

# Mr. Smith and the economy: the influence of economic conditions on individual legislator voting

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**Abstract** This paper estimates the influence of macroeconomic conditions on individual legislator voting over time. Previous work shows legislator voting to be stable over careers. In this paper, voting on an ideological issue space (ADA scores) and a fiscal issue space (NTU scores), from 1976 to 2002, exhibits significant short-term cyclicity with economic conditions. Individual legislators polarize by party in response to rising unemployment, and converge in response to rising inflation. As legislators accumulate tenure, they become more ideologically conservative but more fiscally liberal. Results are also reported on presidential party, divided government, and region. All results are weaker in the Senate than in the House.

**Keywords** Legislator voting · Political polarization · Macroeconomic aspect of political economy

**JEL Classification** D72 · E62

## 1 Introduction

This paper presents evidence from estimating the influence of macroeconomic conditions on the voting patterns of individual members of Congress, controlling for important political variables. We measure career voting patterns in two ways. First, we use each legislator's annual scores on the Americans for Democratic Action (ADA) vote index, which measures voting on a liberal-conservative issue set. Second, we use each legislator's annual scores on the National Taxpayers Union (NTU) vote index, which measures voting on fiscal policies. ADA scores are a reasonable approximation of the legislator's broad ideological position,

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whereas NTU scores indicate a legislator's stance on economic issues. Using both measures allows us to test whether the economy affects voting differently depending on whether the issues are ideological or economic. In broad terms, we find that legislator voting responds to inflation and unemployment in predictable ways that depend on party affiliation and chamber (that is, whether the legislator is a member of the House or of the Senate). Legislator voting also drifts with accumulated tenure in office but is not as responsive to such political variables as whether the president is a member of the legislator's party and whether there is divided government.

Our results touch on several ongoing issues in political economy. First is the issue of polarization between the parties. A large body of research investigates the degree to which the relationship between Democrats and Republicans has become polarized (Poole and Rosenthal 1997; Heckman and Snyder 1997; Groseclose et al. 1999; López and Ramírez 2004). Observers agree that the parties have become more polarized since the early 1970s, but this research has concentrated on investigating the *trend* in polarization, while virtually ignoring the role of cycles in polarization and the relationship between the cycles and economic conditions. In contrast, López and Ramírez (2004) demonstrate *cyclical* effects that are related to economic conditions: net of trends, the parties tend to polarize in response to periods of unemployment and to converge in response to inflation. Although this evidence indicates that mean party voting is responsive to economic conditions, it is possible that the result is an artifact of turnover effects. Since electoral sorting increases after periods of adverse economic conditions (Grier and McGarrity 1998, 2002), the cyclical movements could be driven by the legislature responding to constituent hardship. But this result, in turn, could obtain either because new legislators enter Congress with different positions or because existing legislators change their voting behavior. With longitudinal data, a member drops out of the sample when his or her seat turns over. Hence, the current paper cannot rule out turnover effects on party and chamber movements. However, if *individual* voting is also cyclical with economic conditions, some of the party and chamber cycling may be due to changes in positions of existing members.

Second, the results are relevant to the debate about whether legislators are ideologues who vote their own views, or Downsian (Downs 1957) politicians who invest in political capital and respond to changing electoral constraints. This important issue has received a great deal of attention in recent research, yet the evidence is mixed. On the one hand, several recent studies conclude that legislators adopt a set of preferred policies early in their careers and vote these views for as long as they remain in office (Poole and Rosenthal 1991, 1997; Poole 2007). If this is so, legislative bodies would change only through turnover, and then only if new members adopted ideologies different from those of their predecessors. On the other hand, other research argues that legislators are entrepreneurial and adaptive. Dougan and Munger (1989), for example, advance the Downsian argument that legislators invest in ideological reputation to economize on voter monitoring costs. Stratmann (2000) finds that legislators' career voting patterns change under shifting constraints such as redistricting: legislators change their voting behavior to suit their new constituents' preferences.<sup>1</sup> In the preponderance of our results, legislators respond to economic conditions; thus, the balance

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<sup>1</sup> Stratmann's (2000) findings generally support the Downsian view that legislators represent constituent interests in order to win reelection. This view is consistent with a constrained-choice or principal-agent model of legislator behavior (e.g., Coates and Munger 1995; Kalt and Zupan 1990; Lott 1987; Denzau and Munger 1986; Peltzman 1985). A great deal of earlier empirical research—much of which used cross-sectional data and was troubled with simultaneity of constituent and legislator ideologies—indicates mixed results on the question of whose interests legislators represent. For a useful survey, see Bender and Lott (1996).

of evidence in this paper suggests a Downsian interpretation. We discuss this point in greater detail in the concluding section.

The third issue our results touch on is the relationship between tenure in office and spending preferences. One of our dependent variables measures voting records on fiscal issues, and one of our independent variables is annual tenure in office. Reed et al. (1998) discuss three hypotheses on which to base an expected relationship between length of tenure and spending preferences: first, legislators become acculturated into more spendthrift ways the longer they stay in office—a theory attributable to Payne (1991); second, logrolling opportunities increase with tenure; and third, shirking or capture by special interests increases with tenure. The evidence on this is mixed, although the only longitudinal regression evidence of which we are aware that uses NTU scores as an independent variable finds at best a weak relationship (Aka et al. 1996; Reed et al. 1998).<sup>2</sup> To complement this literature, our results indicate that both Democrats and Republicans in the House vote more fiscally liberal as tenure accumulates; however, a more conclusive test of the culture-of-spending hypothesis is warranted.

Last, interpreting vote scores remains a delicate task. Because the Hotelling/Downs spatial model plays such a central role in studies of legislative politics, much scholarly effort has been expended in developing estimates of legislators' ideal points in policy space. One strand of the literature rescales interest group ratings, such as ADA scores, to make them comparable across chambers and over time (Groseclose et al. 1999). A competing strand, the NOMINATE procedure, calculates spatial parameters from expected utility models based on past roll call voting (Poole and Rosenthal 1997). Meanwhile, several other strands are unfolding.<sup>3</sup> The reason this methodological literature is active is that quantitative measures of legislators' policy positions affect a number of important questions in political economy. In applied research, many scholars expressly interpret vote scores as measures of legislator-specific ideology.<sup>4</sup> To the extent that individual vote scores are responsive to economic conditions, important questions are posed about the practical interpretation of these scores.<sup>5</sup>

A variety of factors other than electoral constraints influence the voting of individual legislators—factors such as the legislator's preferences, reputational investment, and the pull of party leaders. Since ADA and NTU scores are calculated on a subset of roll call votes, and this subset can vary between chambers and over time, individual voting can also

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<sup>2</sup>See López (2003) for a detailed review of this debate within the congressional term limits literature. The results in Aka et al. (1996) and Reed et al. (1998) are strongest for House Republicans entering office between 1975 and 1992. As we explain in the next section, our sample in this paper is not the same as those of Aka et al. (1996) or Reed et al. (1998), and we adjust the dependent variable for spurious changes due to a changing issue set. Thus, the results in the current paper are not directly comparable with Aka et al. or Reed et al., so exploring their similarities and differences is a task reserved for future research.

