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Do voters affect or elect policies? A new perspective, with evidence from the U.S. Senate

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ABSTRACT

Using quasi-experimental evidence from close elections, Lee et al. (2004) – henceforth LMB – argue competition for voters in U.S. House elections does not affect policy positions, as incumbent Senate candidates do not vote more extremely if elected than non-incumbents. Despite stronger electoral competition and greater legislative independence, similar results, shown here, hold for the Senate. Yet, the hypothesis that voters do not affect policies conflicts with how Senators moderate their positions prior to their next election. LMB-style estimates appear to be biased downwards as junior members of Congress prefer to vote more extremely than senior members, independently of their electoral strength. Corrected estimates are more favorable to the hypothesis that candidates moderate their policy choices in response to electoral competition.

1. Introduction

A fundamental question in politics asks whether competition for votes causes politicians to adopt more moderate positions than if they were to run unopposed (e.g. Downs, 1957). Adopting the terminology of Lee et al. (2004) – henceforth LMB – do voters simply choose between candidates with relatively fixed policy positions, merely "electing" policies, or does electoral competition induce candidates to adopt positions closer to the median voter, implying voters are also "affecting" policies. Another question in politics asks how large is the *party-incumbency advantage*, i.e., what advantage does an incumbent, or her successor in the same party, gain in her chances of re-election relative to an opponent from the opposing party?[1]

LMB develop an innovative method of addressing the first question by using an answer to the second question, looking at whether politicians benefiting from an incumbency advantage take more extreme positions than politicians without such an advantage, as the former arguably has greater electoral strength than the latter. With data on the U.S. House of Representatives from 1946 to 1995, LMB find a strong party-incumbency advantage, but do not find that politicians benefiting from this advantage take more extreme positions, and thus come to the strong conclusion that voters merely elect and do not affect policies. These results appear believable, as LMB's estimates are based off of close elections, whose unpredictable nature gives their estimates – known as regression discontinuity design (or RDD) estimates – quasi-experimental properties.

The results presented in Section 3 demonstrate that when the same techniques are applied to data from U.S. Senate, the evidence supports the same conclusion that voters do not affect policies. This seems to be even stronger support since members of the Senate face more competitive elections and have greater legislative independence than members of the House. Furthermore, RDD estimates have greater external validity in the Senate than in the

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[1] The party-incumbency advantage differs from a candidate party advantage as it also applies to new candidates who are of the same party of an incumbent who does not seek re-election. Estimation of incumbency advantage, and necessary conditions for a valid RDD, are discussed in detail in Lee (2008). Lee and Lemieux (2010) provide valuable discussion and survey the RDD literature in political economy. See also Caughey and Sekhon (2010) and Grimmer et al. (2010) for discussions of potential problems with regression discontinuity estimators in Congressional elections.

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House, as a larger fraction of Senate elections are won by a small fraction of votes, and therefore "close," making the RDD estimates more representative of typical situations.[2]

Yet, because Senators have terms that span three Congresses, it is possible to test the hypothesis that voters do not affect policies using a second test that compares their voting behavior of Senators at the beginning and end of their terms. RDD estimates in Section 4 – which improve on those in Thomas (1985) by controlling for unobservable and observable factors – find that Senators vote more moderately in the years just prior to their next election, suggesting that voters are affecting policy choices. Such a test is not as reliable for the House since the legislative agenda may shift within a 2-year Congress.

The explanation for the inconsistent evidence over whether voters affect policies, pursued in Section 5, is that the LMB methodology appears to induce a negative bias in its estimates of how much voters affect policies for estimates in both chambers of Congress. This occurs because senior members of Congress, i.e. those who have served more terms, vote more moderately than junior members for reasons unrelated to electoral strength (Stratmann, 2000). Thus, even though re-elected members may have greater electoral strength, and thus be tempted to vote more extremely, they also prefer to vote more moderately because their desired policies have become more moderate with their greater seniority. Estimates corrected for this seniority effect, shown in Section 5, make it easier to accept the hypothesis that voters do affect policies. This appears to be true especially in the first two years of the term, when Senators usually take their most extreme positions. Therefore, if incumbency status has only a moderate impact on electoral strength, then voting behavior may in fact be quite sensitive to electoral strength, and voters may be able to affect policies quite considerably.

2. The Senate versus the House

Differences between the Senate and House suggest that the Senate may provide a stronger setting to test the hypothesis that voters do not affect policies, as Senators face more competitive elections (Krasno, 1994; Jacobson, 2004; Herrnson, 2004), but are more individualistic and less subject to partisan control (Matthews, 1960; Ripley, 1969; Davidson, 1989; Campbell and Rae, 2001). Only 78.6 percent of Senators who ran for re-election from 1946 to 2002 were successful (Jacobson, 2004, pp. 29–31), as opposed to 92.2 percent of Representatives. Although the latter figure leads to a similar survival rate of 78.4 percent in the House over 6 years, each election a Senator faces is more likely to be a close one. One reason for this stiffer competition is that Senators face higher quality challengers, often experienced politicians or well-known outsiders, with greater campaign resources. Furthermore, unlike districts, states cannot be gerrymandered to make elections safer for incumbents. Senators are also more likely to receive attention in the media, become associated with controversial issues, and lose votes for perceived failures in national policy, making their seats less secure and electoral competition more intense.[3]

Senate leadership is fairly weak relative to the hierarchical House, and Senate rules allow for more floor debate and freedom amending bills. Thus, Senators should have more latitude in their congressional voting behavior, making campaign promises that they will vote independently of their parties more credible. Standard theories of electoral competition predict that the ability to credibly commit to future behavior will cause candidates to adopt more moderate positions as they compete over centrist voters (Alesina, 1988). Given the higher profile of Senators, voters may have better information about their voting records and be better able to discipline Senators by voting them out of office if they do not keep their campaign promises. By having more freedom on the floor than Representatives, Senators may have to be more responsive to any weaknesses in their electoral strength.[4] Therefore, stiffer competition may provide Senators greater incentive to make campaign promises, while greater legislative independence allows them to fulfill those promises.

3. LMB methodology applied to the Senate

Since LMB discuss their estimation strategy in great detail only a brief intuitive explanation is given here as the results are presented, although prior knowledge of LMB's model is not necessary here.[5] Technical details are available in the Appendix, which presents a more general model for Section 5, nesting the original model as a special case.

The main assumption driving the quasi-experimental RDD framework is that, because of uncertainty in the final vote count in an election, whether a Senate seat is assigned

[2] See Table 1 for the fraction of close elections in the sample.

[3] This greater competition may make a Senator's voting behavior more responsive to changes in a candidate's electoral strength. Thus, while more intense competition may make the incumbency advantage look weaker for Senator than a Representative, the electoral strength gained from incumbency could cause a Senator to take a more extreme position than would a similar gain for a Representative.

[4] Some opposing arguments can be made that electoral competition should affect policy decisions less in the Senate. If voters weigh more heavily votes at the end a Senator's term, just prior to an election, than at the beginning, Senators may vote more extremely at the beginning of their terms than at the end (Amacher and Boyes, 1978). However, this change in responsiveness can be measured, as it is in Section 4 below. Also, because policy is multi-dimensional, the more diverse nature of their constituents could allow Senators to hold more extreme positions than Representatives (Goff and Grier, 1993), although the same is true of their competitors. Thus, while we could observe Senators supporting more divergent policies than Representatives, it is not clear that the intensity of competition is any weaker for them.

