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Assessing the Mechanisms of Senatorial Responsiveness to Constituency Preferences

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Abstract

This article analyzes the relationship between U.S. senators and their constituencies over the entire period of time that senators have been selected by direct election. Focusing on preference change within states, we identify three mechanisms that might produce responsiveness in senators' ideological locations. We find that it is not merely the case that responsiveness is produced by party representation. Replacement of one senator with another of the same party facilitates responsiveness, too. And, even without electoral replacement, individual senators appear to adjust their ideological locations in response to changes in their electorates' preferences. We also investigate how the mechanisms of responsiveness changed with the erosion of Democratic dominance in the South and as the parties grew stronger over time.

Keywords

representation, constituency responsiveness, senators, Congress

Over the past 100 years, the partisan and ideological complexions of many state electorates have changed considerably. This is true of all the former Confederate states along with many states outside the South, including Utah,

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Vermont, Massachusetts, and Arizona. Most other states have experienced at least some change. Whether due to generational replacement, patterns of migration, or the evolving opinions of those who remain, preference change is a common phenomenon. This article addresses the consequences for political representation, specifically the responsiveness of elected officials to constituency preferences. Through a consideration of the entire period of time U.S. senators have been constitutionally required to be selected by direct election, we investigate the mechanisms of responsiveness by focusing on longitudinal change within states rather than the more commonly used approach of cross-sectional analysis.

Theoretically, we identify three distinct mechanisms through which an electorate's partisan and ideological preferences may influence the ideological locations of senators. First, as preferences change within a state, voters may use elections to replace one senator with another from a different party. Second, electoral replacement may involve replacing a senator with another from the same party. And, third, in anticipation of future elections, senators may respond directly to changing preferences, thereby preempting the need for either of the replacement mechanisms to produce responsiveness.

Empirically, we take advantage of the change in state electorates over time to estimate how the mechanisms contribute to responsiveness. We trace, for example, the evolution of the Vermont electorate's preferences and how it relates to which party won Senate elections in the state, differences between senators of the same party in the state, and how individual senators adjusted their ideological positions in response to changes in the state.

This article's contributions derive from analyzing all three mechanisms over a longer time period than in previous studies. We find evidence for substantial overall responsiveness, which is produced by the three hypothesized mechanisms. Elections matter as a means of replacing one senator with another, but senators also appear to respond directly to the preferences of their electorates. All three pathways facilitate democratic accountability and responsiveness.

Background

Article I, Section 3 of the U.S. Constitution specifies that a state's senators be "chosen by the Legislature thereof." The 17th Amendment to the Constitution—ratified in 1913—altered the process by requiring that senators be "elected by the people thereof," thereby instituting the direct popular election of senators. In contrast to elections for the House where states are divided into geographically distinct districts, both senators from a state are elected from the same constituency—the statewide electorate—making Senate elections "at large"

contests. And, although there are two senators elected from each state, there are separate elections for each one that typically occur in different election years.[1] As a result, U.S. senators may be characterized as being elected through single-member at-large elections. Another important feature of the electoral system for the Senate is that the geographic boundaries of the constituencies are fixed through time. They are never subject to redistricting as they are for the House.

The single-member at-large electoral system with fixed constituency boundaries means that one can study the responsiveness of senators' ideological positions to constituency preferences over an extended period of time. As states change and evolve, we can observe whether there are differences in senatorial behavior and the mechanisms that account for those differences.

Our analysis of "responsiveness" follows from Achen (1978), which proposes a straightforward model of representation where an elected representative's ideological location is determined by constituency preferences:

$$s = \alpha + \beta \times c + \varepsilon. \quad (1)$$

In this setup, β indicates how much change in the ideological location of a senator (s) occurs when constituency opinion (c) changes.[2] This aspect of the relationship between an elected official and the constituency has received extensive attention among scholars, more commonly in a cross-sectional framework where differences across constituencies are related to differences across elected representatives.[3] Instead, our focus here is similar to research on "macropolitics" (e.g., Erikson, MacKuen, & Stimson, 2002) that analyzes the same electorate or "polity" over time (often an entire country) to determine how mass preferences relate to the ideological positioning of political leaders and institutions, collective or "dynamic representation" (Stimson, Mackuen, & Erikson, 1995).[4] Here, too, there is a difference with the present study because rather than observing a single polity through time, we observe representation for 100 Senate seats across the 50 state electorates.[5]

Theory and Existing Evidence

To elaborate our theoretical approach, consider Vermont, which is an especially useful state to examine because it has undergone major change in its electorate's preferences over time. As we illustrate below, in the early to mid-20th century, presidential voting in Vermont was consistently more Republican than in the country overall. Since then, there has been a steady shift toward the Democrats, to the point that presidential voting in Vermont in recent elections has consistently been among the most Democratic in the

country. Theoretically, we expect change like that which has occurred in Vermont to produce change in the ideological representation a state receives in the Senate for three reasons.

One mechanism of responsiveness is through party representation. Over the entire period that senators have been directly elected, on the main dimension of party conflict over social welfare policy the Democratic party has been more liberal than the Republican party (McCarty, Poole, & Rosenthal, 1997, 2006).[6] Given the evidence that partisanship and policy preferences/ideology matter for voters (e.g., Ansolabehere, Rodden, & Snyder, 2008), then as Vermonters became more Democratic and liberal, one would expect an effect on the party of winning Senate candidates.[7] Earlier in the time period covered by our study we expect to find more Republican (and therefore conservative) senators in Vermont. Later in the period, we expect fewer Republican and more Democratic (and therefore liberal) senators from Vermont. Parties are thus one mediating mechanism of responsiveness of senators' ideological locations to constituency preferences.[8]

The degree to which party representation contributes to responsiveness depends on at least two factors. First, the magnitude of the association between constituency preferences and the party of the candidate who wins an election influences party representation, with a stronger relationship producing greater responsiveness. In the absence of a connection, then given the different pools from which candidates of different parties are drawn and/or party effects in general, one would still expect substantial differences in the ideological locations of Democratic and Republican senators. But, those differences would be unrelated to constituency preferences and therefore not contribute to the type of responsiveness considered in this article. Related, if a state only elects senators of the same party, then the prospects for party representation as a mechanism of responsiveness are severely limited.[9] In such a political context, party representation could occur if the ideological locations of the members of the dominant party were influenced by the national party's position and movement in the national party's position coincided with movement in the state electorate's preferences.

The magnitude of party differences is a second factor that should influence the link between party representation and responsiveness. If the ideological consequences of electing a Democratic or a Republican senator are greater, then party representation will make a larger contribution to responsiveness. In a period when the electoral and institutional causes of ideological differences between the parties do not matter much, whether Vermont elects a Democrat or Republican will result in a smaller change (less responsiveness) when party control of seat changes hands. When the causes of party differences are more influential, the contribution of party representation to responsiveness will

grow, as which party controls a Senate seat will have greater ideological consequences.[10] Previous research suggests that over time, the parties have become stronger along with the interest groups and activists that comprise and influence them (Aldrich, 2011; Bawn et al., 2012; Rohde, 1991; Smith, 2007; Theriault, 2008). As a result, the contribution of party representation to responsiveness may have increased over time, a possibility we investigate empirically below.

