Party and Constituency in the U.S. Senate, 1933-2004

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Introduction

Rational choice models of internal legislative rules have dominated the study of Congress over the last quarter century. While this research agenda has been extremely productive, congressional scholars have not devoted sufficient attention to the connections among elections, parties, and legislative behavior. That complex tripartite relationship deserves greater attention, particularly in the study of the Senate, where the formal powers of party are weaker than the House of Representatives.

One important question in this area is the extent to which members of the Senate are responsive to the characteristics of their constituencies when they vote on the floor, particularly when those characteristics conflict with party membership. Research in this area is surprisingly thin. In particular, while it is clear that party is closely linked to the liberal-conservative dimension of legislative conflict, the influence of constituent characteristics on Senate voting is not well understood, particularly as it differs by issue type.

Our theoretical expectations are straightforward. It is almost tautological that party membership should be more associated with voting on liberal-conservative issues than it is for cross-cutting ones. Conversely, we expect that the effect of constituency will be greater for issues that are orthogonal to ideology, particularly when those issues are highly salient.

Using comprehensive data from 1933-2004, we measure the association between constituency (via state demographics) and Senate voting behavior (via ideal point estimates derived from roll-call voting). As expected, we find that the second dimension of conflict in the Senate, which captures the primary cross-cutting issue(s) on the agenda, is more closely related to demographics, while the first is more closely related to party and presidential voting. In addition, we show that there was a massive upswing in the association between demographics and second-dimension voting during the period in which race was a highly salient issue that split the Democratic Party. However, as the parties polarized after the issue of race was incorporated into the partisan divide, the relationship between demographics and Senate voting declined to a similarly low level for both dimensions.

Previous research

Our research fits within the larger body of work on representation and its relationship to the preferences and composition of members' constituencies (e.g. Turner 1951, Miller and Stokes 1963, Fenno 1973, Fiorina 1974, Bailey and Brady 1998, Uslaner 1999). In particular, the most closely related previous studies have used demographics to predict ADA scores and defined legislative shirking as the residuals from those regressions (see, for instance, Kalt and Zupan 1984). A related literature examines constituency heterogeneity as a key predictor of the extent to which legislators may deviate from constituency preferences (Fiorina 1974; Bond 1983; Bishin 2000; Gronke 2000; Bishin, Dow, and Adams 2006).

But as Goff and Grief (1993) point out, it is impossible to define "shirking" because Condorcet-winning platforms rarely exist in multidimensional policy spaces. Instead, they argue, politicians construct idiosyncratic coalitions.[1] Other authors reach a similar conclusion. For instance, Krehbiel (1993) notes that same-state senators vote

[1] They also argue that the effect of demographics may vary by party, but previous work on the House found that such interaction effects only improve model fit slightly so we do not include them (Aldrich et al 2006).

together only slightly more often than we would predict from chance alone, while Schiller (2002: 110) shows that same-state senators "target distinct sets of geographic areas and related demographic groups to increase electoral support" (see also Schiller 2000).

Rather than trying to measure individual "shirking," we instead seek to measure the strength of the association between legislative behavior and constituency demographics and determine how it has varied over time. Given the extent to which parties structure legislative behavior, we expect that historical patterns will change in tandem with the evolution of the party system. From Poole and Rosenthal (1991, 1997, 2007), we know that there are two major dimensions of legislative conflict. The first and more important dimension represents the locus of conflict between the two major parties, primarily reflecting disagreement over economic policy. It accounts for most of the variance in Congressional voting, correctly classifying over ninety percent of roll call votes in recent years. The second dimension, by contrast, represents a variety of issues that do not map cleanly onto the first dimension. As a result, it varies in importance over time and typically explains much less variance than the first dimension (Poole and Rosenthal 2007).

The most salient second-dimension issue in recent decades was race, which cut across party lines in the mid-20th century. Poole and Rosenthal, who define the relevant period as "roughly" 1940 to 1966, document how the first dimension of DW-NOMINATE explains almost no variance in House voting on civil rights during this period (the Senate held fewer civil rights votes). During this period, a virtual three-party system existed with the Democrats divided North from South. The race issue was subsequently mapped onto the first dimension in what Carmines and Stimson call an "issue evolution," a dynamic process in which highly salient new issues disrupt the alignment of the established party system (1989). In this case, the Republican Party became known for racial conservatism, particularly with the presidential nomination of Barry Goldwater in 1964, and the Democratic Party became identified with racial liberalism. Over time, that shift among elites translated into long-term changes in mass partisanship, especially among southern whites.

