Appendix

Table A1: Variables and measurement

Variable	Description
CFscore	Static recipient CFscore of the candidate as described in Bonica (2014)
DW-DIME Score	Ideology score derived from applying supervised machine-learning to contribution data to infer DW-NOMINATE score, as described in Bonica (2018)
Incumbent Ideology	The ideology score of the incumbent. Higher scores indicate more conservative candidates.
Challenger Ideology	The ideology score of the challenger. Higher scores indicate more conservative candidates.
Candidate Midpoint	Mean of the Democratic and Republican candidate ideology scores. As in Bonica and Cox (2018), for finite mixture model analyses the variable is standardized by demeaning and dividing by the variable's standard deviation. In all other analyses the unstandardized version is used.
Party Midpoint	Mean of the Democratic and Republican party ideology scores, measured as the average CFscore of each party's current members of Congress. As in Bonica and Cox (2018), for finite mixture model analyses the variable is standardized by demeaning and dividing by the Candidate Midpoint variable's standard deviation.
Democrat Candidate Vote Share	Percentage of the two-party vote won by the Democrat
Democrat Incumbent	Binary variable equaling 1 if the incumbent candidate is a Democrat and 0 otherwise
Difference in Logged Spending	Logged amount spent on the campaign by the Democrat candidate minus the logged amount spent by the Republican candidate
District Ideology	The normalized version of presidential vote share from Levendusky, Pope, and Jackman 2008 used in Bonica and Cox (2018) for all analyses that replicate their results or use the identical data. Because these data are not available for the extended time series, other analyses employ the Jacobson (2015) measure, which is the percentage of the two-party vote won by the Democratic presidential candidate in the district in the current, or, for midterms, previous election. For years in which both variables exist their correlation is $\rho = 0.9$.
Quality Challenger - Democrat	Binary variable equaling 1 if the challenger is a Democrat who previously held elected office and 0 otherwise
Quality Challenger - Republican	Binary variable equaling 1 if the challenger is a Republican who previously held elected office and 0 otherwise
Democrat President	Binary variable equaling 1 if the sitting president is a Democrat and 0 otherwise
GDP Growth	Change in gross domestic product per capita from the third quarter of the year prior to the election to the third quarter of the election year, measured in percentage points
Midterm	Binary variable equaling 1 if the election is in a midterm year and 0 otherwise
Presidential Approval	Approval rating, in percentage points, from the last Gallup poll prior to the election

Note: Data through 2012 are from Bonica and Cox (2018). For analyses through 2016, the CFscore and DW-DIME variables are from Bonica (2016), GDP Growth is from the Bureau of Economic Analysis, and Presidential Approval is from Gallup. All other updated variables were provided by Gary Jacobson, who shared an updated version of the dataset used in Jacobson (2015).

Supplemental Material

Table S1: Descriptive statistics

Variable Name	n	Mean	Std. Deviation	Minimum	Maximum
Incumbent CFscore	3867	0.072	0.788	-1.556	1.644
Challenger CFscore	3867	0.024	1.082	-5.177	4.312
Candidate Midpoint (CFscore)	3867	0.048	0.305	-2.212	1.680
Party Midpoint (CFscore)	3867	0.094	0.023	0.060	0.141
Incumbent DW-DIME Score	3323	0.013	0.395	-0.766	0.983
Challenger DW-DIME Score	3299	0.070	0.407	-0.681	0.983
Candidate Midpoint (DW-DIME)	3210	0.044	0.113	-0.393	0.633
Democratic Candidate Vote Share	3867	50.439	13.822	3.030	93.939
Democratic Incumbent	3867	0.510	0.500	0	1
Difference in Logged Spending	3867	-0.063	1.862	-15.765	11.733
District Ideology	3867	0.498	0.113	0.193	0.939
Quality Challenger (Democrat)	3867	0.133	0.340	0	1
Quality Challenger (Republican)	3867	0.127	0.333	0	1
Democratic President	3867	0.516	0.500	0	1
GDP Growth	3867	2.415	2.060	-2.810	5.630
Midterm	3867	0.477	0.500	0	1
Presidential Approval	3867	2.876	21.037	-45	36

Note: Descriptive statistics shown are for available data through 2016.