Except in very rare circumstances, a change in the party affiliation of a senator holding a particular seat entails "member replacement."[11] Member replacement also occurs when senators are succeeded by someone of the same party. Although a primary challenger sometimes defeats an incumbent senator and then goes on to win the general election, the more common method of within-party senator replacement occurs when the incumbent retires and the winner of the subsequent election is from the same party.[12]

To the extent that a senator has discretion in determining where to locate ideologically, if a senator is not responsive to changes in constituency preferences or has only been partially responsive, then a new senator from the same party may better reflect the electorate's current preferences. In periods when senators have more discretion in where they locate ideologically and when their careers are longer, same-party member replacement will contribute more to responsiveness to constituency preferences, especially if the decision to retire is motivated in part by being "out of step" with one's constituency. Furthermore, if the entry decisions of potential candidates are influenced by the ideological proximity of their own preferences to the electorate's preferences, then same-party member replacement will contribute more to responsiveness. For example, suppose that once elected a senator primarily follows his or her own ideological preferences, but as the ideological distance between the senator and the constituency grows, the probability that the senator chooses to retire rather than seek reelection increases. If the senator retires and is replaced by someone from the same party, the new senator may be ideologically closer to the electorate, especially if the decision to seek election is influenced by how close one's own preferences are to the electorate's. In other words, Republican senators elected in Vermont when the trend toward the Democrats was underway might be less conservative than Republican senators elected in Vermont earlier in the time period, when Vermont was more solidly Republican.

Empirically the possibility that within-party replacement may operate as a mechanism of responsiveness comes from cross-sectional representation studies. In such studies, it is common to find an association between electorate preferences and ideological representation among legislators of the same party (Bartels, Clinton, & Geer, 2013; McCarty, Poole, & Rosenthal, 2009).

Democrats elected from more liberal and Democratic districts/states tend to be more liberal in their ideological locations than Democrats elected from more conservative and Republican districts/states and likewise for Republicans. The new question we address here is whether the same is true within constituencies over time.

Both the party replacement and the same-party member replacement responsiveness mechanisms are premised on the idea that voters take partisanship and/or ideology into account when casting their ballots. However, if this is the case, then incumbent senators have an electoral incentive to respond directly to changes in their electorates' preferences in advance of elections to improve their chances of reelection and avoid electoral replacement.[13] For instance, a Republican senator in Vermont might notice the state's changing preferences and respond to them with a less conservative voting record in the hopes of winning reelection.[14]

If senators only care about reelection, are unconstrained by other factors (like their parties), and correctly perceive the preferences of their constituencies, then electoral anticipation will induce perfect responsiveness in advance of elections and convergence to the median voter (Downs, 1957).[15] The effect of the electorate's preferences on ideological representation will be direct and not be mediated through the other two mechanisms.

In contrast to Downs (1957) and the approach by Mayhew (1974) that considers members of Congress to be exclusively motivated by the reelection goal, Poole (2007) argues that members of Congress may be characterized as "true believers" whose internal, ideological "ideal points" are fundamentally stable, and therefore may not be responsive to external influences, be they the electorate's preferences or other causes. If correct, then in the face of changes in a state electorate's preferences, senators would not adjust their ideological locations, and only the replacement mechanisms would serve to bring about responsiveness.

Empirically, Poole (2007) finds stability in ideological locations to be the norm among members of Congress.[16] Poole (2007) notes that findings like these are not only consistent with the true believer theory of ideological stability but also allow for other possibilities, namely, that for many members of Congress, factors like "constituency interest" may be stable during the course of their careers (p. 449). Other research has attempted to analyze whether members of Congress respond directly to the preferences of their electorates. Investigations of the U.S. House that do this typically focus on short-term changes brought about by redistricting, because for some House members, the process results in significant changes in the composition, and therefore preferences, of the districts they represent. Treating redistricting as a natural experiment, Glazer and Robbins (1985) and Stratman (2000) find changing

legislative behavior in response to district changes, but Poole (2007) is unable to find similar effects. More recently Lo (2013) has questioned the logic and validity of treating redistricting as a natural experiment.

On the Senate side, there have been at least two investigations of direct senatorial responsiveness to changing preferences within their respective states (Levitt, 1996; Wood & Andersson, 1998). Levitt (1996) and Wood and Andersson (1998) report varying degrees of direct responsiveness, but the measures used in these studies are problematic. Although acknowledging the desirability of a direct measure of state preferences, both Levitt (1996) and Wood and Andersson (1998) use a proxy measure—the average ideological voting score of House members within a senator's state. Thus, the empirical relationship uncovered in these studies is that as the average House member's voting record becomes more liberal (or conservative), so too does a senator's from the same state. To interpret the relationship as indicating responsiveness to constituency preferences, one must assume that movements in average House member's ideological location are closely correlated with movements in the average voter's preferences. Yet, this is not obviously the case. Furthermore, it seems plausible that movements in senators' and same-state House members' ideological locations might be related for reasons independent of movements in state preferences. For instance, party elites within a state may push senators and House members alike in one direction or another (Wright, 1989). Thus, we view the results reported in Levitt (1996) and Wood and Andersson (1998) as indeterminate with regard to the question of whether senators respond directly to constituency preferences.

In sum, for a given Senate seat, we expect there to be a relationship between the state electorate's preferences and the ideological location of the senator who holds the seat. There are three mechanisms that may produce responsiveness. The first two are based on differences across senators—whether of different or the same parties. The contribution of the third possible mechanism—direct responsiveness—is more uncertain because of competing theoretical considerations and inconclusive empirical evidence.

Measuring State Preferences and Senators' Ideological Locations Over Time

As discussed above, our analysis follows from Achen's (1978) model of responsiveness ($s = \alpha + \beta \times c + \varepsilon$). Initially we want to estimate overall responsiveness (β)—how much change in the ideological location of a senator (s) occurs when constituency opinion (c) changes. To do so, we need measures of c and s.

To measure state constituency preferences (c), we use the Republican share of the two-party presidential vote. Variants of this measure are commonly used in empirical analyses of legislator–constituency linkages that span significant amounts of time and/or cover periods before ample survey data are available (e.g., Ansolabehere, Snyder, & Stewart, 2001; Bartels et al., 2013; Canes-Wrone, Brady, & Cogan, 2002; Gailmard & Jenkins, 2009). Relying on presidential vote shares as a measure of the partisan and ideological leanings of constituencies has the advantage that "every voter in (almost) every district confronts the same choice in (almost) every presidential election; in that sense, at least, the measure is comparable across districts" (Bartels et al., 2013, p. 9). Furthermore, under some simple assumptions, the "Republican vote share across districts will be a monotonically-increasing function of the conservatism of the district's median voter" (Ansolabehere et al., 2001, p. 140).[17]

To facilitate comparison in preferences over time, we compute the Republican presidential vote share of the two-party vote for a given state in a given year relative to the national Republican two-party vote share—the "normalized" presidential vote. This helps to even out the year to year fluctuations brought about by short-term national forces, like economic performance, leaving longer term trends within a state more evident and with less "noise."[18] Because presidential elections occur every 4 years and new congressional sessions begin every 2 years, we use a simple linear interpolation to provide estimates for the even-numbered non-presidential years. Then we connect them to Congresses in the usual fashion. For example, the 109th Congress was in session from 2005 to 2006 and we rely on the 2004 presidential vote shares as our state preference indicators for the session; for the 110th Congress (2007-2008), we use the interpolated values for 2006, which are the average of the 2004 and 2008 presidential vote shares; for the 111th Congress (2009-2010), we use the 2008 presidential vote shares.[19]

The dependent variable in our analyses (s) is the ideological locations of senators.[20] By far the most commonly used measure to track members of Congress over time is DW-NOMINATE (McCarty et al., 1997, 2006). These scores are estimated from all non-consensual roll-call votes in Congress and typically range from −1 (very liberal) to +1 (very conservative). For our purposes, DW-NOMINATE scores may not be appropriate because the scaling process imposes restrictive constraints on how the ideological positions of individual senators may change over time. The model requires any change to be linear and in equal amounts for each Congress in which a member serves.