[5] Elections data on the U.S. Senate come from the *Congressional Quarterly Voting and Elections Collection* and covers years 1947–2002, for a total 992 elections (10 elections per Senate seat except for Alaska and Hawaii seats with 8 elections each). Third-party candidates – there are few – are assigned to one of the two major parties according to their typical alignment in the Senate. Interest group ratings are taken from the *Congressional Quarterly Congress Collection*. Each rating covers a different range of years, with ADA scores covering the longest period. "Turbo-ADA" scores provided by Groseclose et al. (1999) are used in place of original ADA scores to deal with comparability issues over time, although estimates very similar using the original ADA scores. DW-NOMINATE scores are from the Voteview Website, http://voteview.com/dwnomin.htm. All data and code are available on request.

to a Democrat or Republican in a very close election is almost "as good" as randomly assigned. Haphazard events unrelated to political fundamentals seem to play a role in determining whether a candidate wins or loses a very close election – e.g., the timing of a negative news story, or a rain shower or traffic jam depressing the turnout of some voters. Given these "quasi-random" occurrences, the pre-election characteristics of Senate seats in which Democrats win by, say, one percent of the vote should be very similar seats in which Democrats lose by one percent of the vote. Looking at elections from 1946 to 2002, Butler and Butler (2006, table 3) find that observable pre-election characteristics between Senate seats barely won and barely lost by Democrats are not significantly different, suggesting that the same holds for unobservable characteristics, and supporting the idea that the outcomes of close elections are quasi-random, validating the RDD framework.[6] Hence, any average post-election difference in outcomes between seats barely won and barley lost by Democrats can be attributed to the seats being held by Democrats; underlying pre-existing differences – including differences in voter preferences or Senator characteristics – between these seats should be negligible, while the quasi-random incidents which marginally affected the election outcome should have no systematic lasting effects except through the election itself.[7]

The RDD methodology can be understood intuitively by examining Fig. 1a, used to estimate the impact that a current Democrat win, at time t, has on the probability that a Democrat will win in the next election, at time $t+1$, i.e., the party-incumbency advantage. The figure plots the average frequency of a Democrat victory in the subsequent election against the Democratic share of the two-party vote in the current election, where a current Democratic victory occurs to the right of the 50 percent vote-share mark. From the graph it is clear that the probability of a Democrat win in the next election rises sharply exactly at the 50 percent mark, indicating a 40 percent gain from party-incumbency. This effect should be causal as a small change in the current vote share at the 50 percent vote mark is highly correlated at the 50 percent mark with whether a Democrat wins the current election. Otherwise, a small change in vote share is only weakly correlated with changes in *any* other variables which affect the subsequent election, as the probability trend is fairly smooth and flat except at the discontinuity.

The first row of Table 1 reports estimates of the party-incumbency advantage, here called δ_1, or in LMB's notation ${P^D}_{t+1} - {P^R}_{t+1}$, where ${P^k}_{t+1}$ stands for the probability of a Democrat win at time $t+1$ if party k (D for Democrat, R for Republican) currently holds the seat. The first column shows that in all elections a current Democrat win predicts a 56 percent increase in the likelihood of a Democrat winning the next election. Using only "close" elections in column 2, defined here as elections with margins of victory of less than 2 percent, the estimated advantage drops to only 41 percent. This suggests that the unadjusted estimate of the party-incumbency advantage using the entire sample may be biased upwards as Democrats are simply more popular in some states than others, and hence are elected because of their popularity with the electorate as well as the party-incumbency advantage. It may also be that incumbents who won the previous election with well over 50 percent of the vote share may be benefiting from additional "scare-off" effects, as they discourage potential challengers in the next election (Cox and Katz, 1996). Columns 3 and 4 compare results between the Senate and the House, using the sampling period and additional House data from LMB. The incumbency advantage does appear to be smaller in the Senate than in the House, with a p-value of 17 percent, although the difference is not highly significant.[8]

The next issue addressed is how the voting behavior from a Senate seat, as measured by the voting score assigned by the Americans for Democratic Action (or ADA) interest group, varies with the party holding the seat. ADA gives a score from 0 to 100 according to what percentage of time a Senator's votes agree with the liberal positions ADA endorses; a score of 95 implies that a Senator voted 95 percent of the time in accordance with ADA, a liberal record. The ADA scores for a Senate seat are averaged over the six year term following an election, so that an observation consists of an election and its following term. Fig. 1b graphs the average ADA scores of Senators by the vote-share received in the preceding election; observations to the right of the 50 percent threshold give the voting behavior of Democrats and to the left of Republicans. Estimates in the second row of Table 1 report that differences in voting behavior of Democrats and Republicans – written as π_1 – are quite large, with RDD estimates implying a 47 percent difference in voting behavior on issues which ADA took positions on. These results reject the hypothesis that electoral competition causes policy positions of candidates to converge completely, as the difference is highly significant and as the fitted curves show no sign of elected Republicans or Democrats adopting more moderate policies after closer elections: in fact, Democratic Senators with larger margins of victory tend to vote more moderately, an artifact of many of these Senators being from the more conservative South. Results for the House in column 4 – which correct for a coding issue in the original LMB article – give similar results.[9] To the extent that ADA scores are comparable across chambers, the similarity of these

[6] Appendix Figure A shows that near the 50 percent vote share for the current election, the winner of the previous election is equally likely to be from either party, providing one validation of the RDD framework.

[7] As these pre-existing differences include the preferences of voters, this eliminates the need to difference out the estimated tastes of a Senator's constituents from her voting behavior, a procedure which is often done with non-experimental estimates.

[8] If the incumbency advantage is measured as the fraction of the vote share gained by a Democrat in the subsequent election, the estimate using close elections is 0.088 (0.017), instead of 0.186 (0.009) for the whole sample. The close election estimate is similar to that found by Lee (2010) for the House.

[9] In Table 1, LMB accidentally compared differences in ADA scores between Democrats and Republicans in the term *after* the term following the close election (i.e. $t+1$, instead of t) so that their estimates are not technically from an RDD, and are slightly closer to zero than the correct estimates. Also, the standard errors for the affect component do not appear to account for cross-equation correlations in what are seemingly unrelated regressions. Their point estimate (standard error) of the "affect" component, described below, is −1.6 (2.0).

