NBER WORKING PAPERS SERIES

WHY ARE THERE SO MANY DIVIDED SENATE DELEGATIONS?

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Working Paper No. 3663

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
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March 1991

Alesina and Rosenthal acknowledge financial support from NSF Grant SES8821441. This paper was written when Alesina was an Olin Fellow at the NBER and Rosenthal a Visiting Professor at M.I.T. Alesina gratefully acknowledges financial support from the Olin and Sloan foundations. We thank Keith Krehbiel, John Londregan, Keith Poole, Kenneth Shepsle, and participants in seminars at Hoover Institution, Carnegie-Mellon and University of Rochester for very useful comments and Gerald Cohen for excellent research assistance. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

NBER Working Paper #3663
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ABSTRACT

The last three decades have witnessed a sharp increase in the number of states with spilt Senate delegations, featuring two senators of different parties. In addition, there is evidence that senators of different parties do not cluster in the middle: they are genuinely polarized. We propose a model which explains this phenomenon. Our argument builds upon the fact that when a Senate election is held, there is already a sitting senator. If the voters care about the policy position of their state delegation in each election, they may favor the candidate of the party which is <u>not</u> holding the other seat. We show that, in general: (1) a candidate benefits if the non-running senator is of the opposing party; (2) the more extreme the position of the non-running senator, the more extreme may be the position of the opposing party candidate. Our "opposite party advantage" hypothesis is tested on a sample including every Senate race from 1946 to 1986. After controlling for other important factors, such as incumbency advantage, coattails and economic conditions, we find reasonably strong evidence of the "opposite party advantage."

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1. Introduction

Until recently the study of Congressional elections has generally meant the study of House elections. But researchers have now begun to focus their attention on Senate elections.[1] This increased interest probably has multiple sources. To some extent, the political importance of recent Senate elections draws our attention to them. The Republicans were able to capture the Senate in 1980 and hold it until 1986, and their Senate majority was an important component of the legislative successes of the Reagan administration. Another basis of renewed interest in Senate elections undoubtedly stems from their contrast with House elections. While the Republicans held the Senate from 1981-87, the House has remained safely in Democratic hands for thirty-five years. Contrary to the expectations of the Framers, the electoral responsiveness of the contemporary Senate is higher than that of the House (Alford and Hibbing, 1989a,b). Specifically, the advantages of incumbency in contemporary House elections are almost overwhelming, but incumbent fortunes vary greatly in Senate elections.[2] And while qualified, well-funded challengers are a rarity in House elections (Jacobson, 1990, ch.4); Senate incumbents seldom enjoy the luxury of unknown, under-funded challengers.

Occupying a position somewhere between presidential and House elections, Senate elections seem to incorporate some of the major features of each. Like presidential nominees, Senate candidates are highly visible and their campaigns heavily reliant on the mass media. Like Representatives, Senators attempt to exploit the value of their incumbency, but it does not appear to count for as much among the electorate. Issues and ideology are thought to be more important in Senate elections than in House elections. But while sometimes Senate races appear to hinge on major national issues, at other times, the most parochial issues are thought to make the difference.[3] And, finally, one cannot ignore the importance of traditional partisanship, despite two decades of research on its weakening.[4] Apparently, analyses of Senate elections must take into account the full range of variables that appear in both presidential and House election studies.

While the new wave of research undoubtedly will tell us a great deal about the specifics of Senate elections, we should keep the larger picture in mind. In particular, Senate elections show a number of interesting features that pose explanatory challenges for the new research. In particular, recent research identifies two developments that appear to be both politically consequential and theoretically puzzling. We will refer to these as the "split state question," and the "polarization question."

