Online Appendix: Supporting Information for

Parsing Party Polarization in Congress

Daniel J. Moskowitz, Jon C. Rogowski, and James M. Snyder, Jr.

Contents

A.1 About the NPAT Data

As noted in the paper, Project Vote Smart attempts to administer the NPAT survey (the survey name was changed to the "Political Courage Test" starting in 2008) to all presidential, congressional, gubernatorial, and state legislative candidates in each election year. As Project Vote Smart's description notes, "[The issues included on the survey] are determined by a rigorous examination of national and local polls, the majority, minority and third party platforms, State of the Union and Response speeches, State of the State and Response speeches, and legislative agendas. Every effort is made to ensure that the test is as unbiased as possible."[1] Table A.1 provides a breakdown of the number of NPAT survey items by issue area.

Table A.1: Distribution of NPAT Questions by Issue

Issue	# Items Scaled	# Unique Questions
Abortion	3	3
Budget (across various domestic programs)	30	5
Campaign finance	2	2
Education	3	3
Environment	2	2
Guns	1	1
Health care	1	1
Immigration	2	2
Labor & employment	3	3
National defense	24	4
Taxes	42	7

Not all candidates fill out the entire survey, but candidates who choose to fill out the survey tend to respond to most questions. Examining the seven election cycles included in our data (1996-2008), 58 percent of candidate surveys include responses to all of the items that constitute the constant agenda (i.e., questions asked in all seven years). Additionally, 76 percent of candidate surveys have missing responses for 5 percent or fewer of these items. Overall, candidate surveys

[1]See https://justfacts.votesmart.org/about/political-courage-test/

for the years in our sample, on average, have missing responses for 9 percent of constant-agenda items. For comparison, members of Congress included in the Voteview database during the same period (i.e., the 105th through 111th Congresses) on average have missingness for about 7 percent of roll-call votes. Nevertheless, we remain concerned that candidates with high rates of non-response might appear more moderate than they actually are. To remedy this concern, we exclude from the sample candidate surveys with missing responses to at least one-third of the items in the constant agenda. Across our entire sample, this restriction excludes 11 percent of candidate surveys. After implementing this restriction, the candidate surveys in our sample, on average, have missing responses for only about 2 percent of constant agenda items.

A.2 NPAT Questions on a Likert Scale

Most NPAT questions simply ask respondents to indicate whether they support a given policy. These items are naturally dichotomous and are ready for scaling in W-NOMINATE. However, a minority of survey items ask respondents to select an option from a k-item scale. Specifically, candidates are provided a 6-point scale in which they indicate that they would either "greatly increase," "slightly increase," "maintain," "slightly decrease," "greatly decrease," or "eliminate" various general budget items, defense budget items, and taxes. For our main set of analyses, we simply treat each of these response options as a separate decision, and, thus, expand each Likert-scale survey question into multiple items. By expanding the question into multiple items, we allow for greater flexibility in estimation, and we avoid having to split the scale at an arbitrary point. It is also likely the case that there is information in whether a candidate supports a larger/smaller increase or a larger/smaller decrease that is lost if the scale is collapsed. However, this decision is not without drawbacks. In particular, there is risk that artificially expanding the number of items used to scale candidates could itself generate (false) ideological stability. Thus, in this section, we explore alternative approaches in how we code the response options for each of the k-item scale questions.

When categorizing the response options from the 6-item scale, it generally makes sense to group together options indicating support for *increasing* the budget/tax item (i.e., responses of "greatly increase" and "slightly increase") and to group together options indicating support for *decreasing* the budget/tax item (i.e., responses of "slightly decrease," "greatly decrease," and "eliminate"). However, it is unclear whether a response of "maintain" should be categorized with support for *increasing* or support for *decreasing* the budget/tax item. Furthermore, supporting a tax increase (decrease) is fundamentally different from supporting a spending increase (decrease). Thus, it is also unclear whether the "maintain" option should be categorized in the same way for budget items and tax items.

To avoid having to make a judgment as to the most appropriate way to treat responses of

"maintain" for (general and defense) budget items and tax items, we consider two different approaches. In the first approach, which we call the *trichotomous* approach, we expand each budget and tax question into two items: support for an increase and support for a decrease. While this approach allows us to avoid having to group "maintain" responses with either support for an increase or a decrease, it still requires expanding each question (artificially increasing the number of items), albeit to a much lesser extent. In the second approach, which we call the *dichotomous* approach, we avoid expanding questions into multiple items but instead have to group "maintain" responses with either the increase responses or decrease responses (as described below, we explore multiple versions of coding rules).

