Presidential Coattails versus The Median Voter: Senator Selection in U.S. Elections*

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Abstract

We show that senators elected in presidential elections are more ideologically extreme than in midterm elections. This finding is in contrast to the literature suggesting that voters in presidential elections are more ideologically moderate than voters in midterm elections. To explain this incongruence, we propose a theory of spillover effects in which party labels enable voters to update their beliefs about candidates across contemporaneous races for office: unexpected support for a candidate in one race carries marginal candidates from the same party in other races. Our theory implies that presidential coattails may skew representative government away from the median-voter ideal.

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1 Introduction

Elections are most effective when voters have accurate beliefs (Downs, 1957; Becker, 1958). In particular, the Median Voter Theorem (Black, 1948) hinges on the premise that voters are well-informed about their choices. In this paper, we document a new finding on the selection of United States senators that presents a challenge to the Median Voter Theorem, and explore how this finding is linked to the participation of uninformed voters in elections.

U.S. senators are elected in midterm or presidential elections. Typically, one third of the seats in the Senate are contested every election. We find that midterm and presidential elections produce different types of outcomes: senators who take office in presidential elections are more ideologically extreme than senators who take office in midterm elections. Conversely, senators who are ousted, die or voluntarily depart without facing reelection in presidential elections are more ideologically moderate than senators who leave office in midterm elections.

Using panel data from 1968 to 2006 on U.S. elections, we find that senators first elected in presidential elections are about one fifth more ideologically polarized than senators first elected in midterm elections. We compute this estimate by using the average difference in ideology between Democrats and Republicans in the Senate as a measure of ideological polarization. Furthermore, we show that senators who exit in presidential elections are about one quarter less ideologically polarized than those who exit in midterm elections. We address the robustness of our results by employing a variety of specifications and controls.

To offer an explanation for our empirical findings, we propose a theory of spillover effects in elections with contemporaneous races for office. In particular, extreme outcomes can be the result of spillover effects, which can occur when uninformed voters make inferences about one race using information gleaned from another, contemporaneous race. Our theory rests on the sole assumption that voters in a Senate race that is held during presidential elections are less informed about the candidates than voters in a Senate race that is held during midterm elections. Given that participation in elections by uninformed voters can induce errors (i.e., a candidate farther from the median voter than her opponent can win), extreme outcomes

are more likely in presidential elections.

To illustrate our theory, suppose that the Democratic and Republican presidential candidates take more conservative positions than voters expect. All else being equal, this results in more support for the Democratic presidential candidate, because he appeals to a broader range of voters than expected (in particular, right-leaning voters who initially favored the Republican). Using the Democrat's success as a signal of the desirable attributes of Democrats, uninformed voters may update their beliefs about candidates in senatorial races using party labels (Caillaud and Tirole, 2002; Snyder and Ting, 2002). This updating produces a built-in advantage for other Democratic candidates running for office. As a result, more ideologically extreme (in this case, more liberal) candidates, who are typically less electorally viable, can win.

Our primary contribution to the literature is empirical. Our findings on senator selection are new and surprising. Voters in midterm elections tend to be more ideologically extreme than voters in presidential elections. For example, papers by Campbell (1960); Palfrey and Poole (1987); Osborne et al. (2000) and Leighley and Nagler (2007) present robust evidence of the positive relationship between voter turnout and ideological extremism. Since the average turnout rate in presidential elections exceeds that in midterm elections by a factor of 1.4, a higher proportion of moderate voters (relative to extreme voters) are likely to participate in presidential elections than in midterm elections.[1] As such, in midterm elections, more variability in the median voter alone should result in more ideologically extreme senators (even if the expected median voter remains the same). Our findings call into question whether the median voter is doing his part.[2]

Second, our economic model of spillover effects sheds important light on electoral institutions. Our theory shares insights with the literature in marketing and industrial organization that examines information asymmetries in markets for horizontally differentiated goods. For example, Hendricks and Sorensen (2009) find

[1] Estimate is based on turnout data from 1960 to 2012 reported by the United States Elections Project.

[2] Even if one does not find this result surprising, this paper is the first to show that midterm and presidential elections produce ideologically distinct outcomes. Furthermore, our findings suggest that holding contemporaneous races for office is not outcome neutral.

analogous coattail-like effects across sales for a given artist's music albums: the release of a new album, particularly if the album is a hit, spikes sales for older albums, thereby generating backward (rather than down-ticket) spillovers. As with markets, information about one race for office can affect beliefs about another. In the context of learning in elections, our work is most closely related to papers by Knight and Schiff (2010) and Chiang and Knight (2011). Both show how voters rationally respond to signals: the latter focuses on biased signals using learning from newspaper endorsements before elections whereas the former focuses on unbiased public signals using learning about candidates in the sequential presidential primaries. In contrast, we examine how voters respond to unbiased public signals using learning about candidates by observing other candidates in contemporaneous races.

An extensive literature focuses on political polarization. Recent contributions include Glaeser and Ward (2006) and McCarty et al. (2008), and our work offers insights as to how voter information and institutional design may play a role in increasing polarization. The existing literature on presidential coattails focuses on the relationship between a party's presidential voteshare and its subsequent share of congressional seats (Besley and Preston, 2007; Campbell, 1986; Campbell and Sumners, 1990; Coate and Knight, 2007), but not on the types of candidates elected as a result. We fill this gap. Relatedly, the literature on presidential surge and midterm decline studies the regular oscillation in support for the president's party in congressional elections: congressional seat gains in presidential elections and losses in midterms. This phenomenon has motivated a variety of theories (Campbell, 1960, 1991, 1997; Tufte, 1975; Kernell, 1977; Erikson, 1988; Folke and Snyder, 2012) and our results connect to and inform those theories.

The sparse theoretical literature on contemporaneous races suggests that voter behavior and electoral outcomes might differ between midterm and presidential elections because of strategic concerns or changes in the information structure voters face. Papers by Alesina and Rosenthal (1989, 1995, 1996) have focused on the effect of such electoral environments on split-ticket voting, where a voter's objective is to obtain a divided government–a state in which the executive and legislative branches are not controlled by the same party. These papers offer an alternative explanation for our main findings: voters in presidential elections may support ide-

ologically extreme congressional candidates as a counter-weight to their support for an ideologically extreme presidential candidate. More recent work examines positive properties of simultaneous races with respect to voter information. Ahn and Oliveros (2010) show that where voters have common values, contemporaneous races for office aggregate information effectively if and only if each race does so independently, in the absence of other races; however, when voters are heterogenous, holding multiple races simultaneously can generate inefficiencies (Ahn and Oliveros, 2012). Our theory speaks to the latter.

Finally, our paper contributes to the growing body of literature on the interactions between voter information, election outcomes and policy. Recent work has looked at the effects of information on elections in developing countries (Ferraz and Finan, 2008; Banerjee et al., 2010; Casey, 2010; Fujiwara, 2011; Pande, 2011). Other work has isolated the effect of media on beliefs and voter behavior (Gerber et al., 2009; Gentzkow, 2006; DellaVigna and Kaplan, 2007; Chiang and Knight, 2011) and on electoral outcomes and policy (Durante and Knight, 2012; Gentzkow et al., 2011; Strömberg, 2004a,b; Snyder and Strömberg, 2010). This paper contributes to this strand of the literature by documenting the ways in which supplying citizens with political information may have unintended consequences.

The paper proceeds as follows. Next, we present evidence on our motivating stylized fact, followed by a description of the data and a discussion of our empirical approach and results. Our theory is developed in Section 3, followed in Section 4 by an empirical evaluation of our theory against a theory of divided government. Section 5 concludes.

2 Evidence on Selection in Senate Races

Elections serve as aggregators of individual choice. As a result, if electoral institutions work as they should, one would expect political outcomes to reflect voters' preferences. In the context of U.S. elections, it seems natural to suppose that midterm elections produce more ideologically extreme outcomes than presidential election because the electorate at midterms is likely to be more ideologically extreme than at presidential elections. In the case of U.S. senators, however, we find

the opposite to be true.

In Figure 1a, we plot the results of a kernel density estimation of senator ideology using ideology scores given to senators over the past four decades. We do this separately for senators who were first elected in midterms and for senators who were first elected in presidential elections. The scores are given to legislators once every congressional session (lasting two years) and range from -1 to 1, where a more positive score reflects a more conservative voting record in Congress. For example, in the 109th Congress, Ted Kennedy's score was -0.56, John McCain's was 0.374, whereas Arlen Specter's was 0.081. We find the distribution of those who first took office in presidential elections to be more bimodal than that of those who first took office in midterms. Put differently, despite the moderate nature of the electorate in presidential elections, more ideologically extreme candidates are selected.

To emphasize the regularity of the distinct patterns in voting behavior, in Figure 1b, we plot the average ideology scores by entry environment (midterm or presidential election) for each party and for every congressional session. The results are striking: the average ideology of a midterm entrant is consistently more moderate than the average ideology of a presidential entrant, for both parties.[3] In Figure 2, we present analogous plots for exit. The figures suggest that senators whose service ends in midterm elections are more ideologically extreme than senators who exit in presidential elections.[4] Together with our results on entry, we find that the electorate in presidential elections returns a more ideologically extreme Senate than in midterm elections, with moderates leaving and extremists entering. A detailed analysis of these findings is presented next.

[3]Another pattern that emerges in Figure 1b is well documented in the literature: over the past 40 years, Democrats have become relatively more liberal and Republicans more conservative, the overall effect being increasing ideological polarization in Congress. See McCarty et al. (2008) for more on this literature.

[4]We do not distinguish between incumbents who choose to retire at the end of a term and those who compete in elections and are subsequently ousted from office. See Diermeier et al. (2005) for an empirical investigation of strategic retirement decisions in Congress, which suggests that retirees are forward-looking in terms of electoral prospects.

2.1 Data

Our data on presidential election returns along with senators' entry and exit election years come from the Congressional Quarterly Electronic Library and the Almanac of American Politics. The data consist of senators who took office between 1968 and 2006. Of the 221 senatorial entrants, 122 were first elected to office in a presidential election.[5] During the same time period, 137 of these entrants left the Senate, with 76 leaving in presidential election years. Our panel data amount to 1,329 senator-year observations for entry and 754 senator-year observations for exit. Note that our data on exits include only those senators who took office during the sample time frame; as a result, our analysis on exits relies on a smaller number of observations than our analysis on entries.

Table 1 shows the state-level frequency of entries (exits) in presidential and midterm elections from each party.[6] The average number of entries and exits per state is quite small: from 1968 to 2006, most states had around 3 to 5 entries in total and an even smaller number of exits. At least one-third of states lack the full representation of senators from presidential and midterm elections. An even larger number of states have just one presidential or midterm entrant, which means that within-state variation in our data is quite limited. Figure 3 provides information on the spatial variation in the number of senator entries and exits by state. More detailed information on the number of entries (and exits) of each type of senator in every state is given in Table A1. These data suggest that there is no evident skewness in the number of entries or exits across states or regions.

We also gather information on senator characteristics, electoral-race conditions and constituent demographics, described in more detail below. Data on Nominate scores, our measure of senator ideology, come from Poole and Rosenthal's Vote-

[5]For senators who fill a vacancy mid-election cycle, we code the timing of senator entry by the first regularly scheduled federal election she faces. For example, if a senator took office in March 2008 and faced a November election for the first time in 2010 at midterms, then she is coded as a midterm entrant. One Independent senator and four senators that were appointed off-cycle and did not subsequently face a November election were omitted from the analysis.

[6]To address several instances in which a senator switched parties while in office, for the analysis on senator entry, we code senators by the party affiliation they had at the time of entry; whereas, for exit, we code senators by the party affiliation they had at the time of exit. Our results are robust to the exclusion of this set of senators from analysis.

view website.[7] Data on state and senator characteristics are taken from Aldrich et al. (2008); The source for the state demographics is the U.S. Census and Bureau of Economic Analysis. These data are linearly interpolated between decennial censuses. Detailed electoral race characteristics are provided by the Congressional Biographical Directory.