<sup>3</sup>For an excellent overview, see Poole (2007). Some examples include: linear factor scores by Heckman and Snyder (1997); non-partisan scores of voting conflict by Lawson (2004); spatial parameters in which the issue space is endogenous (Londregan 2000); and nonparametric spatial scaling by Poole (2000). In addition, a special issue (vol. 9, issue 3, 2001) of the journal *Policy Analysis* is devoted to the topic of estimating legislators' ideal points in policy space.

<sup>4</sup>Poole and Rosenthal (e.g., 2001) frame the issue space itself as ideological and thus argue that NOMINATE scores measure ideology. The empirical voting literature pervasively treats residuals from regressing constituent interests on ADA scores as legislator-specific ideology (e.g., Levitt 1996; Kalt and Zupan 1990).

<sup>5</sup>Although we do not directly address these issues, our results pose some interesting questions about interpreting vote scores. For example, are ideology and economic performance endogenous? Do vote scores measure preferences per se or perhaps revealed preferences, as in the observed decisions from a constrained-choice model?

be influenced by intertemporal and interchamber movements of the policy space. Therefore, if we are to estimate the secular effects of economic conditions, it is critical to control for these other influences on individual legislator voting. One method of correction is to adjust the observed vote scores for estimates of intertemporal and interchamber movements in the policy agenda space (Groseclose et al. 1999). Since agenda movements are due largely to party leaders and environmental factors, the adjusted scores are designed to net out some important external influences on legislator voting. We elaborate on this and other empirical points in Sect. 3. First, though, we discuss the theoretical rationale for expecting individual legislators to respond to economic conditions.

## 2 Theoretical motivation

There is a rich public choice literature analyzing the determinants of legislators' votes. Rooted in this tradition, we assume that the legislator implicitly maximizes an electoral objective and casts votes to satisfy the interests of her electoral constituency (relevant voters, interest groups, party leaders, media, etc.), subject to her own ideological views and a variety of constraints imposed by the political world.<sup>6</sup> Thus a legislator is expected to respond to the macro economy insofar as economic conditions matter to the well being of her electoral constituency.

Although we do not model the effect of inflation and unemployment on constituent utility, we do make two relatively straightforward assumptions on the basis of economic reasoning. First, constituents prefer lower unemployment rates within their own state, especially constituents vulnerable to unemployment on the margin (e.g., low skills, income, or wealth). Second, greater inflation harms net lenders and wealthy constituents but benefits net borrowers and does not tax people lacking wealth. This type of reasoning is reflected in models relating the macro economy to electoral and partisan politics. In particular, conservatives represent wealthier constituencies and therefore care more about maintaining low inflation than keeping unemployment low. Liberals represent poorer constituencies and want low unemployment more than low inflation. In the current data set, therefore, individual legislators are expected to respond to economic conditions on the basis of their partisan affiliation, Republicans responding more to inflation and Democrats more to unemployment. It follows that Republicans and Democrats are expected to react in opposite ways to both inflation and unemployment.

How legislators respond to economic conditions may also depend on chamber. If the relevant constituencies tend to be more homogeneous for representatives than for senators, members of the House may respond more strongly to changes in unemployment and inflation than members of the Senate. Certainly when partisan gerrymandering has occurred, House districts are increasingly either strongly conservative or strongly liberal, so that if inflation or unemployment rises, a representative may find that most of her constituents are affected similarly. In contrast, a senator may have to weigh disparate effects on her more heterogeneous set of constituents. It is also possible that senators have looser electoral constraints inasmuch as their elections are less frequent and the barriers to entry are higher.

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<sup>6</sup>For brevity and focus, we will not discuss here the particulars of this assumption. See Mueller (2003) for an excellent orientation to the issues, and Bender and Lott (1996) for a review of the empirical legislator voting literature up through the mid 1990s.

### 3 Data and sample properties

For each chamber  $k = \{House, Senate\}$ , define the dependent variable as  $y_{k,i,t}$  for member  $i$  in year  $t$ . The ADA index measures the frequency on a 0-to-100 scale with which a legislator votes the liberal position on a set of 20 key votes selected by the ADA each year. In contrast, the NTU considers all votes that would affect taxes, spending, federal debt/deficit, and certain types of regulation, and assigns a weight to each vote according to the magnitude of its fiscal impact. The NTU score is each member's weighted frequency on a 0-to-100 scale of voting to decrease, or not to increase, taxes or spending. Thus, a higher ADA score indicates a more liberal voting record, while a higher NTU score indicates more fiscally conservative voting.

Before estimation we make two types of adjustment to the dependent variables. First, for ease of comparison with ADA, we invert the NTU scores so that a higher NTU score now indicates more fiscally liberal voting. Second, we also adjust the scores for intertemporal and interchamber movements in the policy space. Since the set of votes used to calculate the scores differs over time and between chambers, changes in individual scores will partly reflect changes in the set of issues being voted on. It is important, for example, to control for possible agenda bias that may be latent in the observed vote scores. Agenda bias could occur if the rating organization changes the manner in which it selects the roll call votes that define the policy space; for example the ADA might select a more liberal set of votes after a particular election year than before. To make the vote scores more comparable over time and across chamber, we employ a linear transformation introduced by Groseclose et al. (1999). If the  $i$ th member in chamber  $k$  has NTU or ADA score  $y_{k,i,t}$  in period  $t$ , then the transformed score is  $\hat{y}_{k,i,t} = \frac{y_{k,i,t} - \hat{a}_{k,t}}{\hat{b}_{k,t}}$ , where the values  $\hat{a}_{k,t}$  and  $\hat{b}_{k,t}$  for each chamber-year are maximum likelihood parameter estimates of movements in the policy space.<sup>7</sup>

Transforming the ADA and NTU scores offers an important advantage in interpreting empirical results. The adjusted scores isolate legislator-specific positions net of influences that are transmitted through movements in the policy space—such as agenda bias. For example, suppose there is a change in party control, such as those which followed the 1994 and 2006 elections. The leaders of the new majority initiate a substantially different policy agenda, such as the Republicans' Contract with America in 1995 or the Democrats' 100 Hours in 2007. The set of votes used to compute ADA and NTU scores shifts from the set before the leadership change. In the 1995 shift, for example, the policy space became more conservative than before the shift. If a returning legislator's policy position does not move—or at least if it does not move as much as the space has shifted—then this legislator will support fewer of the votes used to calculate the index and will receive a lower score. The adjustment by  $\hat{a}_{k,t}$  “corrects” the vote score to isolate legislator-specific movement, if any. A similar story will illustrate the role of  $\hat{b}_{k,t}$  if the policy space stretches, as when the presidency and Congress are first held by the same party and then come under the control of different parties. Strategic manipulation of the agenda may be another source of interchamber and intertemporal variation for which the Groseclose-Levitt-Snyder method is not designed to control (Herron 2000). One reason is that their method implicitly assumes that shifting and stretching does not occur within the time span of a single congressional session. Herron (2000) discusses this form of bias in detail and produces an elegant alternative solution to

<sup>7</sup>For greater detail on the estimation procedure and the estimates for ADA scores, see Groseclose et al. (1999). For the estimates for NTU scores, see López (2006).

approximate true preferences from observable scores. As we noted earlier, this is an active methodological literature, and the method we employ is one of several to produce estimates of ideal points. Thus, note that the coefficient estimates in our results should be interpreted as the influence of economic conditions on one type of estimate of legislator-specific policy positions.

