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

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Abstract:

This paper considers the relationship between state demographics and the party and DW-NOMINATE scores of Senators from the 73rd-108th Congress. We find that demographics are a significant but relatively weak predictor of party and DW-NOMINATE first dimension scores, while DW-NOMINATE second dimension scores are more closely related to demographics. We also find that these relationships have changed significantly over time. In particular, the link between demographics and second dimension scores was extremely high in the 1940s and 1950s, but by the 108th Congress the relationship between demographics and DW-NOMINATE was at a similarly low level for both dimensions.

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Introduction

Much of the study of congressional politics over the last quarter century can be seen as the development of the rational choice-based new institutionalism. This approach emphasizes the importance of internal rules to structure and constrain choice. As a result, modern scholarship on Congress has too rarely considered the interaction between the electorate and legislative behavior.

We seek to re-establish the importance of demographic characteristics in understanding party choice and legislative behavior, first for the House (Aldrich et al 2006) and now for the Senate. In so doing, we hope to better understand the relationship between districts (defined broadly to include states) and the legislators they elect. To what extent can we use aggregate demographic characteristics to explain party choice and legislative behavior? And how have these relationships changed over time?

This analysis, we hope, will provide insight into the factors predicting party success in Senate elections; help us explore the relationship between demographics and dimensions of legislative conflict; and demonstrate how changes in the political significance of race altered these relationships over time.

Modeling approach

This paper represents an exploratory analysis of the relationship between the demographic characteristics of a geographic area and the political behavior of its senators. We focus on examining longitudinal variation, seeking to capitalize on the historical aspect of demographic data available at the state level, which goes back much further than typical House district data.

Given the fixed rules of both primaries and general elections, the selection of candidates and winner of the general election can be modeled as some function of the preferences of the actors involved. We assume that, at any given moment, the primary determinant of voter preferences – including temporally fixed rules and historical context – are a series of exogenous variables (Fenno, 1973). As such, we focus on the distribution of voter preferences in each state, which we attempt to capture using various aggregate demographic measures. Due to limitations in available data, we assume that variation in individual preferences can be adequately characterized as functions of the parameters of $\mathbf{X}_{j,k,t,}$ the aggregate measures of district characteristics.

As a result, we consider the effect of these aggregate measures, $\mathbf{X}_{j,k,t}$, on several political variables. First, we estimate the effect of district characteristics on the winning candidate's party, seeking to answer two specific questions:

- How accurately can we predict the party affiliation of the winning Senate candidate using demographics and state presidential vote?
- To what extent does the demographic predictability of Senate partisan affiliation vary over time and by region?

Second, we use state-level variables to predict estimated legislative ideal points (DW-NOMINATE scores on the first and second dimension), thus bridging the gap between explanations that focus solely upon variables inside the legislature and electoral characteristics outside it. Our hypothesis is that cardinal measures of legislator behavior reflected in DW-NOMINATE scores can be explained as a function of variance in state characteristics, state voting patterns, and the political party of the senator.

In particular, we are interested in variation in the relationship between over time. From Poole and Rosenthal (1991, 1997), we know that there are famously "1.5" dimensions of legislative conflict. The first dimension consistently represents the axis of conflict between the two major parties, and primarily reflects disagreement over economic policy. It accounts for the most variance in voting patterns. The second dimension, by contrast, varies in importance over time, and explains a much smaller proportion of variance in voting behavior. It represents a variety of issues that do not map cleanly onto the first dimension, especially race. As Poole and Rosenthal describe, the race issue cut across party lines from 1941 until approximately 1970, causing the second dimension to become much more important in explaining legislative behavior. Ultimately, however, the issue was mapped onto the first dimension in what Carmines and Stimson call an "issue evolution" (1989).

This subject has received limited attention in the literature, particularly with respect to the Senate. In particular, previous studies defined "shirking" as the residuals from a regression of ADA scores on state or district demographics (see, for instance, Kalt and Zupan 1984). But as Goff and Grief (1993) point out, these approaches are invalid since Condorcet winning platforms rarely exist in multidimensional policy spaces. Instead, they argue, successful politicians construct idiosyncratic winning coalitions.[1] Krehbiel (1993) argues along the same lines that senators from the same state, who represent the exact same geographic constituency, only vote together slightly more often that we would predict from chance alone. Again, he argues that senators respond to reelection constituencies. These critiques are buttressed by Wendy Schiller's research (2000, 20002), which demonstrates how same-state senators (even those from the same party) follow different legislative and electoral strategies, and how they "target distinct sets of geographic areas and related demographic groups to increase electoral support" (Schiller 2002: 110).

Nonetheless, we have no good measure of a politician's idiosyncratic electoral coalition. As such, we are forced to rely on aggregate state characteristics, bearing in mind that such an assumption does some violence to the data. Our paper will examine these issues from an exploratory perspective, seeking to understand the relationship between demographics and legislative behavior and how it changes during an issue evolution.

Data

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

[1] Goff and Grier further argue that the effect of demographics may vary by party, but in previous work (Aldrich et al 2006), we found that such party*demographics interaction effects only improve model fit slightly and consume many degrees of freedom. As such, they were not included in this paper.

- 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] Census data from 1960 to 1990 were found in Adler (n.d.), while data from the 1930, 1940 and 1950 censuses were collected directly from source texts and 2000 Census data was downloaded online.

We account for mid-decade population and demographic changes by linearly 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.[5] State-level demographic data can change a great deal over a single decade, and these changes should be reflected between censuses. Therefore, we estimate mid-decade values based on a linear interpolation of data between censuses. We examined model fit using both linear and geometric interpolation, and found no significant difference (see Appendix, Table 1).

In our analysis of House district demographics (Aldrich et al., 2006), we apply data for a given census to the newly reapportioned Congress following that census. For example, we use the 1980 census for the 98th Congress elected in 1982, and then interpolate the 99th – 102nd Congresses. This approach creates a two-year lag, and some resulting measurement error, between the census and any given Congress. Since state boundaries and number of Senators per state don't change from census to census, our Senate analysis could link census data directly to the election in the corresponding year. In the example above, we could apply 1980 census data to the Senate of the 97th Congress elected in 1980. However, this adjustment does not appreciably improve model fit (see Appendix, Table 1). Since we would

[2] Total population was logged because it displayed high variance and 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 and are available upon request. Every effort was made to maximize comparability over time, but some slippage is inherent due to changes in census methodology.
[4] We collect state-level aggregate personal income data from BEA and divide by interpolated state population. This measure of mean income is less representative than median income, but Census data on median income does not extend back to the 1930s.
[5] We compute our state-level data from the sum of non-statewide Congressional district data compiled in our House analysis (Aldrich et al., 2006).

like to maintain methodological consistency with our House analysis, we have chosen to keep the two-year lag described above for the Senate analysis as well.

The models also include the Democrats' share of the two-party presidential vote in a given state. For each Congress, we use data 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 (1997-2000), and the 2000 presidential election with the 107th (2001-2002).

Our datasets of senators, including DW-NOMINATE scores and ICPSR-based member data, comes from Poole's *Voteview* (http://www.voteview.org) website. We examine all 3621 full and partial Senate terms from the 73rd to 108th Congress (1933 – 2004). Our models predicting the party of the elected senator consider only the members elected immediately before a given Congress, which restricts analysis to 1203 observations.

Finally, all variables (with the exception of personal income, total population and population density) are normalized to interpolated state population.

Results

Model fit: Party

Following the approach described above, we compare a basic demographic model with other models that add variables such as Democratic presidential vote share, the legislator's party affiliation (in the case of DW-NOMINATE models) and a set of interactions between region, population of African Americans, and a dummy variable for the pre-civil rights era (in our data, the 73rd to 88th Congresses). In each pooled model in the table (and in all pooled models described in this paper), we cluster standard errors by legislator.

