10 level, and one

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<sup>17</sup> In Tables 2 and 3, where the presidential ranking is used to estimate the spline, the coefficient on the first spline region is substantially larger than the coefficient on the third region. This means that Republican candidates are punished more by their national party when they move towards the liberal end of the spectrum than are Democratic candidates when they move towards the conservative end. One is reminded of what Will Rogers said when asked if he was a member of an organized political party: "I am not a member of any organized party - I am a Democrat." See Will Rogers (1879-1935) in O'Brien (1935, 162). Unfortunately perhaps, this result does not generalize to results in Tables 4 and 5 where presidential position is used to measure ideological preferences.

is insignificant. In this segment, the competitiveness of Senate races is hypothesized to be *relatively* insensitive to variation in the ideology of the voters. To test this, we again compare the coefficients for the middle segment with the first and third segment coefficients. In the six regressions that are based on both open seat elections and elections with incumbents, the first segment coefficients are on average about 5.5 times as large as the middle segment coefficients. The differences are even more striking in the regressions that are based only on open seat (non-incumbent) elections. In these regressions, the first segment coefficients are on average about 11.9 times as large as the middle segment coefficients. The differences between the third segment coefficients and the middle segment coefficients are sizeable but not as large as the first to second segment differences. In the regressions based on both open and closed races, the third segment coefficients are on average 2.4 times as large as the middle segment coefficients.<sup>18</sup> Once again, the Mixed Influence Model receives more support in the regressions based only on open races; the third segment coefficients are on average 7.4 times the size of the middle segment coefficients.

Our findings that the first segment coefficients are much larger than the middle segment coefficients and that the third segment coefficients are much greater than the middle segment coefficients supports the conclusion that the middle segment corresponds to a region of highly competitive Senate races little influenced by national parties and their activists.

To further investigate the robustness of this general characterization of the results, we estimated a spline with four regions instead of three by splitting the middle region into two, a center-left region that (presumably) modestly favors the Democrats, and one on the center-right that modestly favors the Republicans. This four region spline turns out to produce results similar to those based on the three region spline. The difference in the coefficients on the two middle regions do indicate that Republican candidates gain vote share when the ideological ranking of the state moves to the right. However, differences between the coefficients on the center left region and those on the

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<sup>18</sup> The two negative coefficients for the third segment in Table 5 were not included in this mean.

center right do not prove to be statistically significant.<sup>19</sup>

Finally, before turning to tests of the comparative static predictions of the Mixed Influence Model, we briefly consider the time specific dummies which capture changes over time in the share of votes going to Republican Senate candidates, holding the state's rank (or position) in support for the Republican candidate for president constant. (The omitted or residual time period is the most recent one, 1994 - 2004.) Very few of the time period coefficients in the open election regressions were significantly different from zero. In the full-sample regressions based on open seat races in Table 2, two of the six period coefficients are significantly negative (when compared to the most recent period). They imply that the Republican Senate candidates' share of the vote was 0.101 lower in 1934-45 than in 1994-2004 and was 0.056 smaller in 1946-57 than in the most recent period.

On the other hand, most of the dummy coefficients are significant in the regressions in Tables 3 and 5, which also contain races in which an incumbent is seeking re-election. In the first regression in Table 3, for example, the significantly negative coefficients on the six time period dummies imply that the Republican Senate candidates fared better in the residual time period (1994-2004) than in the earlier time periods. The regression coefficients for the first four time periods (1922-1969) were more negative than the coefficients for the fifth and sixth time periods (1970-1993), indicating that the Republican candidates captured the fewest votes in the periods between 1922 and 1969.

## 5.2 *The role of heterogeneity*

Recall that in the discussion of Figure 2, we argued that greater heterogeneity of voter preferences in a state makes it less likely that the state's Senate candidates will be constrained by a national party,

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<sup>19</sup> We estimated four-segment splines for our four major regressions: the first and second regressions in Tables 2 and 3. An additional break point is assumed to occur at 0.50 in the four-segment spline. So break points at 0.20 and 0.80 in a three-segment spline correspond to break points at 0.20, 0.50, and 0.80 in a four-segment spline. In comparison with the three-segment splines, the first and third break points in the four-segment spline changed by only 0.01 (e.g., 0.20 to 0.19) in three of the four regressions and did not change at all in the fourth regression. A likelihood ratio test was employed to test whether allowing different slopes in the two middle segments in the four-segment spline (e.g., 0.20-0.50 and 0.50-0.80) produced a significantly better fit than constraining there to be a common slope throughout the middle segments (0.20-0.80), as is done with a three-segment spline. The null hypothesis that there is a common slope is not rejected in three of the four regressions. Only for the equivalent of the first regression in Table 3 is the assumption of equal middle-segment slopes rejected.

and thus more likely that Senate elections in the state will be fully competitive. To test this comparative static prediction, we require a measure of heterogeneity of the electorate in the ideological dimension.