The independent variables are as follows: To calculate the annual inflation rate ( $\pi_t$ ), we use the implicit price deflator from the Bureau of Economic Analysis. For annual unemployment in member  $i$ 's home state ( $u_{i,t}$ ), we use the Bureau of Labor Statistics state-level unemployment rates by year, which are available beginning in 1970 for large states and in 1976 for all states. The variable *Tenure* measures the number of years each member has been in office in a given year; it is calculated as year  $t$  minus the member's first year in office. As political control variables, the dummy variable *Divided Government* indicates whether the president and Congress are controlled by different parties, and the dummy variable *Republican President* indicates whether the president is of the Republican Party. The latter two variables have a simple correlation coefficient of 0.286. Finally, the variable *Southern* indicates whether a Democratic legislator is from one of 13 southern states.<sup>8</sup>

The Data Appendix summarizes the samples used. The adjusted ADA scores are available from 1947 to 1999 (Groseclose et al. 1999), and the annual NTU scores were first published in 1979. However, the samples are delimited in certain ways. First, we drop members with less than two years' tenure and legislators with third-party affiliations.<sup>9</sup> In addition, the Census Bureau's state-level unemployment data are available beginning in 1970 for 26 high-population states, and beginning in 1976 for all 50 states.<sup>10</sup> We use all available unemployment data, so the ADA results are estimated on big-state legislators from 1970 to 1975 and on all legislators from 1976 to 1999, resulting in a total of 13,866 legislator-year observations. The NTU sample size is limited only by the availability of the dependent variable and ranges from 1979 to 2002, for a total of 12,267 observations. This sample size is comparable to the samples in previous studies of career voting. It is a longer panel than that of Stratmann (2000), in which the sample spanned the period 1983 through 1993, but shorter than the panels used in studies examining NOMINATE scores, such as Poole (2007), which uses roll call data from 1947 through 2002. We present summary statistics for the ADA and NTU samples in the Data Appendix, where the observations on the dependent variables are broken down by chamber and party.

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<sup>8</sup>The thirteen southern states are: Alabama, Arkansas, Georgia, Florida, Louisiana, Kentucky, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

<sup>9</sup>Independent legislators were dropped from the sample since they could only subjectively be classified as Democrats or Republicans and there were not enough of Independents to obtain reliable regression results treating them as a separate category. Legislators with less than two years of experience were also deleted as their tenure was insufficient for efficiently estimating the dynamic effect of unemployment and inflation on their voting behavior.

<sup>10</sup>The 24 low-population states for which annual unemployment rates are available only from 1976 are Alaska, Arizona, Arkansas, Colorado, Delaware, Hawaii, Idaho, Iowa, Kansas, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oregon, Rhode Island, South Dakota, Utah, Vermont, West Virginia, and Wyoming.

## 4 Specification

To assess the influence of economic conditions on legislator voting, we estimate the following regression within each chamber  $k$ :

$$y_{i,t} = c + \gamma_l(\text{control}_{l,i,t}) + \sum_{j=0}^n \alpha_j(\pi_{t-j}) + \sum_{j=0}^n \beta_j(u_{i,t-j}) + \varepsilon_{i,t}. \quad (1)$$

The dependent variable  $y_{k,i,t}$  is the adjusted ADA or NTU score as defined in the previous section. The  $l$  political control variables are *Tenure*, *Republican President*, and *Divided Government*, also discussed above. In the Democratic regressions we add the dummy variable *Southern*. The economic variables are  $\pi$  to represent the *Inflation Rate* at time  $t - j$ , and  $u_i$  representing the *Unemployment Rate* in legislator  $i$ 's state and at time  $t - j$ . The subscripts  $t - j$  indicate the lag on each variable, running from  $t$  to  $t - n$ , where  $n$  is the maximum lag length. Varying the lag structure permits us to investigate the dynamic effect of economic conditions on legislator voting. Our purpose in adopting this modeling framework is to allow for the possibility that voting may react to both inflation and unemployment, but not necessarily contemporaneously. Although many researchers (e.g., Kramer 1971; Riker 1973; Grier and McGarrity 1998, 2002) find that economic conditions in election years have an effect on election results, our specification does not restrict the possibility of the effect to election years. Even if election results are affected by contemporaneous economic conditions, the effect on voting may occur throughout or across terms in office. Because we do not derive a theoretical model that specifies the exact lag length, we allow  $n$  to range from 0 to 4, which spans the length of a senate term less re-election year.<sup>11</sup>

Since we estimate this regression on Democrats and Republicans separately for each chamber on both dependent variables, our main results contain a total of eight specifications (Tables 1 through 4). Each specification is estimated five times for varying lag lengths. All regressions are estimated using the Baltagi and Wu (1999) generalized least squares procedure, which allows for an efficient estimation of the parameters of the model when the disturbance term is first-order autoregressive and the panel data set is unbalanced. All results control for legislator-specific fixed effects.

## 5 Results

Tables 1 through 4 present results on ADA and NTU scores for House and Senate. Recall that, as discussed in Sect. 3, the dependent variables are measured net of estimated intertemporal and interchamber movements in the policy space; therefore, the coefficient estimates are best interpreted as the effect of a change in the independent variable on an estimate of the legislator's ideal point in a given year.

The coefficient estimates on *Tenure* indicate the *ceteris paribus* effect of an additional year in office. In the House, Tables 1 and 2 show that representatives from both parties become more *conservative* in overall ideology (ADA scores) but more *fiscally liberal* (NTU

<sup>11</sup>There are no specific econometric rules that dictate the choice of the lag length. The standard tools that researchers typically resort to, such as the Akaike Information Criterion and the Bayesian Information Criterion (both of which we report), can be used as guidelines. (For more on these, see Enders 2004.) In our case, however, these information criteria did not offer a uniform recommendation. Thus, we felt it would be more prudent to present the results for a reasonably wide selection of lag lengths.