Table S2: FMMs of Candidate Midpoint model compared to Party Midpoint model with every two consecutive election cycles omitted

	Dependent Variable: Probability Consistent with Party Midpoint								
	Omitted Election Cycles								
	1980-1982	1982-1984	1984-1986	1986-1988	1988-1990	1990-1992	1992-1994	1994-1996	1996-1998
Election	0.286	0.277	0.223	0.236	0.246	0.236	0.222	0.309	0.333
	(0.047)	(0.046)	(0.048)	(0.047)	(0.047)	(0.045)	(0.057)	(0.077)	(0.079)
Post-1994	0.575	0.599	0.327	0.068	0.143	10.842	0.315	−0.378	−0.301
	(0.567)	(0.544)	(0.415)	(0.431)	(0.460)	(98.869)	(0.522)	(0.606)	(0.643)
Senate	−1.881	−1.759	−1.423	−1.527	−1.606	−1.679	−1.527	−1.540	−1.773
	(0.504)	(0.491)	(0.473)	(0.467)	(0.471)	(0.453)	(0.452)	(0.490)	(0.532)
Intercept	−3.225	−3.104	−1.994	−2.052	−2.186	−12.688	−1.776	−2.541	−3.266
	(0.662)	(0.605)	(0.602)	(0.608)	(0.591)	(98.869)	(0.607)	(0.716)	(0.915)
Observations	3,545	3,550	3,589	3,559	3,535	3,480	3,415	3,379	3,423
	Omitted Election Cycles								
	1998-2000	2000-2002	2002-2004	2004-2006	2006-2008	2008-2010	2010-2012	2012-2014	
Election	0.306	0.270	0.281	0.237	0.215	0.198	0.278	0.251	
	(0.055)	(0.045)	(0.046)	(0.051)	(0.052)	(0.053)	(0.069)	(0.058)	
Post-1994	0.241	0.540	0.549	0.653	0.647	0.575	0.501	0.576	
	(0.640)	(0.503)	(0.532)	(0.552)	(0.444)	(0.433)	(0.558)	(0.477)	
Senate	−1.658	−1.764	−1.762	−1.157	−1.447	−1.571	−1.977	−1.996	
	(0.521)	(0.541)	(0.545)	(0.538)	(0.561)	(0.598)	(0.679)	(0.646)	
Intercept	−3.513	−2.997	−3.167	−2.487	−2.104	−1.975	−2.848	−2.400	
	(0.769)	(0.557)	(0.580)	(0.821)	(0.659)	(0.718)	(0.842)	(0.584)	
Observations	3,472	3,518	3,520	3,410	3,378	3,339	3,320	3,381	

Note: Standard errors shown in parentheses below coefficients from the concomitant portion of each FMM. For space purposes, mixture component coefficients are omitted.

Table S3: Varying coefficient estimates for Figure 1

Dependent Variable: Dem. Vote Share										
	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998
Candidate Midpoint	7.010	8.162	7.814	12.293	11.111	6.287	3.613	5.983	5.120	6.325
	(1.805)	(1.520)	(1.805)	(1.763)	(1.833)	(1.282)	(1.360)	(1.308)	(1.255)	(1.515)
District Ideology	19.384	21.805	50.754	37.703	41.091	24.937	44.333	50.561	52.376	39.533
	(5.952)	(4.661)	(6.539)	(5.779)	(5.706)	(5.059)	(3.671)	(3.602)	(3.478)	(4.070)
Year Effects	11.832	16.433	-0.048	7.588	3.979	12.657	-0.268	-9.100	-4.183	3.326
	(3.592)	(3.298)	(3.632)	(3.810)	(3.722)	(3.334)	(3.216)	(3.334)	(3.109)	(3.260)

	2000	2002	2004	2006	2008	2010	2012	2014	2016
Candidate Midpoint	6.133	7.720	3.740	4.611	1.984	-1.099	0.088	-2.208	-1.324
	(1.383)	(1.462)	(1.387)	(1.162)	(1.240)	(1.014)	(1.130)	(1.384)	(1.086)
	(1.269)	(1.450)	(1.371)	(1.293)	(1.339)	(0.997)	(1.102)	(1.346)	(1.100)
District Ideology	53.778	39.834	54.472	39.325	44.753	56.171	51.455	39.965	35.04
	(4.084)	(3.985)	(3.530)	(3.069)	(3.415)	(2.879)	(3.386)	(3.170)	(3.131)
Year Effects	-3.304	2.602	-2.428	5.653	2.343	-10.241	-2.133	0.435	5.807
	(3.235)	(3.230)	(3.091)	(2.983)	(3.001)	(2.928)	(3.002)	(2.945)	(2.944)

