

Political Realignment in American History: Results from a Spatial Scaling of the Congressional Roll Call Record

Keith T. Poole
Howard Rosenthal
Carnegie Mellon University
Pittsburgh, PA 15213

Background

The focus of our supercomputing project is the estimation of dynamic, spatial models of Congressional voting. Because of both the amount of computation involved and the size of the data base, this research has been feasible only on CYBER 205s. Discussion of computational issues, our maximum likelihood scaling algorithm, an overview of the basic model, and some results were presented in the previous Annual Research Report of the JVNC [Poole and Rosenthal, 1988].

In the models we use, both legislators and roll call alternatives are represented as points in Euclidean space. A contemporary two dimensional representation (see Figure 5) would differentiate economic liberals such as McGovern (D-SD) from economic conservatives such as Helms (R-NC). The vertical dimension differentiates socially conservative Southern Democrats such as Stennis (D-MI) from socially liberal Northern Republicans such as Javits (R-NY). While, as we show below, most roll call voting behavior can be accounted for by one or two dimensional models, the substantive content of the dimensions obviously changes with the course of history.

In our current report, we first focus on some new insights we have gained into how spatial alignments relate to the major historical realignments of the American party system and then summarize improvements introduced in our scaling procedure.

Realignment

Voting realignments largely take place via massive replacement of legislators through the electoral process. Changes in positions of incumbent legislators play a far more minor role. We illustrate this point by contrasting the Senate before and after the onset of the Depression with the stock market crash in October, 1929. In Figure 1 on the next page, we show that the last legislature elected prior to the crash showed a differen-

tiated two party system. The only overlap came in the northwest quadrant which mixed Progressives (P), Republicans (R), and Democrats (D) from northern tier farming states and from the Farmer-Labor (F) movement in Minnesota. As the figure illustrates, turnover was relatively low and the few newly elected senators took positions that were quite similar to those of more senior colleagues in their parties.

Figure 2, on the next page, portrays the results of our estimation for the Senate that served during Franklin Roosevelt's first "hundred days." Note first that senators serving in both the 71st and 73rd Senates had had relatively minor changes in their position. As illustrations, Wheeler, Norris, Borah, George, Glass, Metcalf, and Vandenberg moved only slightly. Somewhat more movement appears for Black and Patterson, both of whom shifted to the right. Note further that those senators entering after the crash are again representative of their parties. The basic difference between Figures 1 and 2 is the large increase in the number of Democrats. (In 1931-32, only three new Republicans entered the Senate; in 1933-34, only one.) The Depression did not lead to an immediate change in voting alignments; however, it did change the center of gravity.

Voting realignments largely take place via massive replacement of legislators through the electoral process. Changes in positions of incumbent legislators play a far more minor role. We illustrate this point by contrasting the Senate before and after the onset of the Depression with the stock market crash in October, 1929.