**Table 1** ADA scores in the House

Lag length	Republicans				Democrats				Coefficient difference t-tests						
	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4
<i>Constant</i>	18.79 <sup>a</sup> (1.07)	18.75 <sup>a</sup> (1.27)	17.72 <sup>a</sup> (1.46)	16.70 <sup>a</sup> (1.72)	15.76 <sup>a</sup> (2.01)	78.34 <sup>a</sup> (1.26)	78.10 <sup>a</sup> (1.49)	80.10 <sup>a</sup> (1.73)	81.09 <sup>a</sup> (2.03)	79.04 <sup>a</sup> (2.30)	47.55 <sup>a</sup> (1.24)	40.17 <sup>a</sup> (1.38)	36.47 <sup>a</sup> (1.00)	32.12 <sup>a</sup> (1.19)	27.87 <sup>a</sup> (1.26)
<i>Tenure</i>	-0.241 <sup>a</sup> (0.038)	-0.252 <sup>a</sup> (0.042)	-0.209 <sup>a</sup> (0.047)	-0.205 <sup>a</sup> (0.055)	-0.172 <sup>a</sup> (0.063)	-0.194 <sup>a</sup> (0.038)	-0.194 <sup>a</sup> (0.042)	-0.257 <sup>a</sup> (0.048)	-0.295 <sup>a</sup> (0.077)	-0.249 <sup>a</sup> (0.061)	1.24	1.38	1.00	1.19	1.26
<i>Republican President</i>	0.024 (0.573)	-0.131 (0.587)	0.035 (0.627)	-0.833 (0.654)	-0.396 (0.703)	-3.11 <sup>a</sup> (0.676)	-3.07 <sup>a</sup> (0.701)	-3.81 <sup>a</sup> (0.761)	-2.89 <sup>a</sup> (0.794)	-3.32 <sup>a</sup> (0.833)	4.66 <sup>a</sup> (0.705)	4.23 <sup>a</sup> (7.02)	5.12 <sup>a</sup> (7.16)	2.63 <sup>a</sup> (4.46)	3.57 <sup>a</sup> (3.29)
<i>Divided Government</i>	-1.08 <sup>b</sup> (0.573)	-1.10 <sup>b</sup> (0.602)	-1.49 <sup>a</sup> (0.663)	-0.326 (0.692)	0.223 (0.744)	3.61 <sup>a</sup> (0.669)	3.82 <sup>a</sup> (0.707)	4.09 <sup>a</sup> (0.788)	3.28 <sup>a</sup> (0.818)	3.02 <sup>a</sup> (0.861)	7.05 <sup>a</sup> (-33.1 <sup>a</sup> )	7.02 <sup>a</sup> (-31.76 <sup>a</sup> )	7.16 <sup>a</sup> (-31.35 <sup>a</sup> )	4.46 <sup>a</sup> (1.63)	3.29 <sup>a</sup> (1.68)
<i>Southern Democrat</i>						(1.46)	(1.49)	(1.55)	(1.63)	(1.68)					
<i>Unemployment Rate</i>	-0.336 <sup>a</sup> (0.092)	-0.416 <sup>a</sup> (0.124)	-0.292 <sup>a</sup> (0.144)	-0.347 <sup>a</sup> (0.172)	-0.282 (0.207)	0.376 <sup>a</sup> (0.097)	0.444 <sup>a</sup> (0.131)	0.613 <sup>a</sup> (0.156)	0.789 <sup>a</sup> (0.184)	0.880 <sup>a</sup> (0.216)	7.36 <sup>a</sup> (16.11)	6.59 <sup>a</sup> (15.63)	5.84 <sup>a</sup> (14.84)	6.21 <sup>a</sup> (15.79)	5.40 <sup>a</sup> (12.57)
<i>Inflation Rate</i>	0.636 <sup>a</sup> (0.086)	0.819 <sup>a</sup> (0.114)	0.777 <sup>a</sup> (0.143)	1.00 <sup>a</sup> (0.173)	0.937 <sup>a</sup> (0.200)	-0.796 <sup>a</sup> (0.089)	-0.977 <sup>a</sup> (0.115)	-1.40 <sup>a</sup> (0.147)	-1.76 <sup>a</sup> (0.175)	-1.52 <sup>a</sup> (0.195)					
Rho	0.181	0.169	0.151	0.141	0.141	0.275	0.269	0.263	0.257	0.247					
Chi <sup>2</sup> -stat	211.5	234.1	206.8	219.0	211.5	651.72	609.4	588.4	541.7	505.9					
Prob > Chi <sup>2</sup>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
R <sup>2</sup> (within)	0.062	0.073	0.072	0.083	0.089	0.010	0.013	0.017	0.021	0.019					
R <sup>2</sup> (btw)	0.008	0.018	0.019	0.021	0.029	0.442	0.431	0.438	0.431	0.430					
R <sup>2</sup> (overall)	0.018	0.026	0.034	0.038	0.047	0.393	0.398	0.398	0.393	0.393					
AIC	20.327	17.648	15.154	12.995	11.171	31.006	27.752	24.579	21.549	18.945					
BIC	4.204	4.173	4.153	4.143	4.163	4.648	4.656	4.663	4.650	4.658					
No. obs.	4844	4241	3664	3154	2703	6681	5973	5287	4652	4088					

Notes to Table 1 (see on the next page)



*Notes to Table 1.* The dependent variable is adjusted for intertemporal and interchamber variations in the underlying policy space. A higher vote score indicates a more liberal vote record. The  $j$  indicates lag length as discussed in Sect. 3 of the paper, where the independent variables are also defined and discussed. Estimates on *Inflation Rate* and *Unemployment Rate* are the sums over all lags,  $\sum_{j=0}^n \pi_{t-j}$  and  $\sum_{j=0}^n u_{t-j}$ , respectively. No other independent variables are lagged. The “Coefficient Difference t-tests” column reports results against the null hypothesis that the estimated coefficient for Republicans is equal to the coefficient for Democrats. Standard errors are reported in parentheses. Statistical significance is indicated by <sup>a</sup> for  $\geq 95\%$  confidence and <sup>b</sup> for  $\geq 90\%$  confidence, by a two-tailed t-test. Regressions are estimated using the Baltagi and Wu (1999) general least squares procedure for unbalanced panel data with serial correlation. “Rho” is the estimated serial correlation parameter. AIC and BIC respectively indicate the “Akaike” and “Bayesian” Information Criterion used to assess model goodness of fit—a value closer to zero indicates better model fit

scores) the longer they stay in office. A Republican’s ADA score decreases by an estimated 0.25 (approximately) per additional year in office, and a House Democrat’s ADA score decreases by approximately 0.19 per marginal year of tenure. Thus, legislators from both parties become more ideologically conservative over time. Although the effect appears to be larger for Republicans than for Democrats, a t-test indicates that the Republican and Democratic coefficients on *Tenure* are not statistically different (see rightmost columns in Tables 1, 2).<sup>12</sup> The results are similar for voting on fiscal policy: House members of both parties vote more fiscally liberal with greater *Tenure*, and although Democrats appear to become even more fiscally liberal (by an estimated 0.03 per year), the difference is not statistically significant. As discussed in Sect. 1, many studies have noted the trend of increasing polarization. Our coefficient difference tests indicate that this trend is not necessarily due to relative movements of individual members in the two parties. It is worth noting, however, that party and chamber movements also depend on size of the majority party and proximity and overlap of the party distributions. In the Senate, Tables 3 and 4 report that *Tenure* is not statistically significant for either party; thus none of the foregoing holds for individual senators.