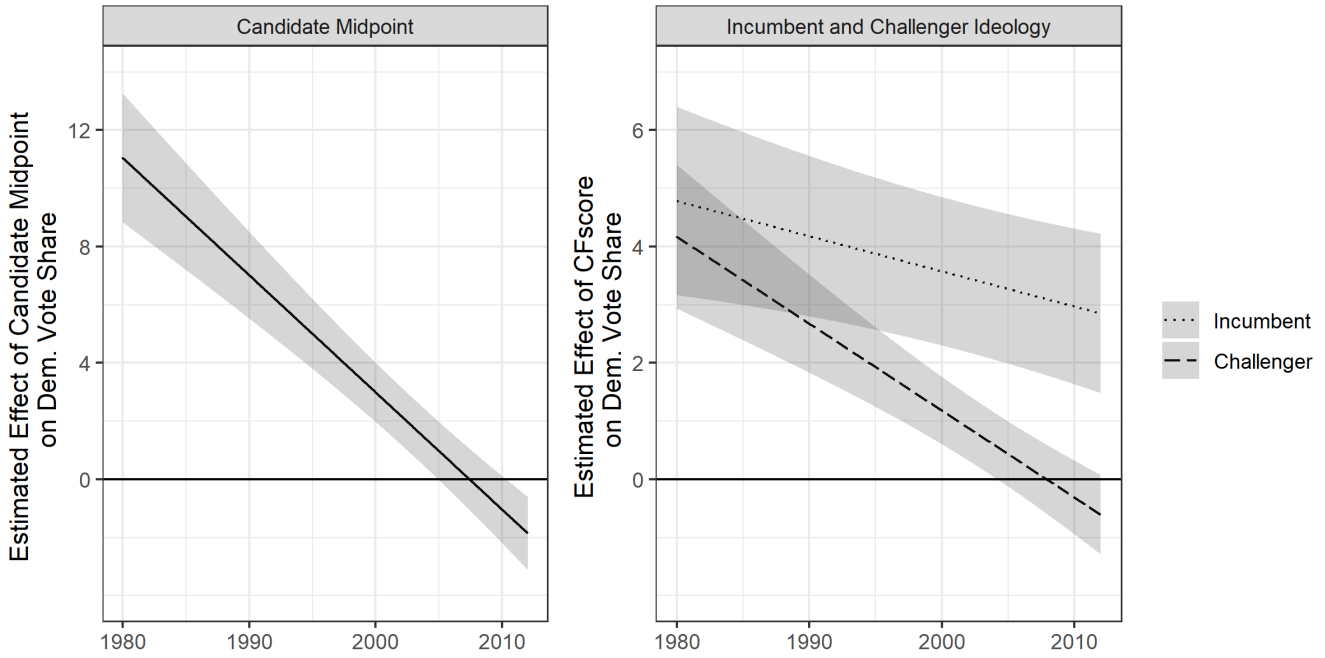
Note: Standard errors displayed in parentheses below coefficients from Bayesian random slopes model.

Table S4: Fixed coefficient estimates for Figure 1

Dependent Variable: Dem. Vote Share	
Dem. Incumbent	11.937
	(0.336)
Difference in Logged Spending	2.158
	(0.081)
Quality Challenger (Dem.)	1.080
	(0.300)
Quality Challenger (Rep.)	−1.301
	(0.302)
Intercept 21.096	
	(2.542)
Observations	3,867

Note: Standard errors displayed in parentheses below coefficients from Bayesian random slopes model.

Figure S1: Change in candidate accountability, OLS with Utych control variables



Note: Control variables include district ideology, a Democratic incumbent indicator variable, the difference in logged spending between the Democrat and Republican candidates, and state fixed effects.