To the extent that votes cast by a legislator reflect the preferences of voters in the legislator's district, then variation in legislators' voting records within a state's congressional delegation should reflect variation in the electorate's political preferences within that state. Poole and Rosenthal (1997) have shown that differences in a liberal-conservative dimension generally can explain most of the variation in votes cast in congress. States in which most of the legislators have similar (e.g., all moderately liberal) voting records, for example, are likely to be less heterogeneous than states in which the state's delegation ranges from extremely liberal to extremely conservative. Accordingly, to measure the variation of a state's delegation in the liberal-conservative dimension, we use the standard deviation in the first dimension of Poole and Rosenthal's DW-NOMINATE scores for a state's delegation in the U.S. House of Representatives. This measure was chosen because it is comparable across congresses and is available for all the years in our sample. Obviously this standard deviation cannot be calculated for small states that have only one representative, which are now omitted from our empirical analysis.

To test the heterogeneity hypothesis, we created two subsamples - low standard deviation of DW-NOMINATE score states and high standard deviation states - and estimated equation (1) for both samples. The resulting break points, which measure the length of the middle or highly competitive segment, are reported in Table 6 under four scenarios.

[Table 6 here]

All estimates recorded in the table utilize *REPUBLICAN PRESIDENTIAL RANK* to measure the conservative ranking of the state's electorate. Since the use of *REPUBLICAN PRESIDENTIAL POSITION* instead leads to essentially the same conclusions, regressions using this second measure are not reported.

The first sample represented in the table includes all the open seat elections for which there are data. In the low heterogeneity subsample, the competitive or middle spline region ranges from 0.31 to 0.69. Since *REPUBLICAN PRESIDENTIAL RANK* is constructed under the assumption that the states are equally spaced, this implies that competitive races occur in 38 percent (0.69-0.31) of the states. That is, races in 19 (0.38×50) states are competitive. In the high heterogeneity subsample, the middle spline ranges from 0.15 to 0.85, which implies that races in 35 states are competitive. Hence this evidence supports the prediction of the Mixed Model that competition is more pervasive in more heterogeneous states.

The heterogeneity hypothesis is also strongly supported in the other three DW-NOMINATE samples used. The second sample is based on open contests in states outside the old Confederacy. Electoral contests in this case are competitive in 6 states in the low heterogeneity subsample, and in 34 states in the high heterogeneity subsample. The remaining two scenarios utilize both open seat races and races in which an incumbent is seeking reelection. With the full (alternatively, the non-confederacy) sample, there are 20 (or 5) competitive states in the low heterogeneity subsample and 30 (13) competitive states in the high heterogeneity subsample. Clearly, then, voter heterogeneity has a substantial impact on the length of the middle spline segment. On average across these four samples, 16 more states are classified as having competitive Senate races in the high heterogeneity subsample than in the low heterogeneity subsample.

### ***5.3 Differences between open primary and closed primary states***

Party platforms tend to be farther apart in closed primary states where only a party's members can select the party's nominee, than in open primary states where independents and perhaps members of other parties also are allowed to participate in the nomination process. Previously we showed that in the Mixed Influence Model, this implies that there should be a longer middle spline section (to which is attached a very small slope coefficient) in closed primary states than in open primary states.

The longest classification of states according to the type of primary they utilize is found in

*The Book of the States*. Tables on primary type begin in volume 3 (1939-1940) and continue, with the exception of volume 7 (1948-1949), through volume 28 (1990-1991). For volumes 3-6 and 8-9, the classification was worded as “party membership tests – Open or Closed.” For volumes 10-28 (1954-1991), the classification was described as “voters receive ballots of: [one party] or [all parties participating].”<sup>20</sup> During the period of the initial classification (1939-1953), the classification seems to have been somewhat erratic. The primaries in thirteen states were reported as initially closed, then open, and then closed (or vice versa) during this period. To avoid this apparent problem in classification, our primary classification data begin in 1954, when the second description of primary classification was first used and continuing through 1991. We extended the classification of state primary systems to 2005 by utilizing tables found in Bott (1990), Bibby (1992, 1996, and 2000) and Bibby and Schaffner (2008).