The results of three different logit specifications predicting party across Congresses are presented in Table 1:

[Insert Table 1 here]

To assess model fit, we use area under the receiver operating curve (ROC) as an overall metric of predictive accuracy for binary dependent variables (Swets 1988). This value ranges from .5 (the rate possible from random chance) to 1 (perfect predictability). In this case, we observe that our ability to predict party has only modest discriminatory power, with area under the ROC curve failing to exceed .75 in any model.

In previous work, we found that the partisan affiliation of House members in the 98th to 107th Congress was significantly more predictable, with area under the ROC curve ranging from .78 to .88 for comparable models (Aldrich et al 2006). However, our data span a longer time period and our House models included a significantly larger number of demographic variables, so we cannot be sure whether this difference holds when the data are comparable across chambers (a task for future work).

As in our previous examination of district characteristics, demographic variables predict party slightly better than Democratic presidential vote alone and the combination of the two improves fit over either in isolation. The area under the ROC curve for Democratic presidential vote is .68 (standard error=.01), whereas the area for demographic variables alone is .70 (standard error=.01) and the area for demographics plus presidential vote is .73 (standard error=.01). Using the DeLong, DeLong and Clarke-Pearson procedure (1988) for comparing the area under two correlated ROC curves, we can compare the difference in areas under the ROC curves. We can strongly reject the null hypothesis that all three areas are equal (χ^2 (2) = 53.53, prob. > χ^2 = .0000). When we compare each pair of curves, we find that the difference between demographics, versus Democratic presidential vote alone, is not significant (χ^2 (1) = 1.79, prob. > χ^2 = .18). However, the addition of demographics to presidential vote is significant (χ^2 (1) = 14.57, prob. > χ^2 = .0001), as is the addition of presidential vote to demographics (χ^2 (1) = 10.14, prob. > χ^2 = .002). These results indicate that the combination of demographics and presidential vote provides maximum predictive power.[6]

When considering the various coefficients in the combined model, we find that Democratic presidential vote is (unsurprisingly) a highly significant factor predicting that a Democrat will be elected. As we would expect, greater numbers of African Americans in a state and higher population densities are also strongly associated with Democratic victory. By contrast, increased numbers of manufacturing workers and farmers significantly increase the chances of electing a Republican.[7]

Next, we disaggregate the data and estimate a logit equation for each Congress to examine changes in the relationship between demographics and party over time. Figure 1 displays the area under the ROC curve for each Congress along with the associated standard errors:

[Insert Figure 1 here]

Because these models only include senators who had just been elected or re-elected (rather than the full chamber), each separate logit includes approximately 33 observations. The reduced number of observations increases the standard errors.[8]

The large confidence intervals around the ROC estimates mean that we must be cautious in interpreting the figure. Still, it seems that demographics were significantly more predictive of the party of an elected senator from the 73rd to the 88th Congress (1933-1965) than the subsequent period (1966-2004). Conversely, the period from the 88th to the 94th Congress (1963 – 1977) shows a significantly reduced ROC area compared to other periods, suggesting that party became especially difficult to predict from aggregate demographics.

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[6] It is important to bear in mind that the use of the χ^2 test will tend to exaggerate the differences between curves due to the large sample size (N=1203), so high significance levels should be interpreted with caution.
[7] The finding that manufacturing workers are associated with electing Republicans, which may seem surprising, is driven by the pre-civil rights era. The correlation between manufacturing and GOP is -.005 for the 89th-108th Congresses (1965-2004).
[8] We do not consider special elections.

It is important to note that the ROC areas for the 98th-108th Congress (1983-2004) are quite low compared to demographic models over a similar time period in the House. However, there are several differences. First, every member of the House stands for election every two years, which increases the power of the estimation procedure dramatically (435 observations per Congress rather than approximately 33). Second, the House model includes many more variables (reflecting the larger quantities of data collected by the modern census). A third explanation is states are more heterogeneous that House districts, which makes it more difficult to predict party on the basis of aggregate demographic characteristics.

Model fit: DW-NOMINATE

For models predicting the two dimensions of DW-NOMINATE ideal point estimates, the role of demographics is theoretically different. Here demographics are assumed to be predictors of constituency influence in voting behavior. We examine OLS models predicting the first dimension of DW-NOMINATE using party; demographics, presidential vote; and a combination of all three factors in Table 2:

[Insert Table 2 here]

Table 2 reports the results of OLS estimates of four different models of the 1st dimension of DW-NOMINATE.

For our data, the first dimension of DW-NOMINATE has a mean of -.03 and a standard deviation of .36. The RMSE of the models improves from .33 with demographics and presidential vote to .22 for GOP and presidential vote to .19 in the combined model. This means that the addition of demographic variables improves RMSE by a very modest .08 standard deviations over a party/presidential vote model. Though the contribution of demographics is minimal, an F-test rejects the null that the entire block of demographics has no effect in the combined model ($F(11, 630) = 18.84$, Prob > F = 0.0000).

A number of the demographic variables are significant in both models 2 and 3 of Table 2. Specifically, the number of blacks, farm workers, manufacturing workers and government workers, population density, and the log of state population are all statistically significant at the .05 level. The addition of party, however, changes the direction of the coefficients for farmers and manufacturing, with both switching from a positive (conservative) to negative (liberal) sign – a puzzling shift.

Figure 2 compares model fit of different specifications of the 1st dimension over time:[9]

[Insert Figure 2 here]

Though we have no statistical way to discriminate between the adjusted R-squared values of the various models, the figure suggests that Democratic presidential vote contributes little

[9] Due to the well-known problems with R^2, we use adjusted R^2, which includes a penalty term for using additional degrees of freedom, to assess model fit for the first and second dimension of DW-NOMINATE by Congress. However, comparing adjusted R^2 between models can be problematic, so we proceed cautiously.

over a model with only demographics. Furthermore, while party alone is clearly better than demographics and demographics plus presidential vote, a model combining all these elements performs marginally better for most Congresses in our time period.

Figure 3 examines changes by Congress in the coefficient and 95% confidence interval for party when the 1st dimension of DW-NOMINATE is regressed on demographics, party and presidential vote:

[Insert Figure 3 here]

Though the large confidence intervals restrict observations about changes over short periods of time, Figure 3 illustrates the increasing relationship between party identification and DW-NOMINATE first dimension scores. Also interesting are two eras of consistent increases in this influence of party: 1937-1948 and 1981-1998.

Finally, we turn to our third dependent variable, the second dimension of DW-NOMINATE, which we again predict using party; demographics, presidential vote; and a combination of all three factors. Table 3 reports the results:

[Insert Table 3 here]

The second dimension values of DW-NOMINATE have a mean of .02 and a standard deviation of .56. In this case, RMSE of the models is .47 for GOP and presidential vote, .46 with demographics and presidential vote, and .38 in the combined model. Thus, adding demographic variables improves RMSE by .16 standard deviations relative to a party/presidential vote model – a larger improvement than we observed on the first dimension, though still relatively small. The demographic variables are also significant in a block F-test ($F(11, 630) = 38.32$, $Prob > F = 0.0000$.) Finally, RMSE for the full model is much higher than in the first dimension case, suggesting that second dimension scores are harder to predict as expected.

Turning to coefficients, we find that Republican party membership decreases second dimension scores, while the proportion of Democratic presidential votes also decreases second dimension scores. This is the result of the shift in party configurations on the second dimension, which we examine in more detail below. In addition, the number of senior citizens and blacks increases second dimension scores, while income per capita and the number of finance workers, manufacturing workers and residents in urban areas all decrease predicted second dimension scores.