We employ in our regressions standard controls that are used in the literature.[8] Senator and electoral-race covariates include age, tenure, dummy variables for whether a senator is a freshman or belongs to the majority party, a dummy variable for whether an open seat is contested and a measure of the closeness of a race, defined as 0.5 (the threshold for winning the race) minus the share of votes obtained by the winning candidate. State characteristics include the share of the population over age 65, that is black, who are farmers, who work in finance, government or manufacturing (each considered separately), who are foreign born, and who live in urban areas. We also include per capita income (logged) and population per square mile. Descriptive information on each set of variables is available in Table 2.

2.2 Correlates of Senator Entry and Exit Election

In this subsection, we examine whether senator entry (exit) in midterm or presidential elections is correlated with a latent state or senator characteristic and address the possibility that our findings are spurious. If, for example, more ideologically extreme states are more likely to elect freshmen senators in presidential elections, then this would bias our results. In Table 3, we present summary statistics of covariates we use in the analysis. For each such covariate, we report the mean and standard deviation separately for those associated with senators who enter in presidential elections and those who enter in midterm elections; the t-statistic of a test for mean equality between midterm and presidential elections is reported as well. For entry, the statistics are based on senators serving in 2000, which is the year for

[7] These scores are widely-used and robust measures of legislator ideology. We use the first dimension of Nominate scores, which most closely corresponds to the liberal (left)-conservative (right) ideology space; during the period of our study, the first dimension accounts for approximately ninety percent of the variation in senators' roll-call voting behavior in Congress. For details on the estimation procedure and construction of this measure see Poole and Rosenthal (2000).

[8] For example, see Aldrich et al. (2008) and Snyder and Strömberg (2010).

which we observe the highest number of senators (95 of 100); for exit, we look at senators serving in 1984, where we observe 69 senators.[9]

In Panel A, we report statistics for state covariates. For entry, the covariates are insignificantly different from each other. The highest t-statistic for a mean equality test is 0.802 for the covariate share of foreign born. Similar levels of statistical significance are obtained for share of government workers, urban population, population density and per capita income. The remaining covariates show even weaker differences between each other. Turning to exit, the share of foreign born has a similar t-statistic as the one for entry (0.7627) and the rest of the covariates have lower significance levels except for population density, with a t-statistic of 1.408. To sum, we do not discern any significant differences between states that have a senator elected in presidential elections versus states that have a senator elected in midterm elections. The same is true for states with senators who exit in midterms versus presidential elections.

Importantly, we do not find that a senator's entry (exit) election is correlated with the degree to which her state is ideologically extreme. Using the margin of victory obtained in the presidential race as a measure of state partisanship, the statistics reported in Table 3 imply that senators elected (ousted) in presidential and midterm elections come from states that are equally partisan. For further inspection, we correlated the proportion of entries (exits) in presidential elections (as opposed to midterm elections) in our panel with our measure of state partisanship and found it to be insignificant.[10] Thus, we do not find a relationship between state ideology and the likelihood of entry (exit) in presidential elections. For more detail on the number of entries and exits per state, see Table A1.

Another plausible set of correlates of midterm and presidential elections is the set of senatorial candidates' characteristics. Put differently, are senators elected in midterms inherently different from those elected in presidential elections? In Panel

[9] Senators who served in 2000 but were elected before 1968, off-cycle or, in the case of exit, were still in office in 1984, are excluded from this analysis.

[10] For example, using returns from the 1988 election, the median presidential election in our data, we find a correlation of -0.00467. This correlation suggests that, if anything, our results are understated because the correlation implies that entry in presidential elections is marginally less likely to occur in partisan states.

B, we report identical statistics to those reported in Panel A. The covariates are whether the selected senator (for entry or exit) is a Democrat, the senator's age and whether he belongs to the majority party. Electoral-race covariates are whether the race that the senator most recently faced was close or had an incumbent seeking reelection. The only difference in means that is statistically significant is the close race covariate for entrants, where midterm entrants appear to compete in less contested races ($t = 2.914$): the average entrant in presidential elections wins the Senate race with a 5 percent vote-margin, whereas a midterm entrant wins by 8 percent. We do not find this electoral distinction among senators who exit. No other differences are statistically significant both for entry and exit. The highest significance levels are associated with open seat for entry ($t = 1.345$), with more open seats observed in midterm elections, and Democrat ($t = 1.364$) and age ($t = 1.246$) for exiting senators; more Democrats and younger senators exit in presidential elections.

In sum, we do not find significant differences between states associated with senators elected in midterm and presidential elections.

2.3 Empirical Strategy

We estimate equations of the form:

$$y_{itsg} = \beta_1 Presidential_i + \beta_2 Presidential_i \times Democrat_i + \beta_3 Democrat_i + \mathbf{x}_{it}'\gamma + \mathbf{z}_{ts}'\eta + \delta_t + \rho_g + \varepsilon_{itsg}, \quad (1)$$

where y_{itsg} is the ideology score of senator i from state s in census region g in congressional session t, $Presidential_i$ is an indicator variable equal to one if senator i first took office during a presidential election (or, in the case of our exit regressions, whether she left office in a presidential election year) and $Democrat_i$ is an indicator equal to one if senator i is a Democrat. Based on the results in Figure 1, for entrants we expect $\beta_1 > 0$ (Republicans first elected during a presidential election are more conservative) and $\beta_1 + \beta_2 < 0$ (Democrats elected in a presidential election are more liberal). The opposite inequalities are expected for senator exits.

To address the possibility that senators' characteristics may unevenly influence

our results, we include a vector $\mathbf{x}_{it}$ of senator and electoral-race covariates described in the data subsection. Likewise, because constituent preferences might play a role in creating bias toward selection in presidential or midterm elections, we include a vector $\mathbf{z}_{ts}$ of state-level demographic and economic controls. Finally, we include in our regressions year (δ_t) and regional (ρ_g) fixed-effects, respectively .

We believe that our main threat to identification in equation (1) is that an unobserved fixed state-characteristic might be correlated with the selection of candidates, in particular the *Presidential* indicator variable. That is, our estimates would be biased if presidential entrants came disproportionately from more extreme states (that is, states that are very liberal or very conservative). Ideally, to control for the unique, invariant, political characteristics of each state, we could include state fixed effects; however, because the number of entries and exits per state is small, this would eliminate a sizable and essential portion of the usable information in our dataset and we would be left with insufficient observations for inference. Because geographical regions correspond quite well with the ideological map in the United States, we partially resolve this problem by including regional fixed effects. Further, given our findings in the previous subsection, it does not appear that selection in midterm or presidential elections is correlated with a state's fixed characteristic. In sum, we do not consider the omission of state fixed-effects as a serious threat to our results.

Finally, we adjust our standard errors for clustering at the senator level in order to address serial-correlation among senator observations across time.

2.4 Estimation

In Table 4, we present regression results of estimating equation (1) using Poole and Rosenthal's first dimension of DW-Nominate scores to proxy for senator ideology. Overall, the estimates corroborate our findings in Figure 1. For entry (exit), The coefficient estimates on *Presidential*, the indicator capturing the ideological difference between Republicans elected (ousted) in presidential and midterm elections, are positive (negative), meaning Republicans elected in presidential elections are more conservative than Republicans elected in midterms. Similarly, the sum of coeffi-

cient estimates on *Presidential* and the interaction term between *Presidential* and *Democrat*, which measures the ideological difference between Democrats elected (ousted) in presidential and midterm elections, are negative (positive), meaning Democrats elected in presidential elections are more liberal than Democrats elected in midterms. In general, the estimates are significant at the 5 percent level; differences in ideology between Democrats elected in midterm and presidential elections are slightly more robust and less variable than the differences among Republicans. Likewise, the results for senator exits are more precise than the results for senator entries.

For clarity, in each regression table, we present in the top two rows estimates for *Presidential* and the interaction term between *Presidential* and *Democrat*. Below these, we provide four useful statistical entries. The following are the items with respect to senator entries:

1. the p-value from a one-sided statistical test for presidential elections resulting in more moderate (i.e., liberal) Republicans ($\beta_1 < 0$),

2. the point estimate for the difference between Democrats elected in presidential and midterm elections ($\beta_1 + \beta_2$),

3. the p-value from a one-sided statistical test for presidential elections resulting in more moderate (i.e., conservative) Democrats ($\beta_1 + \beta_2 > 0$) and

4. the point estimate for the difference between Democrats and Republicans elected in midterm elections (β_3).

The p-values associated with these one-sided tests are useful to infer the direction in which outcomes vary across the election cycle. For exit, the one-sided tests have the opposite inequalities: in entries 1 and 3, we report the p-values from one-sided tests of whether Republicans and Democrats ousted in presidential elections are more ideologically extreme than senators ousted in midterms ($\beta_1 > 0$ and $\beta_1 + \beta_2 < 0$, respectively).

The results for senator entry are presented in Table 4a. In the specification excluding controls and fixed effects (column (1)), the point estimate for *Presidential*, the difference between Republicans who take office in presidential and midterm

elections (β_1), is 0.0431, and for the interaction between *Presidential* and *Democrat*, the difference in inter-party polarization (as measured by taking the average difference between Republican and Democratic DW-Nominate scores) between senators elected in midterms and presidential elections (β_2) is -0.103. This implies a point estimate of -0.0599 for the ideological difference between Democrats who take office in presidential and midterm elections ($\beta_1 + \beta_2$). In percent terms, inter-party polarization among senators elected in presidential elections is 17 percent greater than among senators elected in midterms ($= \beta_2/\beta_3$). The inclusion of year dummies (column (2)) does not influence the estimates, leaving them at 0.0458 and -0.106 for β_1 and β_2, respectively.

In the remaining specifications (columns (3)-(6)), we gradually include electoral-race, senator and state covariates and regional fixed effects. The coefficient estimate for *Presidential* increases in magnitude with the inclusion of electoral-race covariates in column (3): the point estimate for β_1 grows from 0.0458 to 0.0763, and continues to increase with the inclusion of senator covariates. In contrast, the point estimate for $\beta_1 + \beta_2$ (row 2) marginally varies between -0.0536 and -0.0602 across columns (1)-(5), suggesting that Republicans sort across the election cycle on characteristics other than ideology, but Democrats do not. Using the estimates from column (6), the most complete specification in which we include regional fixed effects, implies that inter-party polarization is about 19 percent greater among the group of senators first elected in presidential elections than the group of senators first elected in midterms ($= \beta_2/\beta_3$), with about 60 percent of the increase in polarization attributed to more conservative Republicans relative to more liberal Democrats ($= \beta_1/\beta_2$).

Since much of the variation in senator ideology is captured by factors other than the timing of elections, statistical significance of the estimates increases with the inclusion of controls. In the two specifications without controls (columns (1)-(2)) the estimate for β_1 is insignificant, whereas the estimate for β_2 is significant at the 10 percent level. In the remaining specifications, the results are statistically significant at the 5 percent level, except for the coefficient estimate on *Presidential* in columns (3) and (4). The one-sided tests are rejected in all but the first two specifications, where, as suggested above, the claim that more moderate Republicans are elected

in presidential elections ($\beta_1 < 0$) cannot be rejected.

Turning to the analysis of senator exits, we present regression results of estimating equation (1) in Table 4b. As reflected in Figure 2b, the magnitudes of the coefficient estimates are larger than those for entry and, despite the smaller sample size, more precisely estimated. Specifically, in each of the six specifications, the coefficient estimates are statistically significant and the one-sided tests (rows 1 and 3) are rejected at least at the 5 percent level. In column (1), the specification without controls and fixed effects, the estimate for β_1 is -0.188 and for β_2 is 0.286. The average difference between Democrats and Republicans ousted in midterms is 0.793 (β_3), which implies a moderation in inter-party polarization among senators who exit in presidential elections of about 36 percent relative to that of senators who exit in midterms ($= \beta_2/\beta_3$). The inclusion of year dummies in column (2) does not change the coefficient estimates or significance levels.