As for a culture of spending or similar competing hypothesis (Payne 1991; Aka et al. 1996; Reed et al. 1998), both Republican and Democratic representatives become bigger spenders the longer they stay in office. It is possible that this result is driven by age effects separate from enculturation effects. One way to address this distinction is to observe effects on fiscal voting when members move from the House to the Senate. The culture of spending is more likely to occur in the House than in the Senate because in the House the term in office is shorter, and, in addition, House members represent much smaller and concentrated constituencies. Arguably, senators are less influenced by the culture of spending. We attempted to test this hypothesis by observing whether fiscally liberal voting decreased after House members had passed onto the Senate. We re-estimated all the models reported in Tables 1–4 on the same control variables but with an additional regressor—an indicator variable for legislators who moved from the House to the Senate. The results were inconclusive.<sup>13</sup>

<sup>12</sup>The t-tests used to compare coefficients in Tables 1 through 4 are spelled out in Ashenfelter and Heckman (1974). As used in this paper, the null hypothesis is that the Republican coefficient is not different from the Democratic coefficient.

<sup>13</sup>In general the model fit was poor except for Republicans using ADA scores as the dependent variable. Partly the poor model fit was due to a loss of observations because the sample included only members who switched from House to Senate. Furthermore, the results were weaker for NTU than for ADA scores, and weaker still for Democrats than Republicans. All results are available from the authors on request.

**Table 2** NTU scores in the House

Lag length	Republicans				Democrats				Coefficient difference t-tests						
	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4
	<i>Constant</i>	58.43 <sup>a</sup> (0.586)	57.43 <sup>a</sup> (0.706)	55.54 <sup>a</sup> (0.875)	54.81 <sup>a</sup> (0.980)	55.03 <sup>a</sup> (1.167)	79.26 <sup>a</sup> (0.489)	78.50 <sup>a</sup> (0.557)	78.93 <sup>a</sup> (0.649)	78.52 <sup>a</sup> (0.695)	79.33 <sup>a</sup> (0.792)	38.98 <sup>a</sup>	33.59 <sup>a</sup>	30.92 <sup>a</sup>	28.52 <sup>a</sup>
<i>Tenure</i>	0.068 <sup>a</sup> (0.023)	0.086 <sup>a</sup> (0.026)	0.139 <sup>a</sup> (0.030)	0.159 <sup>a</sup> (0.033)	0.151 <sup>a</sup> (0.038)	0.096 <sup>a</sup> (0.015)	0.114 <sup>a</sup> (0.017)	0.102 <sup>a</sup> (0.020)	0.112 <sup>a</sup> (0.021)	0.112 <sup>a</sup> (0.022)	1.47	1.31	1.49	1.75 <sup>b</sup>	1.30
<i>Republican President</i>	0.247 (0.185)	0.342 <sup>b</sup> (0.197)	0.897 <sup>a</sup> (0.247)	0.726 <sup>a</sup> (0.265)	0.605 <sup>b</sup> (0.358)	-0.292 <sup>b</sup> (0.148)	-0.223 <sup>b</sup> (0.155)	-0.321 <sup>a</sup> (0.188)	-0.302 <sup>b</sup> (0.193)	0.001 (0.263)	3.26 <sup>a</sup>	3.23 <sup>a</sup>	5.64 <sup>a</sup>	4.52 <sup>a</sup>	1.96 <sup>a</sup>
<i>Divided Government</i>	0.446 <sup>a</sup> (0.176)	0.396 <sup>b</sup> (0.190)	0.814 <sup>a</sup> (0.237)	0.583 <sup>a</sup> (0.257)	0.535 <sup>b</sup> (0.295)	-0.080 (0.146)	-0.009 (0.155)	-0.180 (0.184)	-0.243 (0.194)	-0.148 (0.221)	3.29 <sup>a</sup>	2.36 <sup>a</sup>	4.76 <sup>a</sup>	3.69 <sup>a</sup>	2.67 <sup>a</sup>
<i>Southern Democrat</i>						-2.34 <sup>a</sup> (0.441)	-2.18 <sup>a</sup> (0.446)	-1.74 <sup>a</sup> (0.468)	-1.89 <sup>a</sup> (1.13)	-1.53 <sup>a</sup> (0.472)					
<i>Unemployment Rate</i>	0.052 (0.056)	0.136 <sup>b</sup> (0.081)	0.247 <sup>a</sup> (0.103)	0.257 <sup>a</sup> (0.124)	0.168 (0.147)	0.203 <sup>a</sup> (0.041)	0.295 <sup>a</sup> (0.055)	0.261 <sup>a</sup> (0.067)	0.356 <sup>a</sup> (0.074)	0.289 <sup>a</sup> (0.086)	3.13 <sup>a</sup>	2.35 <sup>a</sup>	0.17	1.00	1.04
<i>Inflation Rate</i>	0.296 <sup>a</sup> (0.054)	0.415 <sup>a</sup> (0.070)	0.365 <sup>a</sup> (0.092)	0.607 <sup>a</sup> (0.139)	0.687 <sup>a</sup> (0.227)	0.026 (0.039)	-0.026 (0.048)	-0.012 (0.062)	-0.094 (0.097)	-0.352 <sup>a</sup> (0.161)	5.83 <sup>a</sup>	7.51 <sup>a</sup>	4.92 <sup>a</sup>	5.98 <sup>a</sup>	5.40 <sup>a</sup>
<i>Rho</i>	0.384	0.375	0.379	0.400	0.386	0.284	0.280	0.280	0.278	0.256					
<i>Chi<sup>2</sup>-stat</i>	36.43	56.29	67.76	66.35	72.88	83.93	94.74	68.96	86.82	76.16					
<i>Prob &gt; Chi<sup>2</sup></i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
<i>R<sup>2</sup> (within)</i>	0.001	0.002	0.003	0.003	0.017	0.001	0.014	0.014	0.020	0.021					
<i>R<sup>2</sup> (btw)</i>	0.158	0.155	0.172	0.164	0.130	0.072	0.070	0.061	0.071	0.074					
<i>R<sup>2</sup> (overall)</i>	0.080	0.085	0.091	0.085	0.087	0.049	0.048	0.044	0.051	0.054					
<i>AIC</i>	12.609	11.228	9.604	8.468	7.318	14.640	13.017	11.251	9.725	8.572					
<i>BIC</i>	2.829	2.872	2.847	2.875	2.906	2.640	2.642	2.603	2.549	2.588					
<i>No. obs.</i>	4470	3927	3395	2970	2546	5562	4950	4348	3847	3348					

