Independently Validating Ideology Measures:
A Look at NOMINATE and Adjusted ADA Scores

Benjamin G. Bishin
Assistant Professor
University of Miami
bishin@miami.edu

ABSTRACT

Measures of political ideology are central to a broad range of political science scholarship. However, despite extensive evaluation of the relative characteristics of vote based ideology measures, little scholarship examines their validity independent of legislator behavior. Ideological validity is overlooked because all existing measures are action-based. To address this gap, this paper applies an instrumental variables technique called FILTER to assess the validity of two important measures of legislator ideology— NOMINATE and interest group ratings. The measure is also applied to investigate whether action based ideology measured suffer from agenda bias. The results show that the measures produce valid estimates of legislator ideology. Moreover, FILTER offers an important alternative to existing action-based measures of ideology which may be inappropriate for use in some settings, such as when the dependent variable being studied is also action-based.

INTRODUCTION

Measures of political preferences are integral to the study of political phenomena. As these measures have become more widely applied, their characteristics are increasingly studied (Carson & Oppenheimer, 1984; Shaffer, 1989; Smith, Herrera & Herrera, 1989; Hall & Grofman, 1990; Van Doren, 1990; Jackson & Kingdon, 1992; Brunell, Koetzle, Dinardo, Grofman, Feld, 1999; Desposato, 2001; Lebo, 2001). Most commonly, measures of preference are action-based. The term 'action-based' refers to those preference measures that are based on legislators' visible, purposive behavior, such as their public speeches or roll call votes (e.g. Poole & Daniels, 1995; Poole & Rosenthal, 1997; Hill, Hannah & Shafquat, 1997). Concerns about the accuracy of these measures arise because the issues that legislators choose to speak about or cast votes on, are not a random sample of the issues on which legislators have preferences, but are selected to improve their public standing (e.g. Snyder, 1992; Reeher, 1996). Legislators advertise and take public positions to enhance their election prospects (Mayhew 1974).

One consequence of this strategic position taking is that legislators and party leaders avoid publicly addressing hard issues (Arnold, 1990; Reeher, 1996). Indeed, so rare is the advocacy of extreme or unpopular policy that when it occurs, it stands out.[1] Legislators' ability to avoid addressing extreme issues presents scholars with a measurement problem. Action-based measures may mislead analysts by causing them to believe legislators are more moderate than they actually are. Making matters worse, identifying the degree to which this occurs is difficult since all available measures of

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[1] The case of 1998 California Republican Senate candidate Tom Campbell is especially noteworthy. Campbell supported a pilot program to explore the legalization of heroin.

preference are action-based. Consequently, it is difficult to examine the accuracy of these measures.

This paper examines the validity and nature of action-based measures of preference using a new measure of legislators' *private* ideology based on legislators' background characteristics rather than their purposive behavior. Use of this measure, called FILTER, to study measures of preference shows that action-based scores are valid measures of preference.

This paper begins by discussing the characteristics of action-based measures of legislator preference. Next, I select two action-based measures for evaluation. Then I define and describe a new measure of legislators' private ideology that is not based on purposive behavior, and can thus be used to evaluate the accuracy action-based measures. Using this new measure, I examine the external validity of the scores. The results show that both NOMINATE scores and adjusted interest group ratings produce valid estimates of legislators' preferences. I conclude with a brief discussion of the applicability of various types of measures of legislators' preferences.

MEASUREMENT CHARACTERISTICS

Action-based measures of legislator preferences come in three general types. Interest group ratings gauge the positions taken by legislators on issues an interest group deems important. Groups select about 20 roll call votes on which they rate legislators. Friends of the group are given high scores, while opponents are clumped together at the bottom (Fowler, 1982; Brunell, Koetzle, Dinardo, Grofman & Feld, 1999). In contrast, spatial modeling techniques like NOMINATE scores avoid selection bias by including all votes with enough variation in the outcome to help improve the model fit. Spatial

estimates are accompanied with the option of generating approximate standard errors, and can account for multiple policy dimensions (Poole & Rosenthal, 1997). Measures based on legislators' public speeches as suggested by Jackson & Kingdon (1991), and developed by Hill, Hannah & Shafquat (1997) comb through newspaper coverage of legislators' public statements in the period preceding their initial election. This technique is similar to ones used to estimate judicial ideology (e.g. Segal & Cover, 1986). Despite differences in construction, these measures share an important characteristic. As action-based measures they all use legislators' purposive behavior to construct their scores.

Two Measures: NOMINATE and Adjusted ADA Scores

Research suggests that while most action-based measures of preference are related, there is a great deal of variation across types of measures (Burden, Calderia & Groseclose, 2000). Thus, the appropriateness of any particular measure likely depends on the purpose for which it is being used. For purposes of this work examples are needed that are either unique in their attributes, or widely used. The ideal measures of preference for this study are DW NOMINATE and adjusted interest group ratings.