Unlike our results for entry, the inclusion of covariates in the exit regressions absorbs a fraction of the coefficients' magnitudes. For Republicans, the largest change occurs when the set of state covariates are included. The estimate for β_1 changes from -0.174 in column (4) to -0.126 in column (5). On the other hand, for Democrats, the estimate for $\beta_1 + \beta_2$ reaches its lowest point of 0.0798 in column (4), when electoral-race and senator covariates are included in the regressions; however, when the set of demographic covariates are added in column (5) the estimate rises back to 0.0963, which is similar to the point estimate we obtain in columns (1) and (2). At the same time, for both Democrats and Republicans, the inclusion of regional dummies in column (6) does not affect the magnitudes or statistical significance of the coefficient estimates. Using estimates from this specification implies that inter-party polarization among senators who exit in midterm elections is approximately 39 percent greater than among senators who exit in presidential elections ($= \beta_3/(\beta_2 + \beta_3)$). Similar to our results for entry, Republicans account for about 57 percent of the increase in polarization ($= \beta_1/\beta_2$).

3 Theory

Our theory focuses entirely on selection effects that stem from voter behavior, taking exogenously parties and their candidates.[11] The most basic insight of our theory is that midterm elections aggregate preferences as one would expect: the candidate whose ideological position is closest to the preferred position of the median voter wins office. In presidential elections, by contrast, voter uncertainty introduces errors and occasionally the wrong candidate–one who is farther away from the median voter's preferred position–is elected. Thus, in expectation, outcomes generated in presidential elections are more ideologically extreme than outcomes generated in midterm elections.

We begin by noting that less informed citizens are more likely to abstain, and because a substantial number of citizens vote in presidential elections but abstain in midterm elections, the typical voter in presidential elections is likely to be less informed about senatorial candidates (the 'down-ticket' race). Party labels in presidential elections enable these voters to form informational linkages across the presidential and senatorial contemporaneous races, introducing bias to their voting behavior and the resulting electoral outcomes. A mainstream candidate in the up-ticket race can support a marginal candidate from the same party in a down-ticket race.

Suppose there are only two races for office, presidential (p) and senatorial (s), and that each office is contested by two parties, Democratic (D) and Republican (R). There are two election cycles: midterm and presidential. In presidential elections, both offices are contested, while in midterm elections only the senatorial office is contested.[12]

For simplicity, we assume that the selection of candidates in each race is independent from one another. We denote candidate positions in each race y_D^r and y_R^r (where $r \in \{p, s\}$). For simplicity, we assume that Democratic candidates are drawn

[11] Given our empirical objectives, we present a simple version of our theory here. A more elaborate and robust framework that includes voter microfoundations, formal proofs and a discussion of our modeling assumptions and related theoretical literature is available in the Online Appendix.

[12] Depending on the election cycle, there are one, two or three federal races for office; in each election, all the seats in the House are contested and there is at most one senatorial race in each state.

uniformly from -1 to 0. Similarly, Republican candidates are drawn uniformly from 0 to 1.

Citizens have different preferred positions in the policy space, which are drawn uniformly from -1 to 1. Conditional on voting, a citizen votes for the candidate whose position is closest to his own preferred position. In particular, if a citizen's preferred position is to the left of $\frac{y_D^r+y_R^r}{2}$ he votes for the Democratic candidate; otherwise, he votes for the Republican candidate in race *r*.

There are two types of citizens: those who observe all candidate positions ('informed') and those who observe candidate positions only in the presidential race ('uninformed'). Let the proportion of uninformed citizens in the population be $\delta > 0$. Informed citizens always turn out and vote; uninformed citizens turn out in presidential elections but abstain in midterm elections. In presidential elections, an uninformed citizen votes for his preferred candidate in the presidential race, and votes for the same party in the senatorial race.

In midterm elections, a Democratic candidate for the Senate with policy position y_D^s wins office if and only if

$$\frac{y_D^s + y_R^s}{2} > 0.$$

In words, the Democratic party wins if the midpoint of candidate positions is to the right of the median voter's preferred position. For any given draw of y_R^s, the probability that the Democrat wins is y_R^s; the unconditional probability of a Democrat winning is one half.

In presidential elections, the winner in the senatorial race will also depend on the presidential race. Let π be the proportion of uninformed citizens who vote for the Democrat in the presidential race.[13] Then the Democratic candidate for the Senate wins if and only if

$$\frac{y_D^s + y_R^s}{2} > (1-2\pi)\frac{\delta}{1-\delta}.$$

Thus, for any given draw of y_R^s, the probability that the Democratic party wins is $\min\left\{y_R^s - (1-2\pi)\frac{2\delta}{1-\delta}, 1\right\}$, which is increasing in π. In particular, in presidential

[13] Given our assumptions, $\pi \equiv \frac{\frac{y_D^p+y_R^p}{2}+1}{2}$.

elections, a senatorial candidate is more likely to win than not if a majority votes for his party in the presidential race.[14]

We can now express the expected winning positions of Democrats in the senatorial races, both in midterm and presidential elections. In a midterm election the expected position, $E_m[y_D^s|win]$, is equal to $-\frac{y_R^s}{2}$; whereas in a presidential election, $E_p[y_D^s|win]$ is equal to $-\frac{y_R^s}{2}+(1-2\pi)\frac{\delta}{1-\delta}$, which is decreasing in π (i.e., more liberal Democrat).[15] Thus, greater support for a party in the presidential race results in more extreme outcomes in the senatorial race.

Finally, we compare the expected winning positions for the Democratic party in midterm and presidential elections directly. In a presidential election $E_p[y_D^s|win]$ can be rewritten as

$$E_p[y_D^s|win,\pi>1/2]\,Prob(\pi>1/2|win)+ \\ E_p[y_D^s|win,\pi\leq 1/2]\,Prob(\pi\leq 1/2|win).$$

Since $Prob(\pi>1/2|win)>\frac{1}{2}$ we obtain the key result summarized in the proposition below.[16]

PROPOSITION : *Candidates elected for the Senate in presidential elections are more ideologically extreme than candidates elected for the Senate in midterm elections; conversely, senatorial candidates who lose the race for office in presidential elections are more moderate than senatorial candidates who lose the race for office in midterm elections. Specifically, for winners,*

$$E_p[y_D^s|win]<E_m[y_D^s|win] \text{ and } E_p[y_R^s|win]>E_m[y_R^s|win],$$

[14]For any given δ and y_R^s, the conditional probability that the Democratic candidate wins the Senate race when $\pi>\frac{1}{2}$ is $\min\left\{y_R^s+\frac{2\delta}{3(1-\delta)},1\right\}$

[15]Implicitly, this expectation is bounded between -1 and 0.

[16]Given our assumptions, for interior solutions $E_p[y_D^s|win,\pi>1/2]=-\frac{y_R^s}{2}-\frac{\delta}{3(1-\delta)}$; $E_p[y_D^s|win,\pi\leq 1/2]=-\frac{y_R^s}{2}+\frac{\delta}{3(1-\delta)}$ and $Prob(\pi>1/2|win)=\frac{1}{2}+\frac{\delta}{3(1-\delta)y_R^s}$.

and for losers,

$$E_p\left[y_D^s|lose\right] > E_m\left[y_D^s|lose\right] \text{ and } E_p\left[y_R^s|lose\right] < E_m\left[y_R^s|lose\right].$$

These inequalities illustrate how presidential coattails bias outcomes toward more extreme positions relative to outcomes in midterm elections.

The broader implications of our theory go beyond the unidimensional ideological space we assumed. Information asymmetries in presidential elections induce uninformed voters to externalize their biased decisions. Collectively, this behavior may enable less qualified, as well as ideologically less fit, candidates to win. The simple model described above generates more turnout and a less informed electorate in presidential elections, both of which are consistent with the data. It also accounts for presidential surge and decline and our new empirical findings. In our formal model we relax the assumption of straight-ticket voting among uninformed voters and provide a more rational and robust framework for parties and voter behavior. In particular, we focus on the mechanism that enables rational information contagion across races for office.

Our formal model also accounts for additional phenomena, such as the relative moderation of the electorate in presidential elections as well as "roll-off". Roll-off refers to the dropping rate at which voters cast their votes in down-ticket races in a given election. For example, many voters choose to vote for a presidential candidate (the up-ticket race), but abstain from voting for candidates in senatorial, house or other non-presidential races (the down-ticket races). This phenomenon presents a puzzle for many models of voting, however, our theory predicts behavior that is consistent with roll-off evidence.

We provide two more elaborate versions of our theory in the appendices. In Appendix A, we model the learning process and, in particular, the mechanism for information contagion. In the Online Appendix, we endogenize voters' decisions by providing microfoundations. In this version we also contrast our approach to existing theories of voting and elections and discuss possible extensions to the theory. These versions of our theory deliver a more robust and rational framework for learning and a rich set of comparative statics consistent with literature on elections. That

said, given that testing our theory is beyond the scope of this paper, the proposed mechanism for our empirical findings on senator selection is best illustrated with the simple model. Testing finer predictions of our theory is left for future research.

Lastly, we believe that our proposed mechanism is a reasonable one for explaining our new findings. This, however, does not preclude the existence of alternative explanations. For example, the theory of divided government described in Alesina and Rosenthal (1995) may indeed be at play. Likewise, alternative mechanisms that focus on party strategy may account for our findings. That said, relative to the large literature on presidential coattails, we contribute a formal model of coattails that connects to previous findings on coattails as well as our new ones.

4 Robustness and Extensions

To further examine the robustness of our results presented in Table 4, we use alternative measures of ideology and explore whether our findings hold in subsamples of the data.

In Table 5, we report for both entry and exit regression results of four additional specifications. In the first (columns (1) and (5)), the unit of observation is the median congressional session a senator served in office. Thus, each senator appears only once in these specifications. The dependent variable is the average DW-Nominate score for each senator over her tenure in office. These specifications address the multiplicity of observations for each senator employed in our baseline regressions. While we adjust the standard errors for clustering at the senator level, here we take a more conservative approach by assuming that within-senator observations are perfectly correlated. Additionally, this method also addresses uneven contributions of senators to the analysis by letting each senator have equal weight.[17] Despite the small sample size (216 observations for entry and 120 observations for exit) and the inclusion of the full set of covariates and fixed effects, the coefficient estimates are consistent with our findings in the baseline regressions. As before, the results for exit are more robust than the results for entry. Except for the *Presi-*

[17] This specification also addresses a possible mechanical correlation, whereby senators moderate their position in anticipation of upcoming elections as established in Albouy (2011).

dential entry coefficient, the estimates for β_1 and β_2 are significant at the 5 percent level, and the one-sided tests are rejected at a maximum 10 percent significance level. The obtained estimates imply that inter-party polarization among presidential entrants is 17.5 percent greater than among midterm entrants (compared to 19 percent in the baseline regressions) and 43 percent greater for midterm exits relative to presidential exits (compared to 39 percent in the baseline regressions).

In columns (2) and (6) we use the first dimension of W-Nominate scores, the static version of Poole and Rosenthal's Nominate scores. This score is computed in each congressional session independently and allows for a more flexible response to voting behavior across the election cycle. Using this measure, we find that the coefficient estimates and significance level are comparable with those found in Table 4. In particular, this suggests that our results are not driven by time-dependence in our measure of ideology. In columns (3) and (7) for entry and exit, respectively, we look at the effect of election timing on voting behavior in the first (last) term in office. And in columns (4) and (8), we look at the effects of election timing on all but the first (last) term in office. Whereas the point estimates are not identical across these subsamples of the data, suggesting non-uniform effects with respect to time from entry or exit elections, the results are consistent with our main findings, with more ideologically extreme senators elected in presidential elections and more moderate ones ousted.[18]

In sum, the regression results suggest that ideological differences across the election cycle in winning (and losing) candidates cannot be explained by a standard set of senator, electoral–race or constituency controls, and are not an artifact of differences in the political climate across regions or over time.