For the *trichotomous* approach, consider, for example, the budget item related to education spending (**budget04**). For this item (and every other item of this form), we generate two items to be scaled: **budget04_increase** and **budget04_decrease**. The **budget04_increase** item is coded = 1 for any candidate who supports an increase in spending and = 0 otherwise, while **budget04_decrease** is coded = 1 for any candidate who supports a decrease in spending and = 0 otherwise. Thus, both items are coded = 0 for a response of "maintain." Specifically:

- **budget04_increase** is coded = 1 for responses of "greatly increase" and "slightly increase," while responses of "maintain," "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
- **budget04_decrease** is coded = 1 for responses of "slightly decrease," "greatly decrease," and "eliminate," while responses of "maintain," "slightly increase," and "greatly increase" are coded = 0.

For the dichotomous approach, we avoid having to exercise judgment as to which category (i.e., increase or decrease) to place "maintain" responses by implementing multiple versions of coding rules. Specifically, we implement four versions each of which correspond to a unique combination of assigning "maintain" to the increase category or the decrease category, separately for budget items and for tax items. The four different versions of coding rules are described below and summarized in Table A.2:

- Version 1:
  - For budget questions, responses of "greatly increase," "slightly increase," and "maintain" are coded = 1, while responses of "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
  - For tax questions, responses of "greatly increase," "slightly increase," and "maintain" are coded = 1, while responses of "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
- Version 2:
  - For budget questions, responses of "greatly increase" and "slightly increase" are coded = 1, while responses of "maintain," "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
  - For tax questions, responses of "greatly increase" and "slightly increase" are coded = 1, while responses of "maintain," "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
- Version 3:
  - For budget questions, responses of "greatly increase" and "slightly increase" are coded = 1, while responses of "maintain," "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
  - For tax questions, responses of "greatly increase," "slightly increase," and "maintain" are coded = 1, while responses of "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
- Version 4:
  - For budget questions, responses of "greatly increase," "slightly increase," and "maintain" are coded = 1, while responses of "maintain," "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.
  - For tax questions, responses of "greatly increase" and "slightly increase" are coded = 1, while responses of "maintain," "slightly decrease," "greatly decrease," and "eliminate" are coded = 0.

Given the concern that expanding the number of survey items for k-item scale questions generates false stability over time for candidates, we focus our attention on the within candidate

Table A.2: Dichotomous Approach: Coding Rules for Likert Scale Questions

Version	Greatly Increase		Slightly Increase		**Maintain**		Slightly Decrease		Greatly Decrease		Eliminate	
	Budget	Tax	Budget	Tax	**Budget**	**Tax**	Budget	Tax	Budget	Tax	Budget	Tax
1	=1	=1	=1	=1	**=1**	**=1**	=0	=0	=0	=0	=0	=0
2	=1	=1	=1	=1	**=0**	**=0**	=0	=0	=0	=0	=0	=0
3	=1	=1	=1	=1	**=0**	**=1**	=0	=0	=0	=0	=0	=0
4	=1	=1	=1	=1	**=1**	**=0**	=0	=0	=0	=0	=0	=0

results, which correspond to Table 1 in the paper. The results displayed in Table A.3 indicate on average how much candidates from each party shift over time. For both Republicans and Democrats across all five specifications in the table, there is little evidence of systematic *within* candidate shifts over time. In all cases, the estimated average within candidate shift for each party is substantively small and not statistically distinguishable from zero. Table A.4 examines the extent to which replacement is driving polarization based on our scaling estimates using these alternative approaches for the Likert scale questions. Similar to the main results in the paper, we find evidence of polarization due to replacement, particularly among House Republicans.

Table A.3: Do Candidates Change NPAT Scores Over Time?
Alternative Coding Rules for Likert-Scale NPAT Questions

	Likert-to-Trichot		Likert-to-Binary 1		Likert-to Binary 2		Likert-to-Binary 3		Likert-to-Binary 4		
Case	Diff	t-Stat	Diff	t-Stat	Diff	t-Stat	Diff	t-Stat	Diff	t-Stat	# Obs.
Both major parties											
Year 2 − Year 1 = 2	-0.005	-0.884	-0.003	-0.498	-0.001	-0.225	-0.002	-0.287	-0.003	-0.488	620
Year 2 − Year 1 ≥ 2	-0.007	-1.310	-0.002	-0.266	-0.001	-0.227	-0.002	-0.339	-0.002	-0.348	710
Republicans											
Year 2 − Year 1 = 2	-0.002	-0.230	-0.003	-0.413	0.009	1.024	0.006	0.810	-0.003	-0.376	290
Year 2 − Year 1 ≥ 2	-0.002	-0.299	-0.001	-0.190	0.011	1.357	0.007	0.985	0.001	0.090	329
Democrats											
Year 2 − Year 1 = 2	-0.008	-0.943	-0.003	-0.330	-0.010	-1.249	-0.008	-0.964	-0.003	-0.330	330
Year 2 − Year 1 ≥ 2	-0.011	-1.444	-0.002	-0.197	-0.012	-1.547	-0.010	-1.172	-0.004	-0.486	381