NOMINATE scores are far and away the most commonly used measure of legislator ideology.[2] NOMINATE scores are more objective than other measures that are based on smaller samples of votes, since they are based on all roll call votes on which more than 2.5% of legislators disagreed (Poole & Rosenthal, 1997). The large number of votes allows NOMINATE to avoid some of the adverse characteristics of other preference measures.

Action based measures have been criticized for several reasons. In particular, the small number of items and the use of speeches and writings to construct ratings present several problems. First, they result in measures that are coarse, thereby assigning many legislators the same score. Second, using a subset of all events introduces sampling error. Measures based on a small number of events may inappropriately sample from the universe of all public behavior. As with interest group ratings, the events are often selected for some particular purpose. This results in a biased sample and ultimately a biased measure.[3] Interest group ratings also lack an obvious method to assess their certainty—there are no standard errors. Importantly, these measures are not comparable over time or across chambers, thus precluding their use on examining a wide range of scholarship.

Groseclose, Levitt and Snyder's (1999) development of inflation adjusted interest group ratings overcomes the problems of temporal and chamber incomparability.[4] Inflation adjusted scores are measures of legislator ideology that account for the fact that the ideology scale used by interest groups may shift and stretch over time. Inflation adjusted scores overcome this problem statistically by estimating a mean preference parameter for each member which is used to estimate the amount of shift and stretch. This innovation is very important because it allows for the application of ideology measures to many important questions of legislative politics and representation. Unlike

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[2] Examination of the Social Science Citation Index shows that Poole and Rosenthal's work explaining the NOMINATE procedure has been cited hundreds of times in the last decade. Journals are replete with applications of their widely available scores.
[3] The work by Brunell, Koetzle, Dinardo, Grofman, Feld (1999) demonstrates this bias. They find that interest group ratings poorly discriminate against those with whom they disagree.
[4] Since this limitation has substantially hindered the examination of the influence of institutional preferences across chambers and over time, it constitutes an important contribution, and thus merits examination along NOMINATE scores.

raw interest group scores, approximate standard errors are easily calculated.[5] While the

estimates these authors develop are based on the ratings of Americans for Democratic

Action (ADA) the procedure is widely applicable to the ratings of any interest group.

To test the validity of the adjusted interest group rating methodology, I evaluate

the validity of adjusted ADA scores. ADA scores are well known and widely applied.[6]

They have also been widely criticized (e.g., Jackson & Kingdon, 1992). Consequently,

use of ADA scores provides both a difficult test for the adjustment methodology and an

important barometer on a measure about which a great deal is known.

In sum, these measures are selected for evaluation because of their wide use, and

value in addressing important research questions. Insight into the characteristics of these

measures promises to help a large number of scholars better understand an important

aspect of their work.


FILTER

In order to independently evaluate the accuracy of action-based preferences, a

benchmark that is not action-based is needed. Measures of legislators' preferences are

typically evaluated through comparison with other measures. For example, Burden,

Calderia and Groseclose (2000), examine the characteristics of measures based on

newspaper accounts of politicians' public statements by comparing a wide variety of

measures. Comparing interest group ratings, Brunell, Koetzel, Dinardo, Grofman and

Feld (1999) find that interest group ratings discriminate poorly against individuals with

whom the group disagrees. Shaffer (1989) argues that ADA scores nicely summarize

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[5] The authors also point out that actual standard errors are possible, but computationally intensive to calculate.

congressional behavior. Other scholars examine the efficacy of these measures in various practical applications (e.g. Snyder, 1990; Herron, 1999).

These studies provide insight to the relative efficacy of preference measures. However, precisely because these measures are action-based, they do not independently assess their validity. Such measures might be highly related only because they are all influenced by the same lurking variable. In order to gain leverage to address this problem, a new measure of legislator preference is needed; one that is based on something other than legislators' purposive behavior. In the next several paragraphs I describe a method that overcomes the issues limiting action-based measures.

Historically, scholars have used models of individual behavior and background characteristics to forecast individual or group behavior (e.g. Lazarsfeld, Berelson & Gaudet, 1947; Petrocik, 1991; Jackson & King, 1989). This process is similar to opinion simulation (e.g. Seidman, 1975). Recently, this general method has been applied to forecast legislators' ideology (Bishin, 2001). The methodology, called FILTER, relies on use of an individual's background characteristics to predict their ideology. This paper applies the FILTER methodology to evaluate NOMINATE and adjusted interest group ratings.

Research shows that numerous factors influence an individual's ideology (see for example, Converse, 1964). One way to measure ideology independent of legislators' purposive behavior is by estimating a statistical model that predicts an individual's ideology. The three step FILTER process is as follows. First, a model predicting ideological self-placement is estimated on elites, a group for whom ideology is known,

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[6] ADA scores are calculated by rating legislators according to the percentage of the time they vote for the ADA's preferred position on the 20 or so bills they deem as most important in each chamber.

and extrapolated to legislators. Elites are an excellent forecast group because they share elected officials high levels of political sophistication.[7]  Second, data is collected on the background characteristics of the forecast group—in this case legislators.  Third, the FILTER estimates are calculated by applying the coefficients from step one to the data from step two and solving for the dependent variable.  The process is substantively similar to the two-stage auxiliary instrumental variables procedure developed in Franklin (1989).  The coding of variables and the coefficients obtained from the calibration model are seen in Appendix A and Appendix B respectively.