Relatedly, we collected data on representatives who served in the House between 1982 and 2004 to test whether presidential elections produce more extreme outcomes than midterm elections; however, we find neither support nor a rejection of our theory. We provide descriptive statistics and regression results in Tables A2 and A3. We argue that spillover effects are limited in the race for House repre-

[18]For further robustness, we ran regressions using subsamples of the data with respect to senators' tenure in Congress. Likewise, we ran regressions adjusting for clustering at the state-level to address correlation among within-state senator observations. Significance levels and coefficient estimates are comparable to those in our baseline results.

sentative because information about presidential candidates may be less useful for making inferences about candidates for the House (i.e., lower η). First, representatives are more susceptible to pressures from their constituents than they are from their own party relative to senators. In particular, senators have six year terms so they are more likely to follow their party on a consistent basis than members of the House. And second, voters evaluate candidates for the House more heavily (relative to senators) on their ability to take action in their local district rather than on how well they advance their global agenda in Congress. Another possible reason for a limited coattail effect in the House is roll-off: since roll-off is a behavior associated with uninformed voters and is substantially more prevalent in the House race than in the Senate race, the likelihood that midterm and presidential elections produce similar outcomes is greater in the House than in the Senate. This is because the reason we suggest for the difference in outcomes between midterm and presidential elections is participation by uninformed voters.

Finally, our theory suggests that the ideological extremism of newly-elected (or ousted) senators increases as unexpected support for their party's presidential candidate increases.[19] To provide indirect evidence of this phenomenon, we use the state-level performance of a presidential candidate relative to the past performance of his party in presidential elections as a measure of unexpected support for a presidential candidate ('presidential coattails'). We combine our data on senators newly-elected (or ousted) in presidential elections with this measure to detect a positive relationship between a party's presidential coattails and the ideological extremism of its elected (or ousted) senators. Our regression results are mixed. The relationship is statistically significant in the entry regressions, but not in those for exit. Overall, the correlation between our measure of coattails and voting in the Senate appears to diminish over time. We provide the details of this analysis in Appendices B and C.

[19]This prediction is in contrast to a theory of split-ticket voting, which suggests that support for a presidential candidate is positively correlated with support for ideologically extreme congressional candidates from the opposing party.

5 Conclusion

This paper is motivated by our new fact that senators first elected during presidential-election years are ideologically more extreme than their counterparts first elected during midterm elections. Conversely, senators who exit in presidential elections tend to be more moderate than those who exit in midterms. This is in contrast to a body of literature implying that the electorate prefers the opposite.

We believe that the model presented in this paper provides a plausible explanation for this collection of facts. We suggest that party labels supply valuable information to voters, but also introduce a channel of contagion among simultaneous races. This contagion links observable candidate positions in one race to beliefs and outcomes in other races, thereby generating spillover effects. Our interpretation is supported by both intuition and previous research on the informational role of party labels and voter behavior under incomplete information. We hope that more direct testing of the mechanisms of our model will be an avenue for future research.

When studying electoral institutions, the temptation is to look at elections in isolation. Our results caution against that approach. Our theory suggests that when information asymmetries arise, the presence of unbiased public signals, such as party labels, facilitates information contagion. In the context of contemporaneous races for office, we suggest that information contagion may result in distortions to representation and policy outcomes in the U.S. Congress.

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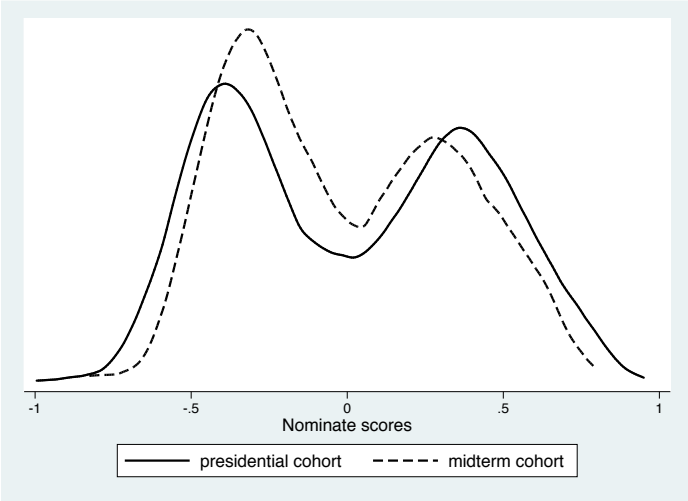
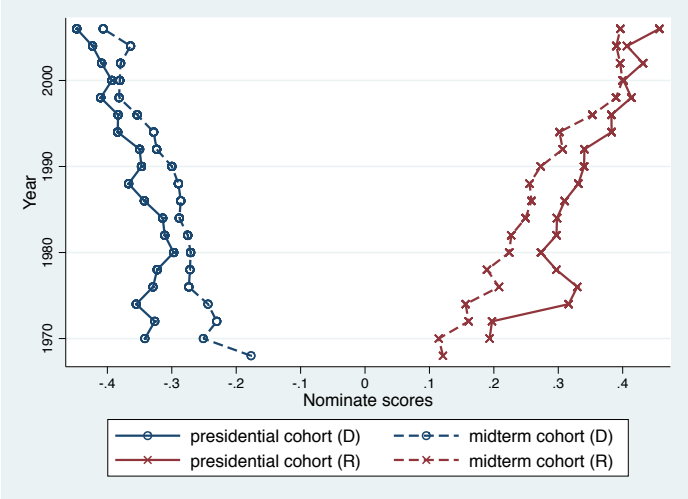


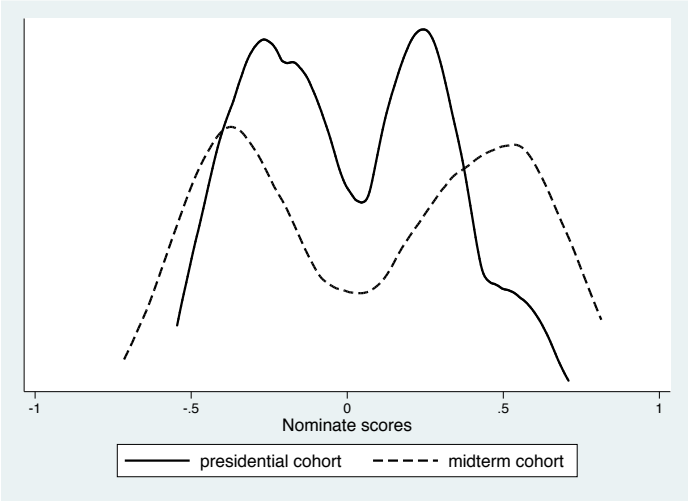
(a) Distribution of Ideology by Entry Election



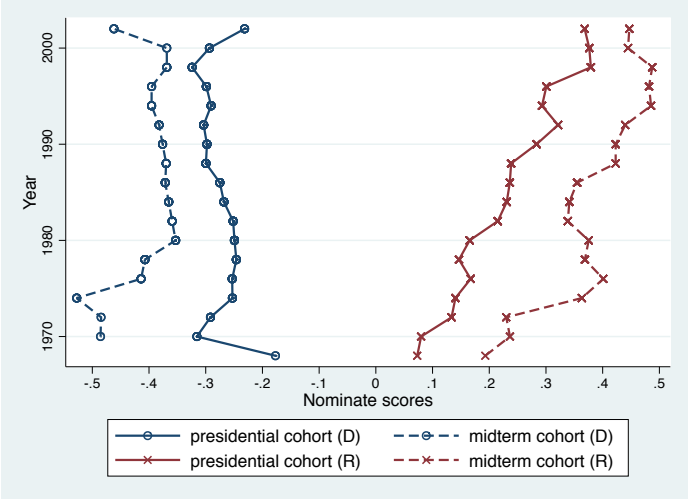
(b) Average Ideology by Entry Election

Figure 1: Senator Ideology and Entry Election 1968-2006

Notes: 'midterm cohort' refers to senators who first ran for office in a midterm election; 'presidential cohort' refers to senators who first ran for office in a presidential election. In Figure 1a, we plot Epanechnikov kernel density estimation results of Poole and Rosenthal's Nominate scores. In Figure 1b, each point corresponds to the average Nominate scores in a given congressional session for one of the four possible groups of senators, where (D) and (R) indicate Democrat and Republican cohorts respectively. The data include senators who took office between 1968 and 2006. There are 221 entrants, resulting in 1430 senator-year observations for entry. See the Data Subsection for more details on the data.



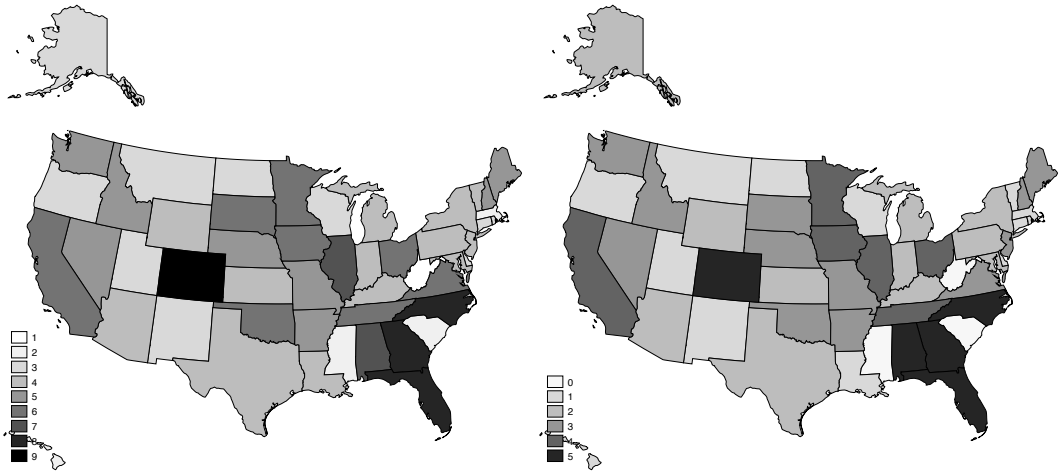
(a) Distribution of Ideology by Exit Election



(b) Average Ideology by Exit Election

Figure 2: Senator Ideology and Exit Election 1968-2006

Notes: 'midterm cohort' refers to senators who ended their service in a midterm election; 'presidential cohort' refers to senators who ended their service in a presidential election. In Figure 1a, we plot Epanechnikov kernel density estimation results of Poole and Rosenthal's Nominate scores. In Figure 1b, each point corresponds to the average Nominate scores in a given congressional session for one of the four possible groups of senators, where (D) and (R) indicate Democrat and Republican cohorts respectively. The data include senators who took office between 1968 and 2006. There are 137 incumbents who exit, resulting in 754 senator-year observations for exit. See the Data Subsection for more details on the data.



(a) Senator Entries per State (b) Senator Exits per State

Figure 3: Senator Entries and Exits 1968 - 2006

Notes: These figures illustrate the cross-sectional variation in the number of senator entries (exits) in our data. A darker color indicates a greater number of senator entries (exits) in a given state.