Figure S2: Comparing DW-DIME and DW-NOMINATE scores by party and candidate type

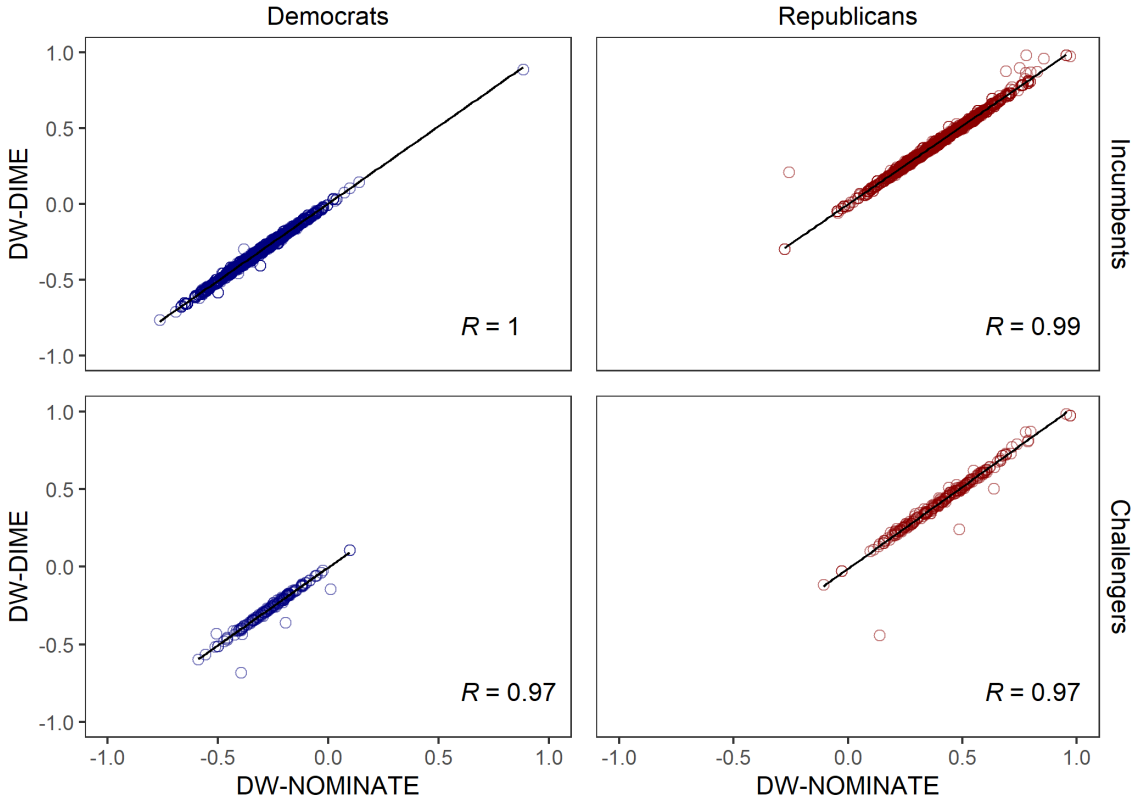


Table S5: Candidate ideology and perceived ideology by CCES respondents for incumbents and challengers

	Dependent Variable: Perceived Ideology (7 Point Scale)			
	Republican Incumbents	Democratic Incumbents	Republican Incumbents	Democratic Incumbents
CFscore	0.189	0.203	0.156	0.171
	(0.015)	(0.020)	(0.013)	(0.018)
Challenger x CFscore	−0.112	−0.134	−0.038	−0.076
	(0.025)	(0.031)	(0.019)	(0.035)
Challenger	−0.103	0.445	−0.081	0.402
	(0.019)	(0.024)	(0.018)	(0.027)
Intercept	1.690	−1.591	1.678	−1.585
	(0.012)	(0.014)	(0.012)	(0.014)
Standard Candidate Set ($\geq$ 10 Donors)	✓	✓		
$\geq$ 50 Donors			✓	✓
Observations	89,610	92,243	86,039	87,209

Standard errors clustered by district shown in parentheses below OLS coefficients.

To evaluate the extent to which voters are aware of the policy positions incumbents and challengers hold, and determine if knowledge differs for the two types of candidates, we use data from the 2010, 2012, 2014, and 2016 waves of the CCES. For each respondent-candidate pair where the respondent placed their district's candidates on a 7-point ideology scale, we regress the respondent's estimate on the candidate's CFscore. If respondents rank more conservative candidates as more conservative (and vice-versa), the coefficient on CFscore should be positive. To evaluate whether this relationship is weaker for incumbents, the CFscore variable is interacted with an indicator variable coded as 1 if the candidate is a challenger, and 0 if the candidate is an incumbent. To restrict our attention to voters, only respondents whose vote in the subsequent election was validated are included in the sample. Following other analyses in the paper, only candidates whose CFscores are estimated with 10 or more donors are included. Additionally, to address concerns that any difference between incumbents and challengers may be driven by measurement error, we show the results for candidates whose CFscores are estimated with at least 50 donors.

As the table above shows, a positive relationship exists between a candidate's CFscore and respondents' estimate of the candidate's ideology, and the relationship is significantly weaker for challengers than incumbents. This finding holds across parties and chambers. Moreover, it holds regardless of whether the 10- or 50-donor threshold is used. Although the effect does diminish with the higher threshold, it remains statistically significant and of a notable magnitude. In particular, with the higher threshold, the relationship between estimated ideology and CFscores is reduced by around a quarter for challengers facing a Republican incumbent and a little more than a third for ones facing a Democratic incumbent.