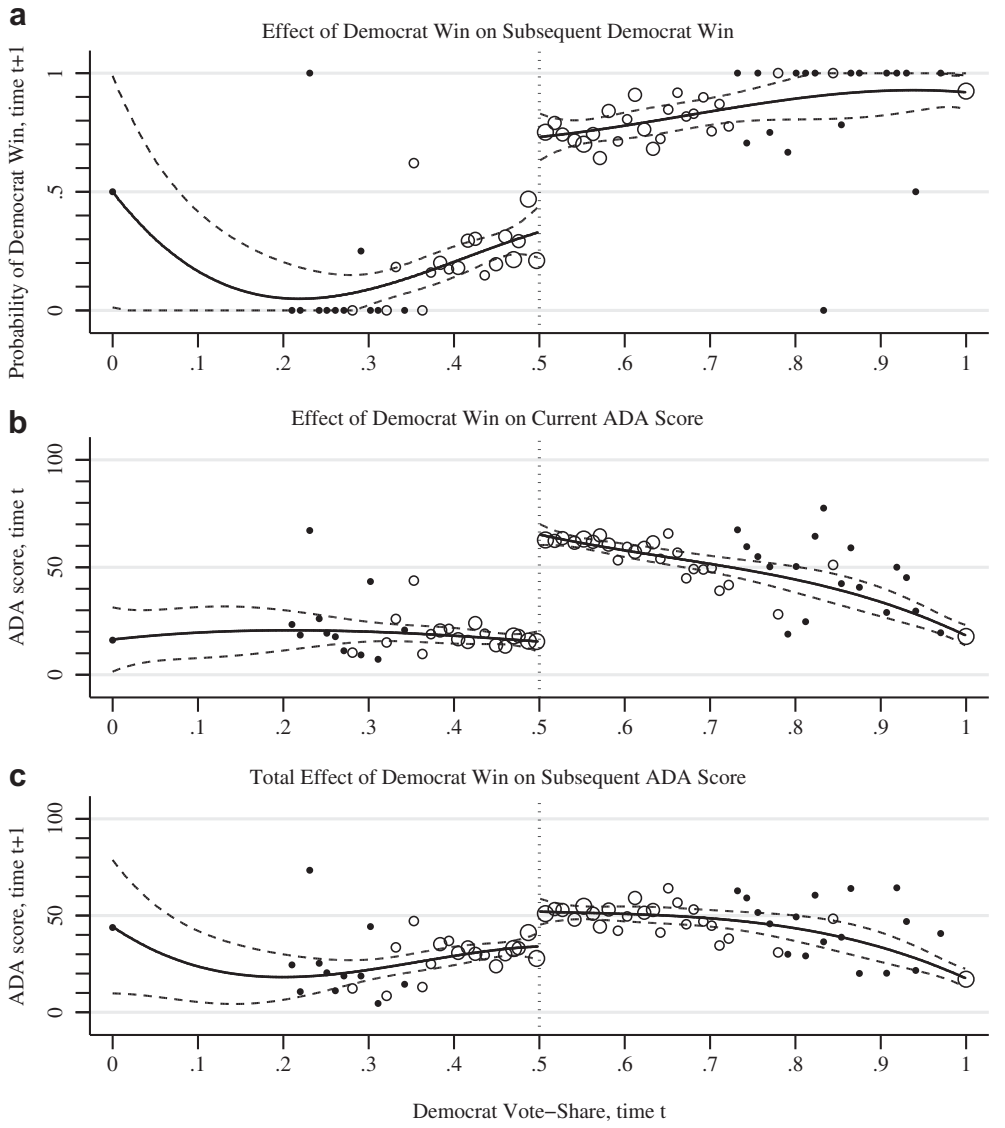

Fig. 1. Regression discontinuity estimates from the U.S. Senate: 1947–1998. *Note*: Democratic vote share measured in terms of votes going to either Democrats or Republicans. Time t corresponds to the current election and following term, time $t+1$ the subsequent election and term. Higher ADA scores correspond to more liberal roll-call voting records. Dots and circles represent averages within 0.01 intervals of vote share, with dots, and small, medium, and large circles representing at least 1, 5, 15, and 30 elections in the interval, respectively. The fitted curve is from a third- order polynomial in vote share fit separately for points above and below the 50 percent threshold. Estimated effects given by the vertical increase in the curve at the 50 percent threshold, going from left to right. The dashed curves give the 95 percent confidence intervals. Sample includes 859 time t elections. See Table 1 for more details.

estimates suggests that Senators are not more or less ideological or subject to party control than Representatives.

In order to perform LMB's test of whether voters affect policies at all, it is necessary to look at voting behavior in a Senate seat in the term after the current term, or $t+1$, as a function of the party incumbent at time t. The total effect on future voting behavior from there being a Democrat currently elected to the seat, called γ, is modeled as a sum of two components. The first "elect" component is the average increase in the future ADA score due purely to an increased probability of a Democrat (not necessarily an incumbent) winning at time t+1; it equals the party-incumbency advantage multiplied by the effect of a current Democrat win on the current ADA score, $\delta_1\pi_1$.

The second "affect" component reflects the possibility that a Democratic Senatorial candidate in election $t+1$ can adopt a more liberal position on future votes as an incumbent than as a challenger because of her greater electoral strength. This more liberal position is the product of two unobservable effects: ϕ_1, which measures the latent increase in electoral strength from incumbency, and π_0, which describes the impact of electoral strength on voting behavior. The hypothesis that voters do not affect policies is tantamount to testing the restriction that $\pi_0 = 0$. The total effect is then the sum of the elect and affect components, or $\gamma = \delta_1\pi_1 + \pi_0\phi_1$.

As π_1 gives the average effect of a Democrat win on the ADA scores using both incumbents and non-incumbents,

Table 1
Estimates of the party incumbency advantage, democratic effect on current voting, and "elect" and "affect" components of subsequent voting score.

Voting score	ADA				Nominate
Time period	1947–1998		1947–1994		1975–2000
Election sample	All	Close	Close	Close	Close
Chamber	Senate	Senate	Senate	House	Senate
	(1)	(2)	(3)	(4)	(5)
Effect on probability of subsequent democrat win at time $t+1$					
Democrat win at time t ($P^D_{t+1} - P^R_{t+1} = \delta_1$)	0.56 (0.03)	0.41 (0.08)	0.35 (0.09)	0.48 (0.04)	0.52 (0.10)
Effect on current voting score at time t					
Democrat win at time t (π_1)	35.5 (1.6)	47.0 (3.5)	45.7 (3.8)	48.9 (1.8)	35.9 (2.6)
Effect on subsequent voting score at time $t+1$					
Democrat win at time t (γ_1) or "total" effect	16.0 (2.0)	16.4 (5.2)	12.3 (5.5)	21.3 (2.6)	17.8 (4.5)
"Elect" component of total effect ($\delta_1\pi_1$)	20.0 (1.4)	19.2 (3.9)	16.2 (4.0)	23.7 (2.1)	18.8 (4.0)
"Affect" component of total effect ($\gamma_1 - \delta_1\pi_1$)	−5.0 (1.1)	−2.8 (2.7)	−3.0 (2.8)	−2.4 (1.3)	−0.9 (2.0)
p-Value for two-sided test	*0.000*	*0.308*	*0.281*	*0.077*	*0.641*
Number of elections	859	137	130	482	73
Proportion of total elections	1.000	0.159	0.164	0.067	0.067

Standard errors reported in parentheses. The unit of observation at time t is a Senate election and the average voting record in that seat over the following term. Time $t+1$ refers to a subsequent election and term. Vote share is given by Democratic percentage of the two-party vote. Observations are weighted by the number of years with voting records. Effect of Democrat win on probability of subsequent Democrat win estimated using linear probability model. Higher ADA scores correspond to more liberal roll-call voting records; (DW-) Nominate scores multiplied by −50 for similar comparability.
Close election sample includes elections with vote shares between 48 and 52 percent. The "elect" component is the product of the effect of a Democrat win on a subsequent win and the effect of Democrat win on the voting score. The "affect" component is the total effect of a Democrat win minus the elect component. See text for more explanation.

the elect component, $\pi_0\phi_1$, gives the predicted change on the ADA score due solely to the increased probability of a Democrat victory in election $t+1$, averaging out the effect of incumbency. Any additional increase in the ADA score in term $t+1$ beyond this amount reflects how an incumbent can take a more extreme position than a typical close-election candidate, $\gamma - \delta_1\pi_1 = \pi_0\phi_1$, identifying the affect component.[10] Since only the product $\pi_0\phi_1$ can be observed, the two components cannot be separately identified and the hypothesis that the affect component is zero is consistent with the hypothesis that $\pi_0 = 0$, i.e., that voters do not affect policies, or $\phi_1 = 0$, i.e., that incumbency does not increase electoral strength.