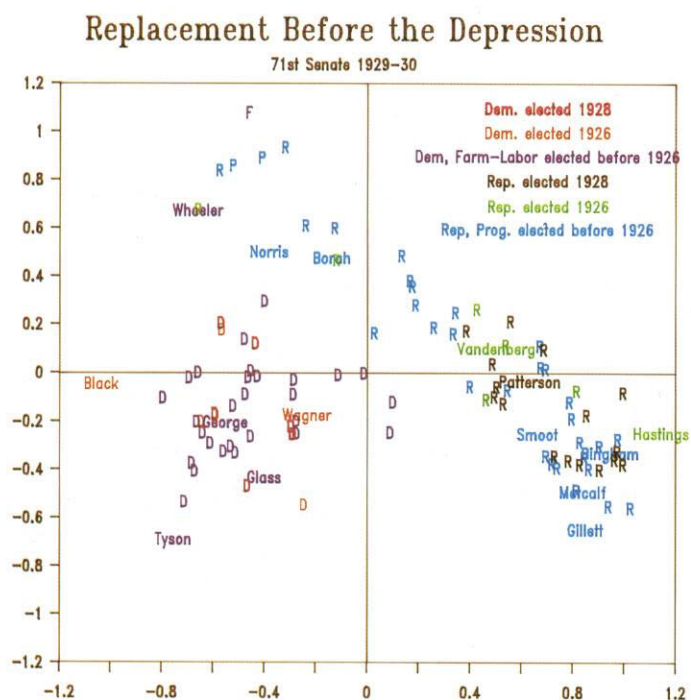


Figure 1: Replacement in the United States Senate Before the Depression

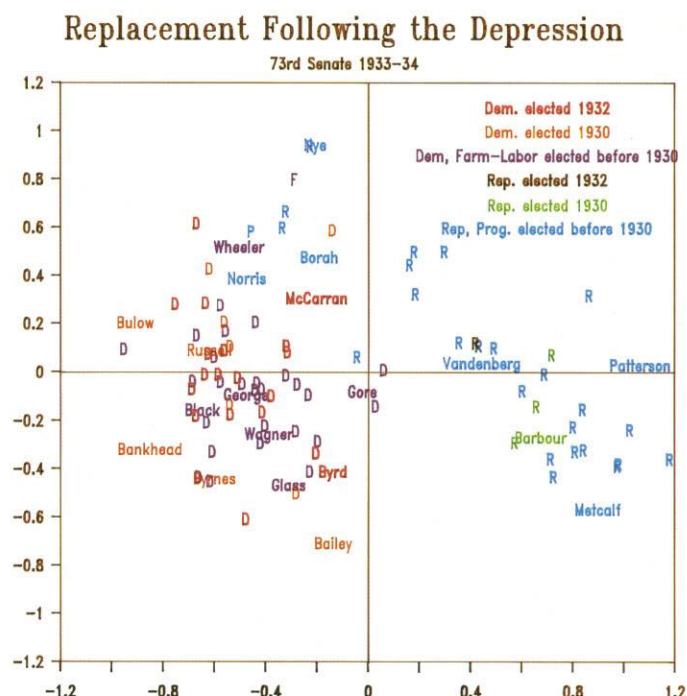


Figure 2: Replacement in the United States Senate Following the Depression

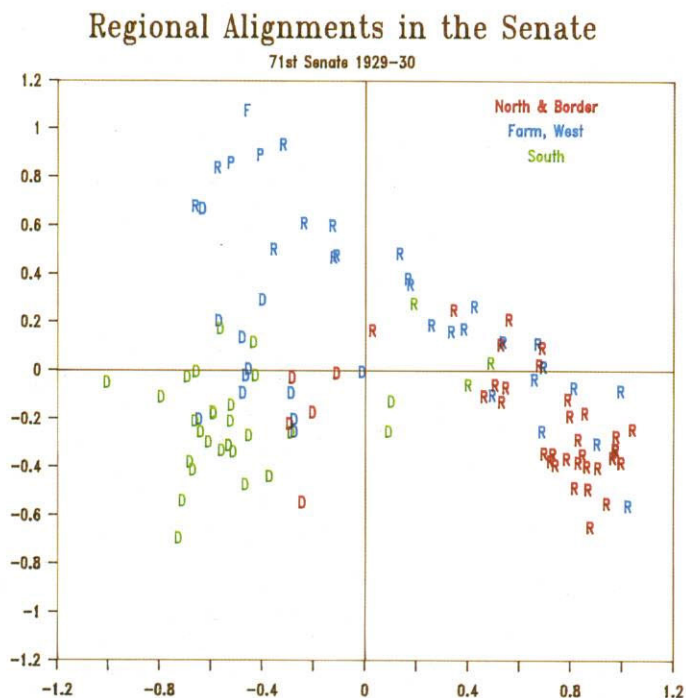


Figure 3: Regional Alignments in the 71st Senate

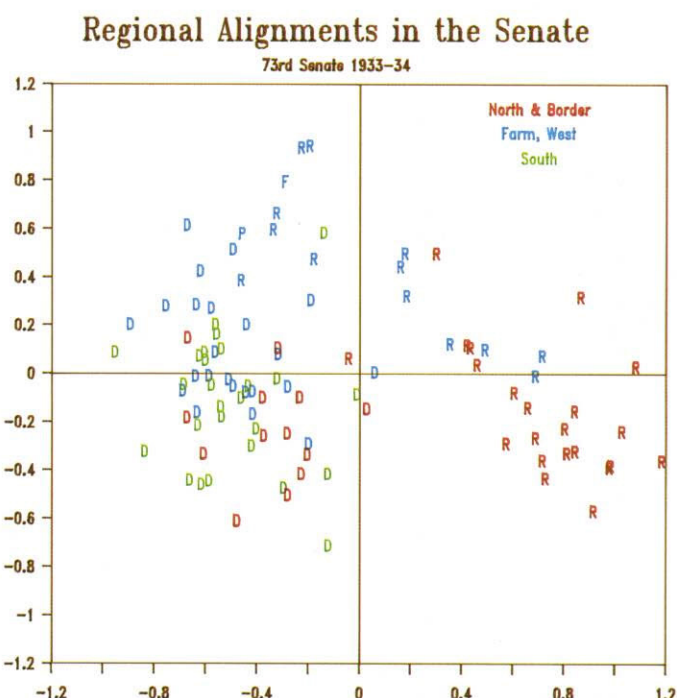


Figure 4: Regional Alignments in the 73rd Senate

The basis of the voting alignments in the twenties and thirties is shown in Figures 3 and 4. From a regional perspective, there was very nearly a three party system prior to the Depression. The South (the eleven Confederacy states plus Oklahoma and Kentucky) had senators located in the southwest quadrant. The North and Border (Missouri, Illinois, Indiana, Michigan, and all other non-southern states to the east of these four states) largely held the southeast quadrant. The top half of the space was largely the province of senators from the West and Farm states (all other states).

The Depression perturbed the regional pattern via an increase in the number of Northern and Border Democrats. These tended to occupy positions in the southwest quadrant, similar to those held by their Southern colleagues. The similarity of these positions attests to the strength of Roosevelt's coalition. Thus the Depression did not force a voting realignment.

By the 1940s, as shown in our previous report [Poole and Rosenthal, 1988], the coalition began to disintegrate in response to civil rights issues. Northern Democrats remained near their location of the thirties, Southern Democrats migrated to the northwest quadrant. Subsequently, the passage of the Voting Rights Act and the resultant increase in black voting in the South was accompanied by substantial replacement of Democrats from the once solid South by conservative Republicans and the arrival of new Democratic senators who tended to vote more like the Northern members of the party.