Table S6: OLS estimates of change in accountability, incumbents only

	Dependent Variable: Dem. Vote Share											
	CFscores				DW-DIME				DW-NOMINATE			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Incumbent Ideology	2.970	1.847	6.560	9.857	5.495	2.163	10.080	4.609	4.002	0.874	8.647	3.432
	(0.690)	(0.677)	(0.699)	(1.117)	(1.523)	(1.420)	(1.658)	(2.514)	(1.359)	(1.344)	(1.453)	(2.312)
Incumbent Ideology x Election	0.129	0.229	−0.068	−0.249	0.252	0.584	−0.204	−0.403	0.351	0.626	−0.073	−0.384
	(0.036)	(0.037)	(0.033)	(0.045)	(0.083)	(0.087)	(0.084)	(0.115)	(0.074)	(0.081)	(0.068)	(0.096)
District Ideology	45.326	26.720	56.524		45.676	21.051	56.199		46.848	26.559	56.956	
	(1.773)	(3.560)	(1.746)		(2.096)	(4.237)	(2.219)		(1.983)	(3.835)	(2.045)	
District Ideology x Election		1.656				2.401				1.817		
		(0.266)				(0.368)				(0.293)		
Election	−0.044	−0.816	−0.015	0.179	−0.039	−1.157	−0.027	0.284	−0.087	−0.931	−0.064	0.149
	(0.038)	(0.131)	(0.042)	(0.053)	(0.052)	(0.185)	(0.057)	(0.070)	(0.038)	(0.145)	(0.042)	(0.054)
Electoral Race Controls	✓	✓			✓	✓			✓	✓		
National Controls	✓	✓			✓	✓			✓	✓		
Election Year FEs			✓	✓			✓	✓			✓	✓
District FEs				✓				✓				✓
Observations	3,867	3,867	3,867	3,867	3,323	3,323	3,323	3,323	3,861	3,861	3,861	3,861
Adjusted R^2	0.833	0.836	0.796	0.769	0.824	0.828	0.775	0.760	0.828	0.831	0.785	0.759

Note: Standard errors clustered by district displayed in parentheses below OLS coefficients. Electoral race controls include candidate spending and challenger quality variables. National controls include presidential party, presidential approval, GDP change and midterm variables.

Table S7: Varying coefficient estimates for Figure 2

Dependent Variable: Dem. Vote Share										
	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998
Incumbent CFscore	3.178	3.461	2.939	3.819	2.864	4.395	3.475	3.077	5.574	3.259
	(0.949)	(0.874)	(1.097)	(1.021)	(0.983)	(0.983)	(0.827)	(0.958)	(0.925)	(0.829)
Challenger CFscore	1.113	2.225	2.668	4.359	3.651	1.720	0.560	1.487	1.729	1.937
	(0.838)	(0.724)	(0.847)	(0.790)	(0.818)	(0.636)	(0.635)	(0.703)	(0.591)	(0.668)
District Ideology	21.197	18.289	42.84	26.116	30.813	26.878	46.063	49.345	60.489	35.716
	(5.985)	(4.676)	(7.067)	(6.385)	(6.227)	(5.616)	(4.209)	(4.144)	(4.338)	(4.512)
Year Effects	-11.839	-5.038	-20.562	-10.32	-14.573	-11.639	-24.692	-31.741	-32.597	-18.116
	(4.914)	(4.061)	(4.550)	(4.682)	(4.712)	(4.383)	(4.302)	(4.853)	(4.675)	(4.356)

	2000	2002	2004	2006	2008	2010	2012	2014	2016
Incumbent CFscore	3.825	3.235	2.779	3.553	3.760	3.925	5.270	3.291	4.015
	(0.840)	(0.893)	(1.049)	(0.821)	(0.781)	(0.712)	(0.732)	(0.785)	(0.760)
Challenger CFscore	2.381	2.824	1.353	1.546	0.630	-0.751	-0.059	-1.214	-0.778
	(0.633)	(0.685)	(0.730)	(0.555)	(0.568)	(0.490)	(0.513)	(0.619)	(0.493)
District Ideology	51.261	34.277	50.459	39.13	49.377	66.739	70.184	53.787	48.62
	(4.706)	(4.398)	(4.385)	(3.779)	(4.214)	(3.146)	(4.323)	(4.103)	(4.002)
Year Effects	-25.481	-17.971	-24.019	-17.70	-23.739	-39.079	-36.081	-30.201	-25.282
	(4.359)	(4.448)	(3.902)	(3.931)	(4.065)	(4.088)	(4.163)	(4.175)	(4.123)

Note: Standard errors displayed in parentheses below coefficients from Bayesian random slopes model.