A second, more flexible, approach to tracking the ideological positions of Congress members over time is based on Groseclose, Levitt, and Snyder (1999), hereafter GLS. The GLS method starts with ideological locations estimated on

a single Congress. They are made comparable across Congresses by estimating "shift" and "stretch" parameters. Groseclose et al. (1999) liken the approach to the method of converting temperatures from one scale to another:

> The notion of shifting or stretching scales is best explained by an analogy to a thermometer. Suppose the tube of mercury is fixed, but one can recalibrate the number marks on the side of thermometer. If, say, all the marks (and corresponding numbers) are moved x units above the original marks, we say that the scale has shifted. If one recalibrates the marks that the distance between them increases, they we say the scale has stretched. (p. 33)

The idea is that within Congresses the *ranking* of members from most liberal to most conservative does not change but that the difference in ideology associated with a shift of one point on the scale might be different in different Congresses (the "stretch" parameter) and that a score of 50, for example, in one Congress may correspond to a different score in another Congress (the "shift" parameter).

The GLS method assumes that the scores from a given Congress can be converted to the scale of any other Congress with a linear transformation. To identify this transformation, the process estimates the shift and stretch parameters for each Congress as well as a mean preference for each legislator during the time he or she served. Year-to-year fluctuations in adjusted scores are assumed to be a function of normally distributed errors that are independent of the legislator's future and past errors, the errors of other legislators during the same time period, and the chamber in which legislators serve. Importantly, changes in a legislator's adjusted scores from one year to the next are not constrained to be of similar size or direction as they are with DW-NOMINATE scores.

For our empirical analysis, we apply the GLS method to the static (estimated on single Congresses) version of DW-NOMINATE, W-NOMINATE. Like DW-NOMINATE, the W-NOMINATE scores are based on all non-consensual roll-call votes and therefore produce finer distinctions than are possible with voting scores based on smaller numbers of votes (like Americans for Democratic Action scores). By applying the GLS adjustment to the W-NOMINATE scores, we produce the dynamic measure of senatorial locations over time on which our primary analyses are based.[21] As with most work relying on NOMINATE, we focus on the first dimension of the scores, which accounts for much of the variation in roll-call voting and is generally understood to represent positions on the traditional liberal-conservative scale or preferences regarding government intervention in the economy and social welfare.

The advantage of relying on the GLS adjustment method rather than on DW-NOMINATE is apparent when one examines the careers of individual

senators. As an example, consider Russell Feingold. Panel A of Figure 1 shows Feingold's W-NOMINATE, GLS adjusted W-NOMINATE, and DW-NOMINATE scores over the course of his career. Comparing the two W-NOMINATE versions, it is clear that the GLS adjustment primarily shifts Feingold's ideological locations in the liberal direction (lower scores). But, both W-NOMINATE versions clearly contrast with the linearly changing DW-NOMINATE scores for Feingold that imply an apparently steady movement toward a less liberal ideological record over the course of his career. With the W-NOMINATE scores, Feingold appears to have made a single and significant movement in the conservative direction only in his last Congress of service—the 111th. Two observations about Feingold's career suggest that this change is more realistic than the linear change implied by the DW-NOMINATE scores. First, the significant shift in the conservative direction in Feingold's last Congress of service coincides with when he faced a strong Republican challenger who ultimately beat him in his 2010 reelection bid. Second, after a career where Feingold's Democratic party unity scores averaged 90% (ranging between 86% and 94%), his party unity score plunged to 78% in the 111th Congress while the average Democratic senator's unity score increased 3 points from 91% to 94% in the 111th Congress compared with the 110th.[22]

To be sure, the differences between the measures are not always as stark as they are for Feingold. Panel B of Figure 1 shows the trends in the measures for Larry Pressler. Although the trends in W-NOMINATE scores are not identical to the DW-NOMINATE trend, all three measures depict Pressler as growing more conservative over the course of his career.

Overall, for the time period considered in our study, the correlation between the GLS adjusted W-NOMINATE scores and the DW-NOMINATE scores is 0.89. Within both parties, the correlation between the two measures is 0.73. However, for the purposes of our study, we are especially interested in variation in ideological locations of individual senators during their careers. To compare the two measures in this regard, we mean-deviated both measures by senator. The correlation between the two mean-deviated measures depends only on the within-senator variation, and it is modest (0.34). Thus, although DW-NOMINATE may be well suited to measure institutional and even party change over time, the constraints imposed by the estimation process may be too restrictive to capture change in the ideological location of individual senators.

Case Study: One State and Two Senate Seats

Vermont has a "Class 1" seat and a "Class 3" seat.[23] Figures 2 and 3 show the careers of every senator from Vermont over time for each seat.[24] The solid lines show the normalized presidential vote in Vermont over time.

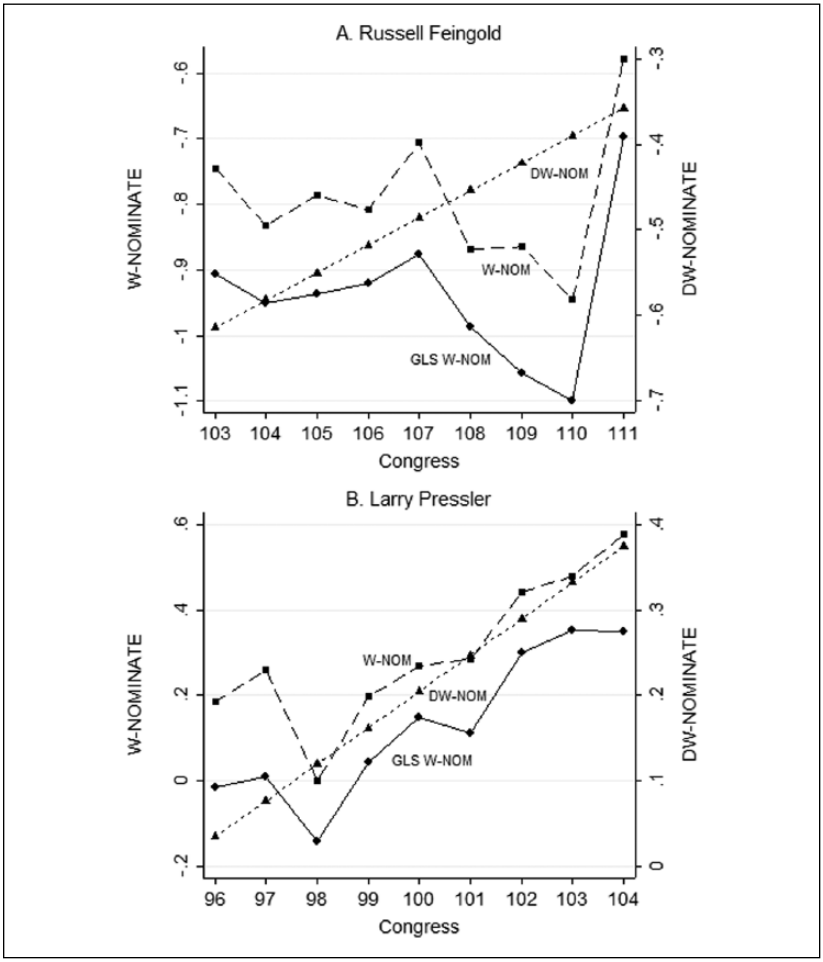

Figure 1. Comparing measures of senators' ideological locations.
Note. The solid lines show the Groseclose, Levitt, and Snyder (1999) adjusted W-NOMINATE scores. The long-dashed lines show the unadjusted W-NOMINATE scores. And, the short-dashed lines show the DW-NOMINATE scores.