Table A.4: Are New MCs More Extreme than Departing MCs? Alternative Coding Rules for Likert-Scale NPAT Questions

Case	Joiner Mean	Leaver Mean	Diff. in Means	t-Stat.	# MCs Joining	# MCs Leaving
Republicans						
NPAT Score, MCs with NPAT, Likert-to-Trichot	0.281	0.185	0.097	2.578	51	85
NPAT Score, MCs with NPAT, Likert-to-Binary 1	0.351	0.266	0.084	2.504	51	85
NPAT Score, MCs with NPAT, Likert-to-Binary 2	0.321	0.220	0.101	2.703	51	85
NPAT Score, MCs with NPAT, Likert-to-Binary 3	0.245	0.172	0.073	2.148	51	85
NPAT Score, MCs with NPAT, Likert-to-Binary 4	0.389	0.278	0.111	3.275	51	85
Democrats						
NPAT Score, MCs with NPAT, Likert-to-Trichot	-0.347	-0.303	-0.044	-1.004	63	48
NPAT Score, MCs with NPAT, Likert-to-Binary 1	-0.244	-0.216	-0.028	-0.635	63	48
NPAT Score, MCs with NPAT, Likert-to-Binary 2	-0.331	-0.259	-0.073	-1.676	63	48
NPAT Score, MCs with NPAT, Likert-to-Binary 3	-0.328	-0.271	-0.056	-1.429	63	48
NPAT Score, MCs with NPAT, Likert-to-Binary 4	-0.225	-0.175	-0.050	-1.108	63	48

A.3 Distribution of Cutpoints

If the NPAT survey questions are of the type that tend to neatly divide the candidates from each party, scaling candidates using these questions might not effectively capture within-party heterogeneity. On the other hand, if the cutpoints for the NPAT items are distributed throughout the ideological space, it is more likely the case that the W-NOMINATE estimates are more appropriately capturing within-party heterogeneity. Figure A.1 displays the distribution of cutpoints for items in the constant agenda across the seven election years.[2] Based on a visual inspection of the histogram, it is apparent that many of the NPAT items have near unanimous support (or opposition) for candidates from both parties. These are items with cutpoints located at the extreme ends of the dimension (i.e., ≈ -1 and ≈ 1). The remaining set of items have cutpoints that are distributed approximately uniformly throughout the rest of the space. That there are cutpoints dispersed throughout the dimension indicates that the set of questions asked during the sample period should allow us to infer within party ideological differences.

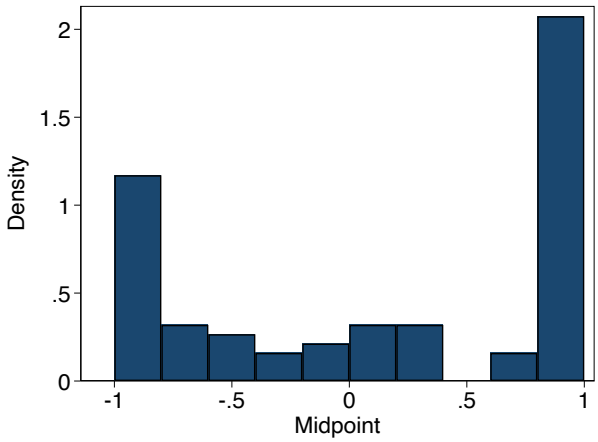


Figure A.1: Distribution of Cutpoints for Constant Agenda NPAT Items

We next examine whether the distribution of cutpoints among NPAT items included in the constant agenda is different from the distribution of cutpoints among NPAT items not in the con-

[2]More precisely, this displays the distribution of midpoints for the first dimension.

stant agenda (i.e., NPAT questions asked in 6 or fewer years). Figure A.2 displays the distribution of cutpoints for items that are not included in the constant agenda. Notably, these items, which were not asked in all 7 years, display the same general pattern: a concentration of cupoints at both extremes with the remaining items exhibiting an approximately uniform distribution across the space. Comparing the distribution of cutpoints for all non-constant agenda NPAT items and for NPAT items in the constant agenda, we fail to reject the null hypothesis of equality of distributions (p =0.157) using a Kolmogorov-Smirnov test.