The variables included in the calibration model are selected using sociology and social psychology research that examines how individual and group socialization influence attitude formation.  To estimate the influence of these background characteristics a regression model is run using data from the *1984 Party Elites in the United States: Republican and Democratic Party Leaders.*  This study is used because it offers a wide range of background variables on a broad sample of party elites, as opposed to other studies, which examine only convention delegates. Additionally, this is the only study for which data is available on the important variables at appropriate levels of analysis.[8]  Several models were run to identify the characteristics that best predict elite ideological self-placement.  However, to ensure that the results are not an artifact of the *1984 Party Elites* sample, validation of these results is crucial.

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[7] Indeed, legislators are generally recruited from among political elites.  Further, the term political elites is usually defined as those who share high levels of political sophistication (e.g. Zaller, 1992).  By this definition, legislators are political elites.
[8] For instance the Convention Delegate studies aggregate a substantial amount of background information in order to preserve the anonymity of the respondent.

Validation is performed in two ways.[9]  First, cross validation was performed by comparing elite ideological self placement in the *1980 Party Elites* study to the scores generated by using coefficients estimated from the 1984 study on the elite background data from 1980 to produce predicted values for ideology in 1980.  These predicted values correlate with the actual ideological self-placement of political elites in 1980 at about .67, a high correlation given measurement error inherent in survey data.[10]  Second, bootstrap resampling was used to test whether the coefficients generated from the 1984 data is unique to the data set. These results, seen in Appendix D, confirm that the estimates do not stem from over fitting the sample.

FILTER provides an appropriate metric for evaluating both NOMINATE and inflation adjusted scores since it is not based on legislators' purposive behavior.  Instead, FILTER scores tap the private or personal aspect of a legislator's ideology.  FILTER appears to be an excellent tool with which to evaluate the accuracy of action-based measures of legislator preferences since there is good reason to believe that private ideology and public ideology are closely linked (Poole 1997).[11]

THE ACCURACY OF ACTION BASED MEASURES

This section examines the nature of the two ideology measures by comparing them with the FILTER benchmark.  The logic of the validation follows Groseclose,

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[9] External validation is performed by comparing FILTER estimates to the results of a 1987 survey of House members' ideological self-placement (Smith, Herrera & Herrera, 1991).  FILTER estimates for the 100th House correlate at .74 with House members' own ideological self placement.

[10] Two points are important.  First, predicted values from 1980 elite background data correlate with 1980 elite ideological self-placement at .69.  So the measures produce virtually identical correlations despite the difficulty of the test.  Second, this result suggests that ideology coefficients are very stable over time.  This is consistent with Poole and Rosenthal's (1997) observation that political ideology has been one-dimensional and stable since the late 1960s.

[11] For an extensive review and explanation see Bernstein (1989).  Also see Krehbiel (1993).

Levitt and Snyder's (1999) discussion of convergent validity (Campbell & Fiske, 1959). The basic idea is that if two concepts measure the same thing then they should be statistically closely related. I begin by examining the relationship between FILTER and NOMINATE in the House and Senate. I then focus on the relationship between FILTER and inflation adjusted ADA scores. If these action based ideology measures are valid then they should be statistically related to FILTER, which has itself been validated independently. I conclude with an investigation of the influence of bias in measures of preference.

*NOMINATE*

The external validity of NOMINATE is examined by comparing NOMINATE to FILTER. To do this, I generate FILTER scores for the 100th U.S. Congress (1987-1988).[12] To examine their relationship, FILTER scores are regressed on NOMINATE. Then I examine plots of the relationship across chambers.

--Insert Table 1--

The first two columns of Table 1 show the results of bivariate regressions of FILTER on NOMINATE scores for the 100th House and Senate. The results are striking in their similarity. In both chambers, the effect of NOMINATE on FILTER is highly statistically significant. Further, the size of the effect is virtually identical across chambers. A one unit increase in NOMINATE corresponds to a 1.58 unit increase for House members, and a 1.59 unit increase for Senators. The measures correlate at about .9 in each chamber. Across chambers, the only difference between the models is in the

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[12] The formula from which these estimates are generated is seen in Appendix A.

size of the standard errors, which may be attributable to differences in sample size. However, the nuances are seen in the plots of the relationship between these variables.

--Insert Figure 1--

The relationship between NOMINATE and FILTER for the 100th House is seen in Figure 1. The scatterplot confirms the strong positive relationship described in Table1. The plot is interesting on several levels. First, while there appears to be a strong positive relationship between the two variables, there are two groups of points. This bifurcation reflects party differences as Democrats are in the lower left portion of the graph while Republicans are in the upper right. Between these two clusters of points is a gap. The gap results from the bimodal distribution of the FILTER measure. This gap appears to show some ideological distance between members of the two parties. Overall, this plot suggests that NOMINATE does a nice job explaining legislator ideology.