First, consider the basic responsiveness model ($s = \alpha + \beta \times c + \varepsilon$). As Vermont moved in the Democratic/liberal direction, so did its senators. It is easy to see that the GLS adjusted W-NOMINATE scores are more positive (more conservative) earlier in the period when the normalized presidential vote in Vermont was more positive (Republican). By the end of the period,

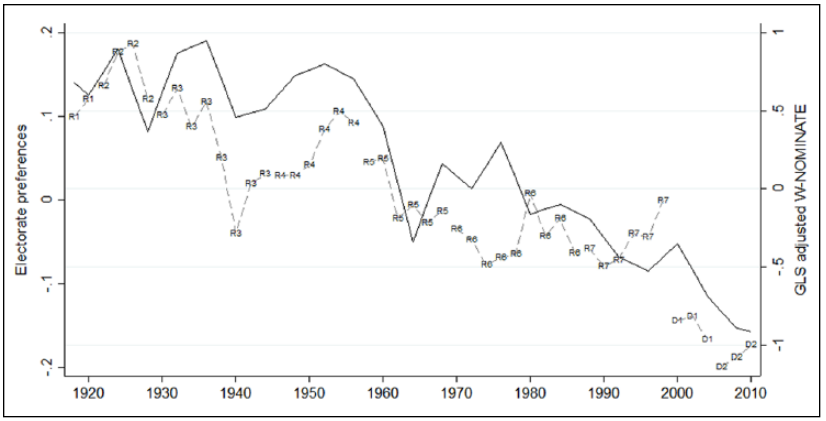

Figure 2. Constituency preferences and senators' ideological positions—Vermont Seat 1 (Class 1).
Note. Senators' careers are labeled by party (Republican = R; Democrat = D) and order of service (1, 2, 3, etc.). The solid line is the measures of state preferences, which is the normalized presidential vote (described in the text). James Jeffords (R7 and D1) left the Republican party and became an Independent. Because he caucused with and received his committee assignments from the Democrats, he is treated as a Democrat after his party switch.

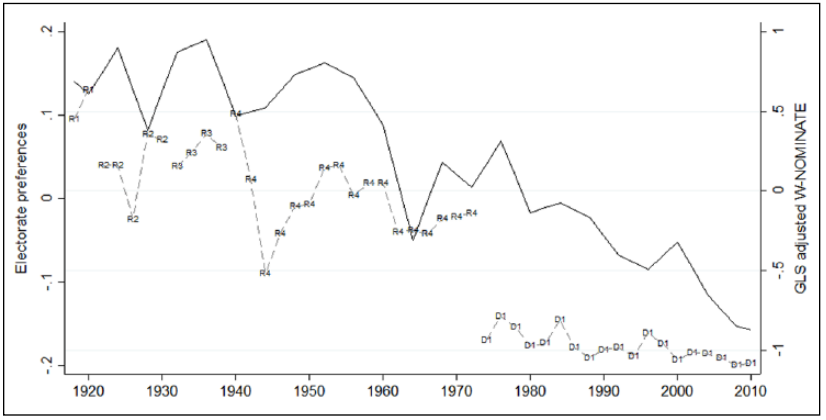

Figure 3. Constituency preferences and senators' ideological positions—Vermont Seat 2 (Class 3).
Note. Senators' careers are labeled by party (Republican = R; Democrat = D) and order of service (1, 2, 3, etc.). The solid line is the measures of state preferences, which is the normalized presidential vote (described in the text).

when the normalized vote was much more Democratic, Vermont's senators were much more liberal with negative (liberal) ideological scores.

A simple visual inspection suggests all three mechanisms of responsiveness may have contributed to the overall level of responsiveness in Vermont. Party representation clearly appears to have facilitated the process. Vermont has had three Democratic senators. All have served at the end of the time period when the state reached its most Democratic/liberal level and all are clearly more liberal in their ideological locations than their fellow Vermont senators who were Republicans. The case of James Jeffords is particularly notable. He switched parties during the 107th Congress (2001-2002). During that Congress, when he affiliated with the Republicans, his voting record produced a GLS adjusted W-NOMINATE score of −0.24. When he became an Independent and caucused with the Democrats, his estimated ideological location was significantly more liberal (−0.84).

Same-party member differences also appear evident, though less substantial. When Jeffords switched parties, his ideological score moved 0.60 points in the liberal direction. When he was replaced by Sanders (a same-party member change) and Vermont was even more Democratic/liberal, there was another movement in ideological positioning, but it was not nearly as large. As a Democrat, Jeffords had an average GLS adjusted W-NOMINATE score of −0.87. The average for Sanders is 0.20 points more liberal (−1.07).

On the Republican side, Vermont had a series of Republican senators hold both of its seats until Jeffords switched parties (Seat 1) and Leahy was elected (Seat 2). Visually, it does appear that those Republicans who served later in the period, when Vermont was more Democratic/liberal, were less conservative in their ideological locations than those who served earlier. Thus, for both the Democrats and Republicans, it appears that the within-party member differences may have facilitated the responsiveness process in Vermont.

Direct responsiveness (within member change) is perhaps the most difficult to discern visually. Consider the long-serving Democrat, Patrick Leahy. His voting record has moved in the liberal direction over time, just as the state has, but the movement is best characterized as modest. In the first half of his career, his average ideological location was −0.93. In the second half, it has been a bit more liberal (−1.02). Overall, during the course of the 19 Congresses he has served in, Leahy's estimated ideological location was less than −1.0 eight times, including in each of the last six Congresses.[25] Among Vermont's Republican senators, there appears to be some who moved in a liberal direction as the state was changing, but there also appear to be some who did not. It certainly would not be safe to conclude that there was direct responsiveness. Nor would it be safe to conclude otherwise.[26] More data and statistical tests are necessary.

Fifty States and 100 Senate Seats

Our analysis of the entire dataset begins by estimating the overall level of responsiveness of senatorial roll-call voting to constituency preferences. To focus on true electorate change (the variation in state electorates that occurs over time) rather than differences in electorates across states, we estimate fixed-effects regression models.[27] In Table 1, the first set of estimates (Model 1) includes fixed effects states. There are separate estimated intercepts (not reported in the table) for each state, and the analysis is therefore based on variation in the ideological locations of senators within their respective states over time.[28] With this specification, the estimated effect of constituency preferences is 2.26 ($p<.05$). A shift of .10 in the normalized presidential vote share is associated with a shift of .23 points on the GLS adjusted W-NOMINATE scale. To put the estimated effect in context, the average within-state standard deviation of constituency preferences and senators' ideological scores are .09 and .55, respectively.