Estimation and theory

Before defining our theoretical expectations, it is useful to be clear about the assumptions underlying our analysis. Let $C_{i,j,k,t}$ denote the preferences of individual i in constituency j for candidate k at time t. We assume that the primary determinant of voter preferences over candidates is a series of exogenous variables $X_{i,j,k,t}$ and historical context $H_{i,j,t}$ (Fenno 1973). This formulation yields:

$$\mathbf{C_{i,j,k,t} = \mathit{f}(X_{i,j,k,t}, H_{j,t})} \qquad (1)$$

Since we do not have comprehensive individual-level data for all fifty states, we shift to the constituency level. We assume that voter characteristics can be adequately characterized using measures of aggregate state demographics. We also assume that the past presidential vote in the constituency $V_{j,t-1}$ captures historical partisan allegiances not captured by demographics. These changes alter equation 1 to:

$$\mathbf{C_{j,t} = \mathit{f}(X_{j,t}, V_{j,t-1})} \qquad (2)$$

Finally, we assume that legislators reveal an ideological position through their voting records and that this behavior is a function of constituent preferences. If we use

DW-NOMINATE scores DW in dimensions $d \in \{1,2\}$ to approximate these positions, then the scores of each member of Congress i who represents constituency j in a given period t will be:

$$\mathbf{DW_{d,i,t} = \; \mathit{g}(\mathit{f}(X_{j,t}))} \qquad (3)$$

However, we also wish to allow for the influence of party affiliation and historical partisan allegiances on voting and therefore include the legislator's party P_i and the constituency's past presidential vote $V_{j,t-1}$ in the equation. Consequently, we represent estimated ideal points as follows:

$$\mathbf{DW_{d,i,t} = \; \mathit{g}(\mathit{f}(X_{j,t},V_{j,t-1}), P_i)} \qquad (4)$$

Thus *g*() is some function mapping constituent characteristics, past presidential vote, and legislator party affiliation into an ideological position. Assuming *g*() is linear, we can estimate equations 3 and 4 via OLS.

We can now define our theoretical expectations about these statistical models. Since the first dimension captures the primary liberal-conservative divide in politics, it should be closely associated with party affiliation. Consequently, we expect that demographic predictors will contribute relatively little to first dimension ideal point estimates. By contrast, since the second dimension captures issues that are orthogonal to the liberal-conservative divide, ideology should be less relevant. Thus, model 3, which only includes demographic predictors, should fit estimated second dimension ideal points better than the first. We expect this relationship to be strongest when the second dimension is highly salient. By contrast, the combined model in equation 4 should fit the first dimension more closely due to its association with party.

Data

Our dataset of senators, including the DW-NOMINATE first and second dimension estimates we use as our dependent variables, comes from Poole's Voteview website (http://www.voteview.org). We examine all 3621 full or partial Senate terms served by individual members from the 73rd to 108th Congress (1933-2004).

We use a number of measures to capture the demographic characteristics of each state over the period in question (1933-2004):

- Seniors age 65 and over
- African-Americans
- Farmers and farm workers
- Finance workers
- Government workers
- Manufacturing sector workers
- Population density
- Logarithm of total population[2]
- Urban population
- Population born outside the U.S.
- Logarithm of per capita personal income (adjusted for inflation)

Except for per-capita income, all our data come from the 1930-2000 U.S. Census.[3] Personal income data are collected from the Bureau of Economic Analysis.[4] The 1960-

[2] Total population was logged because it displayed high variance. It was not normalized to another variable. By contrast, urban population and population born outside the U.S. were normalized to total state population and population density was normalized to land area, so these variables were not logged.
[3] Where possible, we followed the coding in Adler (n.d.). For 1930-1940, coding decisions were made by the authors to maximize comparability to recent data, though some slippage was unavoidable.
[4] Since Census data on median income does not extend back to the 1930s, we collect state-level aggregate personal income data from BEA and divide by interpolated state population.