In Figure 4, we examine model fit over time for the second dimension of DW-NOMINATE by Congress, plotting adjusted R^2 for four models (party, demographics, demographics and presidential vote, and a combined model):

[Insert Figure 4 here]

Here we observe the expected pattern of issue evolution. The adjusted R^2 for party is essentially zero from the 73rd-77th Congresses (1933-1942), but it increases dramatically from the 78th-82rd Congresses (1943-1952) and stays essentially stable for the 83rd-93rd Congresses

(1953-1973) before declining. The interpretation appears to be straightforward. When race became a salient second dimension issue in the pre-civil rights issue, the racial conservatism of Southern Democrats and racial liberalism of northern Republicans meant that party had a significant relationship to the second dimension. But as race was mapped onto the first dimension (Carmines and Stimson 1989), this relationship eroded significantly.

Similarly, we observe demographics increasing from relatively modest predictive power from the 73rd-77th to very high predictive power from the 78th-85th before declining over time. A combined model including demographics, presidential vote and party achieves impressive adjusted R^2 over the whole period, particularly from the 78th-87th, where adjusted R^2 hovers near .8.

To examine changes in the relationship between party and the second dimension over time with more specificity, we plot the estimated GOP coefficient (with 95% confidence intervals) from the combined model predicting the second dimension of DW-NOMINATE for the 73rd-108th Congress in Figure 5:

[Insert Figure 5 here]

Here we again see the expected pattern of the transformed partisan relationship to the second dimension. The GOP coefficient shifts from positive and significant to strongly negative between the 73rd and 91st Congresses (1933-1970). It then reaches an equilibrium and remains relatively stable over the remaining years.

A new perspective on an old story

In the above analysis, we have consistently found major shifts in the relationship between demographics and legislative behavior over time. In particular, the second dimension of DW-NOMINATE appears to be far more predictable from demographic characteristics than the first dimension until the most recent Congresses. In addition, the relationship between demographics and the second dimension seems far more variable than with the first dimension, especially during the pre-civil rights period. Let us consider the differences directly.

Figure 6 presents the adjusted R^2 from models that use demographics to predict DW-NOMINATE's first and second dimension:

[Insert Figure 6 here]

As we can see, the second dimension is much more closely related to demographics than the first, particularly between the 78th and 91st Congresses (1943-1970), the approximate interlude that saw a virtual three-party system in Congress comprising southern Democrats, northern Democrats and Republicans.

When we bring presidential vote and party into the mix, as in Figure 7, the picture becomes even more interesting:

[Insert Figure 7 here]

Using the combined power of demographics, presidential vote and party, we find that the first dimension is more predictable than the second in terms of adjusted R^2 – except for the 80^{th}-92^{nd} Congresses (1947-1972), where the opposite is true.

These findings have two implications. First, the second dimension appears to be much more rooted in demographics than the first. The first dimension, which is essentially partisan, is not closely related to demographics, but the second dimension, which includes a number of cross-cutting issues, has deeper demographic roots. Second, the issue of race – which dominated the second dimension during its period of prominent from 1941 to 1970 – 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.

Below, we explore these results, hoping to discover new insights about parties, demographics and the dimensions of legislative conflict.

Issue evolution and the South: A re-examination

Of course, we must consider whether our models do not pool across Congresses, as we have heretofore assumed. As such, we estimate a series of models that include the following additional variables, which allow us to consider the potential interactions between the number of blacks, being in the South and the civil rights era:

- South
- Pre-civil rights (73rd-88th Cong.)
- Black X South
- Pre-civil rights X South
- Pre-civil rights X Black
- Pre-civil rights X Black X South

The results of these models for GOP and the DW-NOMINATE first and second dimension are presented in Table 4:

[Insert Table 4 here]

For the key interactions, we find a series of interesting results. The coefficient for blacks is non-significant for parties and both dimensions, indicating the number of blacks is not significant at the state level outside the South in the post-civil rights era. The black*south interaction is positive and significant for the first dimension, indicating that the number of blacks in a state increases conservatism more within the South than elsewhere during the post-civil rights era. However, the sign of the black*south interaction is also positive and significant on the second dimension, which is the direction generally associated with Democrats. In addition, the pre-civil rights*black interaction is positive and significant for the first dimension, suggesting that the number of blacks was associated with greater conservatism in the pre-civil rights era outside the South. Conversely, pre-civil rights*black is negative and significant on the second dimension, which means that greater numbers of blacks were associated with racial conservatism outside the South in the pre-civil rights era. Finally, the three-way interaction of pre-civil rights*black*south is negative and significant for party and positive and significant for the first dimension. This indicates that the interactive effect of blacks*south was much less likely to lead to the election of Republicans in the pre-civil rights period, and associated with reduced conservatism on the first dimension.

The conservative Republican takeover of much of the South is also reflected in the data, as we see in Figure 8:

[Insert Figure 8 here]

The coefficient for party in models predicting DW-NOMINATE first dimension scores becomes consistently positive and statistically significant in the post-civil rights era. As we expect, Democratic party affiliation becomes a powerful predictor of liberalism as Southern Democrats are replaced by conservative Republicans.

Figure 9 demonstrates that the South drove the demographic predictability of the second dimension of DW-NOMINATE in the pre-civil rights era:

[Insert Figure 9 here]

When we disaggregate by region, we see that adjusted R^2 is relatively stable for non-Southern states, whereas it spikes dramatically in the 79th Congress and remains consistently high until the 90th Congress (1945-1968).

The power of race appears dramatically in Figure 10, which tracks the value of the coefficient for blacks on the second dimension of DW-NOMINATE:

[Insert Figure 10 here]

From the 80th-88th Congresses (1947-1962), the coefficient for blacks is positive and significant before becoming insignificant as the racial issue is mapped to the first dimension – the same story we have seen previously.

So are these results simply an artifact of the issue of race? Are Poole and Rosenthal correct to describe the second dimension as racial during this era? So far, we have focused almost exclusively on race. However, Figure 11 suggests that race, region and the interaction between the two is not sufficient to explain all of the predictive power of demographics on the second dimension:

[Insert Figure 11 here]

From the 73rd to 87th Congresses (1933-1962), the demographic model of DW-NOMINATE's second dimension consistently outperforms the race/region model in terms of adjusted R^2. As the issue evolution proceeds, however, the race/region model performs just as well as the demographic one before trailing yet again starting in the 97th Congress (1981-1982).

To assess the robustness of this finding, we construct two nested models. The first predicts the second dimension of DW-NOMINATE by 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 76^{th} and the 105^{th}-108^{th} (for all other F statistics, $p<.01$; results available upon request).

Conclusion

We have shown that the relationship between state demographics, party and legislative behavior are relatively strong and predictable. In addition, the relationships between demographics and political variables change in systematic ways that correspond with well-established theories about the issue evolution of race, the political realignment of the South, and the increasing partisanship of recent years. In short, demographics matter.

We have also offered new conjectures about the relationship between demographics and the dimensions of legislative conflict. Specifically, we have demonstrated that first dimension DW-NOMINATE scores bear little relationship to state demographics, while that the second dimension of DW-NOMINATE is much more closely related to demographics. In addition, we show that the strength of the relationship between demographics and the second dimension of DW-NOMINATE surged dramatically in the pre-civil rights era before waning in subsequent years. When partisanship goes down, it seems, faithful representation increases – at least on the second dimension.