The length of the second or highly competitive spline segment under closed primaries is compared with that under open primaries in Table 7 for the four samples described in Table 6. Here, as in Table 6, *REPUBLICAN PRESIDENTIAL RANK* is used to measure a state's ideological character. The first two scenarios are based on open races involving no incumbent. One utilizes all the states, and the other is based on only non-southern states. For both samples, the middle spline segment extends from 0.08 to 0.92 in open primaries, and from 0.06 to 0.94 in closed primaries. Thus, the second spline segment is slightly longer with closed primaries, as expected. There are 42 highly competitive states when a party's nominee is selected in open primaries, and 44 such states when only states with closed primaries are included.

[Table 7 here]

The differences in the extent of competition between elections with open and closed primaries are more pronounced in the third and fourth samples, where the analysis is based on Senate races involving an incumbent as well as on contests without an incumbent. This may be because

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<sup>20</sup> In 1954-55, the wording was “voters receive ballots of [one party] or [both parties].”

these regressions are based on more data. If the primaries are open, competitive races are estimated to occur in 28 or 31 states. With closed primaries, competitive races are found in 45 states. Once again, the second spline segment is estimated to be longer under closed primaries than under open primaries, as predicted. Thus in each of the four types of samples considered, the evidence in Table 7 supports the prediction that Senate races are competitive in more states when primaries are closed rather than open. On average, 9 more states are classified as having highly competitive Senate races in states in the closed primary sample than in the open primary one.

We also tested the robustness of our findings to replacing *REPUBLICAN PRESIDENTIAL RANK* with *REPUBLICAN PRESIDENTIAL POSITION*. We then find that more states are classified as competitive with closed primaries than with open primaries in two subsamples: when only non-southern states are included; and when non-southern states for all time periods (1922-2004) and southern states in recent years (1970-2004) are combined. Our prediction about the effect of closing a primary is not supported when southern states in earlier elections (1922-1969) are added to this second subsample (producing the full sample). The lack of support when the early elections are included may reflect the presence of primary runoffs that were used almost exclusively in the South.

## **6 Conclusions and Further Research**

We have begun to map how the degree of electoral competition varies across the political landscape. In our Mixed Influence Model, which combines elements of the National Party and Local Influence models, the degree of competitiveness of local elections depends on the interaction of national constraints on candidate positioning and differences in the nature of local electorates, as well as on rules governing the selection of candidates. This model predicts the existence of at least three regions of varying competitiveness - Democratic stronghold states, states in which elections are highly competitive, and Republican stronghold states - as well as the emergence of within-party ideological heterogeneity of successful candidates. Empirical spline methodology allows the estimation of the

length of these regions in an ideological dimension, and estimation of the sign and relative size of the coefficients attached to each region, about which the model also makes predictions.

Using a data set that includes almost all Senate election since 1922, we find that in the states that have provided the most support for Republican presidential candidates, Democratic Senate candidates garner fewer votes on average than their Republican opponents. Similarly, Republican candidates in Democratic strongholds are at a disadvantage when they campaign for a seat for the Senate. On average, 32 states are classified as 'highly competitive'. In these competitive states there is very little difference in the vote shares received by Republican candidates in moderately Republican states and the votes garnered by Republican candidates in moderately Democratic states. In this broad set of highly competitive states, candidates appear to have a lot of latitude in selecting platforms before the national party withholds support, or other factors kick in that would constrain a candidate's ability to stray from national party positions.

The predictions of the National Party Model and the Local Platform Model are not supported empirically. Under the National Party Model, very few races should be competitive, since all of a party's candidates espouse the same national platform (and there is no within-party heterogeneity of elected members). Our finding that Senate races are competitive in over half the states' Senate elections is inconsistent with this model. At the other extreme, the Local Platform Model predicts competitive elections in all open seat races. Our evidence concerning regions in which one party is heavily favored does not support this model either.

We may note that identifying states in which the Democratic party has an advantage or in which the Republican party is favored may not surprise many observers. But readers may be surprised by our finding that there is a large region in-between the other two, comprised of over half of the states, in which Senate races are highly competitive and in which there are negligible differences across states in the degree of electoral competition.