--Insert Figure 2--

Additional insight might be gained by examining the relationship between these variables in the Senate as well. We see similar results in Figure 2. Two groups of points reflect party differences. Indeed, the only difference across chambers appears to be slightly greater dispersion among Senate Republicans. Most importantly, we see a strong relationship between FILTER and NOMINATE.

*Adjusted Interest Group Ratings*

Following the procedure applied above, this section examines the validity of the adjusted interest group rating procedure. I begin by regressing FILTER on Adjusted ADA scores for the 100th House and Senate. I then examine the plots of this relationship across chambers.

The second two columns of Table 1 show the results of bivariate regressions of FILTER on adjusted ADA scores for 1987, the first session of the 100th Congress. As with the NOMINATE results, the relationship between FILTER and adjusted ADA scores is very strong. Statistically, adjusted interest group scores are highly significant in both chambers. Indeed, the magnitude of their effect is identical. A one unit increase in ADA scores corresponds to a decrease of .016 in FILTER. Moreover, the measures correlate very highly. In the House, the correlation between FILTER and the adjusted scores are about the same as between FILTER and NOMINATE, just under .9. For the Senate the scores correlate at just over .8. Statistically, the measures appear closely related. We can draw additional insight by looking at the plots of these relationships.

--Insert Figures 3 & 4—

Figures 3 and 4 show the plot of FILTER on adjusted ADA scores for the House and Senate respectively. Other than the differences in the number of points in each plot, these plots depict a similar relationship. Several issues stand out. First, the plots look different from the NOMINATE plots. While the same gap between parties and a strong negative relationship is apparent, the plots are coarser. The coarseness is a product of the underlying ADA measure. In 1987, the ADA used 25 votes to place House members on their scale, and consequently the almost continuous distributions of NOMINATE and FILTER are not replicated here.[13] Similarly, Senate scores are based on 20 votes, making them even coarser. Even with stretching and pulling there are only 25 and 20 possible

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[13] NOMINATE and FILTER incorporate more and better data, which leads to finer gradations in ideology estimates. Statistically, these small distinctions are unlikely to meaningful once the standard errors of the estimates are considered. For instance FILTER's standard errors for legislators usually range from between .03 and .10.

scores, respectively.[14] While there are a handful of outliers, these are all either north

eastern Republicans or southern Democrats.[15] There are no points in the extreme upper

right or lower left quadrants of the plot. Despite the coarseness, the adjusted scores do a

nice job explaining FILTER. In combination with the statistical results, the plots

presented here strongly validate the use of adjusted interest group ratings as measures of

legislator ideology.


A Comment on Agenda Bias

One criticism of action-based measures of preference is that they are biased (e.g.

Londregan, 2000). Theoretically, such allegations are not surprising and are undoubtedly

correct. It is important to keep in mind that ideology, as theoretical construct does not

easily lend itself to measurement. It seems unlikely that scholars will ever be able to

incorporate all of the influences on ideology in a preference measure. Action-based

measures leave out a wide range of observable behavior, including that which occurs in

committee and on the campaign trail. Private ideology measures like FILTER are subject

to the same omitted variable bias problem when data is unavailable to measure the impact

of variables thought to influence an individual's ideology.

Nonetheless, the data presented here allow for a preliminary investigation into the

question of whether agenda bias influences interest group ratings (Snyder 1992). To

examine this we can look at the pattern of residuals for the regression of FILTER on

NOMINATE for the 100th House. The House is the appropriate chamber for study

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[14] Further, the scores clump together more toward the ends of the distribution—a finding which supports
Brunell, Koetzle, Dinardo, Grofman and Feld's (1999) critique of ADA scores. However, it is important to
note that such criticism afflicts not the measure developed by Groseclose, Levitt & Snyder (1999), but the
underlying scores to which they are applied.

because the effects of agenda bias should be stronger here due to majority party control over the agenda via the rules. NOMINATE scores are examined because they account for the largest number of votes among preference measures, providing an almost complete snapshot of the agenda.

Figure 5 shows a scatterplot of NOMINATE on the residuals for FILTER for the House. If no bias exists, then we should see a random pattern to the residuals in Figure 4. Analysis of this plot shows systematic variation from the random 'shotgun' type blast we would expect from random error.

--Insert Figure 5--

Two noticeable patterns stand out. First the gap observed in Figure 1 is apparent in the residual plot. This is not surprising given the bimodal distribution of FILTER scores. However, if we do a thought experiment where we collapse this gap, we would see that the residual plot would look roughly normal, with one exception. Across parties, NOMINATE appears to slightly under predict scores of liberal members and over predict conservatives. The plot for the Senate, seen in Appendix C, produces substantively similar results.

This result sheds light on whether agenda bias effects vote based ideology measures. This plot is inconsistent with what we would expect from agenda bias in action-based measures. If measures are biased by the restriction of the agenda, then the residual plots should under predict for liberals and over predict for conservatives. More specifically, the regression line should be below most Republicans and above most

[15] Consequently, the ADA scores for northeastern Republicans are more liberal than we might expect while southern Democrats are more conservative than we might expect.