The estimated total effect of a Democrat victory at time t on ADA scores at time $t+1$ is shown in Fig. 1c and is reported in the third row of Table 1; the fourth and fifth rows report the estimated elect and affect components. The results from column 2 give a total effect of approximately 16.4 points which is not significantly different from the estimated elect component of 19.2 points. Taking the difference, the estimated affect component is a negative 2.8 points and statistically indistinguishable from zero, ruling out any large affect component. This result signifies that greater electoral pressures on challengers does not induce them to adopt more moderate policies in their next term than incumbents, at least as measured by voting behavior. Insofar as incumbency advantage reduces electoral competition, voters appear to only elect, not affect policies in the Senate. Estimates of the affect component for the Senate and House in columns 3 and 4 appear quite similar, although the House estimate is significant in the *wrong* direction at a size of 7.7 percent.[11]

These conclusions are not sensitive to the measure of voting behavior used, as shown in results for the DW-Nominate score constructed by McCarty et al. (1997) and nine other interest group voting scores. Results for the DW-Nominate scores, used for years starting in 1975 are shown in column 5: the results are fairly similar to those with the ADA scores, with a slightly negative but insignificant point estimate of the affect component. [12] Results for the other interest group scores are summarized in Fig. 2, which plots the estimated total effect of a Democrat victory in time t on voting scores at time $t+1$ against the corresponding elect component estimate, using an acronym of the interest group as the marker for the two estimates. The affect component is represented visually by the vertical distance between the interest-group marker and the diagonal line. Estimates from all ten ratings lie on or very close to the diagonal, with only one rating (ACLU) yielding a significant affect component, although it is a negative one, implying

[10] Strictly speaking one party always has a party-incumbency advantage, however, as Appendix Figure A implies, at the 50 percent vote share incumbents and non-incumbents are evenly distributed.

[11] While a negative value of the affect component is inconsistent with the theory presented by LMB, it could be consistent with a theory whereby candidates have to pander to their bases to a higher degree in more competitive elections, in order to procure greater turnout or campaign resources to win. This is related to theory presented by Cox and McCubbins (1986).

[12] The one dimensional DW-Nominate measure is used after 1975, when the second dimension of the measure does little to explain Congressional voting behavior (Poole and Rosenthal, 1997, pp. 6–8).

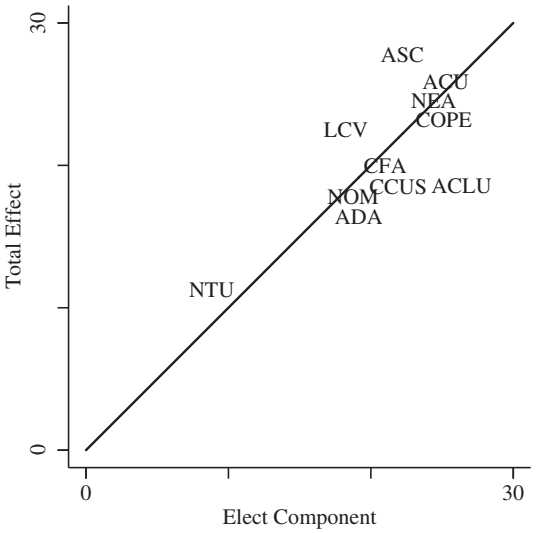

Fig. 2. Total effect versus elect component: alternative interest group ratings. *Note*: ACLU is American Civil Liberties Union (1979–2002), ACU is American Conservative Union (1971–2002), ADA is Americans for Democratic Action (1947–2002), ASC is American Security Council (1969–1994), CCUS is Chamber of Commerce for the United States (1965–2002), COPE is Committee on Political Education of the AFL-CIO (1955–2002), CFA is Consumer Federation of America (1971–2002), LCV is League of Conservation Voters (1971–2002), NEA is National Education Association (1969–2002), and NTU is National Taxpayers Union (1969–2002). Each score is measured on a scale from 0 to 100, normalized so that a higher rating corresponds to a more liberal voting record. NOM refers to DW-Nominate score times −50. The solid line indicates a diagonal with slope one and intercept of zero. The affect component is given by the vertical distance between the diagonal line and the interest group label.

that incumbents will vote more moderately than non-incumbents. This raises the question of whether LMB-style estimates have a negative bias, discussed in Section 5.[13]

4. Do voters affect policies immediately before elections?

The longer terms of Senators allows for an additional test of whether voters affect policies: seeing whether Senators vote more moderately in the years prior to a general election, presumably in response to greater electoral pressures. Indeed, Figlio (2000) finds that voters punish Senators much more for taking positions against their interests late in their terms than earlier in their terms. Furthermore, Senators at the end of their term may be more likely to engage in ideological shirking, as documented by Rothenberg and Sanders (2000).

In the spirit of work by Thomas (1985), but using a close-elections framework, this test is done by splitting each Senate term into three two-year intervals, one for each Congress, and adding two variables to the regression of the effect of a Democrat win on voting: the number of Congresses into the term interacted with the Democrat win indicator, to see if Democrats vote more conservatively over time, as well as a similar interaction with a Republican win, to see if Republicans vote more liberally. Because Senate elections are staggered evenly across time and over two-year periods, these estimates are not sensitive to changes in the legislative agenda within Congresses. Such estimates are not possible for the House.

Table 2 reports estimates for two different estimation strategies: 1) an RDD using the close-election sample, as in Table 1, and 2) a least squares estimate on the entire sample using controls for each two-year Congress. The estimated coefficients on the interaction terms in columns 1 and 3 are consistent with each other, find that Democrats vote more conservatively and that Republicans vote more liberally (albeit less significantly) at the end of their term. To gain statistical power (e.g., reduce the size of the standard errors), estimates which restrict the Republican effect to be equal in magnitude, and of opposite sign, to the Democrat effect are reported in columns 2 and 4: these estimates are more significant and the symmetry restriction is not rejected by the data. While noticeable, the estimates are not very large, with Democrats and Republicans reducing their voting differences in the last 2 years of their terms by about 4–5 points, about a 10 percent reduction in their overall difference.[14]

The fact that Senators do vote more moderately prior to their next elections presents problems for the hypothesis that Senator's policy positions are not affected by voters at all, i.e., that $\pi_0 = 0$. It is also conceivable that Senators' electoral strength is weaker towards the end of terms, but not when Senators lack incumbency status, i.e., $\phi_1 = 0$. Another explanation is that former incumbency status does lead to more extreme voting behavior, but that LMB's estimates of the affect component, $\pi_0\phi_1$, are biased as their specification is missing important dynamics, which the next section gives evidence of.

5. Correcting for dynamic misspecification in LMB estimates

One reason why LMB did not find evidence that voters affect policies may be because of a negative bias in their estimates due to omitted dynamics in how members of Congress change their voting behavior over their careers. Stratmann (2000) argues that senior members are less likely to vote with their party than junior members, as senior members have greater information about their constituents. Furthermore, senior members have less

[13] Even if these estimates are free of bias, there are some caveats against interpreting them as evidence that members of Congress are unresponsive to electoral competition. First, a model with one ideological dimension has only a single Condorcet-winning electoral platform, which politicians will converge to when electoral competition matters. However, with multiple ideological dimensions there are a number of platforms that politicians can hold even if electoral competition is perfect (McKelvey, 1986). Second, voters may deliberately elect candidates who are unresponsive to the pressures of electoral competition if such candidates are also unresponsive to pressure from organized interest groups (Dougan and Munger, 1989).

[14] It should be noted that these estimates are consistent with increasing polarization in the U.S. Congress, documented by Theriault (2006). He finds that two thirds of increasing polarization in the Senate is due to member replacement, while one third is due to member adaptation. Since Congresses are controlled for in Table 2, the results are consistent with these findings since longer lasting members are still moderate relative to newcomers.

Table 2
Estimates of the democratic effect on voting scores in the senate including within-term voting changes.