The Mixed Influence framework explains this pattern of political competition and also yields

interesting and non-obvious predictions about the effects of voter heterogeneity and party primary structure on the number of states that are competitive. Models of electoral competition in the literature predict that party platforms will be farther apart in states in which the electorate is more heterogeneous, and in states where only registered party members are allowed to participate in a party's primary. We have shown that in the Mixed Influence Model, the greater distance that results between a candidate's platform and the state median voter's preferred position allows some Republican (or Democratic) candidates in strongly Democratic (Republican) states to adopt a locally "winning" platform without bumping up against the constraints imposed by the national party or party activists. Thus, Senate races should be competitive in more states where the electorate is more heterogeneous or, similarly, where party primaries are closed. These comparative static predictions are also clearly supported by the empirical results.

On balance, the Mixed Influence Model receives remarkably robust support. Its predictions concerning regions of variable competition are supported: (i) in open seat contests as well as in elections with incumbents running; (ii) with both measures we have employed of the ideological ranking or relative ideological position of voters in a state; (iii) when southern states are excluded; (iv) when transitional Senate elections are not used; and (v) when only the post Second World War period is considered. The empirical support for the model's comparative static predictions about the effect of heterogeneity of voter preferences is insensitive to (i) restricting the sample to open seat contests, (ii) changing the measure of the ideological character of a state's voters, and to (iii) the exclusion of southern states. Findings about the effect of restricting primaries to party members are only a little less robust, as described earlier. Confirmation of the comparative static results suggests that as the electorate in the United States becomes more heterogeneous, and as primary elections become more partisan, the competitiveness of Senate elections rises.

There are several directions for future research suggested by the model and results we have

presented. First, our framework suggests that it would be worthwhile to study how heterogeneity or diversity within and across state electorates evolves, and how this evolution in turn shapes longer run trends in competitiveness. Second, it would be interesting to see if the comparative static predictions of the Mixed Influence Model hold empirically in elections for the House of Representatives, or at other levels of government.

Since a relaxation of national party constraints would allow local candidates to position themselves more favorably in local elections, it has essentially the same effect on competitiveness as an increase in heterogeneity or the closing of an open primary. This observation suggests as a third topic for further work – the study of how competitiveness varies with the formation and evolution of national constraints on local candidates. Fourth and finally, one can envisage an extended framework in which the length of the tether placed on local candidates is (endogenously) determined by the nature of diversity within party caucuses in Congress, leading to more or less competitiveness at the local level, which in turn determines the character of national party caucuses.

All of these avenues for research follow from the framework that we have presented and tested, in which variability in the degree of electoral competition results from the *interaction* of constraints on platform positioning by local candidates and the nature of the electorates that candidates face in each electoral contest.

## References

- Aistrup, Larry. 1996. *The Southern Strategy Revisited*. Lexington, KY: University of Kentucky Press.
- Aldrich, J. H., Rohde, D. W. and Tofias, M. W. (2007). One D is not Enough: Measuring Conditional Party Government, 1887-2002. (In D. Brady and M. McCubbins (Eds.), *Party, Process, and Political Change in Congress, Vol 2: Further New Perspectives on the History of Congress*. (pp. 102-112). Stanford University Press)
- Aranson, Peter H. and Peter C. Ordeshook. 1972. Spatial Strategies for Sequential Elections. In G. Niemi and H.F. Weisberg (Eds.), *Probability Models of Collective Decision Making*, 298-331. Columbus, OH: Charles E. Merrill.
- Austen-Smith, David. 1984. Two-party Competition with Many Constituencies. *Mathematical Social Sciences*, 177-98
- Besley, Timothy, Torsten Persson and Daniel M. Sturm. 2007. Political Competition, Policy and Growth: Theory and Evidence from the United States. Unpublished, London School of Economics, July.
- Bibby, John F. 1992. *Politics, Parties, & Elections in America*. Second Edition. Chicago: Nelson-Hall Publishers.
- Bibby, John F. 1996. *Politics, Parties, & Elections in America*. Third Edition. Chicago: Nelson-Hall Publishers.
- Bibby, John F. 2000. *Politics, Parties, & Elections in America*. Fourth Edition. Belmont CA: Wadsworth Publishers.
- Bibby, John F. and Brian F. Schaffner. 2008. *Politics, Parties, & Elections in America*. Fourth Edition. Boston MA: Thomson Wadsworth Publishers.
- Bond, Jon R. 1983. The Influence of Constituency Diversity on Electoral Competition In Voting for Congress, 1974-1978. *Legislative Studies Quarterly* 7:201-217.
- Bott, Alexander J. 1990. *Handbook of United States Election Laws and Practices*. New York: Greenwood Press.
- Coleman, James S. 1971. Internal Processes Governing Party Positions in Elections. *Public Choice* 11: 35-60.
- Coleman, James S. 1972. The Positions of Political Parties in Elections. In R.G. Niemi and H.F. Weisberg (Eds.), *Probability Models of Collective Decision Making*, 332-357. Columbus, OH: Charles E. Merrill's
- Coughlin, Peter. 1992. *Probabilistic Voting Theory*. New York: Cambridge University Press.