1990 Census data were found in Adler (n.d.), data from the 1930-1950 censuses were collected directly from source texts, and the 2000 Census data was downloaded online.[5] All of the age, race, and workforce measures are constructed as proportions of state population.

We account for mid-decade population and demographic changes by interpolating demographic variables between decennial censuses. Current practice in Congressional demographic analyses has been to carry forward original census data from the beginning of a decade without modification (Adler 2002). Applied to the Senate, this practice effectively assigns static demographic characteristics to each state for a ten-year period, thereby truncating a key source of variance outside the legislature. We therefore estimate mid-decade values based on a linear interpolation of data between censuses.[6]

As stated above, we also use past presidential vote as a measure of historical partisan allegiances when we estimate equation 4. This variable uses the Democratic percentage of the two-party presidential vote from the election that is concurrent to, or immediately preceding, the election of a given Congress (for example, we associate the presidential election of 1996 with the 105th and 106th Congresses of 1997-2000).[7]

Results

To compare model fit between the two primary dimensions of DW-NOMINATE, we estimate OLS models for the pooled 1933-2004 dataset. Table 1 contrasts a

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[5] Specifically, we sum non-statewide district data from our House analysis (Aldrich et al. 2006).
[6] Geometric interpolation was also tested and did not perform better (results available upon request).
[7] While we use the Democratic percentage of the two-party vote in our models, our results hold if the measure is a percentage of the total vote or deviation from the national vote.

demographics-only model with a model including demographics, presidential vote, and party for each dimension.

[Insert Table 1 here]

The first and third columns report the demographic-only models for the first and second dimensions of DW-NOMINATE, respectively. We find that the demographic model of the second dimension explains a larger proportion of the variance than the comparable first-dimension model; the R^2 is 0.33 compared with 0.07.[8] By contrast, the first dimension of DW-NOMINATE is much more closely associated with party and presidential vote than the second dimension. Models of the two dimensions using only party and presidential vote (not presented but available upon request) show that the R^2 for the first dimension is 0.62 compared with 0.28 for the second. Given that the first dimension captures the liberal-conservative divide during this period (Poole and Rosenthal (1991, 1997, 2007), these findings are not surprising; we expect that issues that do align with the first dimension will be less closely related to demographics than those that do not.

In addition, the increased variance explained by demographics on the second dimension appears to be related to a larger set of constituency variables than race alone. When we examine coefficients from the pooled model, we find that the coefficients of the proportions of senior citizens and of blacks are positive and statistically significant, while mean income, population density, and the proportion of farming, finance, and manufacturing workers are all negative and statistically significant. By contrast, we find only three predictors are statistically significant for the first dimension (the proportion of farming and manufacturing workers [both positive] and population density [negative]).

[8] Despite their well-known limitations, we use R^2 and adjusted R^2 as crude model fit statistics in this paper.

The second and fourth columns of Table 1 represent fully specified models that include demographics, past (Democratic) presidential vote, and membership in the Republican Party. Unsurprisingly, the addition of these variables reverses the pattern of model fit. The R^2 for the first dimension, which is closely associated with party, soars to 0.71, while the equivalent second dimension model has an R^2 of 0.54.[9] However, demographics still remain important. The addition of demographics to a model with only the Senator's party and Democratic presidential vote share improves model fit, particularly on the second dimension. We find that root mean squared error falls from .22 to .19 for the first dimension and from .47 to .38 for the second dimension (results available upon request).

The pooled analysis above suggests the second dimension of DW-NOMINATE has been more closely associated with our demographic variables than the first. We next examine how these relationships have changed over time. Figure 1 presents the adjusted R^2 scores from the demographics-only models estimated for each Congress.[10]

[Insert Figure 1 here]

Strikingly, the second dimension is more closely related to demographics than the first for every Congress but one in our sample. The difference was largest from the 78th and 91st Congresses (1943-1970), a period that overlaps closely with the 1940-1966 peak of

[9] Contrary to our expectations, the coefficient for Democratic presidential vote is negative for the second dimension in the fully specified model, which controls for demographics and party. When we examine bivariate correlations, we discover an apparent example of what is known as Simpson's paradox (1951). As we expect, presidential vote is positively correlated with second dimension scores for the sample as a whole ($r = 0.11$), but the correlations are negative when we disaggregate by party (r=-0.08 for Democrats and r=-0.06) for Republicans. When we control for party in the model above, the presidential vote coefficient therefore becomes negative. A similar relationship holds for the first and second dimension of DW-NOMINATE, which are negatively correlated between parties but positively correlated within them.