Voting score	ADA (1947–1996)			
Estimation	Close-election sample		Controls for each Congress	
Method	Unrestricted	Symmetric	Unrestricted	Symmetric
	(1)	(2)	(3)	(4)
Effect on current voting score at time t				
Democrat win at time t	49.3 (3.7)	49.1 (3.9)	35.6 (1.8)	35.7 (1.7)
Democrat win at time $t \times$ # of Congresses into term	−1.7 (0.8)	−1.2 (0.6)	−1.3 (0.4)	−1.1 (0.3)
Republican win at time $t \times$ # of Congresses into term	0.9 (0.8)		0.8 (0.4)	
Observations	360	360	2203	2203
Number of elections	128	128	749	749

There is one unit of observation per Senator per Congress. Robust standard errors, clusterd by term, reported in parentheses The panel is balanced so that each term had at least one last-2-years-of-term observation and one prior. Thus, some terms were dropped, most at the beginning and the end of the sample. The restricted model restricts the coefficient of the Republican win interaction to equal minus the coefficient on the Democrat win interaction. None of the restrictions are rejected at a test size of 5 percent. Close-election sample includes elections with vote shares between 48 and 52 percent. See text for more explanation.

incentive to demonstrate party loyalty in order to gain desirable committee assignments because they already have them. Empirically, Stratmann finds that, controlling for year effects and legislator fixed effects, Democratic Representatives vote more conservatively with seniority, while Republican Representatives vote more liberally.[15]

As demonstrated mathematically in the Appendix, this phenomenon presents a problem for the LMB estimate of the affect component because the original model requires that politicians do not change their policy preferences, or "bliss points," over time. Thus, if incumbents vote differently than non-incumbents, this is attributed to changes in electoral strength. However, if senior members prefer to moderate their votes, then re-elected incumbents will vote more moderately than newly-elected members by virtue of their greater seniority, working against the prediction that incumbents will vote more extremely because of their greater electoral strength. A formal derivation in the Appendix proves that if members of Congress in seats held by the same party two terms in a row vote more moderately than members in seats that have switched parties, then LMB-style estimates of how much voters affect policies are biased downwards.

Fortunately, with RDD it is possible to estimate consistently how previous party tenure in Congress affects current voting behavior, and to use this knowledge to correct estimates of how voters affect policies. The regression of vote score at time t on a Democrat win at time t, for the current party effect on policy choice, should also include terms for a Democrat win at time t interacted with a Democrat win at time $t-1$, to estimate the effect of having a seat held two terms in a row by a Democrat, and a Republican win at time t interacted with a Republican win at time $t-1$, to estimate the effect of having a seat held two terms in a row by a Republican. Since in the close elections sample current party status is quasi-random, and previous party status is pre-determined, the effect of previous party status interacted with current party status on vote scores can be estimated consistently.

Results for the House in the first column of Table 3 under the "Effect on Current Voting Score at time t" report that second-term Democrats in the House do vote more conservatively than first-term Democrats; second-term Republicans also appear to vote more liberally, although not significantly.[16] To make the estimates more precise, the model is restricted in the even columns so that the effect for Democrats is symmetric with the effect for Republicans. This symmetry restriction is never rejected by the data at conventional significance levels. In the symmetric model, the estimated moderation effect is 5 points and highly significant. Results similar in magnitude hold for the Senate in columns 3 and 4, and although they are less precise, their similarity with the House estimates is reassuring.

To use the above results to correct the estimates of how much voters affect policies, similar interactions need to be put in the other two equations. In the equation estimating the incumbency advantage, this means allowing two consecutive terms of party-incumbency to further affect re-election chances. In the first column for the House, under "Effect of Probability of Subsequent Democrat Win at time $t+1$," the coefficients on the interactions have the expected sign: Democrats are more likely to win after two successive Democratic victories than after just one, and less likely after two successive Republican victories than just one.[17] Decoupled, the estimated coefficients are not very significant, but in the restricted model for the House it appears that runs are quite significant: while the one-term party-incumbency advantage gives a 35 percent higher chance of winning, a two-term party-incumbency advantage gives a 46 percent

[15] Because Stratmann (2000) controls for year effects these results are consistent with increasing polarization in the Congress documented by Theriault (2006), cf. footnote 14.

[16] Since lags and leads of Democratic status are needed, the sample is slightly different from the original sample.

[17] Butler (2009) finds a similar result in his work.

Table 3
Estimates of the affect component using a dynamic model of voting behavior and incumbency, close election samples.

Voting Score	ADA					
Chamber	House		Senate		Senate	
Years	1947–1992		1947–1998		1947–1998: Early Term	
Chamber	Unrestricted	Symmetric	Unrestricted	Symmetric	Unrestricted	Symmetric
	(1)	(2)	(3)	(4)	(5)	(6)
Effect on probability of subsequent democrat win at time $t+1$						
Democrat win at time t (δ_1)	0.35 (0.06)	0.35 (0.04)	0.31 (0.12)	0.31 (0.12)	0.34 (0.12)	0.33 (0.12)
Democrat win at time $t \times$ Democrat win at time $t-1$ (δ_2)	0.09 (0.09)		0.02 (0.13)		−0.01 (0.13)	
		0.11 (0.04)		0.11 (0.08)		0.09 (0.09)
Republican win at time $t \times$ Republican win at time $t-1$ (δ_3)	−0.13 (0.06)		−0.17 (0.11)		−0.17 (0.11)	
Effect on current voting score at time t						
Democrat win at time t (π_1)	54.7 (3.0)	55.1 (2.7)	53.5 (5.1)	53.7 (5.0)	61.0 (5.1)	60.9 (5.1)
Democrat win at time $t \times$ Democrat win at time $t-1$ (π_2)	−8.0 (2.5)		−3.7 (5.4)		−8.4 (5.5)	
		−5.0 (1.8)		−6.2 (3.6)		−7.9 (3.5)
Republican win $\times$ Republican win at time $t-1$ (π_3)	1.8 (2.6)		8.1 (4.7)		7.5 (4.6)	
Effect on subsequent voting score at time $t+1$						
Democrat win at time t (γ_1)	18.0 (4.1)	18.5 (4.0)	17.4 (7.7)	17.4 (7.7)	21.8 (8.1)	21.5 (8.1)
Democrat win at time $t \times$ Democrat win at time $t-1$ (γ_2)	−1.6 (3.7)		1.1 (8.9)		−3.4 (8.7)	
		2.2 (2.7)		−0.2 (5.4)		−0.2 (5.6)
Republican win at time $t \times$ Republican win at time $t-1$ (γ_3)	−6.3 (3.9)		−0.4 (7.7)		2.0 (7.4)	
Original "affect" component	−2.3 (1.3)		−2.7 (2.8)		−0.3 (3.2)	
Corrected "affect" component	2.4 (2.3)	2.8 (2.3)	2.6 (4.7)	3.5 (4.5)	6.6 (4.9)	6.7 (4.6)
p-Value for						
Two-sided test	*0.292*	*0.211*	*0.587*	*0.438*	*0.177*	*0.148*
One-sided test	*0.146*	*0.106*	*0.294*	*0.219*	*0.089*	*0.074*
Number of Elections	483	483	121	121	112	112

Standard errors reported in parentheses. Close election sample includes elections with vote shares between 48 and 52 percent. The symmetric model restricts the coefficient of the Republican win interaction to equal minus the coefficient on the Democrat win interaction. None of the restrictions are rejected at a test size of 5 percent. Full details of the estimating equations and calculation of the corrected affect components are given in the Appendix.

higher chance. The restricted estimate for the interaction in the Senate is also 11 points, although it is less precise.

The coefficients on the interactions in the third equation "Effect on Subsequent Voting Scores at time $t+1$" can be combined with coefficients from the first two equations to calculate a corrected estimate of the affect component according to a precise equation that is given and explained in the Appendix. The corrected estimates compare the total effects on the voting score of not just one, but two successive victories of Democrats. The elect component for two successive victories is pushed up by the increased chance of being an incumbent, but pushed down by the moderation effect of seniority.