Table 1: Flow of Senator Entry and Exit

Distribution of Senator Entry per State

	Presidential Entrants		Midterm Entrants	
Number of entries	Democrats	Republicans	Democrats	Republicans
0	16	12	17	16
1	18	21	27	20
2	10	9	1	8
3	5	5	3	4
4	0	3	2	2
5	1	0	0	0
Total	50	50	50	50

Distribution of Senator Exit per State

	Presidential Exits		Midterm Exits	
Number of exits:	Democrats	Republicans	Democrats	Republicans
0	30	25	30	19
1	12	25	15	22
2	7	0	5	8
3	1	0	0	1
Total	50	50	50	50

Notes: This table tabulates our data into the number of states with a given number of senator entries (exits) by party and election type, midterm or presidential. For example, the first column in the tabulation for entry indicates the number of states with a given number of Democratic entrants in presidential elections: 16 state have none, 18 states have one, 10 states have two, 5 states have three, there are no states with four, and one state has five Democratic presidential entrants.

Table 2: Senate Descriptive Statistics

(a) Senator and Electoral Race Data

	Mean	Standard Deviation	Minimum	Maximum	Observations
Age	56.11	9.061	32	82	1430
Freshman	0.155	0.362	0	1	1430
Number of sessions in Congress	3.83	3.342	0	16	1430
Democrat	0.485	0.5	0	1	1399
Member of majority party	0.541	0.498	0	1	1430
Nominate scores (Democrat)	-0.351	0.154	-0.995	0.174	679
Nominate scores (Republican)	0.338	0.214	-0.2	0.95	720
Entry in presidential election	0.546	0.498	0	1	1430
Exit in presidential election	0.613	0.487	0	1	754
Voteshare margin in preceding race[†]	0.064	0.062	0.001	0.349	1414
Open seat in preceding race	0.624	0.484	0	1	1430

(b) State Demographic Data

	Mean	Standard Deviation	Minimum	Maximum	Observations
Population (square mile)	155.503	213.786	0.474	1134.416	1334
Urban population (share)	0.598	0.186	0.154	0.922	1334
Per capita income (logged)	10.196	0.207	8.274	10.74	1334
Black population (share)	0.093	0.087	0.002	0.363	1334
Farmers (share)	0.017	0.014	0.001	0.087	1334
Foreign born (share)	0.049	0.044	0.005	0.262	1334
Work in manufacturing (share)	0.077	0.031	0.008	0.15	1334
Work in finance (share)	0.028	0.007	0.004	0.056	1334
Government workers (share)	0.071	0.017	0	0.137	1334
Age 65 or above (share)	0.117	0.022	0.023	0.183	1334

[†]Among contested races.

Notes: Data on state demographics and senator characteristics are taken from Aldrich et al. (2008). Senators' Nominate scores are from Poole and Rosenthal's Voteview website. Information on senator entry and exit years come from the Congressional Quarterly Electronic Library and the Almanac of American Politics, with detailed electoral race characteristics provided by the Congressional Biographical Directory. The data include senators who took office between 1968 and 2006. There are 221 entrants of which 137 incumbents exit, resulting in 1430 senator-year observations for entry and 754 senator-year observations for exit.

Table 3: Senator Election Timing and Selection on Observables

	Mean	Standard Deviation	Mean	Standard Deviation	*t*-statistic Mean Equality	Mean	Standard Deviation	Mean	Standard Deviation	*t*-statistic Mean Equality
Panel A	State Covariates					State Covariates				
	Midterm Entry		Presidential Entry			Midterm Exit		Presidential Exit		
State partisanship	0.0617	.0070	0.0699	.0067	.8430	0.0870	.0114	0.0891	.0144	.116
Age 65 or above	0.1267	0.0145	0.1243	0.0219	0.6	0.11	0.023	0.1128	0.02	0.52
Black population	0.0935	0.0876	0.0959	0.095	0.1301	0.0819	0.0764	0.0869	0.087	0.2516
Farmers	0.0168	0.0146	0.0165	0.0142	0.1049	0.0177	0.0139	0.0185	0.0154	0.2377
Work in finance	0.0288	0.0064	0.0303	0.0075	1.04	0.0244	0.005	0.025	0.0057	0.4678
Foreign born	0.059	0.0469	0.0675	0.0555	0.802	0.0421	0.0365	0.0492	0.0402	0.7627
Government workers	0.0656	0.0182	0.0685	0.0183	0.7867	0.0766	0.0152	0.0756	0.0093	0.3132
Work in manufacturing	0.0664	0.0255	0.0663	0.0232	0.023	0.0864	0.0356	0.0874	0.0332	0.1191
Urban population	0.5395	0.2027	0.5705	0.2089	0.7318	0.6811	0.13	0.6757	0.1549	0.1559
Population (square mile)	164.5	226.3	200.2	276.3	0.6821	117.4	161.4	192.9	281.7	1.408
Per capita income (logged)	10.34	0.1467	10.37	0.1678	0.6692	10.11	0.1577	10.11	0.1516	0.056
Observations	44		51			40		29		
Panel B	Senator and Electoral-race Covariates					Senator and Electoral-race Covariates				
	Midterm Entry		Presidential Entry			Midterm Exit		Presidential Exit		
Democrat	0.44	0.4989	0.4912	0.5021	0.7469	0.3939	0.4924	0.5185	0.5043	1.364
Age	49.45	8.254	49.79	7.441	0.3164	60.72	8.828	58.65	9.479	1.246
Majority party	0.65	0.4794	0.5965	0.4928	0.8027	0.5735	0.4982	0.5	0.5047	0.805
Close senate race	-0.0799	0.0905	-0.0511	0.0507	2.914	-0.068	0.069	-0.0798	0.1089	0.7298
Open seat	0.66	0.4761	0.5702	0.4972	1.345	0.5882	0.4958	0.5741	0.4991	0.1562
Observations	100		114			68		54		

Notes: This table reports means and standard deviations of selected state, senator and electoral-race covariates by senator entry (exit) election; state demographics for entry (exit) are computed for the year 2000 (1984), the year with the largest number of senators in our entry (exit) sample– 96 (69) in total; statistics on electoral-race and senator covariates are computed using senators' year of entry (exit). State partisanship is measured by the voteshare margin of victory in the presidential race and is interpolated for midterm years. For more details on the variables see Table 2 and the Data Subsection. Absolute values of *t*-statistics reported from midterm and presidential mean equality tests assuming equal variances.

Table 4: The Senate Regression Results

(a) Senator Ideology and Entry Election

Dependent Variable: DW-Nominate Scores (First Dimension)

	(1)	(2)	(3)	(4)	(5)	(6)
$Presidential^{[\beta_1]}$	0.0431	0.0458	0.0763*	0.0816*	0.0801**	0.0676**
	(0.0462)	(0.0457)	(0.0458)	(0.0443)	(0.0370)	(0.0335)
$Presidential \times Democrat^{[\beta_2]}$	-0.103*	-0.106*	-0.130**	-0.136**	-0.135***	-0.113**
	(0.0570)	(0.0572)	(0.0564)	(0.0552)	(0.0469)	(0.0435)
Year dummies		x	x	x	x	x
Electoral-race covariates			x	x	x	x
Senator covariates				x	x	x
State Demographics					x	x
Regional dummies						x
R^2	0.742	0.743	0.760	0.764	0.825	0.840
Observations	1,329	1,329	1,329	1,329	1,329	1,329
1. p-value, test $\beta_1 < 0$	0.176	0.159	0.0487	0.0335	0.0157	0.0225
2. point estimate $\beta_1 + \beta_2$	-0.0598	-0.0602	-0.0536	-0.0540	-0.0546	-0.0455
3. p-value, test $\beta_1 + \beta_2 > 0$	0.0376	0.0399	0.0504	0.0513	0.0241	0.0458
4. point estimate *Democrat* (β_3)	-0.604	-0.603	-0.591	-0.587	-0.577	-0.585

(b) Senator Ideology and Exit Election

Dependent Variable: DW-Nominate Scores (First Dimension)

	(1)	(2)	(3)	(4)	(5)	(6)
$Presidential^{[\beta_1]}$	-0.188***	-0.187***	-0.178***	-0.174***	-0.126**	-0.124**
	(0.0667)	(0.0662)	(0.0640)	(0.0657)	(0.0566)	(0.0524)
$Presidential \times Democrat^{[\beta_2]}$	0.286***	0.287***	0.260***	0.254***	0.222***	0.217***
	(0.0570)	(0.0572)	(0.0748)	(0.0552)	(0.0469)	(0.0435)
Year dummies		x	x	x	x	x
Electoral-race covariates			x	x	x	x
Senator covariates				x	x	x
State Demographics					x	x
Regional dummies						x
R^2	0.729	0.734	0.753	0.754	0.823	0.838
Observations	754	754	754	754	754	754
1. p-value, test $\beta_1 > 0$	0.00275	0.00272	0.00318	0.00459	0.0142	0.00975
2. point estimate $\beta_1 + \beta_2$	0.0972	0.0992	0.0827	0.0798	0.0963	0.0930
3. p-value, test $\beta_1 + \beta_2 < 0$	0.00985	0.0102	0.0210	0.0277	0.0117	0.0116
4. point estimate *Democrat* (β_3)	-0.793	-0.792	-0.797	-0.794	-0.785	-0.771

Notes: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. This table presents OLS estimates for β_1 and β_2 from Equation 1. The unit of observation is senator by congressional session. Dependent variable is first dimension of Nominate scores (DW), which takes values between -1 and 1 with a higher value reflecting more conservative voting on roll-calls. *Presidential* is an indicator variable equal to one if senator enters (exits) in presidential elections and to zero if in midterms; *Democrat* is a dummy variable equal to one if senator is a Democrat. Electoral-race covariates are a dummy variable for whether an open seat is contested and a measure of the closeness of a race, defined as the negative voteshare margin of victory; senator covariates are age, tenure and dummy variables for whether a senator is a freshman or belongs to the majority party. Demographic covariates are the share of the state's population that is above age 65, that is black, who are farmers, who work in finance, government or manufacturing (each considered separately), and who are foreign born, as well as the state's urban population, per capita income (logged) and population (per square mile). Regional dummies are Midwest, South and West; Northeast is the omitted category. Standard errors are adjusted for clustering at the senator level.

Table 5: Measure Robustness and Sample Selection

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Entry				Exit			
$Presidential^{[\beta_1]}$	0.0567	0.111**	0.0359	0.106**	-0.143**	-0.164**	-0.0935*	-0.165**
	(0.0346)	(0.0531)	(0.0315)	(0.0424)	(0.0557)	(0.0806)	(0.0500)	(0.0631)
$Presidential \times Democrat^{[\beta_2]}$	-0.105**	-0.178**	-0.0874**	-0.139***	0.243***	0.260**	0.194***	0.251***
	(0.0493)	(0.0693)	(0.0438)	(0.0528)	(0.0853)	(0.108)	(0.0670)	(0.0865)
Dependent variable	Mean DW	W-Nom.	DW-Nom.	DW-Nom.	Mean DW	W-Nom.	DW-Nom.	DW-Nom.
Included term(s) in office	N/A	All	First	All but first	N/A	All	Last	All but last
R^2	0.857	0.633	0.844	0.849	0.878	0.652	0.849	0.848
Observations	216	1,329	605	724	120	754	359	395
1. p-value, test $\beta_1 < 0$ (">" for exit)	0.0516	0.0188	0.128	0.00660	0.00609	0.0220	0.0320	0.00535
2. point estimate $\beta_1 + \beta_2$	-0.0483	-0.0672	-0.0515	-0.0324	0.0998	0.0964	0.101	0.0862
3. p-value, test $\beta_1 + \beta_2 > 0$ ("<" for exit)	0.0870	0.0553	0.0413	0.145	0.0782	0.0795	0.0115	0.0556
4. point estimate *Democrat* (β_3)	-0.600	-0.604	-0.603	-0.591	-0.804	-0.587	-0.577	-0.585

Notes: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. This table presents OLS estimates for β_1 and β_2 from Equation 1. The unit of observation is senator by congressional session. Dependent variable is indicated under estimates in each specification. *Presidential* is an indicator variable equal to one if senator enters (exits) in presidential elections and to zero if in midterms; *Democrat* is a dummy variable equal to one if senator is a Democrat. In columns (1) and (5), the unit of observation is senator in median congressional session (rounded upward) served in office, and the dependent variable is senator's mean DW Nominate (first dimension) score over her tenure. "Included term(s) in office" refers to observations included in the regression. A senatorial term consists of three congressional sessions; "First" ("Last") refers to first (last) term senator served in office. All specifications include year and regional fixed-effects as well as the full set of covariates; see notes in Table 1 for details. Standard errors are adjusted for clustering at the senator level (heteroscedasticity consistent standard errors reported in columns (1) and (5)).