Note. Please see Notes to Table 1

**Table 3** ADA scores in the Senate

Lag length	Republicans				Democrats				Coefficient difference t-tests						
	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4
	<i>Constant</i>	15.95 <sup>a</sup> (2.67)	16.00 <sup>a</sup> (3.08)	18.57 <sup>a</sup> (3.53)	22.98 <sup>a</sup> (4.12)	21.86 <sup>a</sup> (4.61)	72.89 <sup>a</sup> (2.73)	72.14 <sup>a</sup> (3.09)	73.38 <sup>a</sup> (3.48)	72.35 <sup>a</sup> (3.80)	70.43 <sup>a</sup> (4.10)	20.88 <sup>a</sup>	18.17 <sup>a</sup>	15.74 <sup>a</sup>	12.99 <sup>a</sup>
<i>Tenure</i>	-0.038 (0.087)	-0.005 (0.097)	-0.064 (0.109)	-0.174 (0.126)	-0.16 (0.144)	-0.072 (0.083)	-0.084 (0.089)	-0.098 (0.099)	-0.06 (0.108)	-0.011 (0.115)	0.41	0.88	0.34	1.06	1.29
<i>Republican President</i>	2.13 <sup>a</sup> (1.17)	2.34 <sup>a</sup> (1.21)	2.56 <sup>a</sup> (1.24)	2.09 <sup>a</sup> (1.26)	2.43 <sup>a</sup> (1.29)	-4.87 <sup>a</sup> (1.31)	-4.56 <sup>a</sup> (1.34)	-4.58 <sup>a</sup> (1.37)	-4.28 <sup>a</sup> (1.39)	-4.19 <sup>a</sup> (1.45)	5.37 <sup>a</sup>	5.18 <sup>a</sup>	5.23 <sup>a</sup>	4.58 <sup>a</sup>	4.57 <sup>a</sup>
<i>Divided Government</i>	-1.74 (1.18)	-2.41 <sup>a</sup> (1.24)	-2.89 <sup>a</sup> (1.30)	-2.94 <sup>a</sup> (1.31)	-2.64 <sup>a</sup> (1.32)	4.46 <sup>a</sup> (1.32)	5.09 <sup>a</sup> (1.35)	4.80 <sup>a</sup> (1.39)	4.21 <sup>a</sup> (1.42)	4.07 <sup>a</sup> (1.44)	4.72 <sup>a</sup>	5.58 <sup>a</sup>	5.55 <sup>a</sup>	5.04 <sup>a</sup>	4.66 <sup>a</sup>
<i>Southern Democrat</i>						-31.71 <sup>a</sup> (2.79)	-31.26 <sup>a</sup> (2.87)	-31.16 <sup>a</sup> (3.04)	-30.63 <sup>a</sup> (3.17)	-29.94 <sup>a</sup> (3.17)					
<i>Unemployment Rate</i>	-0.369 <sup>a</sup> (0.188)	-0.538 <sup>a</sup> (0.277)	-0.646 <sup>a</sup> (0.325)	-0.953 <sup>a</sup> (0.37)	-0.741 <sup>a</sup> (0.422)	0.225 (0.213)	0.422 (0.265)	0.383 (0.302)	0.317 (0.340)	0.456 (0.393)	2.80 <sup>a</sup>	3.61 <sup>a</sup>	3.40 <sup>a</sup>	3.73 <sup>a</sup>	3.05 <sup>a</sup>
<i>Inflation Rate</i>	0.394 <sup>a</sup> (0.188)	0.507 <sup>a</sup> (0.232)	-0.397 (0.285)	0.259 (0.342)	0.111 (0.391)	-0.626 <sup>a</sup> (0.206)	-0.710 <sup>a</sup> (0.247)	-0.794 <sup>a</sup> (0.299)	-0.644 <sup>a</sup> (0.342)	-0.582 (0.376)	4.97 <sup>a</sup>	4.95 <sup>a</sup>	1.33	2.64 <sup>a</sup>	1.84 <sup>b</sup>
<i>Rho</i>	0.220	0.217	0.192	0.169	0.144	0.315	0.310	0.295	0.290	0.305					
<i>Chi<sup>2</sup>-stat</i>	16.60	19.37	24.05	28.19	21.39	166.54	157.73	142.48	125.51	120.1					
<i>Prob &gt; Chi<sup>2</sup></i>	0.011	0.013	0.007	0.005	0.092	0.000	0.000	0.000	0.000	0.000					
<i>R<sup>2</sup> (within)</i>	0.021	0.024	0.032	0.043	0.034	0.027	0.027	0.028	0.025	0.027					
<i>R<sup>2</sup> (btw)</i>	0.044	0.044	0.026	0.002	0.002	0.513	0.518	0.497	0.519	0.498					
<i>R<sup>2</sup> (overall)</i>	0.023	0.029	0.017	0.0012	0.001	0.436	0.435	0.432	0.424	0.416					
<i>AIC</i>	4.833	4.526	4.213	3.894	3.596	5.552	5.089	4.664	4.267	3.923					
<i>BIC</i>	4.300	4.336	4.358	4.376	4.401	4.543	4.539	4.537	4.529	4.530					
<i>No. obs.</i>	1131	1053	978	903	832	1230	1131	1040	956	882					

Note. Please see Notes to Table 1

**Table 4** NTU scores in the Senate

Lag length	Republicans				Democrats				Coefficient difference t-tests						
	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4	<i>j</i> = 0	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4
<i>Constant</i>	58.45 <sup>a</sup> (2.129)	55.71 <sup>a</sup> (2.444)	53.01 <sup>a</sup> (2.784)	51.18 <sup>a</sup> (3.095)	52.25 <sup>a</sup> (3.439)	75.98 <sup>a</sup> (1.71)	76.67 <sup>a</sup> (1.91)	76.86 <sup>a</sup> (2.21)	77.28 <sup>a</sup> (2.35)	78.73 <sup>a</sup> (2.72)	8.98 <sup>a</sup>	9.15 <sup>a</sup>	9.36 <sup>a</sup>	9.51 <sup>a</sup>	8.88 <sup>a</sup>
<i>Tenure</i>	0.039 (0.069)	0.067 (0.075)	0.148 <sup>a</sup> (0.085)	0.177 (0.091)	0.138 (0.097)	0.074 (0.049)	0.059 (0.054)	0.026 (0.062)	0.019 (0.064)	0.029 (0.070)	0.57	0.12	1.61	2.01 <sup>a</sup>	1.36
<i>Republican President</i>	0.453 (0.644)	0.609 (0.676)	1.925 <sup>a</sup> (0.799)	1.453 (0.852)	2.228 <sup>a</sup> (1.09)	-1.05 <sup>a</sup> (0.526)	-1.19 <sup>a</sup> (0.568)	-2.07 <sup>a</sup> (0.644)	-1.68 <sup>a</sup> (0.685)	-0.89 (0.916)	2.53 <sup>a</sup>	2.79 <sup>a</sup>	5.44 <sup>a</sup>	4.06 <sup>a</sup>	3.19 <sup>a</sup>
<i>Divided Government</i>	-0.06 (0.637)	-0.194 (0.680)	0.636 (0.797)	0.161 (0.852)	0.145 (0.902)	-0.013 (0.546)	0.18 (0.585)	-0.48 (0.659)	-0.461 (0.695)	-0.077 (0.748)	0.08	0.57	1.51	0.80	0.28
<i>Southern Democrat</i>						-0.759 (1.56)	-0.487 (1.61)	-0.073 (1.73)	0.334 (1.74)	-0.797 (1.82)					
<i>Unemployment Rate</i>	0.054 (0.207)	0.453 <sup>a</sup> (0.267)	0.396 (0.322)	0.378 (0.369)	0.585 (0.410)	0.380 <sup>a</sup> (0.141)	0.343 <sup>a</sup> (0.179)	0.599 <sup>a</sup> (0.206)	0.763 <sup>a</sup> (0.223)	0.508 <sup>a</sup> (0.254)	1.81 <sup>b</sup>	0.45	0.73	1.27	0.24
<i>Inflation Rate</i>	0.163 (0.175)	-0.216 (0.210)	0.177 (0.267)	0.937 <sup>a</sup> (0.432)	0.144 (0.683)	-0.035 (0.140)	-0.157 (0.171)	-0.111 (0.223)	-0.684 <sup>a</sup> (0.376)	-1.13 <sup>a</sup> (0.612)	1.24	0.30	1.16	4.01 <sup>a</sup>	2.00 <sup>a</sup>
Rho	0.302	0.295	0.286	0.286	0.263	0.129	0.131	0.114	0.074	0.045					
Chi <sup>2</sup> -stat	1.68	11.58	16.45	21.57	30.24	12.01	14.21	26.90	37.35	75.16					
Prob > Chi <sup>2</sup>	0.947	0.171	0.088	0.042	0.011	0.100	0.115	0.005	0.000	0.000					
R <sup>2</sup> (within)	0.001	0.008	0.013	0.020	0.029	0.015	0.016	0.030	0.041	0.090					
R <sup>2</sup> (btw)	0.088	0.104	0.087	0.090	0.138	0.005	0.005	0.004	0.062	0.074					
R <sup>2</sup> (overall)	0.021	0.046	0.042	0.042	0.037	0.017	0.021	0.033	0.043	0.072					
AIC	4.493	4.217	3.935	3.667	3.342	4.265	3.992	3.656	3.406	3.167					
BIC	4.057	4.101	4.133	4.199	4.207	3.840	3.901	3.901	3.909	3.934					
No. obs.	1115	1038	964	887	810	1120	1035	951	887	823					