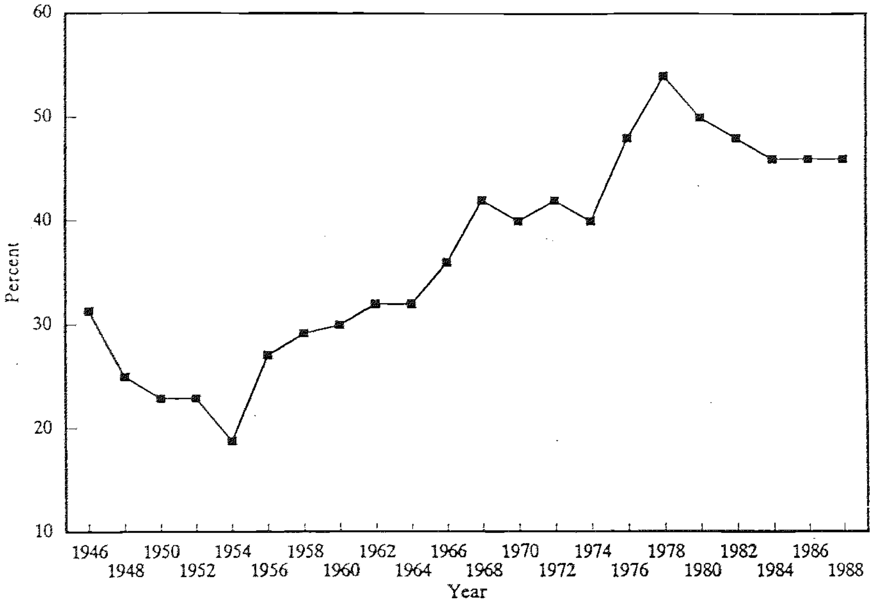
The split state question reflects the increase in the number of states that divide their two Senate seats between the parties (Figure 1). In recent years state representation in the Senate has been split as often as not, a situation that contrasts with the earlier historical record. In surveying that record Brady, Brody and Ferejohn (1989, pp. 3-4) observe

> ...there is a dramatic rise in the number of split states beginning in the 1960s. Prior to 1960 (1918 on) there were only five instances of mixed state representation rising above 30 percent, while since 1960 no Congress has less than 30 percent, and since 1966 the percentage has never been lower than 40 percent and has been as high as 54 percent.

Poole and Rosenthal (1984b) point out that in the late seventies and early eighties, the Senate had a distribution of delegations that was very nearly 50

Figure 1. States with Split Senatorial Delegations

1946–1988



percent mixed, 25 percent Democratic, and 25 percent Republican, exactly what one would expect if every voter came to the polls and tossed a fair coin to determine her Senate vote. The facts are obviously different, so we are challenged to show how individual behavior that is far from random generates an aggregate outcome that is the epitome of randomness.[5]

The polarization question reflects the great ideological differences between Democratic and Republican Senators (Figure 2).[6] Poole and Rosenthal (1984b) demonstrate that the Senate parties are not middle-of-the road, me-too parties; rather, they offer clear choices. Given decades of theorizing — informal and formal — that purports to identify centrist tendencies in two-party electoral competitions, the polarization of the Senate parties challenges us to identify the mechanism or forces that underlie it.[7]