A Theory of Coattails with Voter Learning

Our theory focuses entirely on selection effects that stem from voter behavior, taking exogenously parties and their candidates.[20] The most basic insight of our theory is that midterm elections aggregate preferences as one would expect: the candidate whose ideological position is closest to the preferred position of the median voter wins office. In presidential elections, by contrast, voter uncertainty introduces errors and occasionally the wrong candidate–one who is farther away from the median voter's preferred position–is elected. Thus, in expectation, outcomes generated in presidential elections are more ideologically extreme than outcomes generated in midterm elections.

We begin by noting that less informed citizens are more likely to abstain, and because a substantial number of citizens vote in presidential elections but abstain in midterm elections, the typical voter in presidential elections is likely to be less informed about senatorial candidates (the 'down-ticket' race). Party labels in presidential elections enable these voters to form informational linkages across the presidential and senatorial contemporaneous races, introducing bias to their voting behavior and the resulting electoral outcomes. A mainstream candidate in the up-ticket race can support a marginal candidate from the same party in a down-ticket race.

A.1 Parties and Candidates

Suppose there are only two races for office, presidential (p) and senatorial (s), and that each office is contested by two parties, Democratic (D) and Republican (R). There are two election cycles: midterm and presidential. In presidential elections, both offices are contested, while in midterm elections only the senatorial office is contested.[21]

[20] Given our empirical objectives, we present a simple version of our theory here. A more elaborate and robust framework that includes voter microfoundations, formal proofs and a discussion of our modeling assumptions and related theoretical literature is available upon request.

[21] Depending on the election cycle, there are one, two or three federal races for office; in each election, all the seats in the House are contested and there is at most one senatorial race in each state.

For simplicity, we assume that the selection of candidates in each race is independent of one another. We let candidate positions in each race be given by two independent draws from a normal distribution. We label the draws of both candidates y_D^r and y_R^r (where $r \in \{p,s\}$), such that the more liberal draw in each race is the Democrat (i.e., $y_D^r < y_R^r$). To allow for commonality across races, we propose the following additive model of candidate midpoints:[22]

$$\underbrace{M^p}_{\substack{\text{presidential race}\\ \text{midpoint}}} = \underbrace{\Omega}_{\substack{\text{party}\\ \text{midpoint}}} + \underbrace{\varepsilon^p}_{\substack{\text{presidential race}\\ \text{idiosyncratic effect}}} \tag{2}$$

and

$$\underbrace{M^s}_{\substack{\text{senatorial race}\\ \text{midpoint}}} = \underbrace{\Omega}_{\substack{\text{party}\\ \text{midpoint}}} + \underbrace{\Theta^s}_{\substack{\text{state}\\ \text{fixed effect}}} + \underbrace{\varepsilon^s}_{\substack{\text{senatorial race}\\ \text{idiosyncratic effect}}}, \tag{3}$$

where $M^r \equiv \frac{y_D^r + y_R^r}{2}$, Ω is fixed but unknown, Θ^s is some constant allowing for variation in candidate selection at the local level (e.g., $\Theta^s > 0$ denotes a relatively conservative state), and ε^p and ε^s are independent draws from a normal distribution with mean zero and variance σ_ε^2. We denote the expected midpoints of candidates by μ_p in the presidential race and by μ_s in the senatorial race. Note that the ideological midpoints of candidates in both races are independent of one another even though they share the same party midpoint (Ω). This factor plays an important role in how voting decisions by the uninformed are independent of the realized positions of senatorial candidates.

A.2 Voters

We allow voters to have heterogenous preferences over policy. Specifically, we assume that ideal positions of voters in state s are distributed symmetrically and unimodally with full support around the median preference, μ_s. Conditional on voting, each person votes for the candidate whose position is closest (in expectation)

[22] We do not model parties or their candidate selection process directly. For examples of such models, see Snyder and Ting (2002) and Caillaud and Tirole (2002).

to her own preferred position. In particular, if a voter's preferred position is to the left of M^r, she votes for the Democratic candidate; otherwise, she votes for the Republican candidate in race r.

To incorporate variation in voter information, we assume that there are two types of voters: those who observe the positions of presidential and senatorial candidates ('informed') and those who observe only the positions of presidential candidates ('uninformed'). We let the uninformed voters constitute a proportion $\delta > 0$ of the population. Informed voters always turn out and vote; uninformed voters turn out in presidential elections but abstain in midterm elections.[23] In presidential elections, the uninformed vote for their preferred presidential candidate, and use their updated beliefs to vote in the senatorial race. To keep things simple, we represent voters' beliefs about the unknown party midpoint (Ω) by a normal distribution with mean Ω and variance σ^2_ω.[24]

A.3 Results

In midterm elections, a Democrat wins the senatorial race if and only if[25]

$$M^s > \mu_s.$$

That is, if the midpoint of candidate positions is to the right of the median voter's preferred position, then the Democrat obtains more than half the votes and wins

[23] We assume heavier turnout and a less informed electorate in presidential elections, both of which are consistent with the data; however, our formal model endogenously generates these and additional phenomena, such as the relative moderation of the electorate in presidential elections as well as *roll-off* (i.e., abstain in the Senate race).

[24] We considered the case that there is no interaction among contemporaneous races in presidential elections. Our model predicts that in such a case uninformed voters would roll-off, resulting in the same outcomes as in midterm elections, which does not reconcile with our finding. It is possible that once participation costs are incurred in presidential elections, uninformed voters follow their voting rule (which is separable from their turnout rule) in a race on which they know little about rather than abstain. Indeed, abstention rates in senatorial races in presidential elections are far lower than in midterms. Since information about senatorial candidates is not as widespread in presidential elections relative to midterms, uninformed voters are unlikely to have more knowledge about senatorial candidates in presidential elections than in midterm elections. In this case, more noise is introduced to the Senate race producing more extreme outcomes.

[25] We break ties in favor of Republicans.

office.

In presidential election years, the winner in the senatorial race depends on conditions in the presidential race. For uninformed voters, the observed positions in the presidential race are used as signals to update beliefs about the party midpoint, and, consequently, the senatorial race midpoint. Suppose the draw of candidates in the presidential race is observed to be m^p. Then, the expected midpoint in the senatorial race may no longer be the median (μ_s). Rather,

$$E\left(M^s | M^p = m^p\right) = \mu_s + \Delta\eta, \tag{4}$$

where $\Delta \equiv m^p - \mu_p$ corresponds to so-called presidential coattails–the difference between the realized and expected draw of presidential candidates–and $\eta \equiv \frac{\sigma_\omega}{\sigma_\varepsilon}\rho_{\omega,\varepsilon}$ is a voter's updating coefficient, which is increasing in the correlation between the signal (m_p) and unknown party midpoint (Ω), but decreasing in the relative noise of the signal (σ_ε) to initial uncertainty (σ_ω).[26] Thus, a Democrat wins the senatorial race in presidential elections if and only if

$$\underbrace{(1-\delta)\underbrace{F_s\left(M^s\right)}}_{\substack{\text{share of informed voters}\\ \text{who vote Democrat}}} + \underbrace{\delta\underbrace{F_s\left(\mu_s + \Delta\eta\right)}}_{\substack{\text{share of uninformed voters}\\ \text{who vote Democrat}}} > \frac{1}{2}, \tag{5}$$

where F_s is the cumulative distribution function of preferences in state s. Since $F_s\left(\mu_s + \Delta\eta\right)$ is strictly increasing in Δ, the likelihood that Democrats win office rises in coattails. Intuitively, unexpected support for the Democratic presidential candidate results in better prospects for Democrats in the down-ticket race. When positions of presidential candidates meet expectations ($\Delta = 0$) the condition above becomes $M^s > \mu_s$, the same as in midterm elections.

We next derive the key prediction regarding senator ideology: expected electoral outcomes in presidential elections are more ideologically extreme than in midterms. We begin by noting that Democrats and Republicans are equally likely to win the senatorial office, both in midterms and in presidential elections. In midterms, a Democrat may only win when the senatorial midpoint is to the right of the median

[26] Notice that $\eta > 0$ is implied since $\rho_{\omega,\varepsilon} = \frac{\sigma_\omega}{\sqrt{\sigma_\omega^2 + \sigma_\varepsilon^2}}$.

voter. Thus, we can express the expected position of a Democrat who wins in midterms as

$$E_m\left[y_D^s|win\right] = E_m\left[y_D^s|win, M^s > \mu_s\right], \tag{6}$$

where *win* indicates a win in the senatorial race. In presidential elections, by contrast, if a Democrat wins the senatorial race, the ideological midpoint of candidates may lie leftward of the median's preference ($m^s < \mu_s$) when coattails are positive ($\Delta > 0$), an event that occurs with probability one half. In other words, Democrats can prevail with more liberal positions unattainable in midterms at the cost of failing to win office with certainty when $M^s > \mu_s$. As a result, $E_p\left[y_D^s|win\right]$ is a weighted average of $E_p\left[y_D^s|win, M^s > \mu_s\right]$ and $E_p\left[y_D^s|win, M^s < \mu_s\right]$. Because positions in the presidential race are independent of those in the senatorial race, we conclude:[27]

$$E_p\left[y_D^s|win, M^s < \mu_s\right] < E_p\left[y_D^s|win, M^s > \mu_s\right]. \tag{7}$$

That is, if the Senate race winner is a Democrat, then she is likely to be more liberal as the midpoint between the Democrat and Republican is more liberal. In particular, the Democrat is more liberal when the midpoint is to the left of the median voter ($M^s < \mu_s$) relative to when the midpoint is to the right of the median voter ($M^s > \mu_s$). And, since the distribution of senatorial candidates in midterm and presidential elections are identical, equations (6) and (7) deliver the key prediction of our model.

PROPOSITION 1: *Candidates elected for the Senate in presidential elections are more ideologically extreme than candidates elected for the Senate in midterm elections; conversely, senatorial candidates who lose the race for office in presidential elections are more moderate than senatorial candidates who lose the race for office in midterm elections. Specifically, for winners,*

$$E_p\left[y_D^s|win\right] < E_m\left[y_D^s|win\right] \text{ and } E_p\left[y_R^s|win\right] > E_m\left[y_R^s|win\right],$$

[27] Moreover, since coattails (Δ) are distributed symmetrically with mean zero, the reduction in the probability that a Democrat wins when an arbitrary midpoint, m^s, exceeds the median is recovered by a symmetric gain in the probability of winning a more liberal position equidistant from the median ($2\mu_s - m^s$).

and for losers,

$$E_p\left[y_D^s|lose\right] > E_m\left[y_D^s|lose\right] \text{ and } E_p\left[y_R^s|lose\right] < E_m\left[y_R^s|lose\right].$$

One way to understand this result is to realize that, without information contagion, expected outcomes in midterms and presidential elections would be identical. However, this is not the case in our model, as information in the presidential race is valuable for decision-making in the senatorial race. Instead, positive coattails ($\Delta > 0$) enable relatively more liberal Democrats to win office, and because it is more likely than not that positive coattails carry Democrats (as opposed to 'negative coattails'), a Democrat who wins office in a presidential election is likely to be more liberal than one who wins in midterms.