Note. Please see Notes to Table 1

For the most part, *Divided Government* and *Republican President* are statistically significant. House and Senate Democrats vote more conservatively, on both ADA and NTU indices, under a Republican president. Republican members of both chambers, on the other hand, seem to vote more liberally when the president is of their party. In the Senate the effect is larger on ADA than on NTU scores. In the House, *Republican President* increases NTU scores but is insignificant in the ADA regressions. One explanation for this could be that House Republicans supported more of the budget when proposed by a president of the same party. Interestingly, the parties converge when the president is a Republican—a result that holds for ADA and NTU scores in both House and Senate. Looking at the results on *Divided*, we see that House Republicans also vote more fiscally liberally when the president and Congress are from opposite parties. Interestingly, *Divided* is not statistically significant in the other NTU regressions. On the ADA index, under *Divided* government Democrats of both chambers vote more liberally, but Republicans vote more conservatively.<sup>14</sup>

Coefficient estimates on the variable *Southern* are, for the most part, as theory would predict. House Democrats from the South vote more conservatively than those representing non-southern constituencies, and the effect is of larger magnitude on the ideological (ADA) than on the fiscal (NTU) index. For senators, the effect of *Southern* decreases ADA scores but does not statistically influence NTU scores.

For this paper, our main interest is the estimated explanatory power of the variables measuring macroeconomic conditions. We can characterize the results in relatively general terms first. For example, the voting of individual legislators is more responsive to the economy in the House than in the Senate. This supports the reasoning (discussed above) that House members represent more homogeneous electoral constituencies. Also, ADA scores are more responsive to the economy in these regressions than are NTU scores.<sup>15</sup> In particular, senator voting on fiscal policies (Table 4) is, overall, the least responsive set of results. Finally, in models where inflation and unemployment rates are estimated to be statistically significant, their economic significance is fairly modest. Consider House Republicans' response to inflation, where we estimate that a one-unit increase in *Inflation Rate* has a contemporaneous increase of 0.64 and 0.29 on ADA and NTU scores, respectively. The 0.64 point estimate is one-twelfth the standard deviation of House Republicans' ADA scores (see column  $\sigma_i$  in the Data Appendix). Similarly, to produce a one standard deviation increase in the typical House Democrat's NTU score, *Inflation Rate* would have to increase from its sample mean of 3.55 to 17.38. Nearly all of our estimates are of similarly small magnitude. But when the cyclical response to economic conditions is compared with the results of research showing that voting positions are ideological and do not change over time, the cyclical response is at least surprising. We keep these points in mind as we discuss the specific effects of economic conditions on the voting of individual legislators.

Republicans do respond more to inflation and Democrats more to unemployment, but only in the House. To see this, note that *Unemployment* is positive and significant for Democrats in Tables 1 and 2, but *Inflation* is negative and significant only in Table 1

<sup>14</sup>An anonymous referee suggested that we also control for the costs of legislators' support for greater spending, as when the budget deficit or the interest rate is high. We performed all estimations in this paper controlling for these variables. To measure the deficit, we used BEA data on annual tax revenues less spending. For the interest rate, we used the average annual rate on the six-month Treasury bill. These controls have an immaterial effect on our results (the unreported results are available on request from the authors).

<sup>15</sup>Note that of the 40 inflation and unemployment coefficient estimates on each of the dependent variables, 30 are statistically significant on ADA scores, but only 22 on NTU scores.

(ADA scores). For Republicans, *Inflation* is positive and significant at all lags for both ADA and NTU scores, but the influence of *Unemployment* is mixed. Thus, the regression results are consistent with our earlier expectations based on the types of constituencies the opposing parties represent. We cannot draw a similar conclusion for the Senate, where the influences of *Inflation* and *Unemployment* are less systematic (especially in Senate Democrats' strong response to inflation).

The results also suggest that party convergence or polarization in response to economic conditions is partially due to movements in *individual* legislator voting. For example, on the broad-issue ADA index, House Republicans vote more liberally, and Democrats more conservatively, in response to *Inflation Rate* (Table 1). The coefficient difference tests indicate strong statistical significance at each lag length considered. Thus, inflation leads to convergence of House Democrats and Republicans at the individual level. A glance at Table 2 indicates that the same is true on the fiscal-policy NTU index, where Democrats do not respond to *Inflation* but Republicans vote more fiscally liberal, and the t-tests indicate that the convergence is statistically significant. In the Senate, the effect of *Inflation* is broadly similar but far less systematic (Tables 3 and 4). Thus, it appears that the convergence of party means in response to inflation, as identified in López and Ramírez (2004), is at least partly attributable to convergence of *individual* legislators by party, at least in the House.

The effect of unemployment on polarization depends much more on whether ADA or NTU scores are the dependent variable. On ADA scores in Table 1, *Unemployment* clearly leads to greater polarization: Republican ADA scores decrease, Democratic scores increase, and the difference is statistically significant. But on NTU scores in Table 2, *Unemployment* polarizes with statistical significance only up to lag length  $j = 1$ . The equivalent inference steps in the Senate results show that *Unemployment* leads to polarization of ADA scores (Table 3) but not of NTU scores (Table 4).