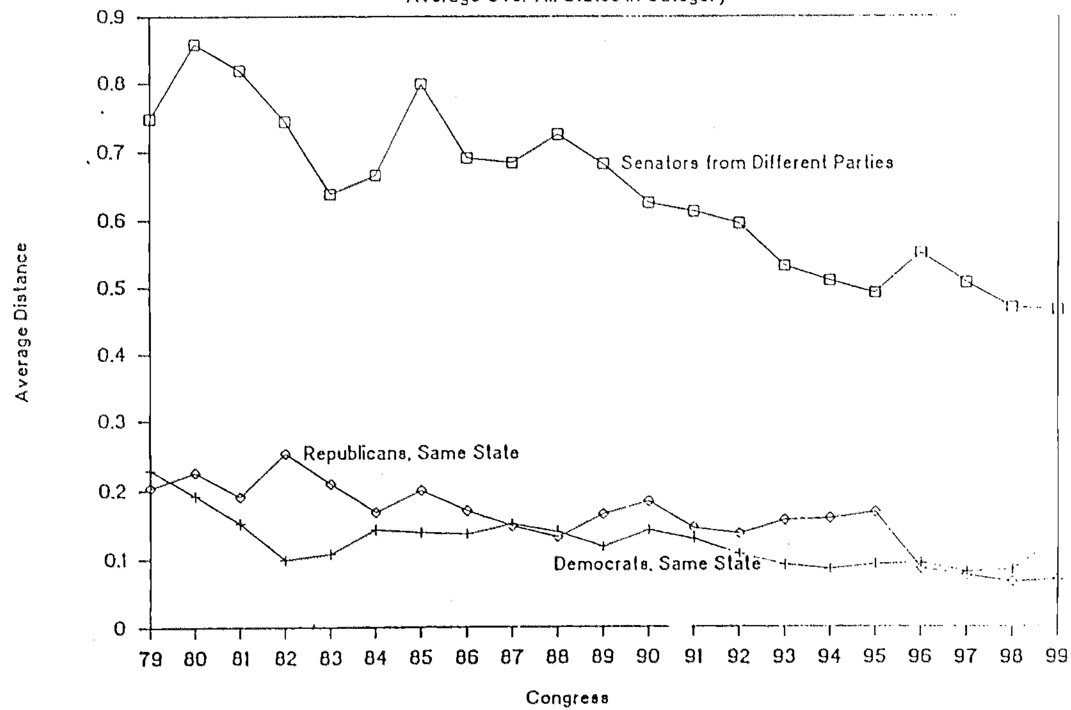
Upon first observing split states one naturally thinks of the decline of parties literature. And perhaps party decline provides a sufficient explanation for split delegations <u>considered in isolation</u>. If large numbers of voters are not strongly moored to the parties, and if recruitment processes characteristically generate and fund credible challengers in Senate races, then "every race a toss-up" would appear to be the natural outcome.

Our difficulty with this argument arises when we view the split trend <u>in combination with polarization</u>. We would be more inclined to accept the decline of parties explanation if all Senate candidates clustered around the mid-point of the ideological spectrum. Then, with weak partisanship and little to choose between on the issues, Senate races would hinge on the unpredictable distribution of attractive personalities, inspired campaign commercials, ethics questions, local issues, and exogenous shocks. But the candidates do not cluster in the middle. Instead, many states elect <u>both</u> a

FIGURE 2

Distances Between Senators, Same State

Average Over All States in Category



liberal and a conservative. And the evidence is that when each comes up for re-election, the electorate has a clear choice.[8] Of course, if Senate candidates were always equally polarized on the issues, then we might expect the same outcome that would occur if they all converged to the median. But then the question arises: why are Senate candidates so polarized?

In reflecting on Senate polarization most political scientists cite some version of the "two constituencies thesis" (Huntington, 1950; Fiorina, 1974; Brady, Brody and Ferejohn, 1989). In each state there are opposed groups of activists who monitor government and participate in campaigns and consequently have their preferences weighted more heavily than those of average voters. Empirical research suggests that such people have more extreme views than ordinary voters and are highly polarized. Thus, candidates are drawn away from the median by their need to please the activists. When the Democrats win the Senator is more liberal than the state, whereas when the Republicans win the Senator is more conservative.

Like most others we first viewed Senate polarization as indicative of the two constituencies notion. But upon reflection the argument is clearly insufficient. First, beginning with Downs (1957) three decades of theorizing about electoral processes in two-party systems has repeatedly found strong centrist tendencies. When equilibria exist they are typically some generalized median. When equilibria do not exist, minmax sets (Kramer, 1977); stochastic solutions (Ferejohn, Fiorina, and Packel, 1980), uncovered sets (Shepsle and Weingast, 1984), and all other known theoretical models of competitive processes suggest centrist outcomes seemingly at variance with the polarization findings of Poole and Rosenthal (1984b). Even when candidates are policy-oriented there are strong incentives to converge (Calvert, 1985).

More recently, however, Alesina (1988) showed that when voters learn candidate ideology, the latter are not free to move in the policy space for credibility reasons. In particular, extremists who are known › be such, would not be believed if they announced a moderate program. But although this recent work explains why extremists may not be able to converge, we still need to explain why centrist, moderate candidates do not enter and defeat relatively more extreme competitors.