Council of State Governments. Various years. *The Book of the States*. Lexington, KY: Council of State Governments.

Cox, Gary, and Michael C. Munger. 1989. Contributions, Expenditure, Turnout: The 1982 U.S. House Elections. *American Political Science Review* 83, 217-231.

Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper and Row.

Endersby, James, Steven Galatas and Chapman Rackaway. 2002. Closeness Counts in Canada: Voter Participation in the 1993 and 1997 Federal Elections. *Journal of Politics* 64(2), 610-631.

Esiasson, Peter. 1999. Not All Politics is Local: The Geographic Dimension of Policy Representation. In Warren E. Miller, Roy Pierce, Jacques Thomassen, Richard Herrera, Soren Holmberg, Peter Esiasson, and Bernhard Wessels eds., *Policy Representation in Western Democracies*, 110-136. Oxford: Oxford University Press.

Ferris, J. Stephen, SooBin Park and Stanley L. Winer. 2008. Studying the Role of Political Competition in the Evolution of Government Size Over Long Horizons. *Public Choice* 137, 369-401.

Filer, J.E. and Lawrence Kenny. 1980. Voter Turnout and the Benefits of Voting. *Public Choice* 35(5), 575 - 585.

Francis, Wayne L. and Lawrence W. Kenny. 2000. *Up the Political Ladder: Career Paths in U.S. Politics*. Thousand Oaks, CA: Sage Publications.

Franklin, Mark. 2004. *Voter Turnout and the Dynamics of Electoral Competition in Established Democracies Since 1945*. Cambridge University Press.

Froman, Lewis A. 1963. *Congressmen and Their Constituencies*. Chicago: Rand McNally & Co.

Gerber, Elizabeth and Rebecca B. Morton. 1998. Primary Election Systems and Representation. *Journal of Law, Economics, and Organization* 11: 304-324.

Grofman, Bernard. 2004. Downs and Two-Party Convergence. *Annual Review of Political Science* 7, 25-46.

Grofman, Bernard and T. Brunell. 2001. Explaining the Ideological Differences between the Two U.S. Senators Elected from the Same State: an Institutional Effects Model. In P. Galderisi Ed. *Congressional Primaries in the Politics of Representation*, 132-142. New York: Rowman & Littlefield.

Grofman, Bernard, R. Griffin, and Amihai Glazer. 1990. Identical Geography, Different Party: A Natural Experiment on the Magnitude of Party Differences in the U.S. Senate, 1960-84. In R.J. Johnston, F.M. Shelley & P.J. Taylor (eds.), *Developments in Electoral Geography*. London: Routledge.

Grofman, Bernard, William Koetzle, Michael P. McDonald, and Thomas L. Brunell. 2000. A New

Look at Split-Ticket Outcomes for House and President: The Comparative Midpoints Model. *Journal of Politics* 62, 34-50.

Heckelman, Jac C. 2004. A Spatial Model of U.S. Senate Elections. *Public Choice* 118, 87-103.

Hibbing, John. and Sara Brandes. 1983. State Population and the Electoral Success of Senators. *American Journal of Political Science* 27, 808-819.

Koetzle, William. 1998. The Impact of Constituency Diversity Upon the Competitiveness of US House Elections, 1962-96. *Legislative Studies Quarterly*, 23(4), 561-573.

Levitt, S. D. and J. M. Poterba. 1999. Congressional Distributive Politics and State Economic Performance. *Public Choice* 99, 185-215.