[10] Since it is not necessary to cluster by senator in these models, we use adjusted R^2 to measure model fit.

the second dimension identified by Poole and Rosenthal.[11] As mentioned earlier, this was the period in which the issue of race became sufficiently salient to split the Democratic Party by region. The gap in model fit between dimensions subsequently narrowed, however. By the 108th Congress, Figure 1 indicates that second dimension model fits were actually slightly *worse* than those for the first.

Does this finding also hold once party and the state presidential vote are taken into account? Figure 2 compares the performance of for the fully specified model presented earlier in explaining the first and second dimensions of DW-NOMINATE.

[Insert Figure 2 here]

As expected, model fit is generally higher for the first dimension when party and presidential voting are included as predictors. However, during the 80th-92nd Congresses (1947-1972), model fits are again better for the second dimension. In short, both sets of models show unexpectedly large increases in model performance for the second dimension in approximately the same period that the second dimension was most salient. We view these findings as further evidence of a strengthened linkage between constituency and the second dimension during the pre-civil rights era.

Based on the results above, we examine whether our fully specified model is consistent with the issue evolution account. If so, we would expect that the relationship of party to the second dimension to become more pronounced as the issues on this dimension are conscripted by the major parties. To this end, we plot the coefficient for the party variable during each Congress for both dimensions of DW-NOMINATE while also

[11] RMSE also declined on the second dimension during this period (results available upon request).

controlling for the demographic variables and presidential vote presented earlier. Figure 3 presents these coefficients and their 95% confidence intervals for 1933-2004.

[Insert Figure 3 here]

As expected, the figure illustrates the increased partisanship on the first dimension and the divergence of the parties on the second dimension. Indeed, the coefficient for the second dimension starts to move in a negative direction quite early. By the 79th Congress of 1945-1946, its 95% confidence interval does not include zero and the coefficient trends down until the 91st Congress of 1969-1970, when it stabilizes.

Taken together, these results have two implications. First, the second dimension appears to have been more closely rooted in demographics than the first over the last seventy years. The first dimension, which is essentially partisan, is not strongly associated with demographics, but the second dimension, which includes a number of cross-cutting issues, seems to have deeper demographic roots. Second, the issue of race – which dominated the second dimension during the mid-20th century – appears to have made members of the Senate *more* responsive to the aggregate characteristics of their constituencies than in any comparable period in the last seventy years.

Since our results are consistent with the issue evolution story, it is important to consider whether our models pool across regions. Our finding that the second dimension of DW-NOMINATE was closely linked to demographics during the pre-civil rights era may be driven by an especially strong relationship in the South, where the issue of race was especially salient. Figure 4 tests this conjecture with demographic models of the second dimension that are disaggregated by region and estimated on each Congress in the data.[12]

[Insert Figure 4 here]

The resulting pattern of model fit over time suggests that the South drove the demographic predictability of the second dimension of DW-NOMINATE in the pre-civil rights era. When we disaggregate by region, we see that adjusted R^2 is relatively stable for non-Southern states, whereas it spiked dramatically in the South starting in the 79th Congress and remains consistently high until the 90th Congress (1945-1968).[13] This period again corresponds closely with the years in which the second dimension was especially salient. Adjusted R^2 then plunged in the South before regaining parity with non-Southern states in the early 1990s.

Conclusion

We have offered evidence for several new conjectures about the relationship between constituency characteristics, party, and legislative behavior. Specifically, we have demonstrated that first dimension DW-NOMINATE scores bear little relationship to state demographics, while second dimension scores are more strongly related to them. In addition, we show that the relationship between demographics and the second dimension of DW-NOMINATE strengthened dramatically in the pre-civil rights South before waning in subsequent years. In other words, the association between demographics and

[12] We define the South as Alabama, Arkansas, Florida, Georgia, Louisiana, Kentucky, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

[13] To test whether the increased demographic-second dimension relationship is simply an artifact of the issue of race, we construct two nested models. The first predicts the second dimension of DW-NOMINATE for each Congress using black, south, south*black and our other demographic variables. The second uses only black, south, and south*black. Using a series of F-tests, we reject the hypothesis that the effect of the other demographic variables is jointly zero for every Congress in our data except for the 76th and the 105th-108th (for all others, $p<.01$; results available upon request).

voting increased on the second dimension during a period in which the salience of parties was suppressed. However, as the alignment of parties in the South came to more closely resemble the two-party politics found in the rest of the nation, this increased association came to an end.