Some scholars also have tried to extend the two constituencies thesis to explain the split trend (Brady, Brody, and Ferejohn, 1989). As with the polarization question, we do not believe that the two constituencies thesis can bear all of the explanatory weight. If one constituency is strong enough to win one election, why is it not strong enough to win the next one as well? Surely, most state are not so closely divided that presidential coattails and mid-term penalties are sufficient to swing each election, the former in favor of one party, the latter in favor of the other. For the two constituencies thesis to say anything about the increase in split states it must posit that states are evenly divided politically, and additionally, identify some consideration that systematically advantages first one constituency, then the other.

We have identified such a consideration, one that contributes both to split states and candidate polarization. Our argument builds on a key insight that has not been taken account of in previous analyses:[9] when a Senate election is held, there is already a sitting Senator. If voters appreciate that at any given time they are choosing the second member of a pair, rather than making an unconditioned choice between two candidates, the nature of the resulting electoral equilibrium is consistent with both the split state and the polarization phenomena. Specifically, in equilibrium (1) a candidate benefits if the non-running Senator is of the opposing party; (2) the more extreme the position of the non-running Senator, the more extreme may be the position of the opposing party candidate. Thus, victory by one party raises the probability that the opposing party will win the next election, and an extreme position by the non-running Senator permits an extreme position by the contending candidate of the other party in the next election. Thus, the model rationalizes both splits and polarization. On first consideration this logic will strike many readers as implausible. We ask them to suspend their skepticism temporarily, for the empirical results to be reported are consistent with the theoretical predictions. In the concluding discussion we will return to the question of the model's a priori plausibility.

2. The Model

The electoral system that produces United States senators is unusual. From the standpoint of the individual senator it is a standard single-member simple plurality system. But from the standpoint of the voter the electoral system is multi-member. Unlike other multi-member systems, however, the members are not in direct competition and are not elected at the same time. Now, might unusual electoral arrangements give rise to unusual voter behavior? Specifically, while a voter may prefer that his Senate representation consist of two Democrats, two Republicans, or one of each, the electoral arrangements for the Senate do not allow the expression of a choice among those three alternatives. Because one senator will not be running in any given election, voters can express a preference only for two senators of the same party as the non-running senator, or for one senator from each party.[10] <u>The voter's choice</u>

is conditional upon the existence of the non-running senator. Thus it would not be surprising if the voter took some account of that senator when making a choice in the election for the other seat.

Specifically, we use a unidimensional spatial model to express how voters care about the composition of the Senate delegation of their state. We characterize voters' utility functions as follows:

$$U_i = -\left(\frac{n + a}{2} - i\right)^2 \tag{1}$$

where n = policy position chosen by the senator elected for the seat which is voted upon; a = position of the senator who is not up for election, which we define as the "anchor"; i = bliss point of the generic voter i. The quadratic specification is adopted only for algebraic simplicity; any single peaked symmetric concave function could be used. Purely for expositional purposes, we also assume that the distribution of voters' bliss points is uniform and normalized in the [0,1] interval. Thus, the median voter has a bliss point $i^m = 1/2$.

Equation (1) posits that the voters care about the "policy position" of their state, which is the result of a linear combination of the positions of the two senators. In (1) it is assumed that the two Senators weigh equally in policymaking. Our analysis can, however, be generalized to the case in which "senior" Senators have a higher weight (see below). Equation (1) also embodies voter myopia, since it assumes that voters act as if they cared only about the current election and do not take into account the implications of the position of the current winner for the future. We conjecture that our qualitative conclusions would not be altered by the explicit consideration of voters' foresight. Even though the voters would be less prone to support an extreme candidate solely for the immediate benefit of balancing an extreme anchor, substantial balancing should still occur, particularly if the future is discounted. We also do not model how state level balancing in senate elections interact with balancing at the national level (see Fiorina 1988, Alesina and Rosenthal 1989a,b), although we control for these effects in our empirical work below.