Mayhew, David R. 1974. Congressional Elections: The Case of the Vanishing Marginals. *Polity* 6(3), 295-317.

Samuel Merrill, III, Bernard Grofman, and Thomas L. Brunell. 2008. Cycles in American National Electoral Politics, 1854-2004. *American Political Science Review*, 102, (1)1-17.

Moore, John L., Jon P. Preimesberger, and David R. Tarr, editors. 2001. *Congressional Quarterly's Guide to U.S. Elections*, 4th edition. Washington, D.C.: Congressional Quarterly Press.

O'Brien, P.J. 1935. *Will Rogers, Ambassador of Good Will, Prince of Wit and Wisdom*. Oxford and London: Oxford University Press.

Palfrey, Thomas R. Spatial Equilibrium with Entry. 1984. *Review of Economic Studies* 51, 139-157.

Poole, Keith T. and Howard Rosenthal. 1997. *Congress: A Political Economic History of Roll Call Voting*. Oxford, UK: Oxford University Press.

Remmer K. L. and E. Wibbels. 2000. The Subnational Politics of Economic Adjustment. *Comparative Political Studies* 33 (4), 419-51.

Scammon, Richard M., Alice V. McGillivray, and Rhodes Cook. Various years. *America Votes: Election Returns by State*. Washington, D.C.: CQ Press.

Schofield, Norman and Itai Sened. 2006. *Multiparty Democracy: Elections and Legislative Behavior*. Cambridge University Press.

Winer, Stanley L., Michael Tofias, Bernard Grofman and John Aldrich. 2008. Is it Economics or Politics? Trending Economic Factors and the Structure of Congress in the Growth of Government, 1930 - 2002. *Public Choice* 113, 389-402.

Table 1

The Extent of Political Competition in U.S. Senate Races, 1922 - 2004.  
Distribution of |Republican Share of the Two Party Vote - 0.5|\*

	<u>0.00-0.05</u>	<u>0.05-0.10</u>	<u>0.10-0.20</u>	<u>0.20-0.30</u>	<u>0.30+</u>
Open & Closed Seat Elections 341 obs.*	39.9%	23.2%	19.9%	7.3%	9.7%
Open Seat Elections 252 obs.*	40.1%	30.6%	15.1%	6.8%	7.5%
Open Seat Elections	<u>0.00-0.05</u>	<u>0.05-0.10</u>	<u>0.10+</u>		
1922-1933 48 states 40 obs.	25.0%	25.0%	50.0%		
1934-1945 48 states 43 obs.	27.9%	37.2%	34.9%		
1946-1957 48 states 36 obs.	36.1%	25.0%	38.9%		
1958-1969 50 states 37 obs.	64.9%	18.9%	16.2%		
1970-1981 49 states 38 obs.	41.1%	40.5%	18.4%		
1982-1993 49 states 28 obs.	46.4%	28.6%	25.0%		
1994-2004 49 states 30 obs.	40.0%	43.3%	16.7%		

\* Between 1922 and 2004 there were 1473 general elections for a U.S. Senate seat. A third party candidate won 14 of these elections, which are not used in the calculation of the measures of the success of Republican candidates against Democratic opponents in the general elections. Louisiana is also omitted after 1970 for reasons described in the main text. For each Senate election in each state, the Republican share of the total number of votes cast for the Democratic and Republican candidates was determined. These vote shares were averaged for each state over 12 year periods beginning in 1922 that include 3 presidential elections and about 4 to 7 Senate elections. There are 341 such state-time cell observations after the eliminations described above, and 252 observations if only open seat elections are included. These 12-year state-time cells or averages are used in the empirical work reported in the paper. In this table, only the national size distribution of these state-time cells for various time periods are reported.