The questions this analysis raises are largely comparative in nature. What explains the weaker predictability of party in the Senate when compared with the House of Representatives (Aldrich et al 2006)? From Lee and Oppenheimer (1999), we know that small states have more homogenous electorates and reduce competition compared to large states. Future analysis will consider whether the greater competitiveness of Senate races and the increased partisanship of the House is driven by the relatively greater homogeneity of House districts, pooling House and Senate data for the 1983-2002 period and examining the effect of homogeneity and heterogeneity on party choice and legislative behavior.

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Figure 1:

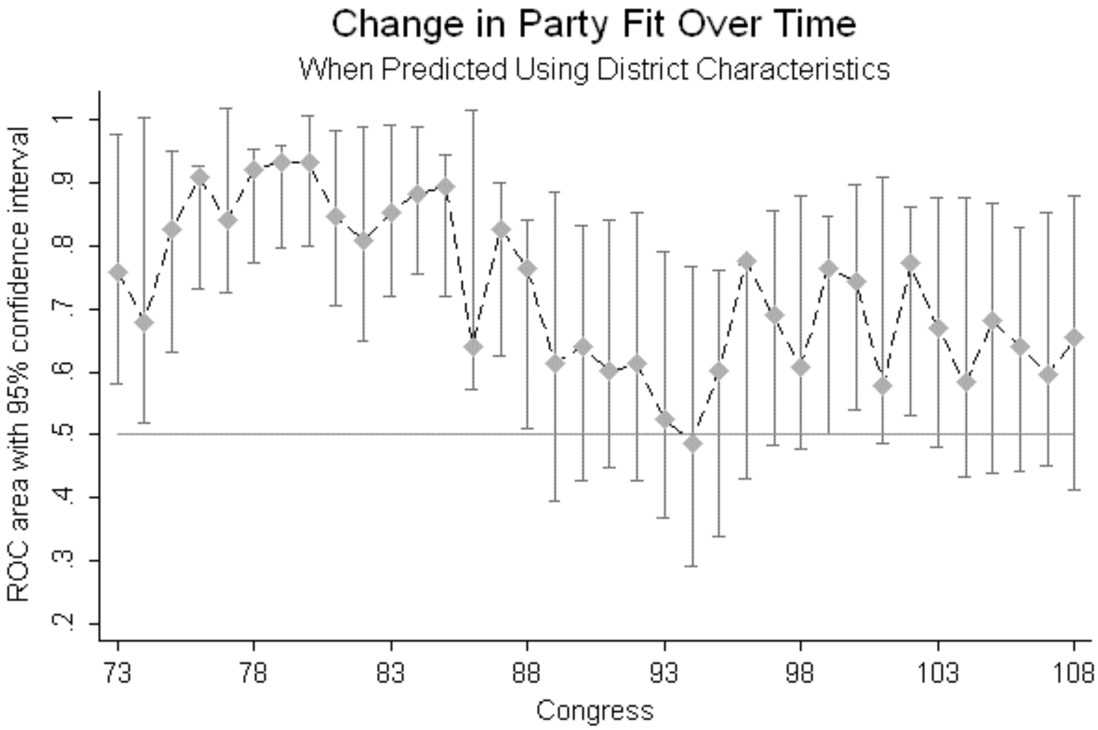
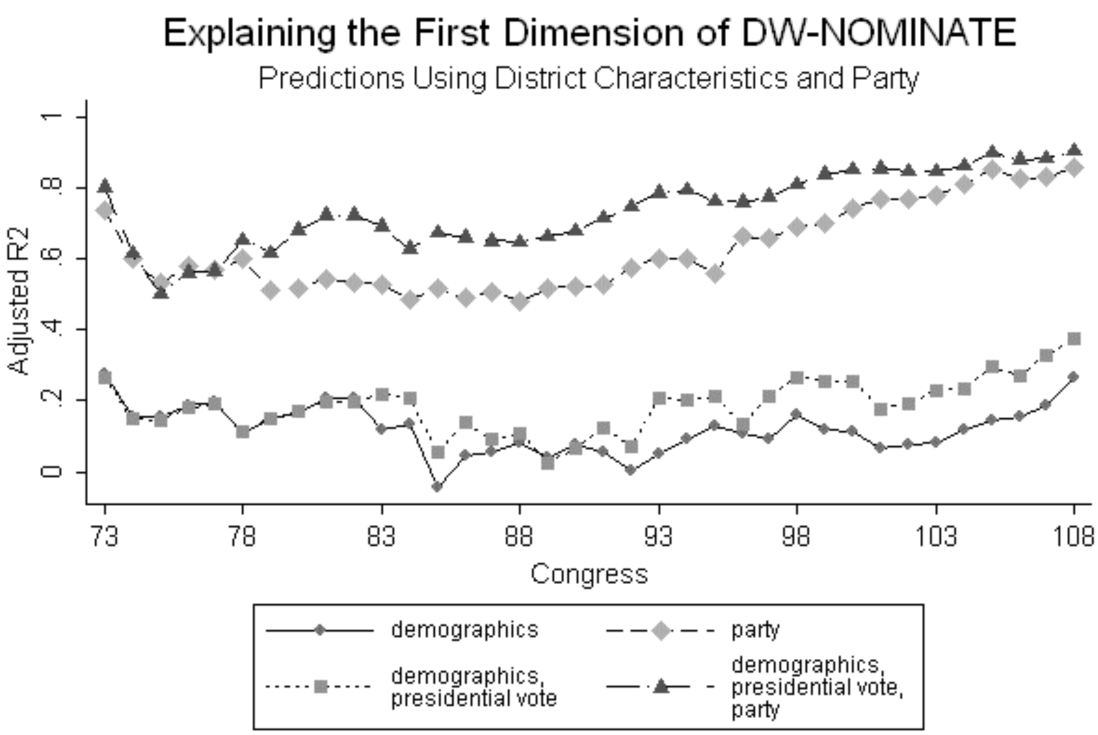


Figure 2:



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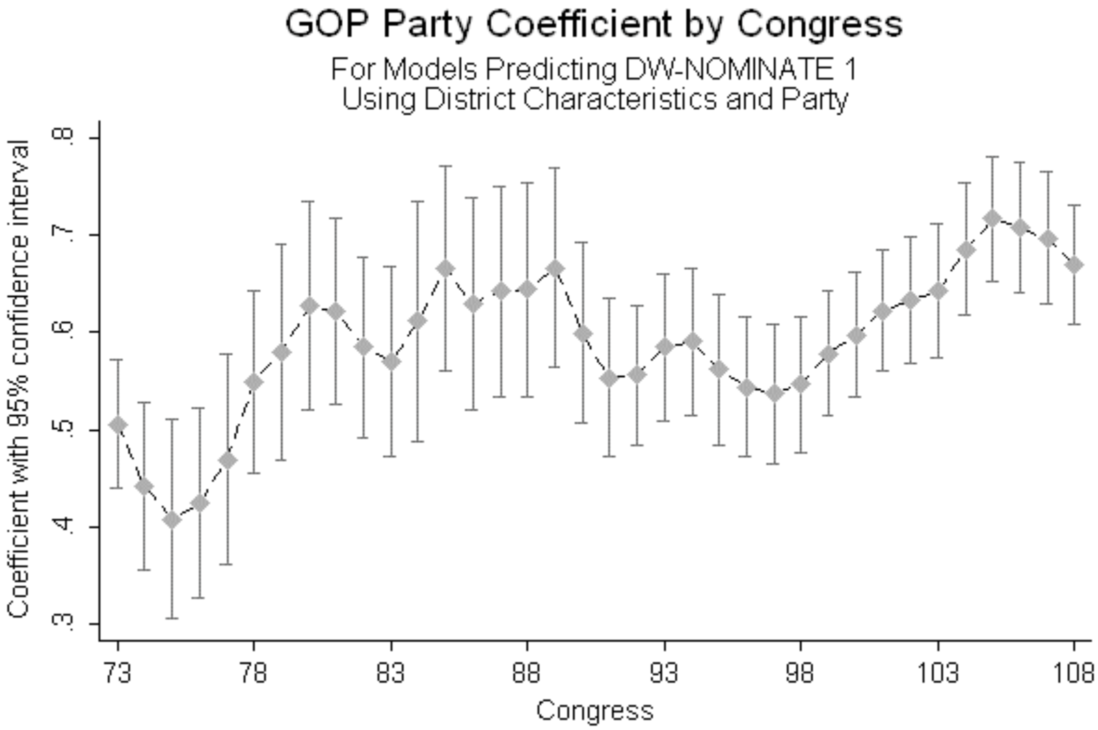