Table S8: Fixed coefficient estimates for Figure 2

Dependent Variable: Dem. Vote Share	
Dem. Incumbent	15.543
	(0.700)
Difference in Logged Spending	2.193
	(0.081)
Quality Challenger (Dem.)	1.097
	(0.294)
Quality Challenger (Rep.)	−1.130
	(0.290)
Intercept	42.735
	(3.649)
Observations	3,867

Note: Standard errors displayed in parentheses below coefficients from Bayesian random slopes model.

Figure S3: Random slopes estimates of incumbent and challenger accountability, DW-DIME scores

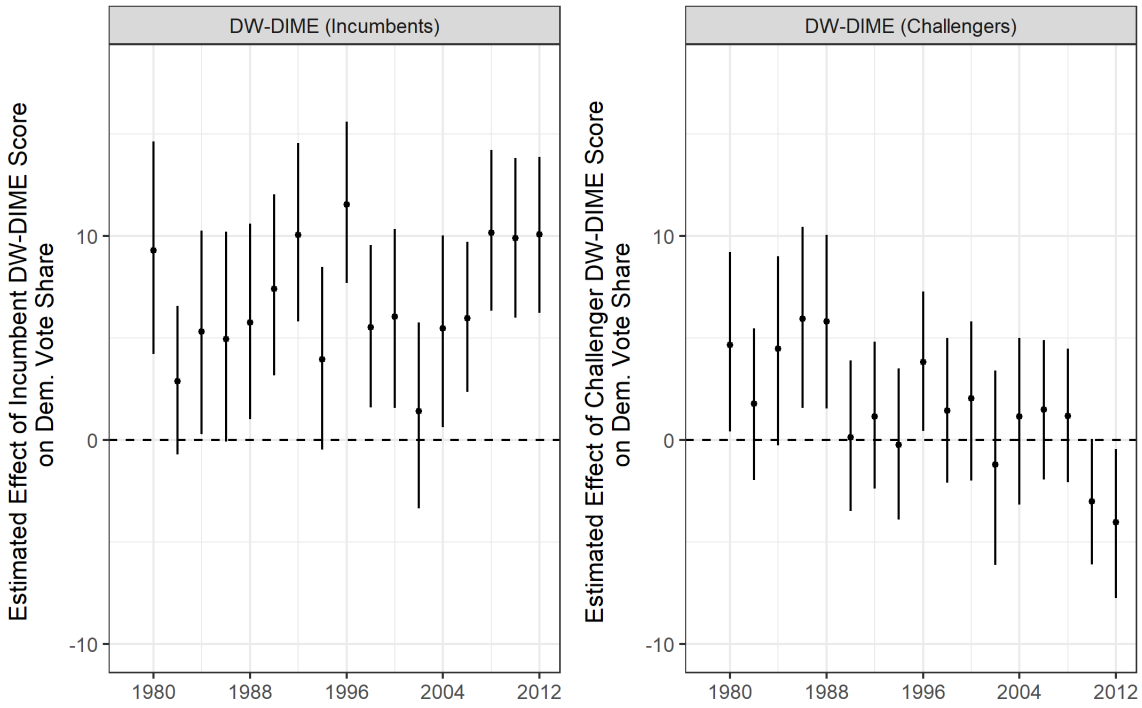


Figure S4: Random slopes estimates of incumbent accountability, challenger ideology omitted