In effect, the disruption of the normal issue alignment allows us to observe the relationship between constituency and legislative voting when it is less structured by party. When Southern Democrats were divided from the rest of their caucus, the explanatory power of demographics increased dramatically on the second dimension. This finding has important implications for understanding how parties affect the relationship between constituency and legislative voting. Possible extensions might include conducting a parallel analysis for the House of Representatives, which we have only been able to study for the 1983-2004 period due to data limitations (Aldrich et al 2006), or considering whether hypothesized issue evolutions on abortion and women's rights affected the relationship between constituency and legislative behavior (Stimson 2004). In general, however, it seems clear that legislative behavior in the Senate cannot be fully understood without considering both party *and* constituency.

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Table 1: Models of DW-NOMINATE, 73rd – 108th Senates

COEFFICIENT	DW-NOMINATE 1st dimension		DW-NOMINATE 2nd dimension	
	Demographics only (SE)	Demographics, presidential vote, and party (SE)	Demographics only (SE)	Demographics, presidential vote, and party (SE)
Proportion 65 or older	0.044 (0.75)	-0.77 (0.44)	2.59 (1.19)	2.32 (0.85)
Proportion black	0.11 (0.17)	0.88 (0.099)	2.06 (0.28)	1.70 (0.21)
Proportion in farming	1.40 (0.69)	-0.85 (0.38)	-2.09 (1.02)	-0.28 (0.88)
Proportion in finance	-0.37 (2.61)	1.06 (1.52)	-7.73 (3.36)	-5.53 (2.39)
Proportion foreign born	0.34 (0.42)	-0.098 (0.21)	-0.26 (0.54)	0.40 (0.44)
Proportion govt. workers	0.71 (1.04)	-2.15 (0.59)	0.38 (1.49)	0.74 (1.15)
Proportion in manufacturing	1.48 (0.54)	-0.93 (0.28)	-4.72 (0.71)	-3.22 (0.58)
Total population (log)	-0.027 (0.021)	-0.025 (0.012)	-0.021 (0.026)	-0.015 (0.019)
Proportion in urban area	0.075 (0.16)	-0.0062 (0.082)	-0.17 (0.20)	-0.32 (0.16)
Population density	-0.00054 (0.000090)	-0.00020 (0.000061)	-0.00034 (0.00013)	-0.00047 (0.000093)
Per capita income (log)	0.056 (0.050)	0.0084 (0.024)	-0.12 (0.043)	-0.094 (0.042)
Democratic presidential vote		-0.36 (0.062)		-0.86 (0.13)
Republican Party member		0.60 (0.019)		-0.56 (0.033)
Constant	-0.36 (0.53)	0.39 (0.26)	1.76 (0.50)	2.00 (0.44)
Observations	3621	3621	3621	3621
R^2	0.07	0.71	0.33	0.54