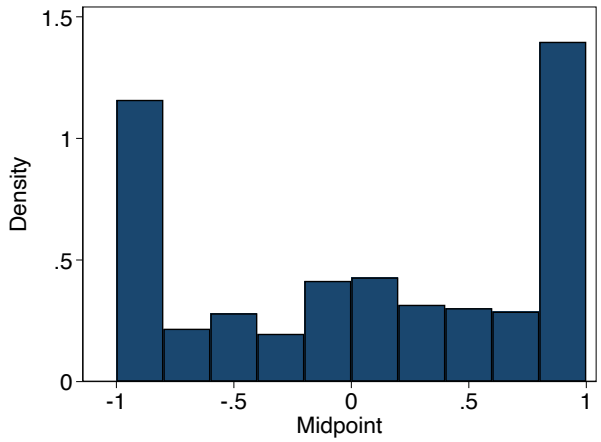


Figure A.2: Distribution of Cutpoints for Non-Constant Agenda NPAT Items

We can also more directly test whether the NPAT measure of candidate ideology captures within-party heterogeneity. To do so, we examine the within-party correlation between the first dimension of our NPAT measure and the first dimension of NOMINATE.[3] Pooling together Democrats and Republicans who have both an NPAT score and a NOMINATE score, the correlation coefficient is 0.91. Examining candidates with both scores within the Democratic Party, the correlation coefficient is 0.79, and examining candidates within the Republican Party, the correlation coefficient is 0.71. In sum, the correlation between NPAT scores and NOMINATE is quite strong within both parties, indicating that the survey items do allow us to capture meaningful within-party heterogeneity.

[3]This analysis is using the Common Space NOMINATE scores.

Table A.5: Correlation Between NPAT Scores and NOMINATE

Case	Corr. Coef.	# Obs.
Overall	0.914	868
Democrats	0.790	447
Republicans	0.714	421

A.4 Are the Bridging Assumptions Satisfied?

One of the key contributions of this paper is using the same set of questions asked at different points in time to scale candidates in an ideological space anchored by the set of issues examined in these questions. We are implicitly assuming that the meaning of these questions does not change over time within the period under examination. For instance, if the status quo changes (e.g., the minimum wage increases) between election year t and $t+2$, then a given position on that issue may not have the same meaning in years t and $t+2$. While this assumption is implausible over a long time period, we believe this assumption is far more plausible over a short span of time like the study period from 1996 to 2008.

Additionally, we have examined the set of items in the constant agenda and attempted to identify all items for which there was a meaningful shift in policy that altered the status quo. Based on this examination, we removed items related to capital gains and estate taxes from the constant agenda. The 2003 Bush tax cuts (the Jobs and Growth Tax Relief Reconciliation Act of 2003) changed how capital gains are taxed and, the 2001 Bush tax cuts (the Economic Growth and Tax Relief Reconciliation Act of 2001) changed how estates are taxed. Specifically, these laws lowered tax rates on capital gains, raised the exemption amount for estates (above which estates are taxed), and lowered the tax rate on estates. In other word, the status quo meaningfully shifted on these issues such that a different response to these questions may be consistent with an unchanged position.

Beyond this manual inspection, we also engage in a more systematic empirical exercise to examine whether the bridging assumptions are satisfied. We assess whether the cutpoints of items in the constant agenda seem to be moving in a systematic fashion from the early part of the sample to the later part of the sample. Specifically, we take the matrix of constant-agenda items and candidate positions on these items. We then allow for a separate cutpoint in the early period (1996-2000) and the later period (2002-2008) by taking an item and treating it as if it were two separate items (one item for each period). We iteratively conduct this analysis one item

at a time across all of the items in the constant agenda (running W-NOMINATE separately for each iteration) to explore whether the cutpoints are shifting systematically. While we expect some movement simply due to noise, evidence of systematic movement would suggest that the bridging assumptions are problematic.

Figure A.3 provides a graphical display of the analysis. The horizontal axis indicates the location of items' cutpoints (i.e., the midpoint of the first dimension) for the early period (1996-2000), and the vertical axis indicates the location of items' cutpoints for the later period (2002-2008). If the location of each item's cutpoint were estimated to be in the identical location for both periods, then all of the points in the figure would lie on the 45-degree line. Based on the figure, we observe no evidence of systematic shifts. Most of the points in the figure appear to be "bouncing" around near the 45-degree line seemingly due to noise. The notable exceptions are those items with cutpoints located on the the unit circle (i.e., midpoints = 1 or = −1). Additionally, there are a handful of items in which the midpoint of the first dimension does seem to shift meaningfully between the earlier and later periods. Figure A.4 displays the cutlines (and the coordinates for candidates) for items in which the midpoint of the first dimension shifted by > 0.4 units in either direction from the earlier to the later period.[4] Notably, with one exception (possibly due to random noise), these cutlines are relatively flat, implying that the second dimension is "doing the work" rather than the first dimension.