The new pattern is shown for the 96th Congress. Again there is a well-separated two party system, but the alignments are substantially different than at the time of the Depression. Differences between the regions remain, but they are more blurred, consistent with a "national but polarized" [Poole and Rosenthal, 1984] political system. Again note the importance of replacement. The four Southern Democrats elected prior to 1968, that is, prior to passage of the Voting Rights Act, tend to occupy the most conservative positions on the vertical dimension. More recently elected Southerners tend to be more liberal on both dimensions.

To summarize the discussion, our results show the Depression to be a realigning event but only in a long term sense. Roosevelt's North-South mixture of "oil and water" led to dynamics that resulted in a new alignment where party is more

important than region. One reason Figure 3 showed such a strong regional pattern is that states were overwhelmingly one party states in the first half of this century. Since the mid-seventies, about half the states have had one Democratic senator and one Republican senator. In such cases (compare McGovern-Pressler, Moynihan-Javits, Morgan-Helms, Bentsen-Tower, and Stennis-Cochran in Figure 5), the spatial locations of the two senators are highly distinct. In contrast, two senators from the same party and the same state tend to have extremely similar positions. This result is consistent with the view that senators and representatives represent polarized support coalitions rather than "middle of the road" voters in their constituencies, [Peltzman, 1984; Poole and Rosenthal, 1984; Alesina and Rosenthal, 1989].

The realignment by replacement phenomena we have discussed have taken place within a context of an overall shrinking of the range of positions represented in Congress. Figure 6 uses different colors to show the positions of senators in 1899-1900, 1919-20, 1949-50, 1975-76, and 1985. It can be seen that the range of positions represented by senators has gradually collapsed over the course of this century after having expanded in the last half of the nineteenth century. The 56th Senate, serving in 1899-1900 is represented in red. These points range further than the purple points