Standard errors clustered by senator

Figure 1: Demographics-only models of DW-NOMINATE by Congress

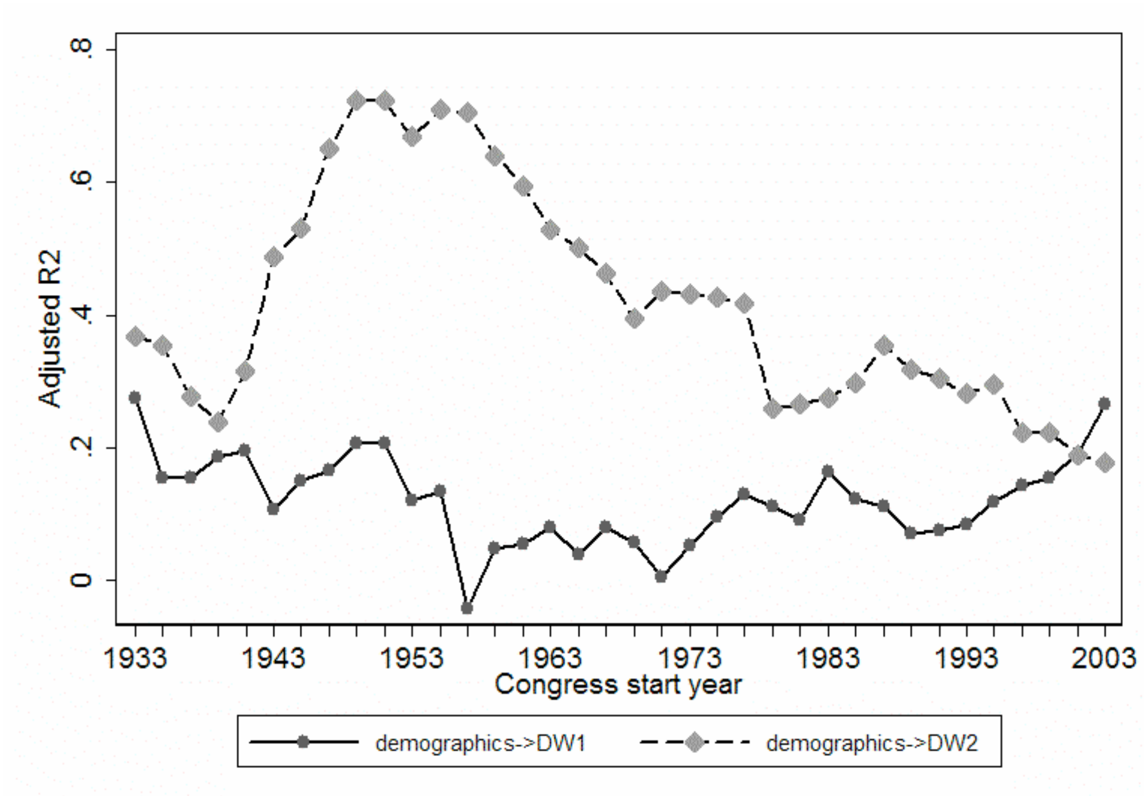

Figure 2: Combined models of DW-NOMINATE by Congress