Democrats making Democrats appear more moderate and Republicans more extreme.[16]

Figure 5 shows that this is clearly not the case. Instead, these plots suggest that the relationship between FILTER and NOMINATE varies within parties. Indeed, were we to take absolute values of the residuals, we would see that within parties, the increased conservatism on NOMINATE is positively associated with increased prediction error. Consequently, it is likely that these systematic differences between what we observe and expect are likely due to other factors such as constituency characteristics or the influence of special interests.

DISCUSSION

Overall these results suggest that both measures produce valid estimates of legislator preference. Unsurprisingly, and consistent with Londregan's (2000) formal work, the plots suggest that some bias exists. Since this work does not account for the numerous influences on legislator behavior we cannot draw definitive conclusions about the source of the systematic variation we observe. In sum, while both measures seem to generally 'predict' legislator ideology correctly, there is some systematic variation in the error component. However, it appears that this variation is not a product of agenda bias.

The results show that the regression model slightly under predicts for liberals and over predicts for conservatives. This result is contrary to the expectation resulting from agenda bias (e.g. Snyder 1992), which implies that party leaders seek to make their members look moderate. Instead, the issues brought to a vote make legislators look more

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[16] We expect residuals for Democrats to be either negative or zero, while positive for Republicans indicating extreme conservatism. Instead, we see a very slight relationship in the opposite direction. Perhaps most importantly, we see both positive and negative residuals for members of both parties.

extreme than they we predict. Importantly, this pattern is visible across chambers and is thus unlikely to be the product of gerrymandering.

One explanation for this pattern might be that legislators appeal to subconstituencies for electoral support (Fenno 1978; Wright 1989; Bishin 2000). If legislators propound the position of intense district minorities instead of those of apathetic district majorities then their voting preference might be more extreme than their personal preferences.

The FILTER procedure offers the potential for advances in a wide range of studies for which adequate ideology measures do not exist. Indeed, because FILTER is based on a strong theory of ideological formation, the measure is widely generalizable. Ideology estimates and standard errors can be calculated for any group of political elites for whom background data is available. Scholars' ability to estimate ideology is no longer limited by the existence of observable behavior such as roll call votes, judicial decisions, or newspaper editorials. Moreover, estimates for different political actors are directly comparable owing to the common underlying scale. Judges, cabinet members, candidates for office, bureaucrats, presidents, interest group leaders and members of Congress can all be placed on the same ideological scale.


CONCLUSION

This paper presents the first exogenous validation of action-based measures of legislator preferences. The results show that the most widely used measure of preferences, NOMINATE scores, are valid predictors of legislator ideology. Given past work showing that NOMINATE scores are closely related to other action-based measures of preference, a consensus seems to be forming concerning the validity of NOMINATE.

Similar conclusions are drawn concerning the adjusted interest group ratings. While the measure seems to discriminate less well among members who are ideologically close, this is a product of the underlying score and not the adjustment procedure. Consequently, these results demonstrate this measure is valid as well.

The results depicted herein also speak to the validity of FILTER as a measure of ideology as well. Internally, FILTER correlates highly with elite attitudes over time. Externally, FILTER is closely associated with House Members ideological self-placement. Moreover, if we turn the analysis around, and take NOMINATE and interest group ratings as independent and valid measures of ideology, then the close association between FILTER and these measures can also be seen as providing evidence for FILTER's validity.

A central implication of this research is that there is no single best measure of ideology. It is inherently difficult to identify which measure best represents something that is intangible. Consumers should consider the characteristics of these measures when deciding which to use in their research. While NOMINATE has a number of desirable properties, adjusted interest group ratings may be more appropriate for applications where preferences must be comparable across chambers or time. In cases in which political behavior is unobservable or behavior based measures need to be avoided, FILTER provides an appropriate measure of ideology.

The development and application of this measure is extremely important because prior to its inception, action-free measures of ideology did not exist. Consequently, FILTER scores provide an alternative for scholars that need an action-free independent variable for use in studying politicians' behavior. While the precise specification of the FILTER model may vary, preliminary results suggest the model presented herein is very stable over at least short periods of time.