These corrected estimates are given in the second panel of Table 3 along with the original estimates. Both the restricted and unrestricted estimates of the corrected affect component are roughly equal, with *positive* values between 2.4 and 3.5. In magnitude this is roughly similar to the amount of convergence between Republicans and Democrats Senators over 2 years of their terms, seen in Table 2. Because the corrected affect components are based on more estimated parameters, the standard errors for the corrected estimates are larger than for the original estimates.

The possibility that voters may affect policies is made more apparent in columns 5 and 6, which uses voting scores from the first two years of Senators' terms, which as discussed in Section 4, is when voting behavior is the most extreme. Here, the point estimate of the corrected affect component is almost one third the size of the total effect in the rows above. This is a sensible result since Senators are

most likely to feel pressure to fulfill campaign promises immediately after their elections, while voters still remember and before shirking behavior may become more prevalent. It is in this early period that the incumbency advantage may provide the most protection from electoral pressures.

The bottom rows of Table 3 present the p-values testing the significance of the corrected affect component relative to zero for both two-sided and one-sided tests. In the theoretical framework presented by LMB, one-sided tests may be appropriate as there are no reasons within the theory why the affect component should be negative.[18] The question of whether voters affect policies put the null hypothesis of $\pi_0 = 0$ against the alternative hypothesis of $\pi_0 > 0$, which under the assumption that incumbency does increase electoral strength, $\phi_1 > 0$, is reflected by affect components of the same sign. Statistically, the corrected affect component for the House is quite distinct from the original estimate, albeit less distinct from zero. The differences for the Senate in columns 3 and 4 are even larger, but because of their lower precision have a lower significance. Those estimates focusing on the first two years of the term in columns 5 and 6 have a higher significance, which are below 10 percent for the one-sided test. If we combine these one-sided tests with those the House, where all votes happen within 2 years of the last election, this results in combined p-values of 6.9 and 4.5 percent for the unrestricted and symmetric models.[19]

Furthermore, while the original estimates were able to rule out any sizable affect components, the confidence intervals for the corrected estimates are consistent with fairly large affect components. For instance, the corrected estimates are more consistent with the hypothesis that lack of incumbency reduces voting scores by 4 points, than with the hypothesis of zero effect.

Overall, the corrected estimates suggest that the true affect components are more likely to be positive than they are to be zero, although relatively small – between 10 and 20 percent of the total component – over the entire length of a Senator's term. However, even if the true affect components are small, one cannot conclude that electoral completion is weak. A small value of the affect component may imply that the change in electoral strength from incumbency, ϕ_1, is weak rather than the impact of electoral competition, π_0.

To demonstrate that these results hold for more than just ADA scores, corrected estimates of the affect component for other voting scores from the restricted model are presented in Fig. 3a for the House and Fig. 3b for the Senate; numerical values, standard errors, and p-values are given in the Appendix Table. These demonstrate that corrected estimates of the affect component are typically larger than the original estimates. Although the standard errors for the corrected estimates are fairly large, the estimates lean towards significance on the positive side. For instance, in the House, 9 out of 13 estimates are positive, of which 7 reject the hypothesis of a zero affect component at a size of 11(22) percent or less using a one(two)-sided test; in the Senate, 9 out of 11 estimates are positive, of which 4 reject that hypothesis at 7(14) percent or less using a one(two)-sided test. Panel 3 of the Appendix Table also reports estimates based on the first two years of Senators' terms, which are even more positive and significant: 7 out of 10 are significant at 20(10) percent.

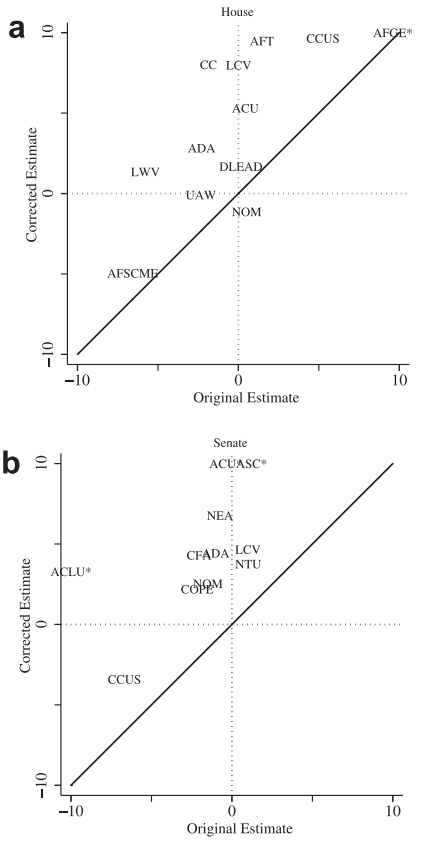

Fig. 3. Corrected versus original estimates of affect component: alternative interest group ratings. *These estimates do not fit on the graph. See the Appendix Table for the estimated values. *Note*: House data provided by Lee et al. (2004). Corrected affect component estimates based off of the restricted dynamic model explained in the Appendix. In addition to groups seen in Fig. 2 LWV is League of Women Voters; AFGE is American Federal Government Employees AFSCME is American Federation of State, County, Municipal Employees, AFT is American Federation of Teachers, UAW is United Auto Workers, CC is Conservative Coalition. DLEAD corresponds to percent voted like Democratic leadership times 100. NOM refers to DW-Nominate scores times −50. All scores normalized so that a higher rating corresponds to a more liberal voting record.

6. Conclusion

Exploring the question of whether voters affect policies with Senate data has led us to subsequently confirm, question, and then possibly reject the hypothesis that voters do not. A straight application of LMB's techniques to Senate data reveals that their incumbency advantage is almost as large, and that their policy choices appear just as unaffected by electoral pressures as those in the House,

[18] For more on the applicability of one-sided tests, see Tituinik (2010). For theoretical reasons to consider two-sided tests, cf. footnote 11.

[19] This involves using the formula for combining p-values from two independent tests, p_1 and p_2, to get $p^* = p_1 p_2[1 - \ln(p_1\ p_2)]$.

despite the fact that members of the Senate are more independent and face tougher elections than members of the House. But, if we look within the long terms that Senators hold between elections, there is evidence that Senators are affected by voters as they moderate their voting behavior in years just prior to the next election, when voters are most sensitive to their behavior.

The apparent contradiction may be accounted for by a shortcoming in LMB's methodology, which leads to a negative bias in their estimates of how much voters affect policies. Such a bias is apparent from the negative estimates of the affect component, which suggest that incumbents vote more moderately than non-incumbents. This is because members of Congress tend to vote more moderately with seniority, independently of their electoral strength. Modeling the dynamic setting corrected estimates for both the House and the Senate are consistent with the hypothesis that re-elected incumbents do take more extreme positions than newly-elected challengers because of their greater electoral strength, and that electoral competition may be playing an important role in affecting government policies.