The estimated effects of constituency preferences in Model 1 are the estimates of β in the basic responsiveness model ($s = \alpha + \beta \times c + \varepsilon$)—the overall level of responsiveness of senatorial ideological locations to constituency preferences. To assess the contributions of the three responsiveness mechanisms to the total, we proceed to estimate additional models. The first mechanism we consider is party representation. As described earlier, if movement in a state toward the Democratic (Republican) party increases the chances of a Democrat (Republican) being elected, then as long as Democrats (Republicans) are more liberal (conservative) than Republicans (Democrats), senators' party differences will account for a portion of the overall level of responsiveness.

To take into account party differences, we first estimate the responsiveness model including state-party fixed effects (rather than state fixed effects as in Model 1), thereby allowing for different intercepts for each of the 100 state parties (e.g., New Hampshire Democratic senators, New Hampshire Republican senators, Arizona Democratic senators, Arizona Republican senators, etc.). If party representation is the only mechanism by which responsiveness is produced, then once the variation due to party differences within states is taken into account, the relationship between constituency preferences and senators' ideological positions would be eliminated. The estimates for Model 2 show that this is not the case. With state-party fixed effects, the estimated effect of constituency preferences remains substantial ($\hat{\beta} = 1.2$).

Model 2 with state-party fixed effects entails the assumption that party differences within states are constant over the entire time period. At the same time there is a scholarly consensus that national party differences have varied over time (e.g., McCarty et al., 1997, 2006; Theriault, 2008). Following

Table 1. Parameter Estimates of Responsiveness.

Variable	Model 1	Model 2	Model 3	Model 4
Constituency preferences (normalized Republican presidential vote)	2.26** (.08)	1.20** (.06)	1.10** (.05)	0.72** (.06)
National party location (mean location of party members)			0.89** (.03)	0.94** (.03)
Fixed effects	State	State-party	State-party	Senator
No. of observations	4,734	4,734	4,734	4,734
Adjusted R^2	.24	.71	.76	.91

Note. Estimates are from fixed-effects ordinary least squares (OLS) regressions. To conserve space, estimated fixed effects are not shown in the table. Standard errors are in parentheses. *$p < .10$. **$p < .05$.

Levitt (1996), to take changing national party differences into account, for Model 3 we computed the average GLS adjusted W-NOMINATE ideological location by party for each Congress and included the party's average score for each senator in addition to the state-party fixed effects.[29] The estimates indicate an effect of national party ideological locations on senators that is almost 1:1; the estimated effect is close to 1.0 (.89). And, the estimated effect of constituency preferences is reduced a bit further to 1.10.

The degree to which the estimated effect of constituency preferences is reduced in Model 3 compared with the estimate in Model 1 indicates the contribution of senators' parties to responsiveness. The reduction is just about 50% suggesting that party representation accounts for half of the responsiveness apparent in senators' ideological locations. The sizable effect of constituency preferences on senators' ideological locations that remains *after* taking into account party differences suggests that the other two responsiveness mechanisms play a significant role, too.

Same-party member replacement and direct responsiveness are similar mechanisms in that they both involve members of the same party. The difference, of course, is that with same-party replacement, different members of the same party are compared across Congresses, whereas with direct responsiveness, the same member is compared across Congresses. In the models that include fixed state-party effects, the variation in senators' ideological locations that is not accounted for by the fixed effects is variation within state parties (Democrats in Mississippi; Republicans in Illinois, etc.). The estimated effect of constituency preferences in such models includes the contributions of both mechanisms. We can differentiate them by estimating another model, one that includes fixed senator effects. With a fixed senator effects

model, the estimated effect of constituency preferences is based only on the relationship between constituency preferences and ideological locations within individual senators over time—the direct responsiveness effect. Subtracting the direct responsiveness effect from the estimated effect that includes the direct responsiveness effect and the same-party replacement effect (the estimate in Model 3) leaves the contribution of same-party replacement to the overall level of responsiveness.

Model 4 reports the estimates from the fixed senator effects model. The estimated effect of constituency preferences is .72 ($p<.05$) indicating the presence of direct responsiveness. Compared with the overall responsiveness estimates from Table 1, the mechanism of direct responsiveness appears to account for 32% of total (0.72 / 2.26 = 0.32). The reduction in the apparent effect of constituency preferences on senators' ideological locations from the fixed state-party models to the fixed senator model reveals the extent to which same-party member differences contribute to responsiveness. In Model 3, the estimated effect of constituency preferences is 1.1. The difference in the estimated effects of constituency preferences between Model 3 and Model 4 (1.10 − 0.72 = 0.38) indicates the contribution of same-party member differences to responsiveness. Overall, then, all three mechanisms contribute to the total amount of responsiveness to constituency preferences with the largest effect due to party and the smallest due to within-party replacement.[30]

As discussed above, the prospects for party representation to contribute to responsiveness are limited in a state (or region) where one party is sufficiently dominant that members of the other party do not get elected. This consideration suggests that the responsiveness to constituency preferences in the South earlier in the time period under study might differ from responsiveness in the South later in the time period and also with the non-South.[31] In addition, in light of the research mentioned earlier suggesting that the influence of parties (in Congress and the electoral arena) has grown over time, the mechanisms of responsiveness outside the South may have changed, too. To provide some insights into these issues, we divided data into two nearly equal time periods (the 66th-89th and 90th-112th Congresses) and estimated the four responsiveness models from Table 1 separately for each region in each period.[32]

Table 2 shows the estimated effects of constituency preferences on senators' ideological positions in the South and non-South for the two time periods. Like in Table 1, Model 1 estimates the total amount of responsiveness to state preferences by including the measure of constituency preferences and fixed effects for states. For both the South and non-South, there is not much change in responsiveness from the earlier to the later time period, but there does appear to be more responsiveness in the non-South (2.28 and 2.26 in the

Table 2. Parameter Estimates of Responsiveness by Region and Period.

Region—Period	Model 1	Model 2	Model 3	Model 4
South—Period 1	1.47**	1.41**	0.96**	0.86**
	(.10)	(.10)	(.10)	(.10)
South—Period 2	1.32**	0.13	0.05	0.18
	(.39)	(.25)	(.19)	(.13)
Non-South—Period 1	2.28**	1.13**	0.99**	0.31**
	(.26)	(.17)	(.16)	(.15)
Non-South—Period 2	2.26**	0.70**	0.46**	0.25**
	(.29)	(.13)	(.13)	(.10)
Fixed effects	State	State-party	State-party	Senator

Note. The South is defined as the former Confederate states. The Congresses included in Periods 1 and 2 are the 66th to 89th and 90th to 112th, respectively. Models 2 and 3 include state-party fixed effects. The difference between the models is that Model 3 also includes national party locations. See text for details. Standard errors are in parentheses.
*$p < .10$. **$p < .05$.

first and second periods, respectively) than the South (1.47 and 1.32 in the respective time periods).

Significant changes in the mechanisms of responsiveness across the periods are evident for both regions. Focusing first on the South, note that in the first period, the estimated effect of constituency preferences barely changes from 1.47 (Model 1 with fixed state effects) to 1.41 (Model 2 with fixed state-party effects). The reason is straightforward. There were only two Republican senators in the South during the entire first period (Strom Thurmond in South Carolina after he switched parties and John Tower in Texas). The other 94 southern senators in the period were all Democrats. As a result, whether one includes fixed effects for states or state parties the results are nearly identical. Virtually all of the change in constituency preferences in the southern states during this period was *not* associated with party change, significantly limiting the degree to which party representation could contribute to responsiveness. That said, with the inclusion of national party ideological locations in Model 3, the estimated effect of constituency preferences does decrease, suggesting some party representation. The explanation appears to be that there was some shared movement in the conservative direction of all Democratic senators during the period that coincided with the movement of southern state electorates away from being as strongly Democratic as they had been previously.