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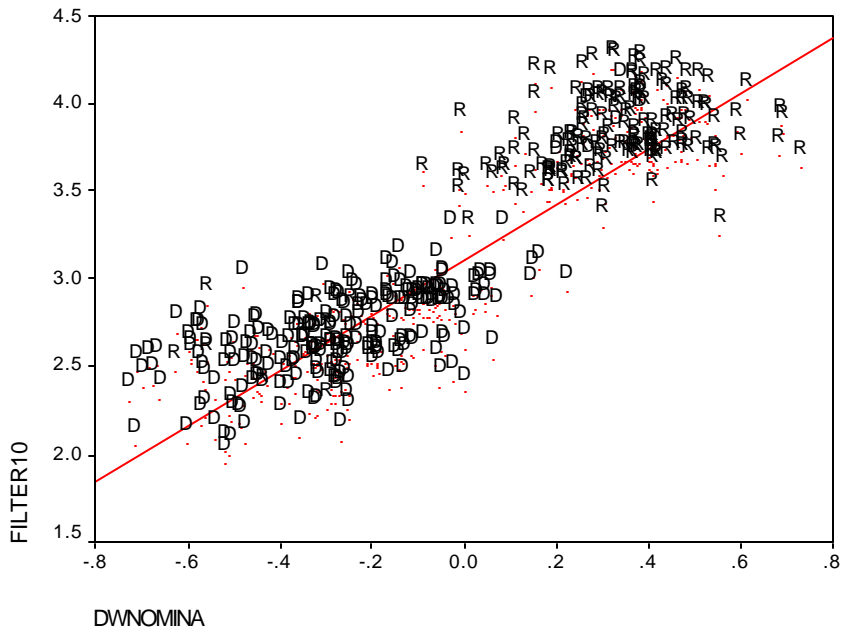Figure 1.  Plot of FILTER for the 100th House on DWNOMINATE.



Figure 2.  Plot of FILTER for the 100th Senate on DWNOMINATE.
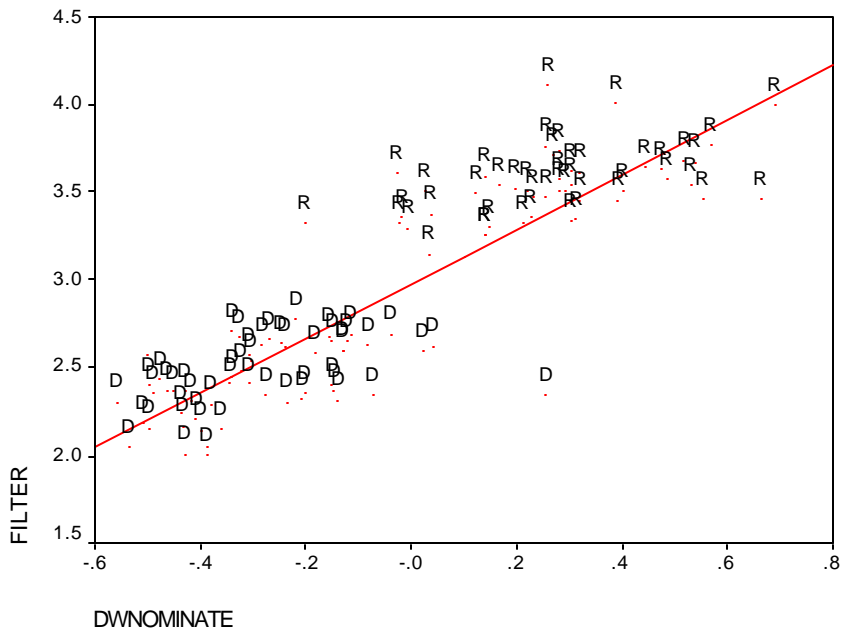
Figure 3.  Plot of FILTER for the 100th House on Adjusted ADA scores (1987).
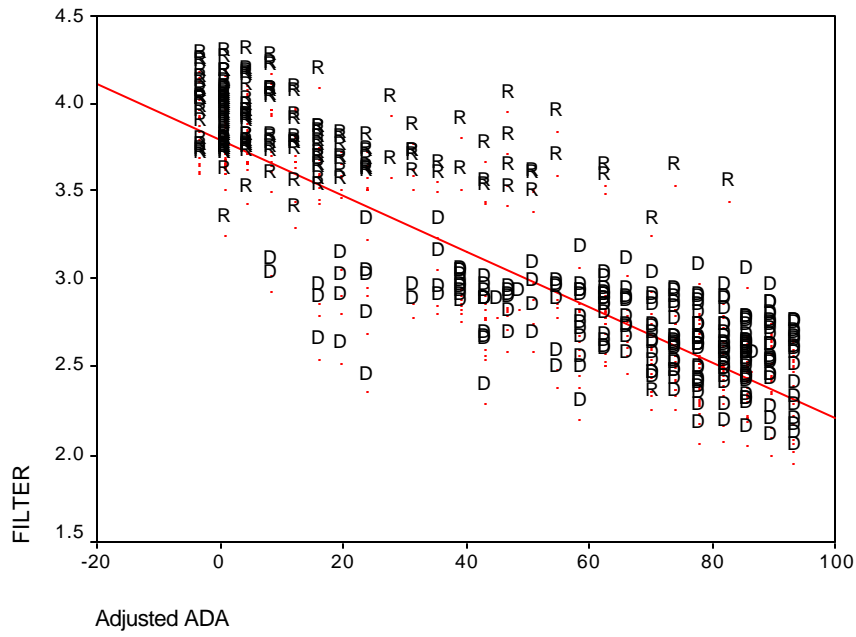