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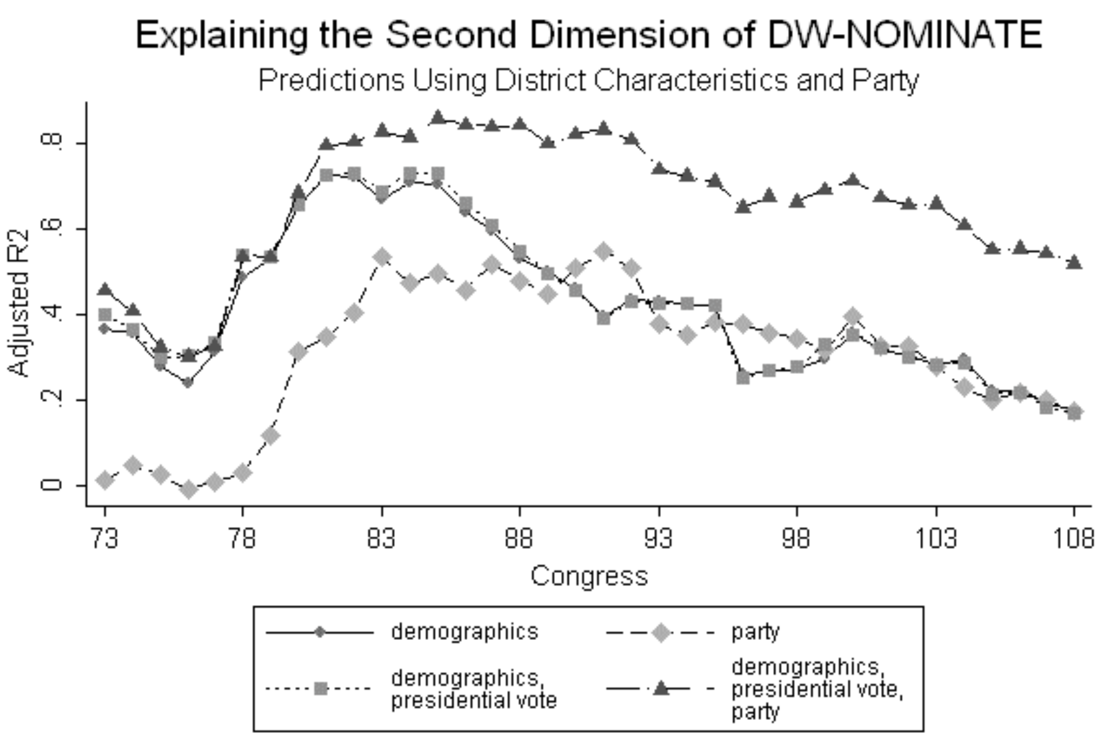