Also notable about the South during the first period is the substantial contribution of direct responsiveness to the overall level of responsiveness. In absolute (0.86) and relative (0.86 / 1.47 = 59%) terms, the contribution is

substantial. It is also unexpected, given the electoral security of southern senators during this time and our theoretical rationale that identified the reelection incentive as the motivation for direct responsiveness. Southern senators faced modest if any competition for reelection, which would seem to provide little incentive to be responsive to constituency preferences. One possible reconciliation is that the overall preferences in southern states might have closely approximated the preferences of the primary constituencies within the states due to the overwhelming identification among Whites with the Democratic party and mass exclusion of African Americans from the electorate. If so, then given that the threat of credible Democratic primary challenges was greater than the threat of credible Republican general election challenges (Key, 1949), the direct responsiveness may be the result of southern senators being responsive to the preferences of their primary electorates.

From the first to the second period, there was also significant change in the mechanisms of responsiveness in the South. In the latter period, virtually all of the responsiveness may be attributed to party representation. The estimated effect of constituency preferences is reduced from 1.32 to 0.13 when moving the model for fixed state effects (Model 1) to the model for fixed state-party effects (Model 2) suggesting that party differences account for almost the entire observed relationship between constituency preferences and senators' ideological locations. In fact in none of Models 2, 3, or 4 is the effect of constituency preferences distinguishable from zero at conventional levels of statistical significance.

Although not as substantial as the change in the South, in the nonsouthern states, the contribution of party representation to overall responsiveness also increased from the first to the second period as would be predicted from the research on the increasing importance of parties in American politics. In the first period, the contribution of party representation was 1.29 ($2.28 - 0.99 = 1.29$) in absolute terms, which accounts for 57% of the total responsiveness to constituency preferences ($1.29 / 2.28 = 57\%$). In the second period, the contributions increased to 1.80% and 80%, respectively. Thus in both regions, party representation was more influential in the more recent period.

Discussion and Conclusion

In a review of public opinion scholarship, Stimson (1995) posed an important question about representative democracy, one that motivated this article: "When a district, or a state, or a nation becomes more liberal, do its representatives follow?" (p. 181). With respect to states and the U.S. Senators who represent them, the answer appears to be "yes." Across the entire period of time that senators have been selected through direct election, earlier in the

period and later in the period, in the South and outside the South, changes in a state electorate's ideological preferences are related to the ideological locations of its senators. Thus, one "key" normative expectation that in a democracy there be "responsiveness of the government to the preferences of its citizens" (Dahl, 1971, p. 1) appears to be met.

Theoretically we identified three mechanisms through which responsiveness could be produced. In more recent Congresses, party representation accounts for virtually all of the responsiveness observed in the South and about 80% of responsiveness in the rest of the country. Thus "gyroscopic representation" (Mansbridge, 2003) through political parties best characterizes the Senate during this period.[33] In this context, normative assessments of the quality of responsiveness depend on two criteria. One is easily met through constitutionally required, regularly occurring elections. These ensure that "voters be able at periodic intervals to reenter the system, either perpetuating its current direction by maintaining their self-propelled representatives in office or changing that direction by removing one representative and inserting another" (Mansbridge, 2003, p. 522).

The second normative criterion presents a significantly greater challenge. Assessing gyroscopic representation also requires "estimating the quality of deliberation among constituents [before elections]" with the goal of determining if voters have "developed understandings of their own interests and accurate predictions of their chosen representatives" (Mansbridge 2003, p. 522). On one hand, the substantial ideological difference between the parties and the ideological homogeneity within them (McCarty et al., 1997, 2006) facilitates and simplifies voters' task of making predictions about the future behavior of candidates if they are elected. Most Democrats are ideologically similar and very different from most Republicans who are themselves also ideologically similar. On the other hand, two of the most influential works on public opinion and voting in the last 50 years (Campbell, Converse, Miller, & Stokes, 1960; Converse, 1964) argue that voters' choices are primarily influenced by their social identifications with parties and that those identifications are not much shaped by ideological and policy considerations.[34] In light of the normative stakes, continued attention to the underlying causes of party identification and party choices among ordinary citizens is obviously important.[35]

Although party representation is the cause of most contemporary responsiveness, direct responsiveness is evident outside the South during this period and in both regions in the earlier period. These findings are more consistent with those reported by Levitt (1996) and Wood and Andersson (1998), who argue that senators adjust their ideological positions, than the view that members of Congress maintain fixed ideological locations during the careers (Poole,

2007). At the same time, the substantial amount of direct responsiveness estimated for the South during the period of Democratic party dominance is striking and unexpected given our theoretical focus on the threat of electoral defeat as the motivation to induce direct responsiveness.

Earlier we suggested a *post hoc* explanation for significant direct responsiveness in the South in the earlier period. At that time, the only real potential electoral threat for southern senators was from primary challengers. Senators could insulate themselves from this threat by being directly responsive to their primary electorates. And, given the lopsided balances of partisanship in the southern states, the preferences (and changes in preferences) of the primary and general election electorates were very similar. Thus senators could simultaneously be responsive to the two constituencies needed for election. Going further, in political contexts where there is a greater prospect of a credible general election challenger, being responsive to the primary election electorate may be at odds with being responsive to the general election electorate (Aranson & Ordeshook, 1972; Banks & Kiewiet, 1989; Stone & Maisel, 2003). There is certainly little reason to expect the degree of overlap that occurs when one party is sufficiently dominant to make the outcomes of general elections foregone conclusions. Further investigation into the nature of responsiveness in electorates where two-party competition is lacking is clearly warranted. Additional research could identify other states and periods of one-party dominance along with House districts that lack two-party competition. The nature of responsiveness in these states and districts could be analyzed to determine if the pattern for the South is a more general one. If it is, then further theorizing will be important. If it is not, then developing an explanation for this aspect of southern "exceptionalism" would still be warranted.

Finally, although our focus in this article was on U.S. senators, the theoretical approach we used is not unique to the Senate or even the U.S. Congress. In an electoral system where representatives are elected and can seek reelection from geographically defined constituencies, as long as they have at least some discretion in the ideological locations they stake out, it is plausible that all three responsiveness mechanisms may operate to produce the overall level of responsiveness in the relationship between legislators and their constituencies. The model could even be extended to the period before the direct election of senators. During that time, all responsiveness to state electorates was necessarily indirect because the state legislatures selected the senators. But, one could examine the connection between state preferences and the partisan and ideological composition of state legislatures along with analyzing the degree to which and mechanisms by which the ideological locations of senators responded to the partisan and ideological compositions of the state legislatures

that selected them. As other scholars have noted (e.g., Bernhard & Sala, 2006; Gailmard & Jenkins, 2009), state legislatures are very different "principals" than state electorates, if only with respect to their ability to monitor senators, which has important implications for responsiveness and representation in general.

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Notes

1. The only time concurrent Senate elections take place in a state is when there is a regularly scheduled election for one seat along with a special election to fill a vacancy in the other. However, even in this case, people vote separately for the two seats.
2. If s and c are measured in the same units, then it is possible to estimate other quantities of interest like "centrism" and "proximity" (Achen, 1978), but such analysis is not possible in the present study.
3. The research literature on legislator–constituency linkages is immense. The most influential study is by Miller and Stokes (1963). Several excellent recent reviews are by Ansolabehere and Jones (2011); Bartels, Clinton, and Geer (2013); and Shapiro (2011).
4. Whether cross-sectional or longitudinal, Achen's (1978) responsiveness model applies. The differences between the approaches arise when responsiveness (β)

is estimated. Cross-sectional models compare across constituencies to see how differences in *c* relate to differences in *s*. Longitudinal models do the same, but by comparing within electorates over time, there is a built in control for (at least some) omitted variables that may bias estimates of β.