Table 2

Regressions Explaining Average Share of Two Party Vote  
Received by Republican Senate Candidate, 1922 - 2004

Open Seat (No Incumbent) Races  
Uses *REPUBLICAN PRESIDENTIAL RANK*  
(absolute t-statistics in parentheses)

	Full Sample (1)	Non- Southern States (2)	Non-transitional Senate Elections (3)
<i>REPUBLICAN PRESIDENTIAL RANK</i>			
1 <sup>ST</sup> SPLINE SEGMENT	1.620 (7.35)	3.775 (2.22)	1.544 (7.55)
2 <sup>ND</sup> SPLINE SEGMENT	0.186 (4.34)	0.087 (3.46)	0.185 (4.21)
3 <sup>RD</sup> SPLINE SEGMENT	0.384 (1.98)	2.055 (2.51)	0.356 (1.99)
1922-33	-0.043 (1.54)	0.034 (1.51)	-0.043 (1.57)
1934-45	-0.101 (3.70)	-0.042 (1.89)	-0.101 (3.74)
1946-57	-0.056 (1.96)	.0072 (0.32)	-0.057 (2.03)
1958-69	-0.044 (1.55)	-0.037 (1.68)	-0.030 (1.05)
1970-81	-0.026 (0.94)	-0.015 (0.65)	-0.022 (0.78)
1982-93	-0.027 (0.91)	-0.030 (1.24)	-0.027 (0.91)
Break points	.20 .80	.06 .94	.21 .79
Root Mean squared error	0.1148	0.0794	0.1137
Adjusted R-square	0.4335	0.2186	0.4478
Number of Observations	252	196	247
No. of competitive states	30	44	29
(No. of competitive states = (high break point - low break point) × 50)			

Table 3

Regressions Explaining Average Share of Two Party Vote  
Received by Republican Senate Candidate, 1922 - 2004

Open Seat (No Incumbent) and Closed Seat (Incumbent) Races  
Uses *REPUBLICAN PRESIDENTIAL RANK*  
(absolute t-statistics in parentheses)

	Full Sample (1)	Non- Southern States (2)	Non-transitional Senate Elections (3)
REPUBLICAN INCUMBENT ADVANTAGE	0.156 (16.2)	0.113 (15.9)	0.149 (15.4)
<i>REPUBLICAN PRESIDENTIAL RANK</i>			
1 <sup>ST</sup> SPLINE SEGMENT	1.235 (8.60)	0.352 (2.47)	1.262 (8.74)
2 <sup>ND</sup> SPLINE SEGMENT	0.125 (4.26)	0.072 (3.30)	0.133 (4.48)
3 <sup>RD</sup> SPLINE SEGMENT	0.145 (1.07)	0.321 (3.16)	0.138 (1.01)
1922-33	-0.064 (3.62)	.0039 (0.28)	-0.065 (3.62)
1934-45	-0.076 (4.27)	-0.018 (1.32)	-0.078 (4.34)
1946-57	-0.077 (4.36)	-0.015 (1.09)	-0.074 (4.17)
1958-69	-0.063 (3.54)	-0.029 (2.20)	-0.060 (3.36)
1970-81	-0.039 (2.19)	-0.021 (1.56)	-0.028 (1.56)
1982-93	-0.038 (2.12)	-0.027 (2.05)	-0.038 (2.13)
Break points	.20 .80	.19 .81	.20 .80
Root Mean squared error	0.0870	0.0575	0.0875
Adjusted R-square	0.6996	0.6507	0.6935
Number of Observations	341	267	340
No. of competitive states	30	31	30
(No. of competitive states = (high break point - low break point) × 50)			

Table 4

Regressions Explaining Average Share of Two Party Vote  
Received by Republican Senate Candidate, 1922 - 2004

Open Seat (No Incumbent) Races  
Uses *REPUBLICAN PRESIDENTIAL POSITION*  
(absolute t-statistics in parentheses)

	Full Sample (1)	Non- Southern States (2)	Non-transitional Senate Elections (3)
<i>REPUBLICAN PRESIDENTIAL POSITION</i>			
1 <sup>ST</sup> SPLINE SEGMENT	0.355 (3.54)	0.665 (2.01)	0.377 (3.68)
2 <sup>ND</sup> SPLINE SEGMENT	0.413 (1.55)	0.072 (1.68)	0.406 (1.82)
3 <sup>RD</sup> SPLINE SEGMENT	0.606 (7.18)	0.993 (4.21)	0.604 (7.06)
1922-33	-0.135 (4.79)	0.020 (0.81)	-0.135 (4.80)
1934-45	-0.184 (6.61)	-0.054 (2.29)	-0.183 (6.63)
1946-57	-0.130 (4.55)	-.00015 (0.01)	-0.131 (4.53)
1958-69	-0.030 (1.06)	-0.034 (1.51)	-0.018 (0.62)
1970-81	-0.016 (0.57)	-.0095 (0.42)	-0.013 (0.46)
1982-93	.00055 (0.02)	-0.022 (0.90)	.0013 (0.04)
Break points	.45 .55	.16 .84	.44 .56
Root Mean squared error	0.1140	0.0790	0.1133
Adjusted R-square	0.4413	0.2272	0.4511
Number of Observations	252	196	247
No. of competitive states	7	44	8
(calculated from frequency distribution of <i>REPUBLICAN PRESIDENTIAL POSITION</i> )			