Figure 5

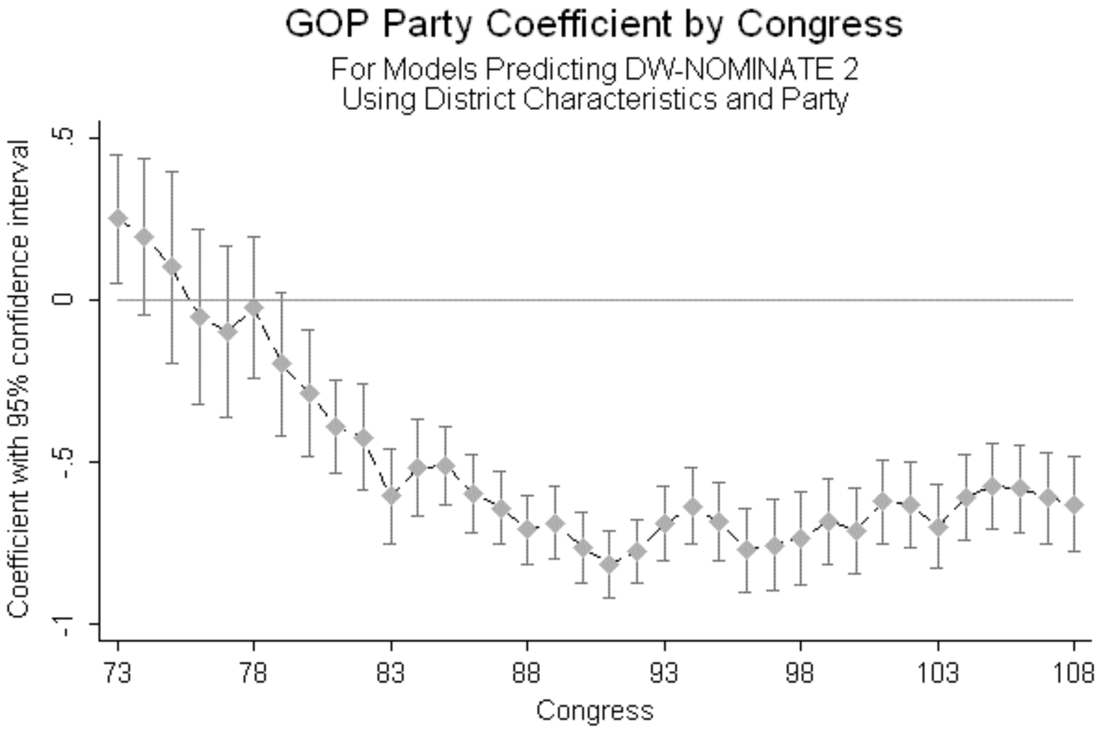


Figure 6

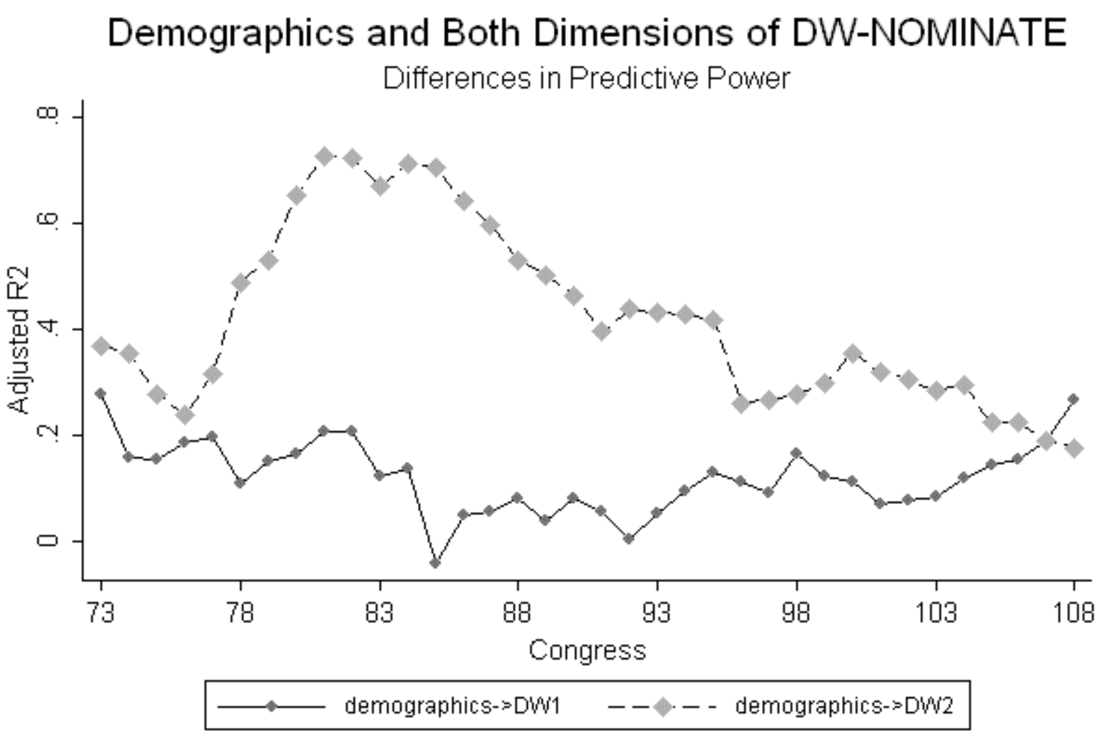


Figure 7

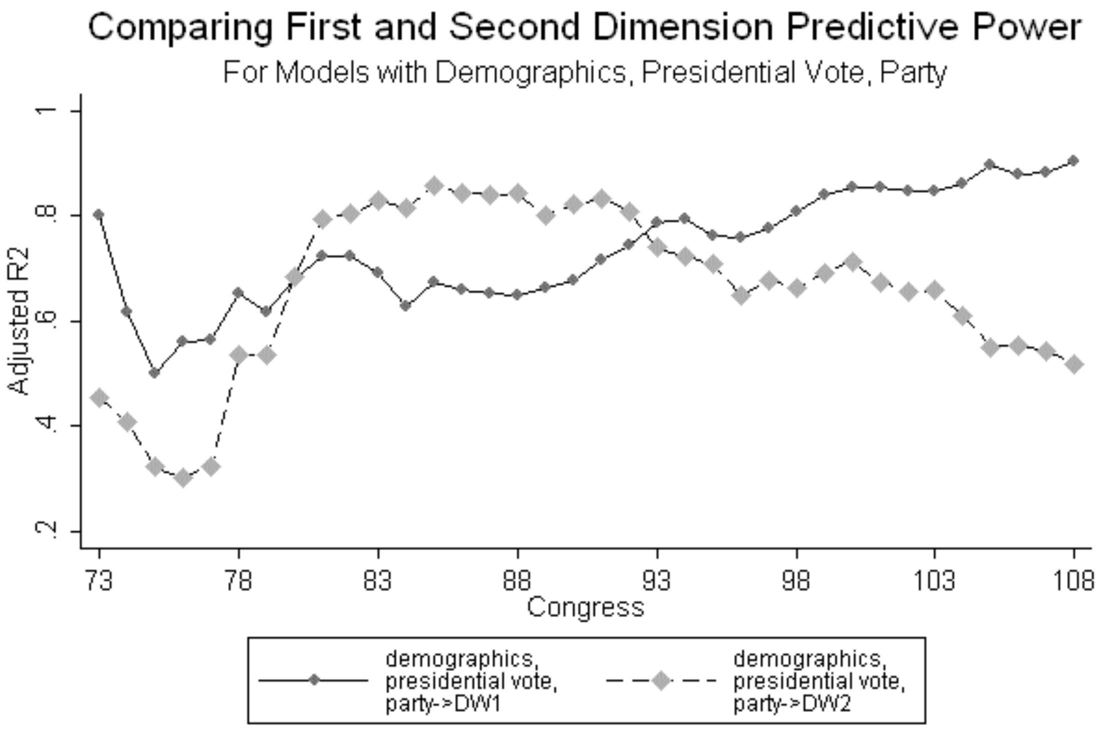


Figure 8

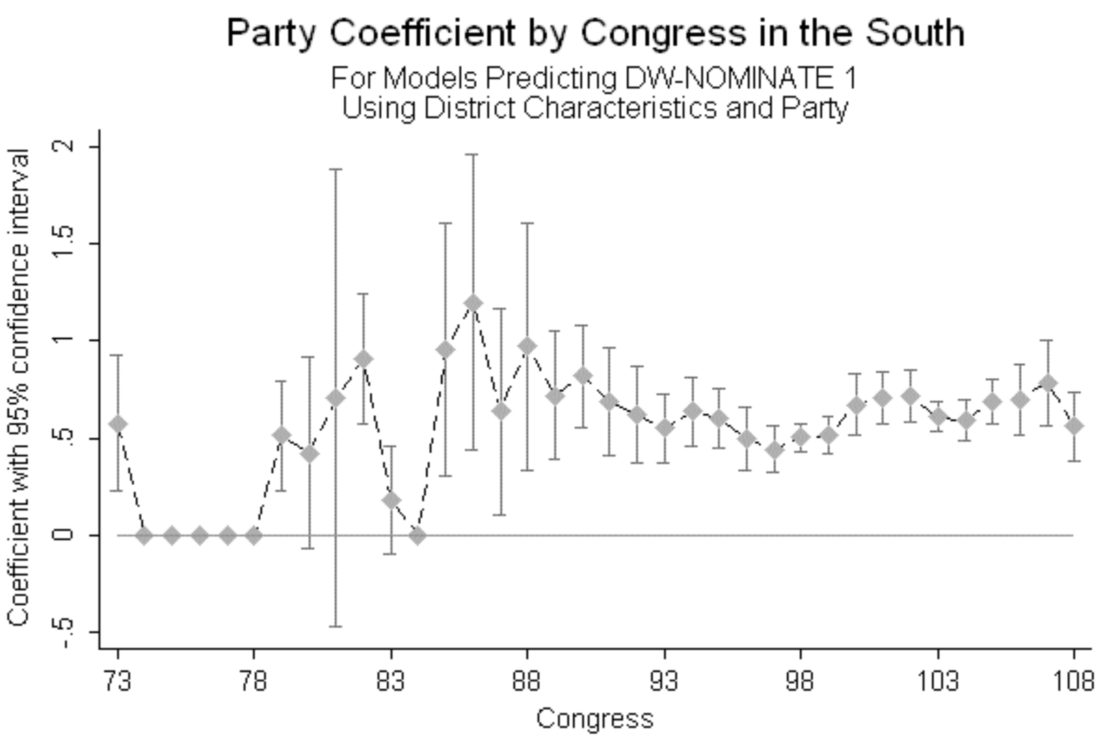


Figure 9

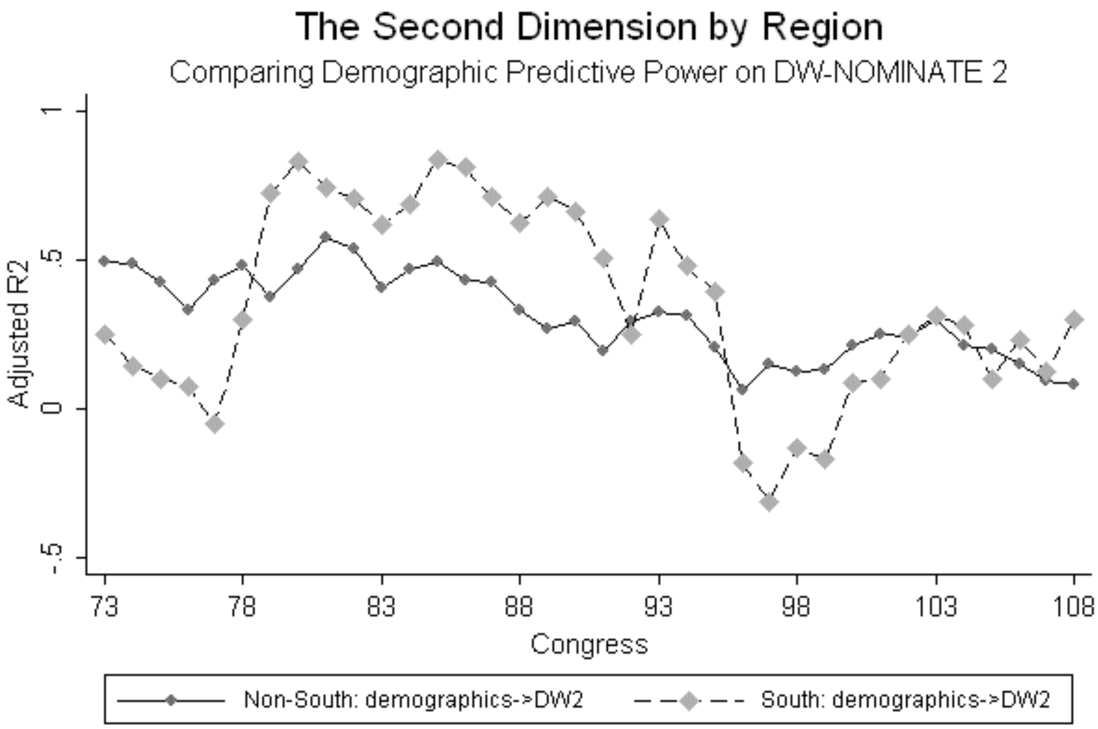


Figure 10