5. In contrast to the present study, when Stimson, Mackuen, and Erikson (1995) and Erikson, MacKuen, and Stimson (2002) analyze Congress, the focus is on institutional level (rather than legislator-level) outcomes.
6. To be sure, the degree of difference between Democrats and Republicans nationally has fluctuated, a factor we consider in our empirical analysis.
7. Although sorting out the precise effects is complicated by a host of issues like measurement error in both partisanship (Green, Palmquist, & Schickler, 2002) and issues (Ansolabehere, Rodden, & Snyder, 2008) along with reciprocal causation between the two (Highton & Kam, 2011), most scholars accept the proposition that at least to some extent partisanship and policy matter for voters. See Niemi, Weisberg, and Kimball (2010) for useful summaries and analyses related to ongoing "controversies" in this area.
8. This notion is similar to what McCarty, Poole, and Rosenthal (2009) refer to as "within-district divergence," namely, that "for a given set of constituency characteristics, a Republican representative compiles an increasingly more conservative record than a Democrat does" (p. 667).
9. Given the extended period during which many of the former Confederate states elected only Democratic senators, we are able to analyze empirically the mechanisms of responsiveness in this context.
10. Party replacement may also produce hyper-responsiveness or "leapfrog representation" (Bafumi & Herron, 2010), which underscores the difference between responsiveness on one hand and congruence or proximity on the other.
11. Party replacement without member replacement (i.e., party switching) is very rare in the Senate. According to the U.S. Senate Historical Office, during the period of direct election of senators there have only been 12 senators who changed party during their terms of service.
12. For example, from 1946 to 2012 about 4 times as many senators retired than lost their primary elections (Stanley & Niemi, 2013, Tables 1-18).
13. In addition to improving senators' chances directly with voters, being responsive may have an indirect effect if "high quality" candidates are less likely to challenge senators more closely aligned with their constituencies.
14. To be clear, we hypothesize that a senator's public ideological location (as revealed through roll-call votes) may change in response to a change in constituency preferences. This could happen with or without a senator's own preferred (sincere) ideological location changing.
15. If voters' pay more attention as an election approaches, then senators may be more responsive as reelection approaches (Levitt, 1996; Lindstadt & Vander Wielen, 2011; Wood & Andersson, 1998).
16. Poole (2007) tests for stability in ideological locations by comparing two models of roll-call voting in Congress. The first model is based on the "assumption that all members of Congress . . . have fixed ideological positions throughout their

careers" (Poole, 2007, p. 438). The second model only requires that members maintain the same location within a given Congress. In the model that assumes fixed ideological locations and a single underlying ideological dimension, 85.4% of senators' votes are correctly classified across 28 Congresses. In the flexible model that allows different individual senatorial locations in every each Congress, the improvement in classification is minor, less than 1 percentage point, to 86.3%. It is important to note that in this test, Poole (2007) does not impose the assumption that if members change positions from one Congress to the next, they do so in a linear fashion—a key assumption to produce DW-NOMINATE scores (McCarty, Poole, & Rosenthal, 1997, 2006), discussed below. By estimating a separate model for each Congress, the form of change—if there is any—is unconstrained.

17. Some limitations of relying on the presidential vote are discussed by Kernell (2009).
18. The appendix (available online at http://apr.sagepub.com/supplemental) provides an example showing how using the normalized presidential vote reduces the short-term variability, or noise, in the measuring state electorate preferences. In the online appendix, we also compare the performance of the normalized and non-normalized versions of presidential vote share and report that the estimated level of "total" responsiveness is about one third larger when the normalized version of the measure is used.
19. As a check on the validity of the linear interpolation, we tested for differences in responsiveness in presidential election years and midterm (interpolated) election years. In general, the differences were small with modestly larger (though not statistically significant at conventional levels) apparent effects in midterm years.
20. We focus on the general ideological location of senators rather than issue-specific locations for a variety of reasons. First, specific issues come and go, especially over such a long time period like the one examined in this article. Second, even if we were able to locate senators on specific issues over time, measuring state preferences would be infeasible given the general lack of survey data, especially surveys with sufficient sample sizes to estimate state-level opinion.
21. We started with roll-call data downloaded from Keith Poole's Voteview website (http://voteview.com/, accessed on July 8, 2014) and estimated W-NOMINATE scores using the wnominate package in *R* (Poole, Lewis, Lo, & Carroll, 2011). We estimated the Groseclose, Levitt, and Snyder (hereafter GLS; 1999) adjusted W-NOMINATE scores using *R* code from Groseclose's website (http://www.sscnet.ucla.edu/polisci/faculty/groseclose/, accessed on December 18, 2013).
22. We obtained the party unity scores from the Voteview website (http://www.voteview.com/Party_Unity.htm) on July 6, 2015.
23. With 100 Senate seats and 6-year terms, one third (one "class") of the seats are up for election every 2 years.
24. The two Democratic senators in the Class 1 seats are James Jeffords (D1 in Figure 2) and Bernie Sanders (D2 in Figure 2). Jeffords began his career as a Republican (R7 in Figure 2), but left the Republican party and declared himself an Independent. Because he caucused with the Democrats after leaving the

Republican party, we code him as a Democrat. Sanders succeeded Jeffords, and he is also an Independent, but like Jeffords, he caucuses and receives committee assignments from the Democrats.

25. A potential confound is the location of the national Democratic party, which has also become more liberal over the course of Leahy's career. Before concluding that Leahy (and others like him) was being responsive to the preferences of those in Vermont, one would need to take national party trends into account, something we do in our statistical analysis in the next section.
26. Given that the national Republican party was moving in the opposite direction of Vermont in the latter part of the 20th century, Republican senators from Vermont may have been "cross-pressured." In a case like this, just as in the case of Leahy, estimating the degree of direct responsiveness requires taking into account (changing) national party locations.
27. To estimate the models, we include a set of dummy variables identifying each of the units for which we estimate fixed effects (states in Model 1, state parties in Models 2 and 3, and senators in Model 4) excluding one, which is estimated with the constant. To preserve space and because they are not of direct interest for our analyses, we do not report the estimated fixed effects (and constants) from the models.
28. Estimating the model with fixed effects for each of the 100 senate seats instead of for each of the 50 states as in Model 1 produces almost identical results.
29. For example, a Democratic senator in the 94th Congress receives the average Democratic senator's GLS adjusted W-NOMINATE score.
30. See the online appendix for an extensive series of replications where we use different measures of the constituency preferences and senators' ideological positions to assess how the results depend on how the key concepts are measured.
31. We define the South as the 11 former Confederate states.
32. We divide the data into two periods to maintain variability within the periods while also allowing for the possibility of differences over time. With just two time periods, our ability to draw precise conclusions about temporal breakpoints is limited.
33. "In all versions of gyroscopic representation, the voters affect political outcomes not by affecting the behavior of the representative ('inducing preferences,' as in promissory or anticipatory representation), but by selecting and placing in the political system representatives whose behavior is to some degree predictable in advance based on their observable characteristics" (Mansbridge, 2003, p. 521). In the case of more recent Congresses, the key observable characteristic is party affiliation.
34. "[I]n theory of course the party usually has little rationale for its existence save as an instrument to further particular policy preferences. . . . The policy is the end, and the party is the means. . . . The reversal for the mass public is of course a rather dramatic special case of one of our primary generalizations: The party and the affect toward it are more central within the political belief systems of the mass public than are the policy ends that the parties are destined to pursue" (Converse, 1964, pp. 240-241).
35. The characterization of the mass public in Lenz (2012) is consistent with the view of Campbell, Converse, Miller, and Stokes (1960) and Converse (1964). Ansolabehere et al. (2008) provide an alternative view.