Notice that polarization can occur even as both parties move in the same direction. For instance, if Republicans become slightly more liberal but Democrats become significantly so, then polarization will increase. For example, in Table 2 for lag  $j = 1$ , a typical Republican's NTU score increases by 0.136 with a one-unit increase in *Unemployment Rate*, while a typical Democrat's increases by 0.295. Thus, the typical House Democrat and Republican grow further apart by  $0.295 - 0.136 = 0.159$  in the year following a 1% increase in unemployment, *ceteris paribus*. The difference is statistically significant above the 95% level, as shown by the t-statistic of 2.35. Thus, where the differences are statistically significant, the inference is intuitive: although Republicans vote more liberally on fiscal issues in response to unemployment, Democrats become even more liberal, thus widening the gap.

Our results are generally weaker for the Senate than the House. One potential reason is that senators represent more heterogeneous constituencies than do representatives. In addition, looser electoral constraints (e.g., lower frequency of reelection bids) may promote greater shirking (Lott 1987; Dougan and Munger 1989), which in the context of our study would mean less responsiveness to economic conditions. Finally, voting data in the Senate typically introduce more noise in empirical estimates than do voting data in the House (Zupan 1990).

## 6 Conclusion

The career voting of individual legislators exhibits cyclical sensitivity to contemporaneous and lagged economic conditions, although more strongly in the House than in the Senate. In

response to higher inflation, individual Democrats vote more conservatively and individual Republicans more liberally, such that inflation leads to convergence. Meanwhile, unemployment leads to greater polarization between the typical Democrat and her Republican counterpart. Thus, previously reported economic cycles in *party* polarization can be attributed at least partly to movements in legislator-specific ideal points, net of turnover effects and of movements in the policy space across time and chamber. This implies that congressional bodies (parties and chambers) can shift policy positions even in the absence of member turnover, so long as the relevant economic conditions in the economy change sufficiently. Individual voting also exhibits trends over tenure in office: members of both parties become more conservative on the broad-issue index (ADA scores) but more liberal on fiscal issues (the NTU index) as tenure accumulates. However, our tenure results do not support polarization between the typical Democrat and her Republican counterpart over time, even though many researchers have reported polarization of party means/medians.

Researchers have become accustomed to interpreting vote indexes—such as ADA and NTU scores—as measures of legislator ideology. To the extent that the indexes do measure ideology, our results would suggest that there is an empirical relationship between legislator ideology and the business cycle. Perhaps legislators are not strictly ideologues but use ideological voting as a means of investing in reputation (Dougan and Munger 1989). It is well known that political parties value reputation because it signals party platform positions to rationally ignorant voters (Downs 1957). Voters, too, value reputation because it economizes on their information costs by reducing the number of issues on which candidates are evaluated. Individual legislators value their own reputations for additional reasons: reputational capital allows legislators to deviate from immediate constituent interests in order to seek support from interest groups (campaign donations) and party leaders (committee seats), and this support, in turn, situates legislators to better serve constituents over a longer term. As a seminal paper in this vein points out, “What each [legislator] needs is a way to commit himself credibly to the voters’ preferred positions” (Dougan and Munger 1989, p. 125). A Republican responds more to inflation, a Democrat more to unemployment. Both are using economic conditions as a way of committing to their respective constituencies’ preferences. Thus, ideological voting can itself be a rational tendency. So we should not be surprised to observe legislators voting in response to the economy according to their parties’ historical positions on economic issues (e.g., Coates and Munger 1995).<sup>16</sup> Observed vote scores—if understood as the outcomes of vote-maximizing agents responding dynamically to electoral constraints and reputational investment incentives—would be better interpreted as revealed preferences rather than ideology *per se*.

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<sup>16</sup>The Coates and Munger (1995) paper advances a constrained choice model of legislator voting in which vote scores are the observed result of maximization subject to electoral constraints. The view of legislators as optimizing under electoral constraints is critical of interpreting vote scores as ideology. A different strand of literature examines NOMINATE and ADA scores independently of legislator behavior using instrumental variables and finds empirically valid estimates of legislator ideology (Bishin 2003).

## Appendix: Data

**Table 5**

	<i>N</i>	Median	Mean	$\sigma_{i,t}$	$\sigma_t$	Min	Max
ADA sample (1970–1999)							
<i>Adjusted ADA scores</i>							
House Democrats	6681	73.59	66.36	27.16	9.63	–7.42	128.99
House Republicans	4844	11	16.89	18.58	7.69	–7.94	115.99
Senate Democrats	1230	68.81	63.08	22.22	9.36	0.031	111.59
Senate Republicans	1131	8.93	17.24	20.59	7.92	–8.14	89.57
<i>Tenure</i>	13,886	9	11.31	7.95	4.57	2	49
<i>Republican President</i>	30	1	0.62	0.485	0.403	0	1
<i>Divided Government</i>	30	1	0.80	0.407	0.378	0	1
<i>Southern</i>	13,886	0	0.182	0.386	0	0	1
<i>Unemployment Rate</i>	1,362	6.2	6.43	2.04	1.51	2.2	18.0
<i>Inflation Rate</i>	30	3.81	4.52	2.48	1.82	1.25	9.34

**Table 6**

	<i>N</i>	Median	Mean	$\sigma_{i,t}$	$\sigma_t$	Min	Max
NTU sample (1979–2002)							
<i>Adjusted NTU scores</i>							
House Democrats	5562	82.26	80.89	6.22	3.57	35.47	98.74
House Republicans	4470	60.35	61.05	7.65	4.01	25	97
Senate Democrats	1120	80.57	78.71	9.41	6.41	–23.33	108.31
Senate Republicans	1115	58.71	60.08	10.95	7.29	–2.28	106.61
<i>Tenure</i>	12,267	9	11.45	8.10	4.37	2	51
<i>Republican President</i>	24	1	0.58	0.493	0.428	0	1
<i>Divided Government</i>	24	1	0.75	0.432	0.400	0	1
<i>Southern</i>	12,267	0	0.165	0.371	0	0	1
<i>Unemployment Rate</i>	1,200	5.9	6.25	2.07	1.47	2.2	18.0
<i>Inflation Rate</i>	24	2.43	3.55	2.29	1.69	1.25	9.34

Notes. The column  $\sigma_{i,t}$  reports standard deviation of vote scores across members and time. The  $\sigma_t$  column is the standard deviation for individual members over time. *Tenure* is equal to the number of years the legislator has been in office. *Republican President* = 1 if the President is from the Republican Party, 0 otherwise. *Divided Government* = 1 if the President and Congressional majority are from different parties, 0 otherwise. *Southern* = 1 for Democrats from southern states, 0 otherwise. *Inflation Rate* is the annual percentage change in the implicit price deflator (from the Bureau of Economic Analysis). *Unemployment Rate* is the annual unemployment rate in the legislator's home state (from the Bureau of Labor Statistics)

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