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Appendix

Fig. A: Previous Democrat Win not Predicted by Current Democrat Win at the Regression Discontinuity. Note: Estimate = 0.04 (s.e. 0.08). See Fig. 1 for details.

$$RC_t = const + \pi_0 P_t^* + \pi_1 D_t + \pi_2 D_t D_{t-1} + \pi_3 (1 - D_t)(1 - D_{t-1}) + \varepsilon_t \quad (1)$$

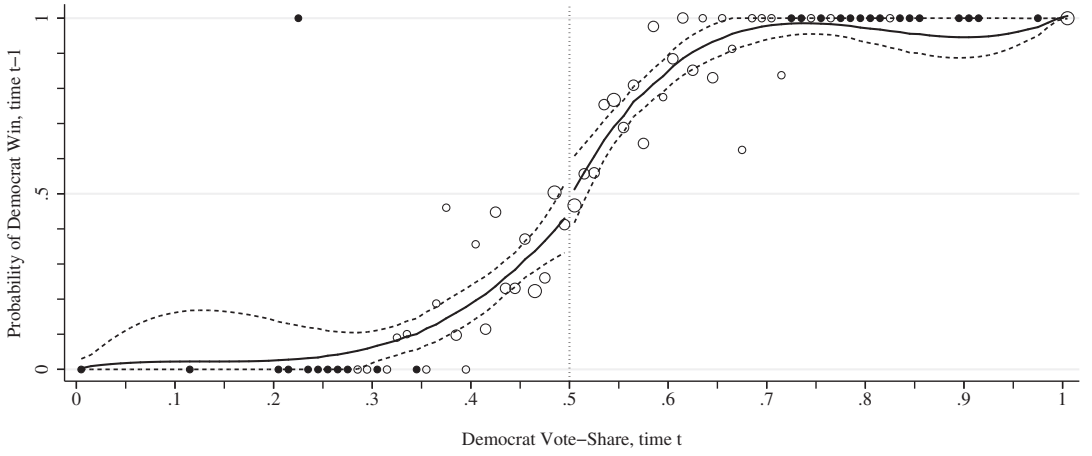
$$E[D_{t+1} | D_t, D_{t-1}] = \delta_0 + \delta_1 D_t + \delta_2 D_t D_{t-1} + \delta_3 (1 - D_t)(1 - D_{t-1}) \quad (2)$$

$$E\left[P_{t+1}^* | D_t, D_{t-1}\right] = \phi_0 + \phi_1 D_t + \phi_2 D_t D_{t-1} + \phi_3 (1 - D_t)(1 - D_{t-1}) \quad (3)$$

The new parameters π_2 and π_3 measure how Senators' bliss points change, with $\pi_2 < 0$ and $\pi_3 > 0$ indicating more moderate behavior the longer they hold office, although we still expect Democrats to always vote more liberally, so that $\pi_1 + \pi_2 > 0$ and $\pi_1 - \pi_3 > 0$.The incumbency advantage may also depend on previous victories, with the expected signs being $\delta_2 > 0$ and $\delta_3 < 0$, as two successive victories should impart a stronger incumbency advantage than a single victory. Furthermore, the latent electoral strength of party D is allowed to depend on previous runs. LMB's model corresponds to the static case where $\pi_2 = \pi_3 = \delta_2 = \delta_3 = \phi_2 = \phi_3 = 0$.

Making the assumption that D_t is exogenous – courtesy of the RDD – and incorporating these new effects we get the following reduced-form equation for roll-call voting at time $t+1$:

$$\begin{aligned} E[RC_{t+1} | D_t, D_{t-1}] = {} & const + [\pi_0 \phi_1 + \pi_1 \delta_1 + \pi_2 (\delta_0 + \delta_1) \\ & - \pi_3 (1 - \delta_0)] D_t + [\pi_0 \phi_2 + \delta_2 (\pi_1 + \pi_2)] \\ & \times D_t D_{t-1} + [\pi_0 \phi_3 + \delta_3 (\pi_1 - \pi_3)](1 - D_t) \\ & \times (1 - D_{t-1}) \equiv const + \gamma_1 D_t \\ & + \gamma_2 D_t D_{t-1} \\ & + \gamma_3 (1 - D_t)(1 - D_{t-1}) \end{aligned} \quad (4')$$



Expanding on the notation developed in LMB, where t indicates a term, RC is the roll-call voting record, D is an indicator for whether the Democrat won the seat, P^* is the (unobserved) measure of electoral strength of party D, and ε reflects heterogeneity in bliss points across districts

Conditioning out D_{t-1} we get the original static LMB parameters for the effect of current Democratic victory on subsequent voting score, current voting score, and probability of a subsequent win in terms of the dynamic model parameters:

$$E[RC_{t+1}|D_t = 1] - E[RC_{t+1}|D_t = 0] = \pi_0\phi_1 + \pi_1\delta_1 + \pi_2(\delta_0 + \delta_1) - \pi_3(1 - \delta_0) + P[\pi_0\phi_2 + \delta_2(\pi_1 + \pi_2)] - (1 - P)[\pi_0\phi_3 + \delta_3(\pi_1 - \pi_3)] \equiv \tilde{\gamma} \quad (4)$$

$$E[RC_t|D_t = 1] - E[RC_t|D_t = 0] = \pi_1 + \pi_2 P - \pi_3(1 - P) \equiv \tilde{\pi}_1 \quad (5)$$

$$E[D_{t+1}|D_t = 1] - E[D_{t+1}|D_t = 0] = \delta_1 + \delta_2 P - \delta_3(1 - P) \equiv \tilde{\delta}_1 \quad (6)$$

Here P is the overall (steady-state) probability of a Democrat winning a seat. Defining $\tilde{\phi} \equiv \phi_1 + P\phi_2 - (1 - P)\phi_3$ as the expected sum of all changes in electoral strength from a Democratic victory, LMB's original estimate of the affect component is equal to

$$\tilde{\gamma} - \tilde{\pi}_1\tilde{\delta}_1 = \pi_0\tilde{\phi} + \pi_2[\delta_0 + (1 - P)\delta_1] - \pi_3[1 - \delta_0 - (1 - P)\delta_1] + (\pi_2 + \pi_3)(\delta_2 + \delta_3)P(1 - P)$$

With the sign restrictions from above, the second and third terms are unambiguously negative; the fourth term should be relatively small if Democrats and Republicans exhibit symmetric behavior, i.e. if either $\pi_2 \approx -\pi_3$ or $\delta_2 \approx -\delta_3$. Thus, unless $\pi_2 = \pi_3 = 0$, the bias from misspecification imparted to the affect component should be negative.

The unrestricted model calculates the affect component as an appropriate average of the three unrestricted affect parameters:

$$\pi_0\tilde{\phi} = [\gamma_1 - \pi_1\delta_1 - \pi_2(\delta_0 + \delta_1) + \pi_3(1 - \delta_0)] + P[\gamma_2 - \delta_2(\pi_1 + \pi_2)] - (1 - P)[\gamma_3 - \delta_3(\pi_1 - \pi_3)]$$

This estimate is easier to interpret in the symmetric model, which imposes the restrictions:

$$\delta_2 = -\delta_3, \pi_2 = -\pi_3, \gamma_2 = -\gamma_3.$$

This leads to the following symmetric estimate of the affect component:

$$\pi_0\tilde{\phi} = [\gamma_1 - \pi_1\delta_1] + [\gamma_2 - \pi_2(1 + \delta_1) - \delta_2(\pi_1 + \pi_2)].$$

The term in the first square bracket is the total effect on the voting score minus the elect component, each projected for one Democratic victory. The term in the second bracket is the total effect on the voting score minus the elect component, each projected for an additional successive Democratic victory. The component $\pi_2(1 + \delta_1) < 0$ is the prediction due to the moderating effect of seniority. The component $\delta_2(\pi_1 + \pi_2) > 0$ is the prediction due to the higher incumbency of advantage of more senior members.

Appendix Table: Corrected versus original estimates of affect component: alternative interest group ratings.