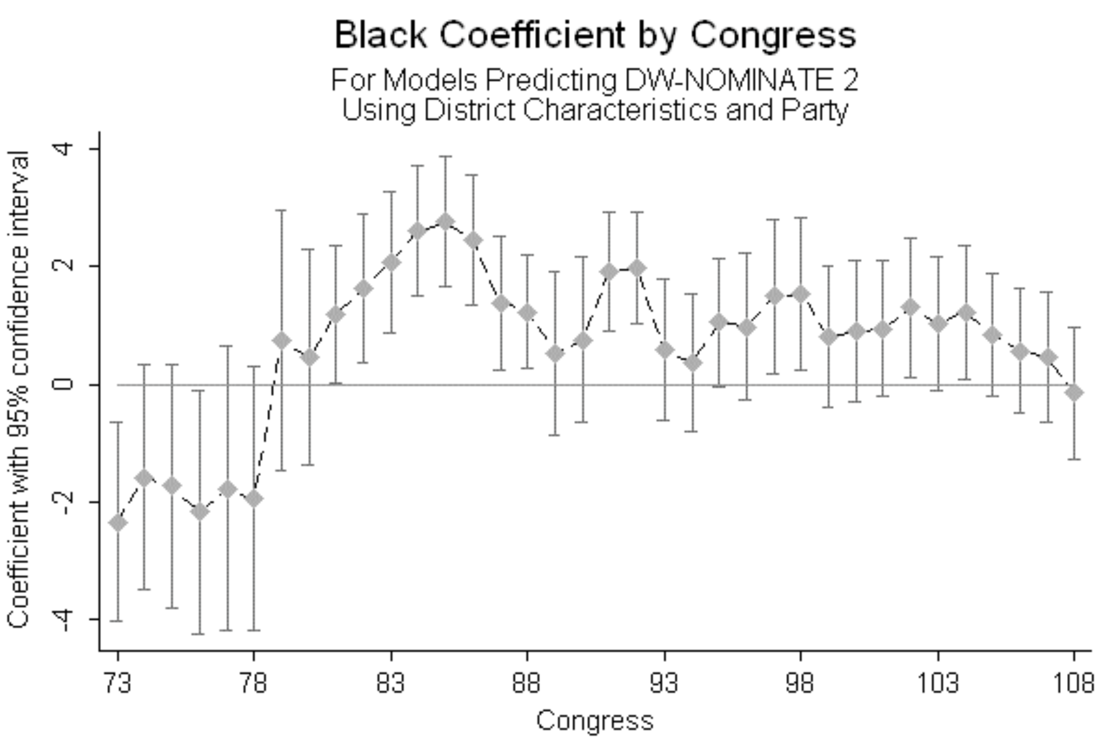
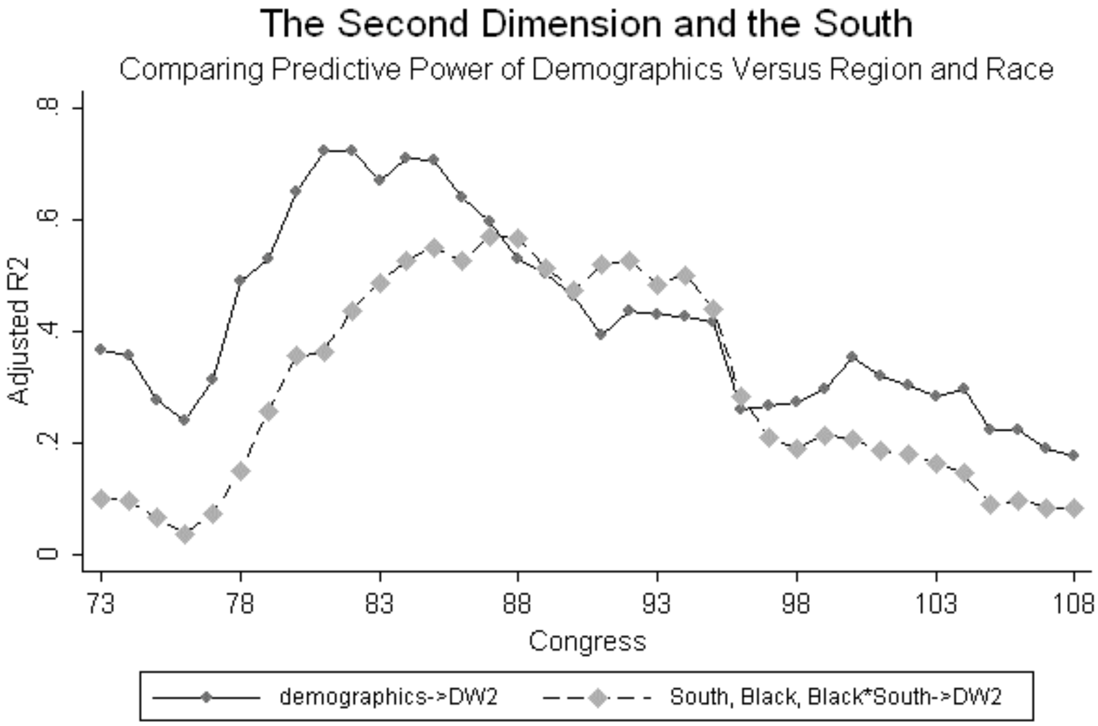


Figure 11



The Second Dimension and the South
Comparing Predictive Power of Demographics Versus Region and Race
Adjusted R2
0
.2
.4
.6
.8
73
78
83
88
93
98
103
108
Congress
demographics->DW2
South, Black, Black*South->DW2