We also formally test whether there is evidence of systematic shifts in the cutpoint locations between the earlier and later periods with a paired t-test. Based on this test, we fail to reject the null of no difference (p =0.408).

[4]These cutlines are based on the original estimates, not the estimates from the iterative analysis splitting the earlier and later periods. The figure excludes cutlines with midpoints on the unit circle, as they cannot be plotted.

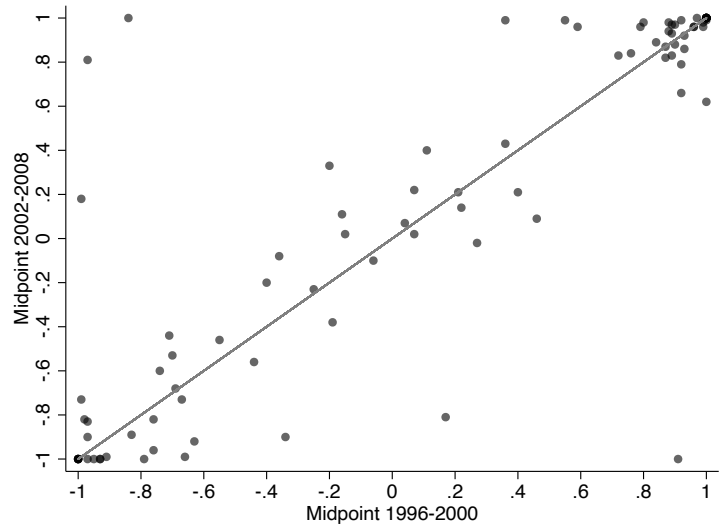


Figure A.3: Iterative Analysis: Are Cutpoints Systematically Shifting?

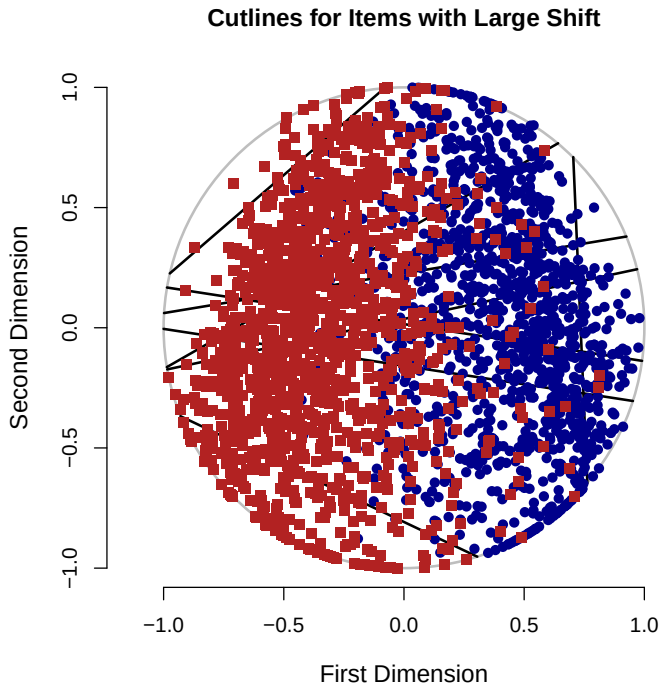


Figure A.4: Iterative Analysis: Cutlines for Items that Shifted > 0.4 Units

A.5 Linear Conservative Probability Scores

In this section, we replicate the main results reported in Figure 4, Table 1, and Table 2 in the paper using the Linear Conservative Probability Scores rather than W-NOMINATE. As described in the paper, these scores indicate the proportion of items on which a candidate selected the "conservative" option. The conservative option is determined by comparing the proportion of Republicans and the proportion of Democrats who selected a particular option. If a higher proportion of Republicans selected an option, then that is considered the conservative choice.

The results from this analysis examining within-candidate movement are displayed in Figure A.5 and Table A.6. Based on a visual inspection of Figure A.5, there is no evidence of within-candidate movement, resulting in polarization. The points on the scatterplot are generally dispersed near the 45-degree line, indicating that Democrats do not seem to be shifting to the left and Republicans do not seem to be shifting to the right. Examining the average within-candidate shift over time by party in Table A.6, there is again no evidence of systematic candidate shifts in more extreme directions for either party. The estimates for both parties are small in magnitude and not statistically distinguishable from zero.