The seat which is voted upon can be won by either a Democratic candidate, who adopts position "d" or by a Republican candidate, who adopts position "r." In order to illustrate our basic argument in the simplest possible way, we consider first the case in which all the candidate positions, i.e., d, r and a are fixed and known by the voters. We also assume $r \geq d$, that is, the Democratic position is never on the right of the Republican position. With no possibility of confusion we will sometimes refer to the Democratic party as d and to the Republican party as r.

2.1. Fixed positions

It is immediate to show that voter i votes r if and only if (with no loss of generality we assume that the indifferent voter votes r):

$$i \geq \left(\frac{d + r}{4}\right) + \left(\frac{1}{2}\right)a = \frac{d + r + 2a}{4} \equiv i^* \qquad (2)$$

That is, i^* is the ideal point of the indifferent voter. Voters on the left of i^* vote d; voters on the right vote r. Several comments are in order.

i) If there were no anchor, the indifferent voter would be given by:

$$\bar{i} = \frac{d + r}{2} . \tag{3}$$

Note that $\bar{i} > i^*$ if and only if

$$\frac{d + r}{2} > a . \tag{4}$$

Condition (4) illustrates the basic idea of this paper. If the anchor is to the left of the midpoint between d and r, the right wing candidate (r) is advantaged in the election with the anchor, relative to the case of no anchor, since $i^* < \bar{i}$. Similarly, if the anchor is right wing, the voters want to "moderate" him by favoring the left candidate.

An example of this result is the situation in which the anchor adopts position d (i.e., $a = d < 1/2 < r$). In this case we have:

$$i^* = \frac{1}{4} r + \frac{3}{4} d < \bar{i} \tag{5}$$

Thus, <u>a Republican candidate gains by running with a Democratic anchor</u>. We will refer to this result as the "opposite party advantage" hypothesis, and will test it below, in the empirical part of the paper.[11]

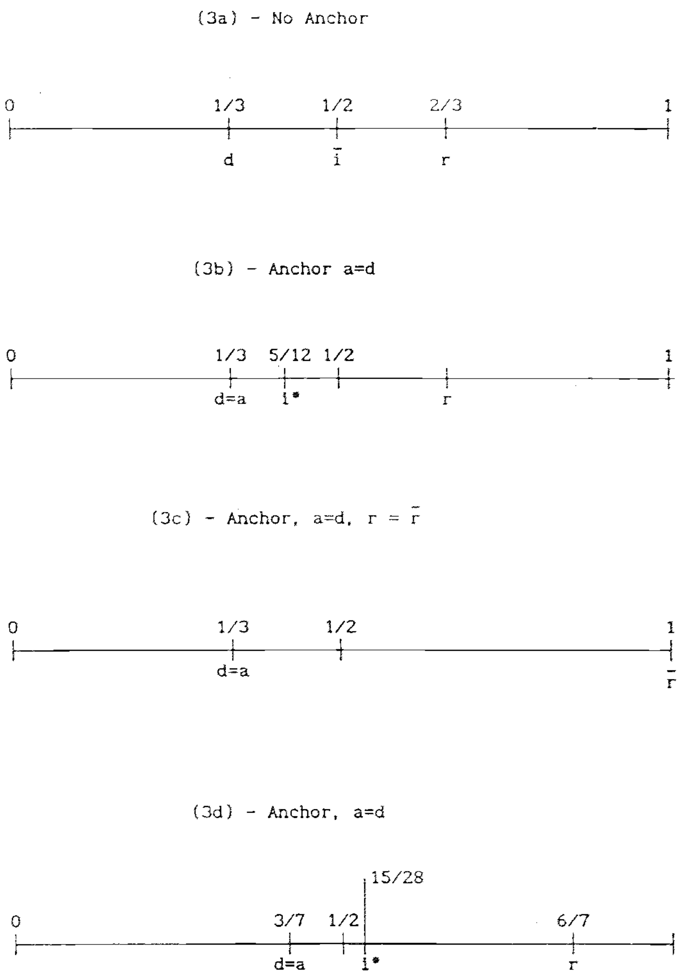
ii) Given (2) and a fixed position for d, the most right wing position that r can adopt and at least tie the election, i.e. $i^* = 1/2$, is given by $\bar{r}$ such that:

$$\bar{r} = 2 - d - 2a \qquad (6)$$

Thus, the more left wing is a, the more right wing r can be and at least tie the election. This is due to the fact that the more left wing is the anchor, the more moderation on the right is desired by the voters. This result may hint at a "polarization trend" in a dynamic setting. If r becomes more extreme, in the next election he will be the anchor, enabling the d candidate to be extreme and still win. If an extreme d becomes the anchor, then r can be more extreme in the next round, and so on. Since we have not developed a dynamic model, it is impossible to explicitly characterize this adjustment through time; however, condition (6) suggests a possible basis of increasing polarization.

Figure 3 illustrates our arguments. In Figure (3a) we represent a standard two-candidate contest with no anchor. The policy space is the interval [0,1], the median voter is at 1/2, d = 1/3 and r = 2/3. In this case the indifferent voter is $\frac{d + r}{2} = \bar{i} = \frac{1}{2}$. The election is a tie. In Figure (3b) we consider an election with the same positions for d and r, but with a left wing anchor; that is, a = d = 1/3. In this case, the indifferent voter is $i^{*} = 5/12$ as implied by (5). Thus, voters with ideal points between 5/12 and 1/2 vote d in the election without the anchor, but vote r in the election with the anchor; in the second case, candidate r wins the election. Figure (3c) illustrates that given a = d = 1/3, the most right wing position that r can take and still tie is given by $\bar{r} = 1$. Thus, for these parameter values r can be as right wing as the most extreme position in the policy space and still at least tie. Remember that without the left wing anchor, r would lose the election if he chooses a position to the right of 2/3 (Figure 3a).

FIGURE 3
Illustrative Cutpoints



Finally, it should be noted that our framework is not inconsistent with the case in which two Senators of the same party are elected. This possibility is illustrated in Figure 3d. Suppose that $a = d = 3/7$ and $r = 6/7$. In this case $i^* = 15/28$ and d wins the election. Clearly, two Senators of the same party are elected when their position is much closer to the median than that of the opponent.[12]

Our results can be generalized to the case in which the anchor and the new Senator weigh differently in policy formulation. Suppose, again that the anchor is "left wing" (i.e., to the left of the median voter and to the left of $\frac{d + r}{2}$) and more influential in policy formulation than the new Senator. Then, the r candidate receives more votes (for given d, r and a) the higher is the weight of the anchor in policymaking. In addition, for given d and a the higher is the weight of the anchor, the more right wing r can be and still win.

Differential weight in policy can be explained by multiple considerations. Seniority is one: a more senior senator is likely to be more influential in policymaking than a freshman. Thus, if the anchor, who has been in office for some time, is senior to the new Senator, he may be more influential. Another consideration is "mandate." *Ceteris paribus*, an anchor who had been elected with a landslide is likely to be more influential than if he had barely won his seat in a highly contested race. In general, the "opposite party advantage" and the "polarization trend" are stronger the lower the weight of the new senator. This is because more voters will turn to an "extreme" left (right) wing candidate in order to moderate a very powerful right (left) wing anchor.[13]

3. Mobile Candidates

We now consider models in which the candidates can choose their positions. We assume that candidates d and r have different preferences (Wittman, 1977, 1990; Calvert, 1985). The policy platforms chosen before an election are "credible" in the sense that post-election policies cannot be different from the pre-electoral platforms. (For a discussion of this assumption see Alesina, 1988). There is uncertainty about the preferences of the electorate,[14] which can be captured by assuming that the extremes of the uniform distribution of the voters' ideal policy are $[w, 1+w]$ where w is a random variable with an expected value of zero, i.e., $E(w) = 0$, and a cumulative distribution $F(w)$.[15]

For given d, r and a, the probability that d wins the election is given by:

$$
\begin{aligned}
P = \text{prob}[d \text{ wins}] &= \text{prob}\left\{\left[i^{*} - w\right] > 1/2\right\} \\
&= \text{prob}\left[w < i^{*} - 1/2\right] \\
&= F\left(\frac{d + r}{4} + (1/2)a - 1/2\right) . \qquad (7)
\end{aligned}
$$