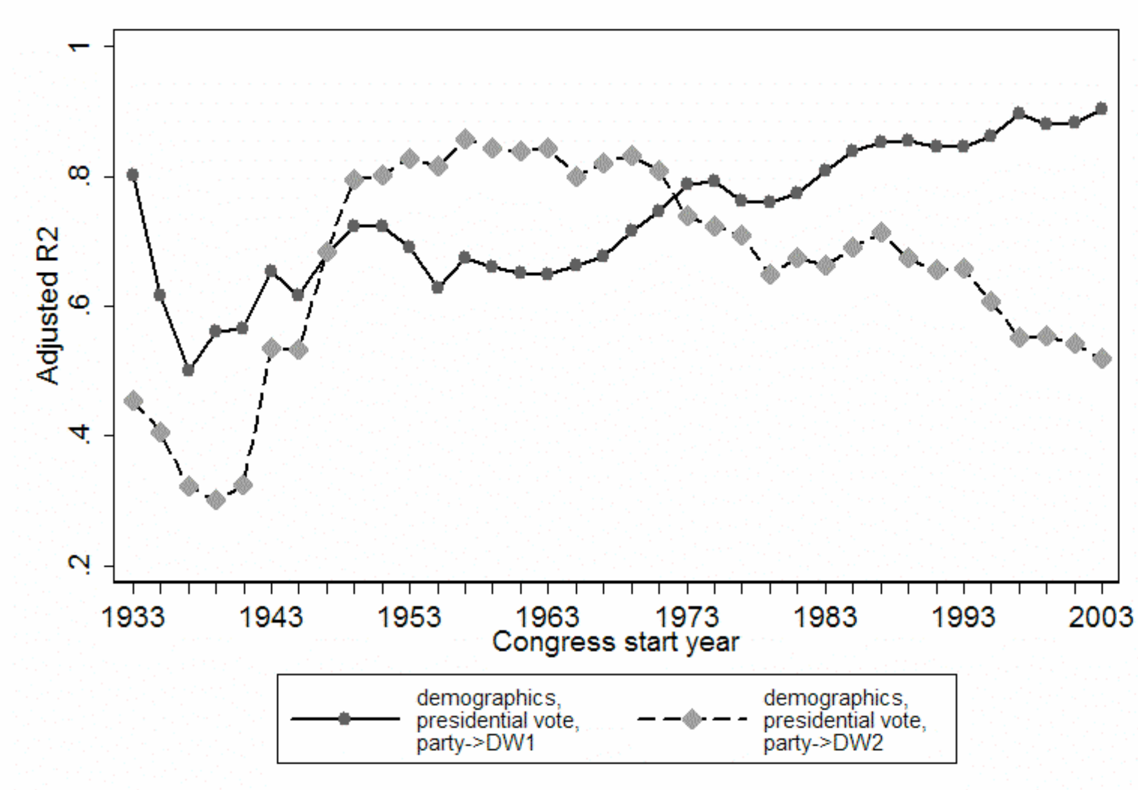

Figure 3: GOP coefficient by Congress for DW-NOMINATE models

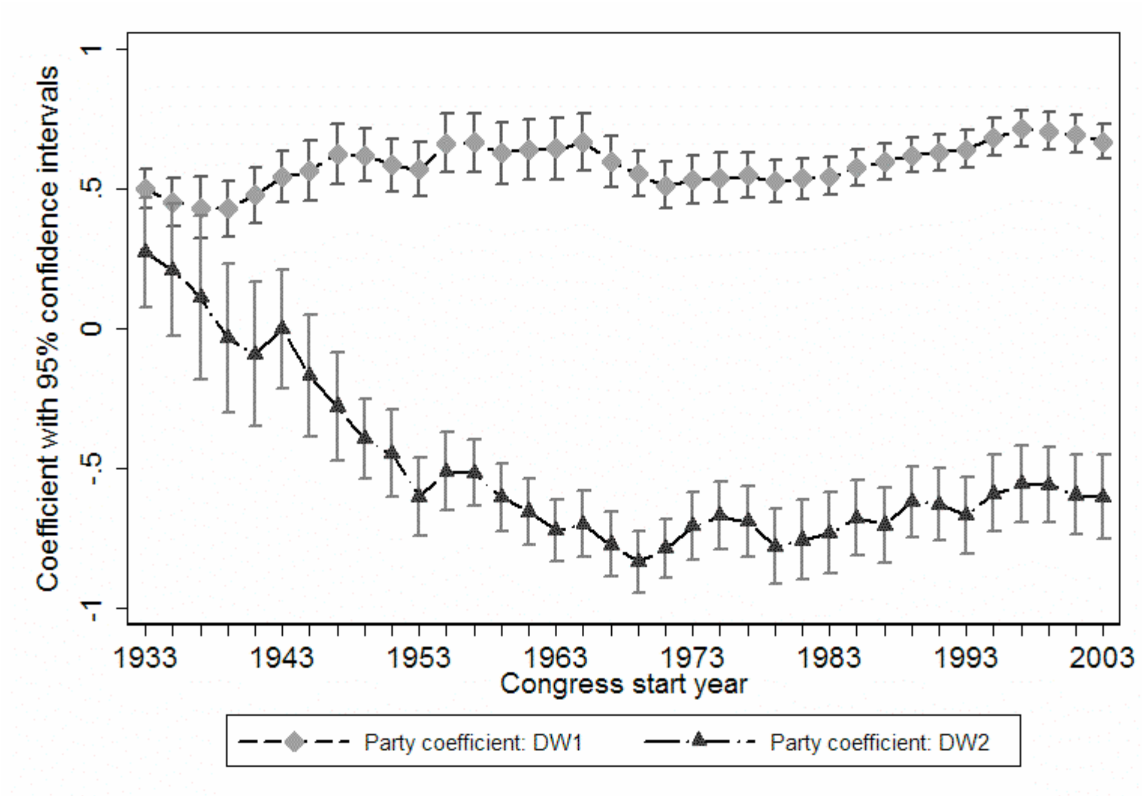

Figure 4: Demographics-only models of DW-NOMINATE by region and Congress