Examining the results related to member replacement in the House (displayed in Table A.7), the estimates are again consistent with the main results in the paper. Specifically, we find strong evidence that Republican members who joined the chamber over the 1996-2008 period were more conservative than their co-partisans who left the chamber during that period. In the case of Democrats, we find no evidence that joining members were more liberal than exiting members based on the linear conservative probability scores.

Given the simplicity of the measure and its straightforward interpretation, we are reassured that the main pattern of results from the paper based on W-NOMINATE are reproduced using this method.

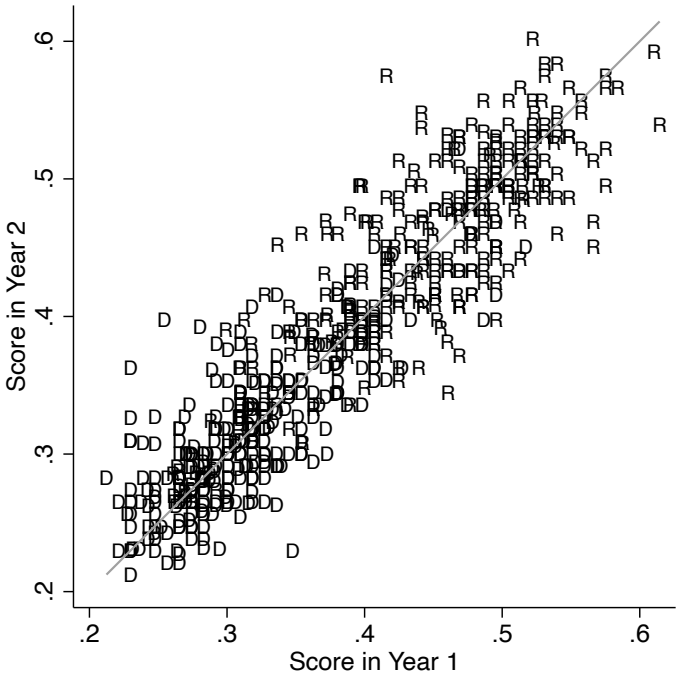


Figure A.5: Year 2 vs. Year 1 NPAT Fraction Conservative Scores for Candidates with Scores in Adjacent Years, All Pairs Pooled

Table A.6: Do Candidates Change NPAT Scores Over Time?
(Linear Conservative Probability Scores)

Case	Difference	t-Statistic	# Obs.
Both major parties			
Year 2 − Year 1 = 2	0.003	1.613	620
Year 2 − Year 1 ≥ 2	0.002	1.569	710
Republicans			
Year 2 − Year 1 = 2	0.004	1.491	290
Year 2 − Year 1 ≥ 2	0.004	1.574	329
Democrats			
Year 2 − Year 1 = 2	0.001	0.739	330
Year 2 − Year 1 ≥ 2	0.001	0.559	381

Table A.7: Are New MCs More Extreme than Departing MCs?
(Linear Conservative Probability Scores)

Case	Joiner Mean	Leaver Mean	Diff. in Means	t-Stat.	# MCs Joining	# MCs Leaving
Republicans						
NPAT Score, MCs with NPAT	0.473	0.444	0.029	2.675	51	85
Democrats						
NPAT Score, MCs with NPAT	0.324	0.318	0.005	0.572	63	48

A.6 Issue Bundle Analysis

Table A.8 displays the partisan gap among members who joined the House during the 1996-2008 period as well as the partisan gap among members who exited during the same period. The extent to which the partisan gap for a particular issue bundle was larger among entering members relative to exiting members indicates the degree to which polarization grew due to replacement for a particular issue area. The findings from this analysis indicate that the primary issues in the NPAT agenda driving polarization through replacement were environmental and social/cultural issues.

Table A.8: In What Issue Bundles is Polarization Growing through Replacement? (Linear Conservative Probability Scores)

Issue Bundle	Party Gap Joiners	Party Gap Leavers	Diff. in Party Gaps	p-value from F-test
Economic	0.158	0.131	0.027	0.150
Education & health	0.177	0.161	0.016	0.498
Environmental	0.368	0.167	0.201	0.000
National defense	0.079	0.104	-0.026	0.303
Social & cultural	0.455	0.328	0.127	0.007
Other	0.067	0.073	-0.006	0.712

Party gap joiners is the difference in means between Republican joiners and Democratic joiners: $(\bar{R}_{\text{joiner}} - \bar{D}_{\text{joiner}})$. Party gap leavers is the difference in means between Republican leavers and Democratic leavers: $(\bar{R}_{\text{leaver}} - \bar{D}_{\text{leaver}})$. The difference in party gaps is the difference in these differences: $(\bar{R}_{\text{joiner}} - \bar{D}_{\text{joiner}}) - (\bar{R}_{\text{leaver}} - \bar{D}_{\text{leaver}})$.