Note that P is increasing in a and r; in particular, the more right wing is the anchor the better the chances of the d candidate. The result generalizes the "opposite party advantage" hypothesis, since it implies that the probability that the d candidate wins is higher if the anchor is r than if she is d. Also note that,

$$\frac{\partial \text{Prob[d wins]}}{\partial a} > \frac{\partial \text{Prob[d wins]}}{\partial r} \tag{8}$$

The probability that d wins is more sensitive to the anchor's position than to the other candidate's position.

Let us now move to the choice of platforms. Two possibilities may arise. In the first, one of the two candidates is the incumbent, chosen to be r. The positions of both the anchor and of the incumbent are fixed and known to the voters. That is, it is impossible for the incumbent to "move" in the policy space since the voters know his ideology. On the contrary, the challenger is free to move; thus we study the optimal choice of the position of the challenger, d. The second possibility is that of an open seat competition. In this situation, both candidates are free to move in the policy space. We analyze the incumbent case here; the open seat case is dicussed in the Appendix.

When r is the incumbent, the choice of d depends upon the specification of the objective function of the challenger. We have considered three cases: in all three our basic results of "opposite party advantage" hold, but some interesting differences emerge. The three cases are as follows:

1) Candidate d cares about the position adopted in the campaign <u>and</u> being in office per se. Thus, his utility function is given by:

$$U^D = -(d-\hat{d})^2 + K\delta \tag{9}$$

where $\hat{d}$ is the party bliss point; $K > 0$ is the utility of being in office and $\delta = 1$ if and only if d is elected, and zero otherwise.

2) Candidate d cares about the position he adopts <u>only if</u> he wins; thus, his utility function is:

$$U^D = [-(d-\hat{d})^2 + K]\delta \tag{10}$$

3) The candidate cares (as the voters) about the policy outcome <u>and</u> about winning per se. Thus, the challenger's objective function is given by:

$$U^D = -(\frac{n+a}{2} - \dot{d})^2 + K\delta \tag{11}$$

<u>Case 1</u>

The problem faced by party d is the following:

$$\max_{d} -(d - \dot{d})^2 + P(d,r,a)K \tag{12}$$

In (12), $P(\cdot)$ is the probability that d wins, given in (7).

The first order condition is:

$$\frac{\partial P(\cdot)}{\partial d} K = 2(d-\dot{d}) \tag{13}$$

The left hand side represents the marginal benefit of convergence, since it is composed of the marginal gain in probability (remember that $\frac{\partial P(\cdot)}{\partial d} > 0$ if $d < r$) of a move to the right, multiplied by the utility of being in office. The right hand side represents the marginal cost of deviating from party d's ideal policy $\hat{d}$. The maximum is obtained at the point in which marginal costs equal marginal benefits.[16]

Several comments are in order:

i) In equilibrium $\hat{d} < d \leq r$. If $d \leq \hat{d}$ the right hand side of (13) is zero or negative and the left hand side is positive. If $d > r > \hat{d}$ the right hand side is positive and the left hand side negative.

ii) By applying the implicit function theorem to (13) one can immediately obtain:

$$\frac{\partial d}{\partial a} = \frac{K}{2} \frac{\partial^2 P(\cdot)}{\partial d \partial a} \tag{14}$$

The sign of $\frac{\partial d}{\partial a}$ depends upon the generally ambiguous sign of the cross partial derivative of $P(\cdot)$. If w is uniformly distributed, it immediately follows, from (7) that $\frac{\partial P(\cdot)}{\partial d \partial a} = 0$. Thus, in this case the position chosen by d is not affected by a. The intuition of this result is that the d candidate cares about his own platform regardless of the position of the anchor except, possibly, for the indirect effect of the cross partial derivative of the $P(\cdot)$ function. This indirect effect is zero in the uniform case.