Figure 4.  Plot of FILTER for the 100th Senate on Adjusted ADA scores (1987).
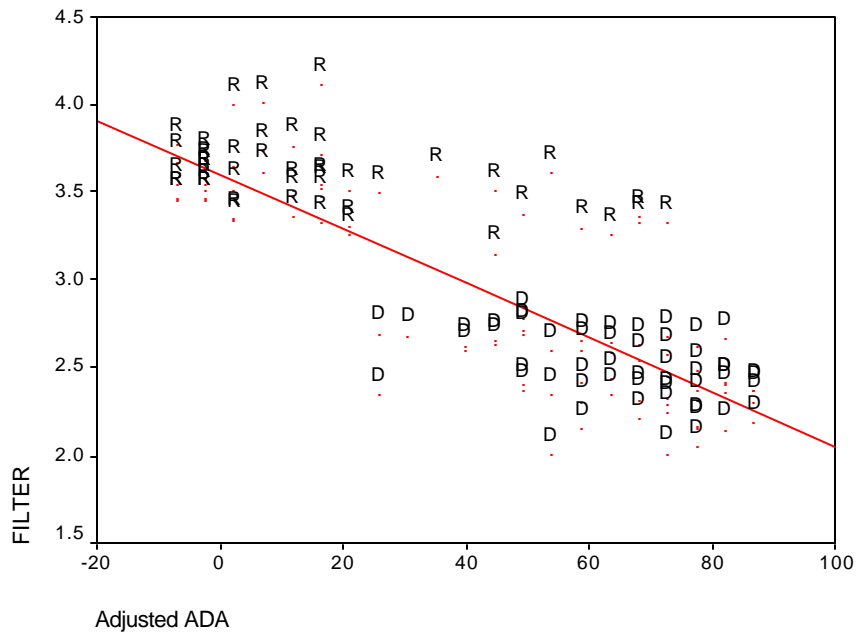
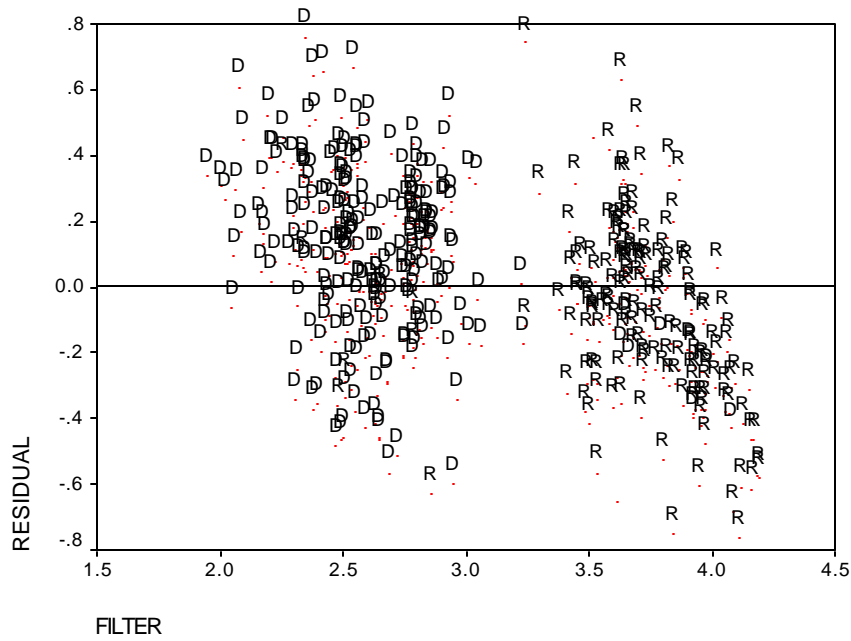Figure 5. Plot of FILTER on Residuals for the 100th House.



Table 1. Regression of FILTER on ideology measures for 100th House and Senate.

| Independent Variable | House | Senate | House | Senate |
|---|---|---|---|---|
| Constant | 3.10** (.013) | 2.99** (.026) | 3.79** (.023) | 3.59** (.06) |
| NOMINATE | 1.58** (.037) | 1.59** (.078) | | |
| Adjusted ADA | | | -.016** (.000) | -.016** (.001) |
| R2 | .81 | .81 | .78 | .67 |
| N | 435 | 100 | 435 | 98 |

Standard errors in parentheses.
** p<.01

Appendix A.  Coding and explanation of variables in the forecast model.

Ten independent variables are used to estimate ideological self-placement.  The coding of each variable is listed below.  The inclusion of each variable is based on a theoretical expectation of influence on attitude and belief formation.

Dependent Variable:  Ideological Self-Placement
1 Very Liberal
2 Liberal
3 Moderate
4 Conservative
5 Very Conservative

Independent variables.
Education
1 H.S. or less
2 Some College
3 B.A. or B.S.
4 MA
5 Professional Degree (JD, MBA)
6 PhD, MD

Gender: 0 Male, 1 Female

Southern State: 0 Non-south, 1 South

Northern State: 0 Non-Northern State, 1 North

Divorced: 0 Not Divorced, 1 Divorced

Single:  0 Not Single, 1 Single

Farmer or Rancher: 0 Other, 1 Farmer or Rancher

Black: 0 Not black, 1 Black

Party: 0 Democrat or Independent, 1 Republican

Age: Coded in years.