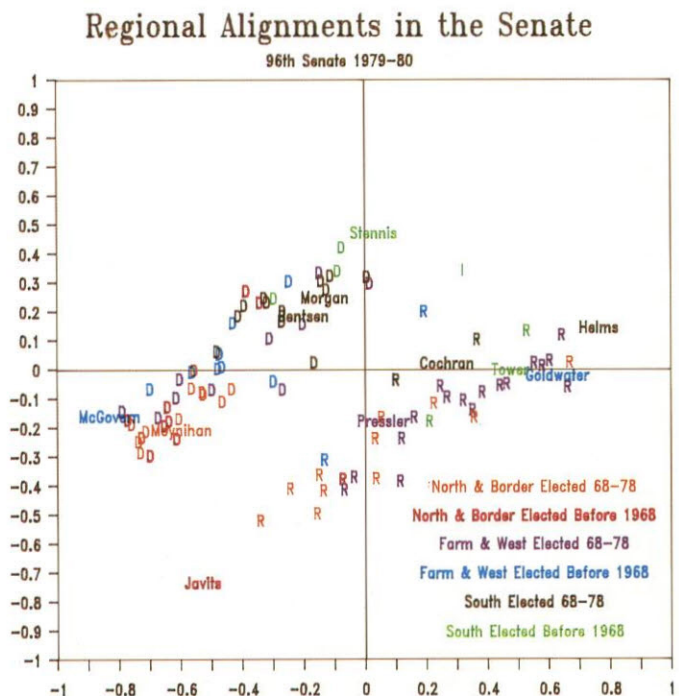


Figure 5: Regional Alignments in the 96th Senate

corresponding to 1919-20 which in turn have less range than the blue points corresponding to 1949-50. Note in particular that, after World War II, senators have disappeared from the conservative area in the southeast quadrant filled with red and purple points. Finally, the very liberal Senate elected after Watergate, shown in green, and the more conservative one led by a Republican majority in 1985 both have points that are even further toward the center of the space. This spatial collapse is an interesting phenomenon that we will investigate in our future research.

Scaling

Our scaling procedure can be thought of as processing a gigantic matrix where the rows are legislators and the columns roll call votes. The entries in the matrix are "1" for a Yes vote, "0" for a No vote, and "missing data" for did not vote. When the procedure is applied to the data for a single Congress, there is almost no missing data. Legislators either vote or are paired on over 90 percent of the votes. With virtually no missing data, convergence of the maximum likelihood procedure is well behaved. In fact, extensive

tests we have performed at the JVNC yield essentially identical estimated parameters when the procedure is started from a variety of random starting values or from starts generated by least squares metric unfolding [Poole, 1989] of legislator similarity matrices.

In contrast, when we perform a simultaneous scaling spanning two centuries, most of the gigantic matrix is missing data, simply because an individual legislator serves for at most a few decades. In spite of this missing data, our estimation is identified because we constrain legislators' positions in the space to be low order polynomial functions of time and because there is overlap in the period of legislative service. Nonetheless, in periods when the overlap is weak, the results of the estimation proved sensitive to the starting values. For the Senate, we encountered a problem only, from the 36th to 37th Congress, membership in the Senate shrunk from 66 to 48 and the Democrats lost 27 seats.

There were more persistent problems for the House, because all House seats are up every two years and, prior to contemporary times,