Table 1: Predicting party (GOP), 73rd-108th Senate

	Model 1 (Presidential vote)	Model 2 (Demographics)	Model 3 (Demographics, pres. vote)
Democratic presidential vote	-5.73 (.76)	--	-4.68 (.86)
Senior citizens		3.96 (5.54)	.96 (5.53)
Black population		-5.38 (1.61)	-5.08 (1.67)
Farmers and farm workers		16.52 (5.23)	12.76 (5.36)
Finance workers		-8.73 (19.30)	.57 (19.69)
Foreign born population		4.06 (3.01)	4.97 (2.93)
Govt. workers (all levels)		14.91 (7.36)	6.25 (7.46)
Manufacturing workers		16.85 (3.92)	13.52 (3.97)
Population density		-.002 (.0008)	-.002 (.0008)
Total population (log)		.01 (.14)	.07 (.15)
Income per capita (log)		.60 (.33)	.53 (.31)
Pop. living in urban areas		.07 (.98)	-.87(1.00)
South			
Pre-civil rights (73rd-88th Cong.)			
Black X South			
Pre-CR X South			
Pre-CR X Black			
Pre-CR X Black X South			
Constant	2.54 (.40)	-8.54 (3.46)	-5.19 (3.45)
ROC area	.68 (.01)	.70 (.01)	.73 (.01)
Pseudo R^2	.07	.11	.13

Robust standard errors in parentheses, N = 1203. Models estimated only for those members elected immediately prior to a given Congress.

Table 2: Predicting 1st Dimension of DW-NOMINATE, 73rd-108th Senate

	Model 1 (GOP, pres. vote)	Model 2 (Demographics, pres. vote)	Model 3 (Demographics, pres. vote, GOP)
Dem. presidential vote	-.003 (.058)	-.87 (.11)	-.36 (.06)
GOP	.57 (.02)		.60 (.02)
Senior citizens		-.71 (.74)	-.77 (.44)
Black population		.37 (.17)	.86 (.10)
Farmers and farm workers		1.19 (.63)	-.85 (.38)
Finance workers		2.22 (2.56)	1.06 (1.52)
Foreign born population		.53 (.39)	-.10 (.21)
Govt. workers (all levels)		-.98 (1.00)	-2.15 (.59)
Manufacturing workers		.94 (.53)	-.93 (.28)
Population density		-.0004 (.00009)	-.0002 (.00006)
Total population (log)		-.02 (.02)	-.03 (.01)
Income per capita (log)		.04 (.05)	.01 (.02)
Pop. living in urban areas		-.09 (.15)	-.01 (.02)
South			
Pre-civil rights (73rd-88th Cong.)			
Black X South			
Pre-CR X South			
Pre-CR X Black			
Pre-CR X Black X South			
Constant	-.27 (.03)	.33 (.51)	.39 (.26)
Root MSE	.22	.33	.19
R^2	.62	.13	.71

Robust standard errors in parentheses, N = 3621.

Table 3: Predicting 2nd Dimension of DW-NOMINATE, 73rd-108th Senate

	Model 1 (GOP, pres. vote)	Model 2 (Demographics, pres. vote)	Model 3 (Demographics, pres. vote, GOP)
Democratic presidential vote	-.27 (.15)	-.38 (.16)	-.86 (.13)
GOP	-.62 (.05)		-.56 (.03)
Senior citizens		2.27 (1.21)	2.32 (.85)
Black population		2.17 (.28)	1.70 (.21)
Farmers and farm workers		-2.18 (1.01)	-.28 (.88)
Finance workers		-6.61 (3.33)	-5.53 (2.39)
Foreign born population		-.18 (.55)	.40 (.44)
Govt. workers (all levels)		-.35 (1.51)	.74 (1.15)
Manufacturing workers		-4.96 (.72)	-3.22 (.58)
Population density		-.00028 (.00014)	-.00047 (.00009)
Total population (log)		-.019 (.026)	-.015 (.019)
Income per capita (log)		-.12 (.042)	-.093 (.042)
Pop. living in urban areas		-.24 (.21)	-.32 (.16)
South			
Pre-civil rights (73rd-88th Cong.)			
Black X South			
Pre-CR X South			
Pre-CR X Black			
Pre-CR X Black X South			
Constant	.42 (.08)	2.06 (.49)	2.00 (.44)
Root MSE	.47	.46	.38
R^2	.28	.34	.54

Robust standard errors in parentheses, N = 3621.

Table 4: Modeling black/south/civil rights interactions, 73rd-108th Senate

	Predicting Party (Logit results)	Predicting DW-NOMINATE 1	Predicting DW-NOMINATE 2
Dem. presidential vote	-4.01 (.96)	-.33 (.07)	-.60 (.12)
GOP	--	.60 (.02)	-.56 (.03)
Senior citizens	-1.05 (5.76)	-1.05 (.44)	.98 (.86)
Black population	-2.55 (3.83)	-.12 (.24)	.15 (.39)
Farmers and farm workers	17.52 (6.19)	-.68 (.42)	.50 (.95)
Finance workers	9.50 (22.60)	2.76 (1.49)	-1.80 (2.69)
Foreign born population	2.86 (3.05)	-.13 (.22)	-.45 (.41)
Govt. workers (all levels)	9.31 (7.31)	-2.01 (.55)	.49 (1.01)
Manufacturing workers	13.93 (4.10)	-.89 (.28)	-3.06 (.57)
Population density	-.002 (.0009)	-.0001 (.00006)	-.00031 (.00008)
Total population (log)	.09 (.15)	-.03 (.01)	-.013 (.019)
Income per capita (log)	.50 (.30)	.02 (.03)	-.097 (.045)
Pop. living in urban areas	-.94 (.98)	.03 (.08)	-.14 (.15)
South	.30 (.80)	.06 (.05)	.12 (.11)
Pre-civil rights (73rd-88th Cong.)	.40 (.41)	-.003 (.03)	.080 (.057)
Black X South	-1.46 (5.35)	.82 (.31)	1.71 (.61)
Pre-CR X South	1.13 (1.54)	.01 (.07)	-.26 (.16)
Pre-CR X Black	.86 (5.00)	.69 (.39)	-1.56 (.79)
Pre-CR X Black X South	-31.23 (15.06)	-.69 (.48)	.89 (1.07)
Constant	-6.00 (3.49)	.28 (.27)	1.85 (.48)
ROC area	.74 (.01)	--	--
Pseudo R^2	.16	--	--
Root MSE	--	.19	.36
R^2	--	.72	.58
N	1203	3621	3621

Appendix

Table 1: Model fit statistics across four different interpolation procedures[a]

	Linear interpolation: census maps to '01	Linear interpolation: census maps to '03	Geometric interpolation: census maps to '01	Geometric interpolation: census maps to '03
GOP=f(dempres)	.682	.682	.682	.682
GOP=f(demos)	.701	.706	.698	.702
GOP=f(dempres,demos)	.728	.734	.727	.733
GOP=f(dempres, demos, south, 1965, interactions)	.740	.745	.736	.742
GOP=f(dempres, demos, regions)	.752	.756	.750	.753
DW1=f(gop)	.219	.219	.219	.219
DW1=f(dempres)	.346	.344	.346	.344
DW1=f(demos)	.343	.343	.344	.343
DW1=f(gop, dempres)	.219	.219	.219	.219
DW1=f(gop, dempres, demos)	.190	.193	.190	.192
DW2=f(gop)	.475	.483	.475	.483
DW2=f(dempres)	.556	.559	.556	.559
DW2=f(demos)	.458	.466	.457	.466
DW2=f(gop, dempres)	.474	.482	.474	.482
DW2=f(gop, dempres, demos)	.380	.398	.379	.397

a. Statistics represent ROC area for models with GOP as the dependent variable, and root mean square error for models with DW-NOMINATE as a dependent variable