	Interest	Corrected estimate			Original estimate			Difference
	Group	Estimate	Std err	*p-value*	Estimate	Std err	*p-value*	
Panel 1: House	CC	8.0	(3.7)	0.03	−1.9	(2.0)	0.36	9.9
	CCUS	9.7	(6.0)	0.11	5.3	(3.6)	0.15	4.4
	AFGE	15.5	(10.1)	0.12	15.1	(5.1)	0.00	0.4
	AFT	9.5	(6.9)	0.17	1.5	(3.8)	0.70	8.0
	LCV	8.0	(6.2)	0.20	0.0	(3.6)	1.00	8.0
	DLEAD	1.7	(1.3)	0.21	0.2	(0.9)	0.86	1.5
	ADA	2.8	(2.3)	0.21	−2.3	(1.3)	0.08	5.1
	ACU	5.3	(7.8)	0.49	0.4	(3.8)	0.91	4.9
	LWV	1.4	(7.0)	0.85	−5.8	(3.4)	0.09	7.1
	UAW	−0.1	(6.3)	0.99	−2.3	(3.2)	0.47	2.3
	NOM	−1.1	(2.2)	0.61	0.5	(1.2)	0.68	−1.6
	AFSCME	−4.9	(8.9)	0.58	−6.6	(4.7)	0.16	1.6
Panel 2: Senate	ACU	10.8	(5.9)	0.07	0.4	(3.7)	0.91	10.3
	ASC	14.2	(8.8)	0.11	7.0	(6.2)	0.26	7.2
	NEA	8.8	(5.8)	0.13	1.7	(3.8)	0.66	7.1
	COPE	6.9	(4.7)	0.14	0.3	(3.2)	0.91	6.6
	CFA	5.6	(5.8)	0.34	−1.3	(3.9)	0.74	6.9
	NTU	3.8	(4.1)	0.36	2.2	(3.0)	0.46	1.6
	ADA	3.5	(4.5)	0.44	−2.7	(2.8)	0.34	6.2
	LCV	4.9	(7.1)	0.50	3.4	(4.5)	0.44	1.4
	NOM	1.7	(3.6)	0.63	−2.1	(2.2)	0.33	3.8
	ACLU	−0.9	(7.0)	0.89	−11.3	(3.8)	0.00	10.3
	CCUS	−2.9	(4.6)	0.53	−5.6	(2.6)	0.03	2.7
Panel 3: Senate early term	NEA	21.7	(7.5)	0.004	2.8	(4.9)	0.57	18.9
	ACU	10.3	(6.2)	0.10	0.3	(3.4)	0.93	10.0
	CFA	9.7	(6.0)	0.11	−1.4	(4.1)	0.73	11.1
	COPE	8.0	(5.3)	0.14	3.2	(3.7)	0.38	4.8
	ASC	18.1	(12.2)	0.14	5.9	(8.5)	0.49	12.2
	ADA	6.7	(4.6)	0.15	−1.2	(3.0)	0.69	7.9
	NTU	6.3	(4.8)	0.18	3.5	(3.8)	0.36	2.9
	CCUS	5.2	(5.1)	0.31	−2.8	(3.3)	0.39	8.1
	NOM	2.1	(3.8)	0.59	−1.3	(2.1)	0.55	3.3
	LCV	3.1	(7.6)	0.68	−1.2	(5.4)	0.82	4.3
	ACLU	−0.7	(8.6)	0.93	−9.5	(4.7)	0.04	8.8

See Figure 3 for more detail. p-values are for a two-sided test of the null hypothesis that the affect component is zero.

References

Alesina, A., 1988. Credibility and policy convergence in a two-party system with rational voters. American Economic Review 78 (4), 796–805.

Amacher, R.C., Boyes, W.J., 1978. Cycles in senatorial voting behavior: implications for the optimal frequency of elections. Public Choice 33 (3), 5–13.

Butler, D.M., 2009. A regression discontinuity design analysis of the incumbency advantage and tenure in the U.S. House. Electoral Studies 28 (1), 123–128.

Butler, D.M., Butler, M.J., 2006. Splitting the difference? Causal inference and theories of split-party delegations. Political Analysis 14 (4), 439–455.

Campbell, C.C., Rae, N.C., 2001. Party politics and ideology in the contemporary Senate. In: Campbell, C.C., Rae, N.C. (Eds.), The Contentious Senate: Partisanship, Ideology, and the Myth of Cool Judgment. Rowman and Littlefield, Lanham, MD, pp. 1–20.

Caughey, D.M., Sekhon, J.S., 2010. Regression-discontinuity designs and popular elections: Implications of pro-incumbent bias in close U.S. House races. Manuscript. UC Berkeley Department of Political Science, Berkeley, CA. December 9.

Cox, G.W., Katz, J.N., 1996. Why did the incumbency advantage in U.S. House elections grow? American Journal of Political Science 40 (2), 478–497.

Cox, G.W., McCubbins, M.D., 1986. Electoral politics as a redistributive game. Journal of Politics 480 (2), 370–389.

Davidson, R.H., 1989. The Senate: if everybody leads, who follows? In: Dodd, L.C., Oppenheimer, B.I. (Eds.), Congress Reconsidered, fourth ed. Congressional Quarterly Press, Washington, DC, pp. 275–306.

Dougan, W.R., Munger, M.C., 1989. The rationality of ideology. Journal of Law and Economics 32 (1), 119–142.

Downs, A., 1957. An Economic Theory of Democracy. Harper and Row, New York.

Figlio, D., 2000. Political shirking, opponent quality, and electoral support. Public Choice 103 (3–4), 271–284.

Goff, B.L., Grier, K.B., 1993. On the (mis)measurement of legislator ideology and shirking. Public Choice 76 (1–2), 5–20.

Grimmer, J., Hersh, E., Feinstein, B., Carpenter, D., 2010. Are Close Elections Randomly Determined?" Manuscript. Harvard Department of Government, Cambridge, MA. October 22.

Groseclose, T., Levitt, S.D., Snyder, J.M., 1999. Comparing interest group scores across time and chambers: adjusted ADA scores for the U.S. Congress. American Political Science Review 93 (1), 33–50.

Herrnson, P.S., 2004. Congressional Elections: Campaigning at Home and in Washington, fourth ed.. Congressional Quarterly Press, Washington, DC.

Jacobson, G.C., 2004. The Politics of Congressional Elections. Pearson Longman, New York.

Krasno, J., 1994. Challengers, Competition, and Reelection: Comparing Senate and House Elections. Yale University Press, New Haven, CT.

Lee, D.S., 2008. Randomized experiments from non-random selection in U.S. House elections. Journal of Econometrics 142 (2), 675–697.

Lee, D.S., Lemieux, T., 2010. Regression discontinuity designs in economics. Journal of Economic Literature 48 (2), 281–355.

Lee, D.S., Moretti, E., Butler, M.J., 2004. Do voters affect or elect policies? Evidence from the U.S. House. Quarterly Journal of Economics 119 (3), 807–859.

Matthews, D.R., 1960. U.S. Senators and Their World. University of North Carolina Press, Chapel Hill.

McCarty, N., Poole, K.T., Rosenthal, H., 1997. Income Redistribution and the Realignment of American Politics. The AEI Press, Washington, DC.

McKelvey, R.D., 1986. Covering, dominance and institution-free properties of social choice. American Journal of Political Science 30 (2), 283–314.

Poole, K.T., Rosenthal, H., 1997. Congress: A political-economic history of roll call voting. Oxford University Press, New York.

Ripley, R.B., 1969. Power in the Senate. St. Martin's Press, New York.

Rothenberg, L.S., Sanders, M.S., 2000. Severing the electoral connection: shirking in the contemporary congress. American Journal of Political Science 44 (2), 310–319.

Stratmann, T., 2000. Congressional voting over legislative careers: shifting positions and changing constraints. American Political Science Review 94 (3), 665–676.

Theriault, S.M., 2006. Party polarization in the U.S. Congress: member replacement and member adaptation. Party Politics 12 (4), 483–501.

Thomas, M., 1985. Election proximity and senatorial roll call voting. American Journal of Political Science 29 (1), 96–111.

Tituinik, R., 2010. Two Tailed Test. In: Salkind, N.J. (Ed.), Encyclopedia of Research Design. SAGE Publications, Thousand Oaks, CA.