A.7 Changing Positions

Medicare Part D

The prescription drug benefit for Medicare recipients (Medicare part D), passed in 2003, is another interesting case. The relevant item in the NPAT survey asks candidates whether they "support expanding prescription drug coverage under Medicare." Between 2000 and 2002, 11 out of 106 candidates (10%) switched from not supporting to supporting expansion, while only 2 candidates (2%) switched in the opposite direction. After 2003 the pattern is reversed. Between 2002 and 2004, 15 out of 114 candidates (13%) switched from supporting to not supporting expansion, while only 2 candidates (2%) switched in the opposite direction. Between 2004 and 2006, 11 out of 112 candidates (10%) switched from supporting to not supporting expansion, while only 4 candidates (4%) switched in the opposite direction.

The Minimum Wage

A final case is the minimum wage. The federal minimum wage increased by 21% between 1996 and 1998, from $4.25 to $5.15. It remained unchanged until 2008. Between 1996 and 1998, 19 candidates out of 139 (14%) switched from supporting to not supporting an increase in the minimum wage, while only 2 candidates (1%) switched in the opposite direction. This is the only pair of years in which an imbalance of this sort occurs. In all other cases where a large number of candidates change positions on this issue, they increase their support for the minimum wage. Between 1998 and 2000, 24 candidates out of 116 (21%) switched from not supporting to supporting an increase in the minimum wage, while only 2 candidates (2%) switched in the opposite direction. Similarly, between 2004 and 2006, 12 candidates out of 111 (11%) switched from not supporting to supporting an increase in the minimum wage, while only 1 candidate (1%) switched in the opposite direction. Both of these pairs occurred during periods in which the minimum wage was fixed in nominal terms and therefore decreasing in real terms.

A.8 Robustness checks: Within-candidate movement

A.8.1 Restricting the sample to members of Congress

One concern with the main results is that they could be driven to an important extent by losing candidates who are not representative of candidates who actually serve in Congress. Given that we are interested in explaining polarization among House members, this concern is quite serious. In this section, we reassess our main results restricting the sample to candidates who served in the House of Representatives. Figure A.6 is a plot of members' NPAT scores in year t (horizontal axis) vs. year $t+2$ (vertical axis). As in the results based on the full sample in Figure 4, members demonstrate remarkable ideological stability over time. Most of the points are neatly situated relatively near to the 45-degree line. Table A.9 displays results from t-tests for these within candidate shifts by party. As in the main results based on all candidates, there is essentially no evidence of within member shifts in extreme directions for members of either party.

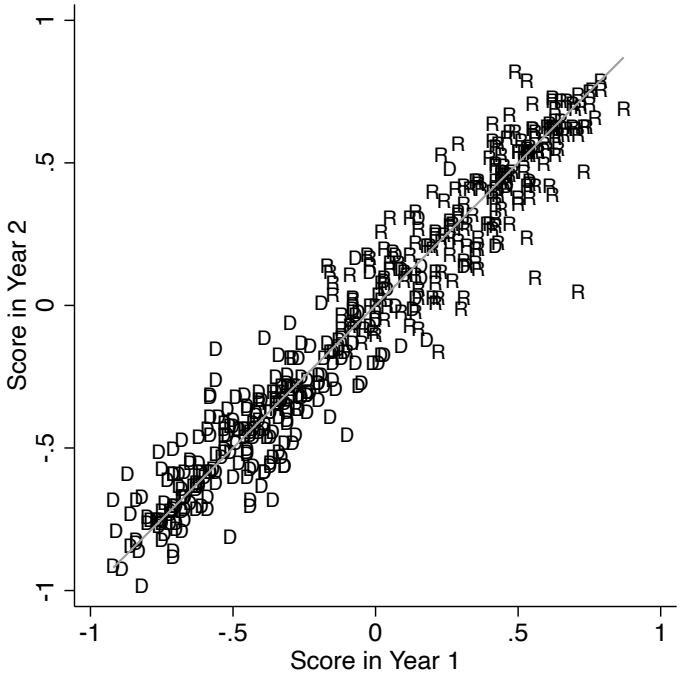


Figure A.6: NPAT Scores for Candidates who Served in the House with Scores in Adjacent Years, All Pairs Pooled. This figure plots candidates' scores in year t vs. year $t+2$. Negative values indicate liberal candidates and positive values indicate conservative candidates.