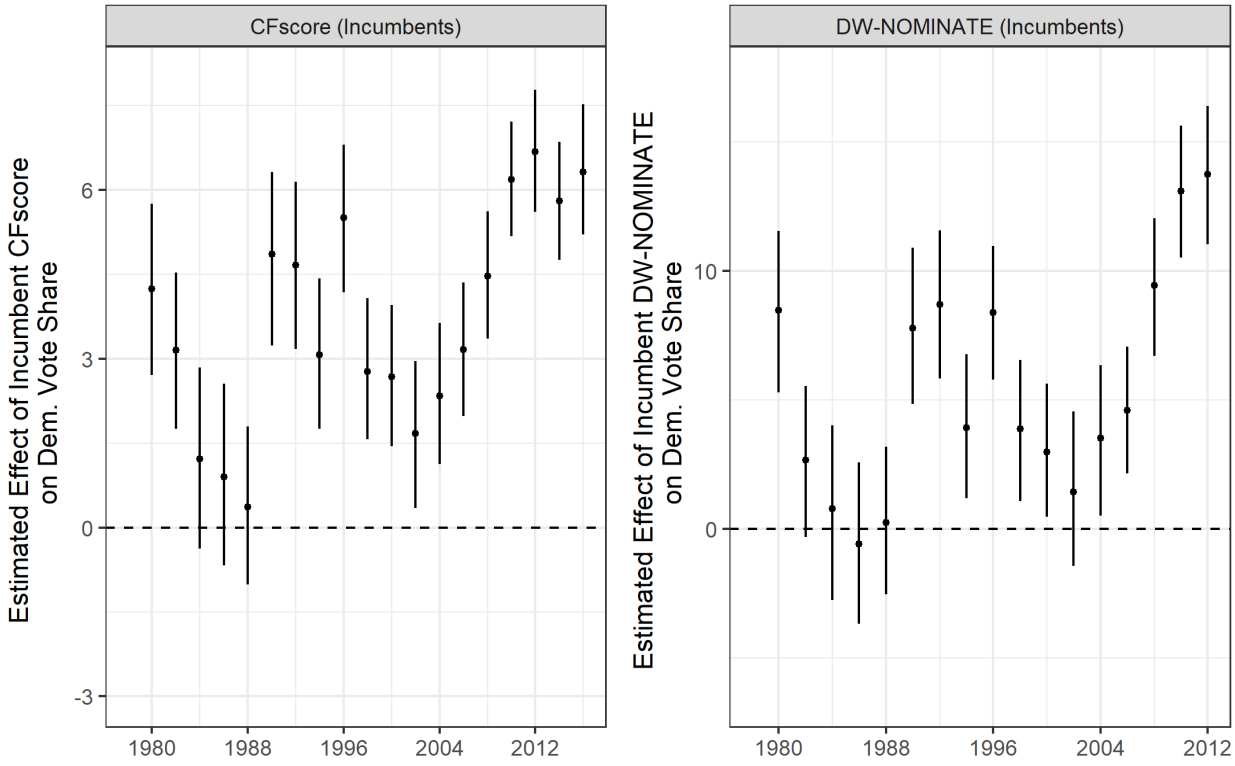


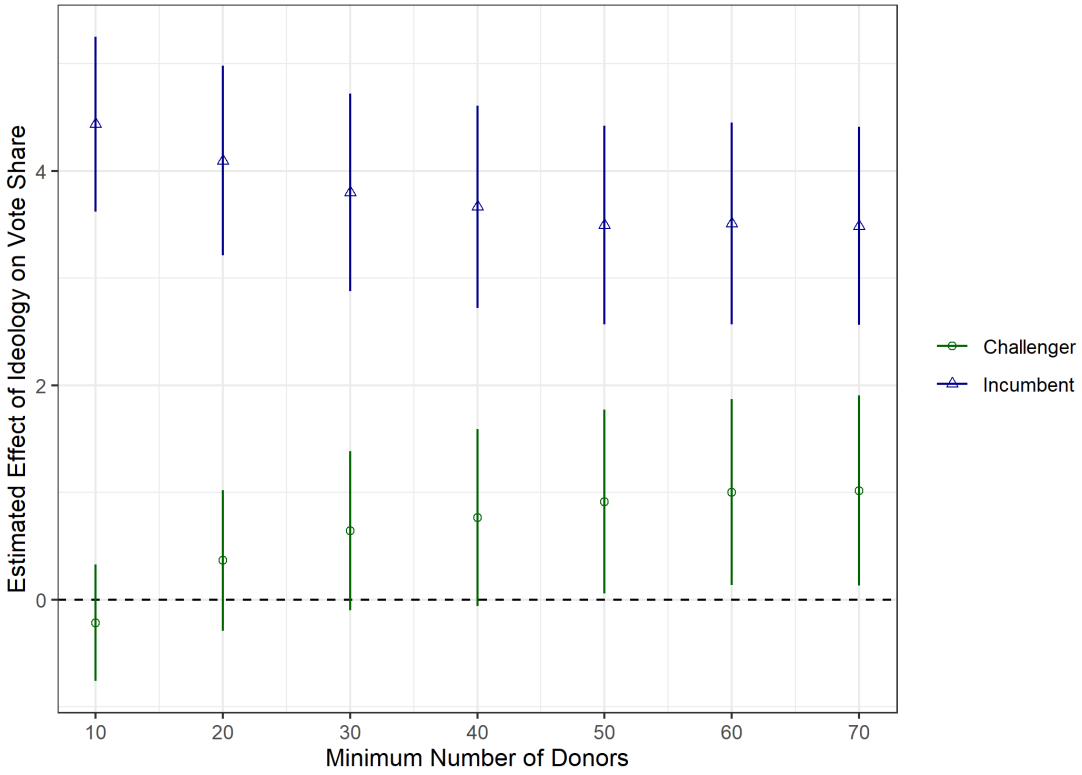
Table S9: Comparing the Party Midpoint and Differential Accountability models