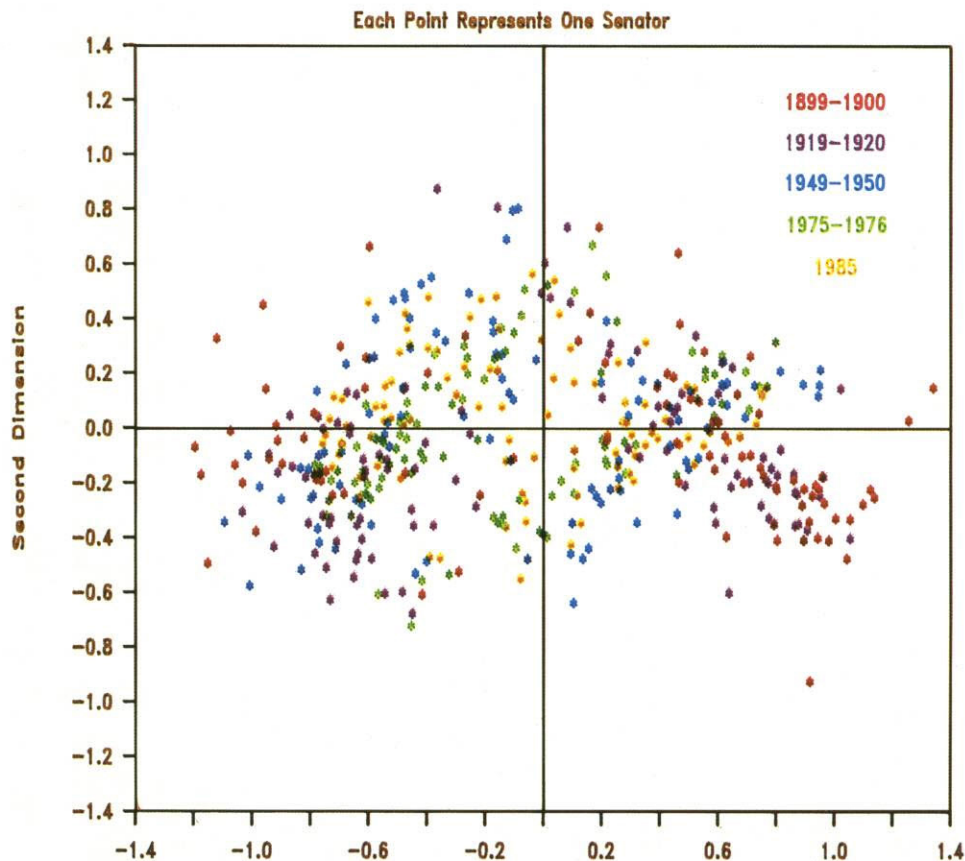


Figure 6: Spatial Collapse in the 20th Century

incumbents were frequently turned out. In the 1894 elections, for example, the Republicans gained 120 seats in a House with only 357 members. The lack of overlap introduced party rotations that lacked face validity. To overcome this problem, we developed the following heuristic. The original converged results for each Congress were rotated in a manner that the centroid of the Democrats (and Democrat-Republicans) was always to the left of the centroid of Federalists, Whigs, or Republicans. Then a new start for each legislator was computed by averaging his rotated coordinates across Congresses where he served. A new estimation was then performed.

The results from the new estimation better support our initial research hypotheses in several ways. First, the fits of the low dimensional spatial models are, on the whole, slightly better than those found previously. Second, and more important, the strongest improvement in fits were for the one dimensional, constant position model. This supports our hypothesis that belief consistency [Converse, 1964] imposes a simple structure where legislators, once they enter Congress, preserve stable voting alignments in a low dimensional space. Third, results from the Senate and House are very similar (compare Figures 7 and 8, for example), leading us to focus attention on historical changes in the issues that define the dimensions of political conflict in contrast to the emphasis political scientists currently give to institutional differences [Hammond and Miller, 1987, Shepsle, 1986].

Indeed, Figures 7 and 8 on the next page, show that the ability of a spatial model to fit the data is far more a question of historical circumstances than choice of a model. The natural measure of fit for our model is the geometric mean probability that the maximum likelihood model assigns to the observed sources. To simplify somewhat, the measure is close to 0.5 if legislators vote by tossing fair coins and approaches 1.0 as voting approaches an errorless spatial voting pattern. An alternative measure of fit is the percentage of votes correctly classified. Our classification percentages are in excess of 80 percent, even on "close" votes decided by a less than 60 to 40 margin.

With some exceptions, fits barely change as we either increase the dimensionality of the model or increase the flexibility of position permitted to individual legislators. In both the House and the Senate, fits are initially weak and then improve as the two party system based on the Jeffersonian Democrats and the Federalists is formed.

During the "Era of Good Feelings", when the two party system had collapsed, all spatial models fail to fit the data. The fit then improves during the Whig period, but then declines in the early 1850s when voting on slavery related issues tore apart the political parties. Since the Civil War, fit has almost always been excellent, particularly during the period of strong party conflict around the turn of the century.

Allowing for an added dimension improves fit far more than allowing for variation in the degree of the time polynomial. In one dimension, the figures show that increasing the degree of the polynomial makes no notable difference. The small improvement gained from adding a second dimension is not surprising because increasing the dimensionality adds far more parameters than does increasing the polynomial degree. The second dimension makes its greatest impact in the Senate in the 1940's, 50's, and 60's, when the civil rights debate, with related cloture votes on filibusters, occupied much of the Senate's agenda. During the same period, we see that allowing for linear movement in positions improves over the two-dimensional constant model. This is largely the result of the spatial migration of Southern Democrats, previously noted in our comparison of the period around the Depression and the current decade.

References

- Alesina, Alberto and Rosenthal, Howard, "Partisan Cycles in Congressional Elections and the Macroeconomy," *American Political Science Review*, 1989.
- Converse, Philip E. "The Nature of Belief Systems in Mass Publics," in David Apter, ed., *Ideology and Discontent* (New York: Free Press), 1964.
- Hammond, Thomas and Miller, Gary, "The Core of the Constitution," *American Political Science Review*, v.81, pp.1155-75, 1987.
- Peltzman, Sam, "Constituent Interest and Congressional Voting," *Journal of Law and Economics*, v. 27, pp.181-210, 1984.
- Poole, Keith T., "Least Squares Metric, Unidimensional Scaling of Multivariate Linear Models," *Psychometrika*, 1989.
- Poole, Keith T. and Howard Rosenthal "The Polarization of American Politics," *Journal of Politics*, v.46 pp.1061-79, 1984.

Poole, Keith T. and Rosenthal, Howard, "Roll Call Voting in Congress 1789-1985: Spatial Models and the Historical Record." In Science at the John von Neumann National Supercomputer Center: Annual Research Report Fiscal Year 1987 (Princeton, N.J.: JVNC), 1988.

Shepsle, Kenneth A., "The Positive Theory of Legislative Institutions: An Enrichment of Social Choice and Spatial Models," Public Choice v.50, pp. 135-178, 1986.