Table A.9: Do Candidates Change NPAT Scores Over Time? Restrict Sample to Candidates Who Served in Congress

Case	Difference	t-Statistic	# Obs.
Both major parties			
Year 2 − Year 1 = 2	-0.006	-1.071	462
Year 2 − Year 1 ≥ 2	-0.008	-1.446	525
Republicans			
Year 2 − Year 1 = 2	-0.006	-0.703	218
Year 2 − Year 1 ≥ 2	-0.010	-1.116	243
Democrats			
Year 2 − Year 1 = 2	-0.006	-0.811	244
Year 2 − Year 1 ≥ 2	-0.007	-0.931	282

A.8.2 Collapsing the Data: One Observation per Candidate

For the main results in the paper, we examined multiple shifts for any candidates who completed the NPAT survey three or more times during the 1996-2008 period. In this section, we perform the robustness check of collapsing the data to one observation per candidate by calculating the average within-candidate shift. Based on this collapsed data, we again do not find evidence that candidates from either party moved to more extreme positions.

Table A.10: Do Candidates Change NPAT Scores Over Time? Collapsed Data, One Observation per Candidate

Case	Difference	t-Statistic	# Obs.
Both major parties			
Year 2 − Year 1 = 2	0.003	0.395	341
Year 2 − Year 1 ≥ 2	0.002	0.283	378
Republicans			
Year 2 − Year 1 = 2	0.004	0.362	162
Year 2 − Year 1 ≥ 2	0.005	0.405	180
Democrats			
Year 2 − Year 1 = 2	0.003	0.213	179
Year 2 − Year 1 ≥ 2	0.000	0.009	198

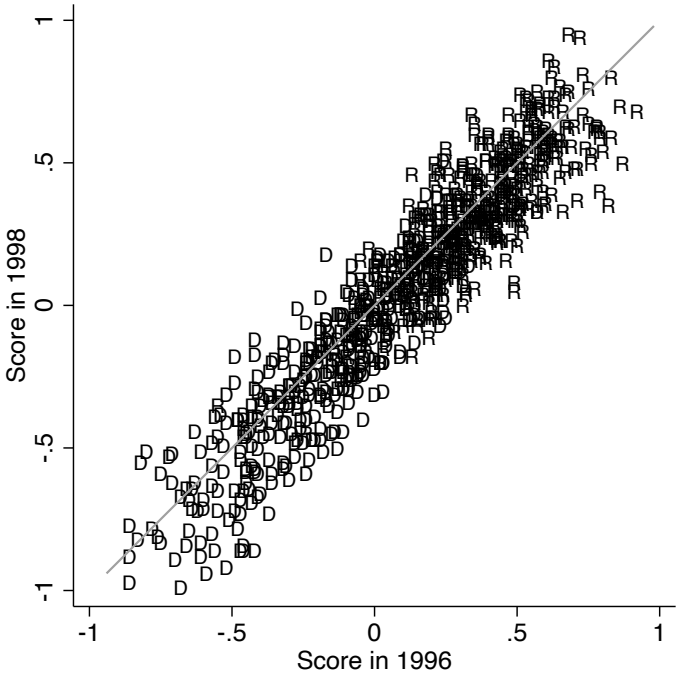
A.9 State Legislatures

Shor and McCarty (2010) show that partisan polarization extends to state legislatures, but their data also show considerable variation across states in both levels and trends. By assumption, and in contrast with DW-NOMINATE scores, legislators in their data are constrained to have a constant roll-call score across time.

We computed NPAT Fraction Conservative Scores for all state legislative candidates in 1996 and 1998 analogous to those above for the U.S. Congress, using only the questions that are common across states and appear in both years. In Figure A.7, we plot the 1998 scores against the 1996 scores, for those legislators with scores in both years. Consistent with our analysis of Congress, the points lie clustered tightly around the 45 degree line, and there is no signs of systematic movement toward polarization—i.e., no clustering of points above the 45 degree line among the candidate with relatively conservative scores in 1996, and no clustering of points below the 45 degree line among the candidates with relatively liberal scores in 1996.

Though limited to two election years, the patterns in Figure A.7 are quite similar to those for members of the U.S. House. The high degree of ideological consistency across time provides empirical justification for the estimation assumptions used by Shor and McCarty (2010). Substantively, the patterns suggest that within-member adaptation is unlikely to be an important contributor to varying patterns of partisan polarization in state legislatures. We suspect, then, that "parsing" the polarization in state legislatures will produce patterns similar to those we found above for Congress.

Figure A.7: NPAT W-NOMINATE Scores for State Legislative Candidates, 1996 and 1998



This figure plots candidates' scores in 1996 vs. 1998. Negative values indicate liberal candidates and positive values indicate conservative candidates.

References

Shor, Boris, and Nolan McCarty. 2010. "The Ideological Mapping of American Legislatures." *American Political Science Review* 105 (3): 530-551.