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Assessing the Mechanisms of Senatorial Responsiveness to Constituency Preferences

Online Appendix

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In this Appendix we address a variety of issues related to the measurement of the key independent (constituency preferences) and dependent (senators' ideological locations) variables in the article. First, as discussed in the main text, we rely on the state presidential vote to measure constituency preferences, a common practice in representation studies that span substantial time periods (e.g., Ansolabehere, Snyder, & Stewart, 2001; Bartels, Clinton, & Geer, 2013; Canes-Wrone, Brady, & Cogan, 2002; Gailmard & Jenkins, 2009). Specifically, we computed the Republican presidential vote share of the two-party vote for a given state in a given year relative to the national Republican two-party vote share – the "normalized" presidential vote. We normalized the measure to help even out election-to-election fluctuations brought about by short-term national forces, like economic performance, leaving longer term trends within a state more evident and with less "noise." To illustrate, consider Vermont. As discussed in the main text, the Vermont electorate's preferences transformed over the past 100 years. Figure A1 shows this using both presidential vote measures. The dotted line in Figure A1 shows the actual Republican share of the presidential vote in every presidential election (with .50 subtracted from it to facilitate comparison). The long-term trend is apparent, but after normalizing the measure by subtracting the national vote shares from Vermont vote shares (the solid line in the figure) the short term swings (like the one from 1960 to 1964) are notably smaller, bringing the longer term trend into even clearer relief.

< Figure A1 >

The consequences of using the normalized presidential vote rather than the actual presidential vote are apparent when estimating the responsiveness models. We reestimated the main results (Models 1-4 of Table 1) after substituting the actual (non-normalized) Republican presidential vote share instead of the normalized measure. Because the units of both measures are the same, the estimates are directly comparable. They show that with the normalized measure, the amount of total responsiveness appears to be about one third greater (2.26 with the normalized measure compared to 1.66 with the non-normalized measure). Further, as shown in the second set of entries in Table A1 with the non-normalized measure, the apparent share of responsiveness due to direct responsiveness is more than cut in half (from 32% to 12%) while the contributions of member replacement (within party) and party replacement both increase.

< Table A1 >

We also conducted a replication informed by Fiorina (2011, 183-186). Fiorina (2011) explains how differences and changes in voting may be influenced by the ideological locations of parties. One implication is that growing polarization of state electorates in presidential voting may not reflect preference changes across the states as much as the growing polarization of the parties. If this is the case, then with respect to underlying preference change, a ten percentage point change in the normalized presidential vote at one point in time may not be equivalent to a ten point change at another time. To address this, we make (the probably overly restrictive) assumption that all changes in the amount of variation in the presidential vote across elections is due to national party change. We do this by standardizing the normalized presidential vote by year, thereby equalizing the amount of variability over time, with the consequence being that state changes over time are the result of shifts within the distribution.

The last third set of entries in Table A1 shows the results of employing the standardized measure of the normalized presidential vote with GLS adjusted W-NOMINATE as the dependent variable. (We only focus on the relative contributions because the units of the normalized and standardized presidential vote measure are different.) The results show a pattern very similar to one observed when we rely on the conventional measure of the normalized (but unstandardized) presidential vote. The contributions of party representation, member (but not party) replacement, and direct responsiveness are 53, 24, and 23 percent, respectively for the standardized version, compared to 51, 17, and 32 percent, respectively, when the unstandardized version is used.

We also conducted a series of replications using different measures of senators' ideological positions. One is based on using DW-NOMINATE scores instead of the GLS adjusted W-NOMINATE scores as the measure of senators' ideological locations. As discussed earlier, DW-NOMINATE imposes strict constraints on how individual senators' locations may change over time. A second is based on using Americans for Democratic Action (ADA) voting scores, adjusted for comparability over time with the GLS method. (The latter are available for the 80th through the 110th Congresses from Groseclose's website.) To facilitate comparison we estimate the responsiveness models for all three versions of the dependent variables (GLS adjusted W-NOMINATE scores, DW-NOMINATE scores, and GLS adjusted ADA scores) over the same time period (80th-110th Congresses) and report the relative contributions of the three mechanisms given that all three dependent variables are in different units. What we find is that whether one uses the GLS adjusted W-NOMINATE scores or the GLS adjusted ADA scores, the pattern of results are similar with a majority of responsiveness due to party representation, but with a substantial contribution from direct responsiveness, too. In contrast, with the DW-

NOMINATE scores, the apparent contribution of party representation appears notably larger (93 percent compared to 68 percent when the other two measures are used). And, there is no apparent contribution of direct responsiveness. In light of the advantages of the GLS adjusted W-NOMINATE scores over the DW-NOMINATE scores discussed in the main text, we view the results presented in the first column of Table A2 as better estimates of the contributions of the three responsiveness mechanisms than those in the second. These results reinforce the importance of using measures appropriate for the topics being investigated. The analysis of DW-NOMINATE scores has led to many important insights into the nature of legislative behavior. But, had we relied on them for the analysis conducted here, we would have mistakenly concluded that direct responsiveness was not a feature of the relationship between senators and their state electorates. Our use of a more suitable measure based on a different version of NOMINATE scores and the GLS adjustment method points to the conclusion that along with the other two mechanisms of responsiveness, senators directly respond to the preferences of their constituencies.

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Table A1
Replications with Alternative Measures of State Electorate Preferences

	Relative contributions to overall responsiveness with the indicated measure of state presidential vote:		
Mechanism	Normalized	Actual	Standardized
Party	51%	60%	53%
Member replacement (within party)	17%	28%	24%
Direct	32%	12%	23%
Total responsiveness	100%	100%	100%

Notes: For all three replications, the dependent variable – senators' ideological locations – is the GLS adjusted W-NOMINATE scores. See appendix text for a description of the three measures of state presidential vote.

Table A2
Replications with Alternative Measures of Senators' Ideological Locations

	Relative contributions to overall responsiveness with the indicated measure of senators' ideological locations:		
Mechanism	GLS-WNOM	DW-NOM	GLS-ADA
Party	68%	93%	68%
Member replacement (within party)	-2%	8%	5%
Direct	34%	-1%	27%
Total responsiveness	100%	100%	100%

Notes: For all three models the measure of state electoral preferences is the normalized state presidential vote. GLS-WNOM refers to Groseclose, Levitt, and Snyder adjusted W-NOMINATE scores. DW-NOM refers to DW-NOMINATE scores. GLS-ADA refers to Groseclsoe, Levitt, and Snyder adjusted ADA scores. The latter are available for the 80th through the 110th congresses from Groseclose's website (http://www.sscnet.ucla.edu/polisci/faculty/groseclose/Adj.Int.Group.Scores/). To facilitate comparison across the measures, all three models were estimated for observations in the 80th through the 110th Congresses only.

Figure A1.
Presidential Vote Shares in Vermont over Time