B Presidential Coattails versus Divided Government

We saw that the Democratic threshold for winning the Senate race decreases with Democratic coattails. Specifically, Democratic coattails enable Democrats to win with more liberal positions. Thus, we obtain a second key prediction of our model.

PROPOSITION 2: *In presidential elections, ideological extremism of winning and losing senatorial candidates increases in presidential coattails. Specifically, if* $\Delta^1 > \Delta^0$, *then for Democrats*

$$E_p\left[y_D^c|win,\Delta^1\right] < E_p\left[y_D^c|win,\Delta^0\right] \text{ and } E_p\left[y_D^c|lose,\Delta^1\right] < E_p\left[y_D^c|lose,\Delta^0\right];$$

likewise, for Republicans,

$$E_p\left[y_R^c|win,\Delta^1\right] < E_p\left[y_R^c|win,\Delta^0\right] \text{ and } E_p\left[y_D^c|lose,\Delta^1\right] < E_p\left[y_D^c|lose,\Delta^0\right].$$

Intuitively, as a party's coattails increase, uninformed voters provide a greater built-in advantage for their candidates (independent of their realized positions) in down-ticket races. As a result, relatively marginal (and more ideologically extreme) candidates can win. Moreover, if a candidate loses despite her riding on relatively

positive presidential coattails, then she must be too ideologically extreme to carry. This prediction is in contrast to what a theory of divided government would suggest. In particular, unexpected support for one presidential candidate should be countered by increasing support for candidates (and, thus, enabling more ideologically extreme candidates to win) from the opposing party.

To shed light on these conflicting predictions we gather data on state-level returns in the presidential race to construct a measure for presidential coattails and merge this measure to senators by their entry (exit) election year. Specifically, in the regressions that follow we use, for each party, the difference between its voteshare in a presidential race and unweighted average voteshare in four preceding presidential races to proxy for unexpected support. We provide more details on the construction of this measure in the following appendix. The standard deviation of the measure of coattails we use is approximately 0.1 (with mean zero). We then merge this measure to each senator who entered (exited) in a presidential election by party and election year. For example, Barack Obama was elected to the Senate in Illinois in the 2004 presidential election on the coattails of Democratic presidential candidate John Kerry. A measure of coattails for Obama is Kerry's voteshare in Illinois net of the average Illinois voteshares of the four preceding Democratic presidential candidates: Al Gore, Bill Clinton (two elections) and Michael Dukakis.

Having constructed a measure of presidential coattails, we next estimate regressions of the form:

$$y_{itsg} = \beta_1 Coattails_i + \beta_2 Coattails_i \times Democrat_i + \beta_3 Democrat_i + \mathbf{x}_{it}'\gamma + \mathbf{z}_{ts}'\eta + \delta_t + \rho_g + \varepsilon_{itsg}, \quad (8)$$

where $Coattails_i$ is a measure of senator i's presidential coattails described above and the remaining notation follows from equation (1). The estimation equation applies symmetrically to entry and exit, where $Coattails_i$ is the time invariant measure of a party's state-level unexpected presidential support at the time of senator i's entry (exit). Our theory of coattails indicates that ideological extremism of senators increases with coattails, both for entry and for exit. Thus, Republicans are more conservative ($\beta_1 > 0$) and Democrats are more liberal ($\beta_1 + \beta_2 < 0$).

We present regression results in Table A4. The relationship is statistically significant in the regressions for entry, but not in those for exit. Specifically, ideological extremism is positively correlated with the coattails senators experience upon entry to the Senate; however, we do not find similar support for the relationship between ideological extremism and exit coattails. Overall, the effect of coattails on senator voting in Congress appears to fade off over time. In column (1) we present results for entry using only senators' first term in office. The coefficient estimates for β_1 and β_2 are statistically significant. To get a sense of the magnitudes, a one standard deviation increase in Republican presidential coattails is associated with more liberal voting behavior of Republican entrants in the range of 10 percent of the ideological distance between Democrats and Republicans (approximately 0.6 as measured by DW-Nominate); likewise, more liberal positions are taken by Democratic entrants as a result of Democratic presidential coattails; the magnitude is slightly greater than 10 percent for a 0.1 unit change in coattails. We present in column (2) similar results using the first dimension of W-Nominate scores. Significance levels remain at the 1 percent level. In columns (3) and (4), we run the same specifications for the full sample (i.e., all terms in office). Significance levels drop using both types of ideology scores. This may suggest that coattails have a diminishing effect over time as more current events shape senator behavior. The one-sided test for Republicans ($\beta_1 < 0$) is rejected at the 5 percent level, whereas a similar test for Democrats ($\beta_1 + \beta_2 > 0$) is not rejected.

Turning to exit, in columns (5) and (6), we use only data on a senator's last term in office (which leaves us with 167 senator-year observations). With the exception of the one-sided test for Democrats, the results are statistically insignificant and remain so in columns (7) and (8), where we include the full sample. Overall, we take these results to suggest that unexpected presidential support is more likely to enable the selection of ideologically extreme senators from the same party (as predicted by our model) rather than from the opposing party, as implied by the theory of divided government.

C Coattails Measurement

To derive the observable analog for presidential coattails, we denote the expected Democratic presidential voteshare in state s by $\bar{\pi} \equiv F_s(\mu_p)$, and the realized one, $F_s(m^p)$, by π. Democratic coattails can then be rewritten as

$$\Delta = F_s^{-1}(\pi) - F_s^{-1}(\bar{\pi}). \tag{9}$$

Equation (9) establishes a mapping between candidate positions in the presidential race and the corresponding observable voteshares in state s. Thus, our empirical analogue for presidential coattails is:

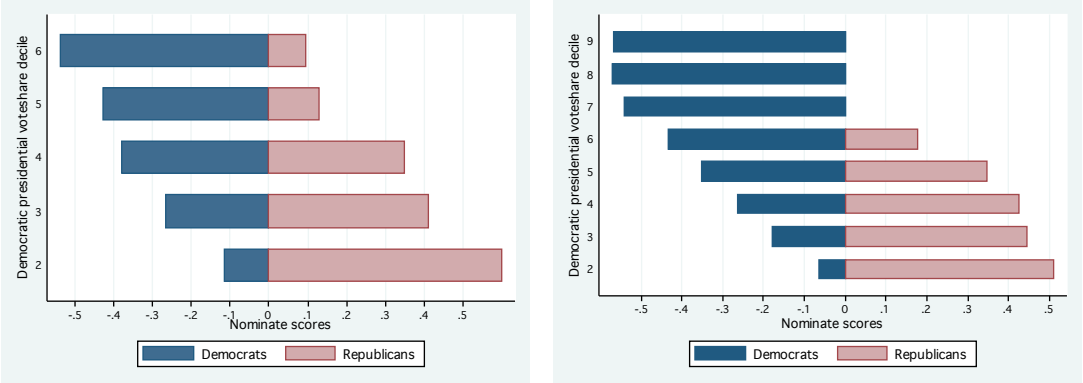
$$Coattails_{s\tau} = \begin{cases} \frac{1}{4}\sum_{j=1}^{4}\left(\pi_{s\tau} - \pi_{s\tau-j}\right) & \text{if Democrat} \\ \frac{1}{4}\sum_{j=1}^{4}\left(\pi_{s\tau-j} - \pi_{s\tau}\right) & \text{if Republican} \end{cases}, \tag{10}$$

where $\pi_{s\tau}$ is the Democratic presidential voteshare in presidential election τ in state s. By construction, *Coattails* can take values between -1 and 1. For example, voters facing the presidential election in 2012 use information from previous presidential elections dating back to Clinton versus Dole in 1996 to form expectations about party positions (Ω).

To emphasize the novelty of employing our measure of coattails, we make the following point: our model indicates that support in the presidential race affects selection in contemporaneous senatorial races. In Figure A1, we restrict our attention to legislators who enter during a presidential-election cycle, and plot the average Nominate scores of legislators in both chambers of Congress by the Democratic presidential vote-decile in their constituency at the time of entry. In both the Senate and the House, support for a party's presidential candidate is associated with more extreme voting behavior by its legislators. Although this is evidence in support of our model's prediction, the ideological preferences of voters in a given locality may account for much of this phenomenon. For example, a Democratic presidential candidate is likely to generate more support in a liberal-leaning state, which in turn is likely to elect more liberal legislators. Our measure of coattails partially addresses this concern and is a more accurate representation of its theoretical counterpart–an

increasing function of the difference between $\bar{\pi}$ and π.

To contrast our measure of coattails with voteshares, in Figure A2, we map presidential wins and coattails in the 1992 and 2000 presidential elections to states. In 1992, when George H.W. Bush ran against Bill Clinton, Bush obtained a plurality in 19 states. However, this statistic underrepresents the overwhelming victory by Clinton: in all but two states, Clinton's coattails were realized. On the other hand, in the 2000 election, the presidential candidates were more evenly matched. George W. Bush won 29 states, but his coattails reached only 26 states.

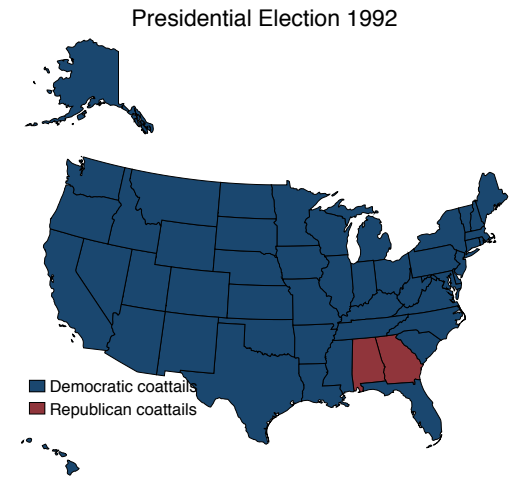


(a) The Senate

(b) The House

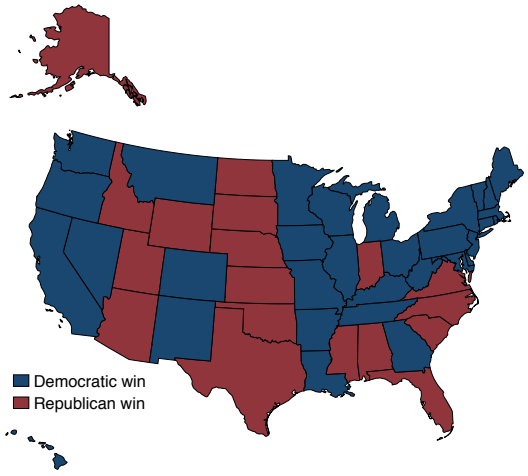
Figure A1: Roll Call Voting and Presidential Voteshares

Notes: The left (right) bound of horizontal bar representes average Nominate scores for Democrats (Republicans) in a given Democratic presidential vote decile at the time of entry. Data on the Senate is for entrants from 1968 to 2006. Data on the House is for representatives who served between 1982 to 2004.

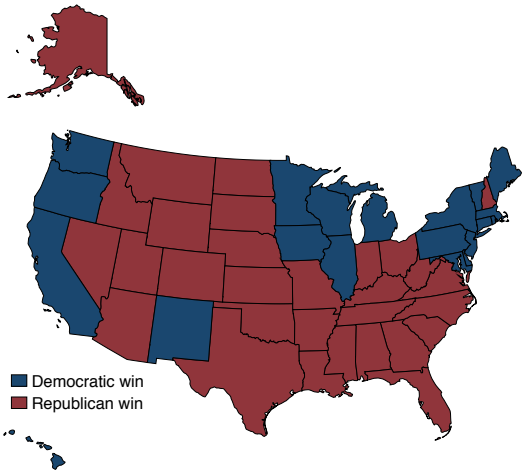


(a) Bush versus Clinton Coattails

(b) Bush versus Gore Coattails



(c) Bush versus Clinton Wins



(d) Bush versus Gore Wins

Figure A2: Presidential Coattails versus Wins 1992 and 2000

Notes: Democratic win denotes plurality vote for party's presidential candidate in given state; Democratic coattails denotes positive difference of party's presidential voteshare from unweighted average of four preceding presidential voteshares in given state.