Depression (grew up during):1 if born between 1905 and 1920, else 0.

Appendix B.  Elite model used to generate FILTER scores and standard errors for the 101$^{st}$ Senate.

| Variable | |
|---|---|
| Intercept | 2.652*** <br> .0985 |
| Education | -.0586*** <br> .0115 |
| Gender | -.175*** <br> .0328 |
| South | .2671*** <br> .0339 |
| North | -.1933*** <br> .0444 |
| Divorced | -.1414* <br> .0628 |
| Single | -.3127*** <br> .0602 |
| Farmer | .1482* <br> .065 |
| Black | -.2036*** <br> .0783 |
| Party | 1.131*** <br> .0315 |
| Age | .0036* <br> .0017 |
| Depression | -.1288* <br> .0629 |
| N | 1972 |
| *p<.05 <br> **p<.01 <br> ***p<.001 | |

Appendix C.  Plot of FILTER on Residuals for the 100th Senate.
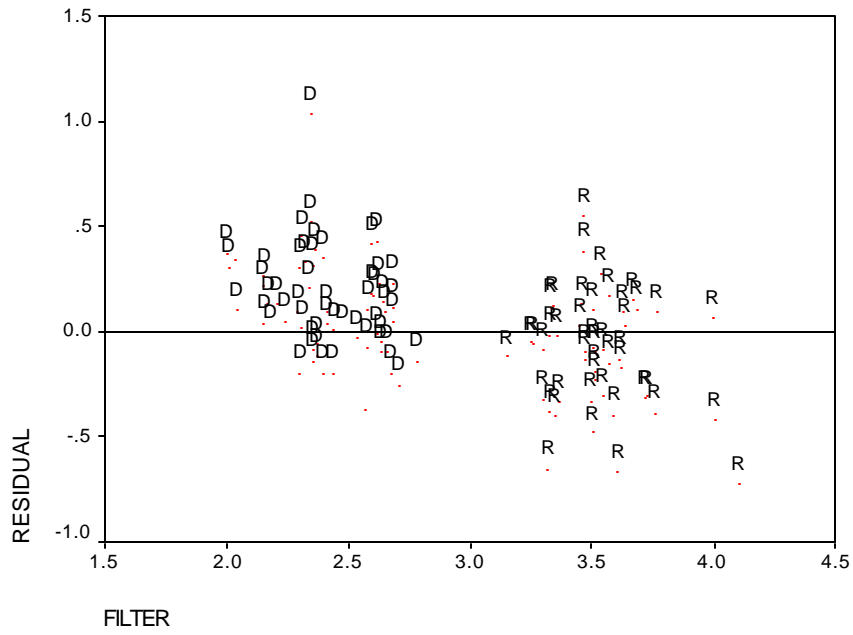
## Appendix D. Bootstrap Results from Forecast Model on 1984 Data.

| Variable | Observed Coefficient | Bias | Standard Error | 95% Confidence Interval | | |
|---|---|---|---|---|---|---|
| Education | -.0586 | .0002 | .0119 | -.082 | -.0353 | (N) |
| | | | | -.0814 | -.0351 | (P) |
| Gender | -.1750 | .0004 | .032 | -.2377 | -.1122 | (N) |
| | | | | -.2357 | -.1130 | (P) |
| South | .2671 | -.0023 | .0336 | .2011 | .3331 | (N) |
| | | | | .2002 | .3314 | (P) |
| North | -.1933 | -.0009 | .0440 | -.2796 | -.1069 | (N) |
| | | | | -.2801 | -.1056 | (P) |
| Divorced | -.1414 | -.0024 | .0642 | -.2674 | -.0153 | (N) |
| | | | | -.2783 | -.0215 | (P) |
| Single | -.3127 | -.0007 | .0669 | -.4339 | -.1815 | (N) |
| | | | | -.4533 | -.1792 | (P) |
| Farmer | .1482 | .0031 | .0653 | .0200 | .2764 | (N) |
| | | | | .0166 | .2797 | (P) |
| Black | -.2036 | .0021 | .0843 | -.3690 | -.0383 | (N) |
| | | | | -.3684 | -.0444 | (P) |
| Party | 1.131 | -.0015 | .0293 | 1.074 | 1.188 | (N) |
| | | | | 1.074 | 1.189 | (P) |
| Age | .0036 | -.0000 | .0017 | .0003 | .0068 | (N) |
| | | | | .0003 | .0067 | (P) |
| Depression | -.1288 | .0015 | .0589 | -.2443 | -.0134 | (N) |
| | | | | -.2436 | -.0106 | (P) |

Bootstrapped estimates are recovered by adding the bias of the observed coefficient. Bias is calculated by subtracting the bootstrap coefficients form the observed coefficients depicted above (in Appendix B). Standard errors are for the bootstrapped values. (N) indicates the confidence interval using the assumption that the statistic is normally distributed. (P) indicates the vales between which 95% of the estimates in the bootstrap sampling distribution were observed.