Concomitant Model	*Dependent Variable:* Consistency with Party Midpoint Model
	(1)
Election	−0.148
	(0.041)
Post-1994	−0.906
	(0.404)
Senate	0.880
	(0.349)
Intercept	0.670
	(0.393)
Observations	3,867

Mixture Components	*Dependent Variable:* Dem. Vote Share	
	(1a)	(1b)
Incumbent CFscore	4.331	
	(0.287)	
Challenger CFscore	0.225	
	(0.211)	
Party Midpoint		2.258
		(0.404)
Dem. Incumbent	17.517	17.517
	(0.574)	(0.574)
Difference in Log Spending	2.245	2.245
	(0.077)	(0.077)
District Ideology	43.831	43.831
	(1.131)	(1.131)
Quality Challenger (Dem.)	1.325	1.325
	(0.282)	(0.282)
Quality Challenger (Rep.)	−1.604	−1.604
	(0.294)	(0.294)
Dem. President	0.641	0.641
	(0.464)	(0.464)
GDP Growth	−0.317	−0.317
	(0.069)	(0.069)
Midterm	1.148	1.148
	(0.301)	(0.301)
Presidential Approval	0.008	0.008
	(0.008)	(0.008)
Dem. Pres. x GDP Growth	−1.109	−1.109
	(0.183)	(0.183)
Dem. Pres. x Midterm	−2.147	−2.147
	(0.466)	(0.466)
Dem. Pres. x Approval	0.140	0.140
	(0.016)	(0.016)
Intercept	20.827	21.155
	(0.657)	(0.822)
Observations	3,867	3,867

Note: Standard errors displayed in parentheses below coefficients from finite mixture models.

Figure S5: Estimates of incumbent and challenger ideology by minimum donor threshold



To help ensure that the observed difference in accountability between challengers and incumbents is not simply an artifact of different levels of measurement, we evaluate how much the minimum donor threshold required for inclusion affects the findings. The figure above shows the estimated effect of incumbent and challenger ideology on Democratic vote share when estimated using OLS, without any time interactions and with the standard set of controls. On the $x-$axis, the minimum number of donors required for inclusion in the sample is allowed to range from 10, the threshold used by Bonica and Cox (2018) for their main analyses, to 70. As the figure shows, although the estimates for the two candidates converge weakly when moving from a threshold of 10 to 30, from 30 donors onwards the difference between challenger and incumbents remains stable and is statistically significant in all cases.

Table S10: OLS estimates of change in candidate accountability, matched sample

	Dependent Variable: Dem. Vote Share							
	CFscores				DW-DIME			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Incumbent Ideology	4.095	3.364	6.877	13.012	9.184	4.398	12.009	11.433
	(0.873)	(0.839)	(0.956)	(1.104)	(2.105)	(1.921)	(2.370)	(3.547)
Incumbent Ideology x Election	−0.083	0.027	−0.152	−0.540	−0.279	0.230	−0.498	−1.161
	(0.064)	(0.063)	(0.062)	(0.072)	(0.151)	(0.145)	(0.170)	(0.232)
Challenger Ideology	2.304	1.792	2.149	7.062	7.726	5.291	9.282	16.546
	(0.768)	(0.757)	(0.945)	(0.988)	(1.842)	(1.748)	(1.963)	(2.884)
Challenger Ideology x Election	−0.238	−0.152	−0.191	−0.483	−0.555	−0.357	−0.389	−0.971
	(0.052)	(0.051)	(0.060)	(0.070)	(0.130)	(0.125)	(0.148)	(0.207)
District Ideology	28.313	9.077	44.593		45.071	21.223	57.436	
	(2.844)	(4.036)	(3.147)		(2.357)	(4.095)	(2.330)	
District Ideology x Election		2.179				2.391		
		(0.311)				(0.348)		
Election	−0.031	−1.134	0.149	0.310	−0.171	−1.333	−0.030	0.315
	(0.033)	(0.151)	(0.053)	(0.059)	(0.032)	(0.174)	(0.054)	(0.068)
Electoral Race Controls	✓	✓			✓	✓		
National Controls	✓	✓			✓	✓		
Election Year FEs			✓	✓			✓	✓
District FEs				✓				✓
Matched Observations	3,867	3,867	3,867	3,867	2,653	2,653	2,653	2,653
Adjusted R^2	0.741	0.746	0.689	0.736	0.822	0.827	0.790	0.774

Note: Matched sample constructed using the `CEM` package in R. Observations matched on the ideology of the Democratic candidate, Republican candidate, and the district. Standard errors clustered by district shown below coefficients from OLS. Electoral race controls include candidate spending and challenger quality variables. National controls include presidential party, presidential approval, GDP change and midterm variables.