Table 5  
Regressions Explaining Average Share of Two Party Vote  
Received by Republican Senate Candidate, 1922 - 2004

Open Seat (No Incumbent) and Closed Seat (Incumbent) Races  
Uses *REPUBLICAN PRESIDENTIAL POSITION*  
(absolute t-statistics in parentheses)

	Full Sample (1)	Non- Southern States (2)	Non-transitional Senate Elections (3)
REPUBLICAN INCUMBENT ADVANTAGE	0.153 (16.0)	0.113 (16.1)	0.146 (15.1)
<i>REPUBLICAN PRESIDENTIAL POSITION</i>			
1 <sup>ST</sup> SPLINE SEGMENT	1.168 (1.28)	0.286 (2.43)	1.125 (1.22)
2 <sup>ND</sup> SPLINE SEGMENT	0.340 (11.8)	0.124 (4.10)	0.350 (12.0)
3 <sup>RD</sup> SPLINE SEGMENT	-1.385 (1.34)	0.349 (3.82)	-1.368 (1.32)
1922-33	-0.127 (6.91)	-0.026 (1.77)	-0.129 (6.96)
1934-45	-0.134 (7.16)	-0.044 (2.93)	-0.137 (7.29)
1946-57	-0.134 (7.39)	-0.037 (2.51)	-0.133 (7.26)
1958-69	-0.058 (3.30)	-0.028 (2.17)	-0.055 (3.09)
1970-81	-0.035 (1.96)	-0.022 (1.69)	-0.023 (1.30)
1982-93	-0.017 (0.96)	-0.018 (1.37)	-0.016 (0.93)
Break points	.05 .95	.23 .77	.05 .95
Root Mean squared error	0.0866	0.0568	0.0873
Adjusted R-square	0.7023	0.6592	0.6944
Number of Observations	341	267	340
No. of competitive states	48	38	48
(calculated from frequency distribution of <i>REPUBLICAN PRESIDENTIAL POSITION</i> )			

**Table 6**  
**Effect of Heterogeneity [std. dev. of House DW-NOMINATE Scores]**  
**On Length of the Middle ("No Interference") Segment, 1922-2004\***

Uses **REPUBLICAN PRESIDENTIAL RANK**  
 (Number of Observations in Parentheses)

	<u>Low Heterogeneity</u>			<u>High Heterogeneity</u>		
	Break Points	#Competitive States*		Break Points	#Competitive States*	
<i>Open Seat (No Incumbent) Races</i>						
Full Sample	0.31 (123)	0.69 19		0.15 (110)	0.85 35	
Non-Southern States	0.44 (85)	0.56 6		0.16 (92)	0.84 34	
<i>Open Seat (No Incumbent) and Closed Seat (Incumbent) Races</i>						
Full Sample	0.30 (154)	0.70 20		0.20 (155)	0.80 30	
Non-Southern States	0.45 (105)	0.55 5		0.37 (130)	0.63 13	

\*Number of competitive states = (high break point - low break point) × 50

**Table 7**  
**Effect of Primary Structure on Length of the Middle**  
**("No Interference") Segment, 1954-2004\***

Uses **REPUBLICAN PRESIDENTIAL RANK**  
 (Number of Observations in Parentheses)

	<u>Open Primaries</u>			<u>Closed Primaries</u>		
	Break Points	#Competitive States*		Break Points	#Competitive States*	
<i>Open Seat (No Incumbent) Races</i>						
Full Sample	0.08 (41)	0.92 42		0.06 (128)	0.94 44	
Non-Southern States	0.08 (35)	0.92 42		0.06 (97)	0.94 44	
<i>Open Seat (No Incumbent) and Closed Seat (Incumbent) Races</i>						
Full Sample	0.19 (64)	0.81 31		0.05 (181)	0.95 45	
Non-Southern States	0.22 (53)	0.78 28		0.05 (140)	0.95 45	

\*Number of competitive states = (high break point - low break point) × 50