Table A1: Senator Entries and Exits per State

	Presidential Entrants		Midterm Entrants		Presidential Exits		Midterm Exits	
	Democrats	Republicans	Democrats	Republicans	Democrats	Republicans	Democrats	Republicans
Alabama	1	2	4	0	2	0	1	2
Alaska	1	2	0	0	1	0	0	1
Arizona	1	1	0	2	0	0	1	1
Arkansas	0	1	4	0	1	0	1	1
California	3	1	1	1	2	0	0	2
Colorado	3	1	3	2	1	1	2	1
Connecticut	2	0	0	1	0	1	0	0
Delaware	2	0	0	1	0	1	0	0
Florida	1	4	3	0	2	1	0	2
Georgia	3	3	1	1	2	0	1	2
Hawaii	1	0	1	0	0	0	1	0
Idaho	0	3	0	2	0	1	0	2
Illinois	5	0	1	1	3	0	1	0
Indiana	0	3	1	0	0	0	0	2
Iowa	3	1	1	1	1	1	2	0
Kansas	0	3	0	1	0	1	0	1
Kentucky	1	1	1	1	1	0	1	0
Louisiana	2	1	1	0	1	0	0	0
Maine	1	1	1	2	0	1	2	0
Maryland	1	1	1	1	0	1	0	1
Massachusetts	1	0	1	0	1	0	0	0
Michigan	2	0	1	1	0	1	1	0
Minnesota	1	0	1	4	0	1	1	2
Mississippi	0	1	0	1	0	0	0	0
Missouri	1	1	0	3	0	1	1	1
Montana	1	1	1	0	1	0	0	0
Nebraska	3	1	1	0	2	0	1	0
Nevada	1	1	1	2	1	1	0	1
New Hampshire	0	2	0	3	0	1	0	2
New Jersey	2	0	2	0	2	0	1	0
New Mexico	0	2	1	0	0	0	0	1
New York	2	0	1	1	1	0	0	1
North Carolina	0	4	3	1	2	0	0	3
North Dakota	1	1	1	0	0	0	0	1
Ohio	1	1	1	3	0	1	2	1
Oklahoma	0	4	1	1	0	1	1	1
Oregon	0	2	1	0	0	0	0	1
Pennsylvania	0	3	0	1	0	1	0	1
Rhode Island	1	1	0	1	0	0	0	1
South Carolina	0	1	0	1	0	0	0	0
South Dakota	2	2	1	1	0	1	1	1
Tennessee	2	0	0	4	0	1	2	1
Texas	0	1	1	2	0	0	1	1
Utah	0	2	0	1	0	1	0	0
Vermont	0	0	1	3	0	1	0	0
Virginia	1	2	1	2	1	1	0	1
Washington	2	1	1	1	1	1	0	1
West Virginia	1	0	0	0	0	0	0	0
Wisconsin	2	1	0	0	0	1	0	0
Wyoming	0	2	0	2	0	1	0	1

Notes: This table tabulates our data into the number of entries and exits per state, by party and election type (midterm or presidential). Note that exits appear in our data only for those senators who took office after 1968, and who therefore appear as entrants in our data. For example, the first row indicates that Alabama saw five Democratic entrants over the sample period (4 midterm and 1 presidential), and two Republican entrants (both in presidential elections.) Of these, three of the Democratic entrants also exited within the sample time frame (two during a presidential election and one during a midterm election), with the other two remaining in office as of 2006; both of the Republican entrants exited during a midterm election.

Table A2: House Descriptive Statistics

(a) Representative and Electoral Race Data

	Mean	Standard Deviation	Minimum	Maximum	Observations
Age	52.45	10.27	26	88	4938
Freshman	0.136	0.342	0	1	5077
Number of sessions in Congress	4.482	4.036	0	26	5072
Democrat	0.528	0.499	0	1	5083
Member of majority party	0.561	0.496	0	1	5077
Nominate scores (Democrat)	-0.355	0.178	-0.875	0.568	2681
Nominate scores (Republican)	0.402	0.196	-0.55	1	2381
Powerful committee member[†]	0.306	0.461	0	1	5077
Committee chair	0.048	0.214	0	1	5069
Committee ranking member	0.048	0.213	0	1	5069
Party leader	0.018	0.132	0	1	5077
Entry in presidential race	0.509	0.5	0	1	5083
Exit in presidential race	0.546	0.498	0	1	3417
Voteshare margin in preceing race[†]	0.156	0.092	0	0.469	4167
Open seat in preceing race	0.097	0.296	0	1	5070
Preceding race uncontested	0.178	0.383	0	1	5070

(b) District Demographic Data

	Mean	Standard Deviation	Minimum	Maximum	Observations
Population (logged square mile)	5.850	2.002	-0.351	11.209	5073
Urban population (share)	0.700	0.271	0	1	5073
Median income (logged)	-1.231	0.422	-2.473	-0.088	5073
Military workers (share)	0.007	0.014	0	0.146	5073
Farmers (share)	0.012	0.012	0	0.099	5073
Foreign born (share)	0.076	0.09	0.002	0.585	5073
Bluecollar workers (share)	0.073	0.023	0.02	0.175	5073
Age 65 or above (share)	0.148	0.048	0.041	0.438	5073

[†]Among contested races.

Notes: Data on district demographics and representative characteristics are taken from Snyder and Strömberg (2010). Representatives' Nominate scores are from Poole and Rosenthal's Voteview website. Information on representative entry and exit years come from the Congressional Quarterly Electronic Library and the Almanac of American Politics. The data include Representative who served in office between 1982 and 2004.

Table A3: The House Regression Results

(a) Representative Ideology and Entry Election

Dependent Variable: DW-Nominate Scores (First Dimension)

	(1)	(2)	(3)	(4)	(5)	(6)
$Presidential^{[\beta_1]}$	-0.0218	-0.0201	-0.0192	-0.00801	-0.00444	-0.0157
	(0.0184)	(0.0181)	(0.0182)	(0.0175)	(0.0172)	(0.0152)
$Presidential \times Democrat^{[\beta_2]}$	-0.00167	-0.00543	-0.00298	-0.000793	-0.00434	5.99e-05
	(0.0253)	(0.0254)	(0.0247)	(0.0235)	(0.0221)	(0.0200)
Year dummies		x	x	x	x	x
Electoral-race covariates			x	x	x	x
Representative covariates				x	x	x
District Demographics					x	x
State dummies						x
R^2	0.823	0.823	0.831	0.850	0.872	0.898
Observations	4,803	4,803	4,803	4,803	4,803	4,803
1. p-value, test $\beta_1 < 0$	0.882	0.867	0.853	0.677	0.602	0.848
2. point estimate $\beta_1 + \beta_2$	-0.0235	-0.0256	-0.0221	-0.00880	-0.00878	-0.0156
3. p-value, test $\beta_1 + \beta_2 > 0$	0.0898	0.0756	0.0930	0.292	0.269	0.117
4. point estimate *Democrat* (β_3)	-0.765	-0.761	-0.754	-0.755	-0.718	-0.701

(b) Representative Ideology and Exit Election

Dependent Variable: DW-Nominate Scores (First Dimension)

	(1)	(2)	(3)	(4)	(5)	(6)
$Presidential^{[\beta_1]}$	-0.00127	-0.00127	-9.35e-05	0.00186	0.0107	0.0113
	(0.0201)	(0.0201)	(0.0201)	(0.0193)	(0.0183)	(0.0152)
$Presidential \times Democrat^{[\beta_2]}$	0.0260	0.0260	0.0227	0.0153	0.00504	-0.00722
	(0.0289)	(0.0289)	(0.0284)	(0.0270)	(0.0242)	(0.0214)
Year dummies		x	x	x	x	x
Electoral-race covariates			x	x	x	x
Representative covariates				x	x	x
District Demographics					x	x
State dummies						x
R^2	0.807	0.807	0.813	0.828	0.858	0.888
Observations	3,250	3,250	3,250	3,250	3,250	3,250
1. p-value, test $\beta_1 > 0$	0.475	0.475	0.498	0.539	0.720	0.772
2. point estimate $\beta_1 + \beta_2$	0.0247	0.0247	0.0226	0.0171	0.0157	0.00413
3. p-value, test $\beta_1 + \beta_2 < 0$	0.118	0.118	0.131	0.183	0.161	0.394
4. point estimate *Democrat* (β_3)	-0.698	-0.698	-0.694	-0.714	-0.674	-0.653

Notes: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. This table presents OLS estimates for β_1 and β_2 from Equation 1. The unit of observation is representative by congressional session. Dependent variable is first dimension of Nominate scores (DW). *Presidential* is an indicator variable equal to one if representative enters (exits) in presidential elections and to zero if in midterms; *Democrat* is a dummy variable equal to one if representative is a Democrat. Electoral-race covariates are dummy variables for whether the race is uncontested or whether an open seat is contested (each considered separately) and a measure of the closeness of a race, defined as the negative voteshare margin of victory; representative covariates are age, tenure and dummy variables for whether a representative is a freshman, belongs to the majority party, is a committee chair, member of the Ways and Means or Appropriations committees, is a committee ranking member or a party leader (each considered separately). Demographic covariates are the share of the district's population that is above age 65, who are bluecollar workers, farmers or military (each considered separately), and who are foreign born, as well as the state's urban population, per capita income (logged) and population (logged per square mile). Standard errors are adjusted for clustering at the representative level.

Table A4: Presidential Coattails and Senator Ideology

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Entry				Exit			
$Coattails^{[\beta_1]}$	0.639***	1.198***	0.552*	1.425***	0.119	0.383	-0.300	-0.324
	(0.235)	(0.349)	(0.316)	(0.486)	(0.353)	(0.558)	(0.498)	(0.689)
$Coattails \times Democrat^{[\beta_2]}$	-1.397***	-2.409***	-0.554	-1.853**	-1.066**	-1.239	-0.225	-0.297
	(0.441)	(0.645)	(0.484)	(0.763)	(0.512)	(0.784)	(0.641)	(0.886)
Dependent variable	DW-Nom.	W-Nom.	DW-Nom.	W-Nom.	DW-Nom.	W-Nom.	DW-Nom.	W-Nom.
Included term(s) in office	First	First	All	All	Last	Last	All	All
R^2	0.883	0.750	0.870	0.731	0.895	0.709	0.877	0.710
Observations	220	220	693	693	167	167	353	353
1. p-value, test $\beta_1 < 0$	0.00356	0.000369	0.0416	0.00207	0.368	0.247	0.726	0.680
2. p-value, test $\beta_1 + \beta_2 > 0$	0.00436	0.00293	0.497	0.179	0.000269	0.0220	0.0624	0.117

Notes: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. This table presents OLS estimates for β_1 and β_2 from Equation 1. The unit of observation is senator by congressional session. Dependent variable is indicated under estimates in each specification. *Presidential* is an indicator variable equal to one if senator enters (exits) in presidential elections and to zero if in midterms; *Democrat* is a dummy variable equal to one if senator is a Democrat. In columns (1) and (5), the unit of observation is senator in median congressional session (rounded upward) served in office, and the dependent variable is senator's mean DW Nominate (first dimension) score over her tenure. "Included term(s) in office" refers to observations included in the regression. A senatorial term consists of three congressional sessions; "First" ("Last") refers to first (last) term senator served in office. All specifications include year and regional fixed-effects as well as the full set of covariates; see notes in Table 1 for details. Standard errors are adjusted for clustering at the senator level (heteroscedasticity consistent standard errors reported in columns (1) and (5)).