iii) From (7) it follows that the total derivative of $P(\cdot)$ with respect to a is given by:

$$\frac{dP(\cdot)}{da} = \left(\frac{1}{2} + \frac{1}{4}\frac{\partial d}{\partial a}\right)F'(\cdot) \tag{15}$$

Therefore, $\frac{dP(\cdot)}{da} > 0$ if and only if $\frac{\partial d}{\partial a} > -2$, which implies [from (14)] $\frac{\partial^2 P(\cdot)}{\partial d \partial a} > -\frac{4}{k}$. Thus, under this condition, which is satisfied in the case of a uniform distribution of w, the more right wing is the anchor the more likely it is that d wins the election: this is the "opposite party advantage" result.

<u>Case 2</u>

In this case the problem faced by party d is as follows:

$$\max_{d} P(d,r,a)\left\{\left[-(d-\hat{d})^2\right] + K\right\} \tag{16}$$

The first order condition for this problem is given by:[17]

$$\frac{\partial P(\cdot)}{\partial d}\left[K - (d-\hat{d})^2\right] = 2P(\cdot)[d-\hat{d}] \tag{17}$$

As in (13), the right hand side of (17) represents the marginal cost of converging; the loss in ideology is incurred only if elected, unlike in the previous case. The left hand side is the marginal benefit of convergence, which is positive, since the term $[K-(d-\hat{d})^2]$ represents the total value of being in office. Note that this term has to be positive in equilibrium; otherwise the utility level for party d would be higher when out of office than when in office. In other words, the loss entailed by a candidate taking a position other than his ideal point must not exceed the value of the office. As in case 1, in equilibrium we have $\hat{d} < d \leq r$. (The second inequality is strict for K sufficiently low.) Under mild sufficient conditions, discussed in the Appendix, which imply that the cross partial derivative of $P(\cdot)$ is not too large, one can show that $\frac{\partial d}{\partial a} < 0$. That is, the more right wing is the anchor, the more left wing is the position chosen by candidate d. As emphasized above, the sufficient condition on the cross partial derivatives of $P(\cdot)$ is satisfied in the case of the uniform distribution of w as well as by more general distributions (see Appendix).

This last result hints at the possibility of the dynamic "polarization trend" discussed above in the context of the fixed position model. Note that this trend would be bounded by the ideal points of the two candidates. That is, in equilibrium the positions of d and r would always be in the interior of the interval bounded by $\hat{d}$ and $\hat{r}$. Thus, the "polarization trend" would not be explosive.

Finally, under mild sufficient conditions on the cross partial derivatives of $P(\cdot)$ which are discussed in Appendix and are satisfied in the uniform case, the "opposite party advantage" holds in this case as well. Namely we have:

$$\frac{dP(\cdot)}{da} = \frac{\partial P(\cdot)}{\partial a} + \frac{\partial P(\cdot)}{\partial d}\frac{\partial d}{\partial a} > 0 \qquad (18)$$

The more right wing is the anchor, the more likely it is that, in equilibrium, the left candidate is elected, despite the fact that d moves to the left, in response to a's right wing move. The intuition is that if the anchor is more of an extreme right winger, d faces a better "trade-off" between his ideology and his likelihood of victory. In general, d chooses to improve on both "margins"; i.e., probability of victory <u>and</u> ideology. Thus, the "opposite party advantage" holds: the d candidate has a better chance of victory when the anchor is r than when the anchor is d.

<u>Case 3</u>

The maximization problem faced by candidate d in this case is as follows:

$$\max_{d} P(d,r,a)\left\{\left[-\left(\frac{d+a}{2}-\hat{d}\right)^2+K\right] + [1-P(d,r,a)]\left(\frac{r+a}{2}-\hat{d}\right)^2\right\} \tag{19}$$

Define: $\bar{d} = 2\hat{d} - a$ (20)

Then problem (19) can be rewritten as follows:

$$\max_{d} P(d,r,a)\{\frac{1}{4}[(r-\bar{d})^2 - (d-\bar{d})^2] + K\} \tag{21}$$

Equation (21) shows that d acts as if his ideal policy were $\bar{d}$ in a standard two candidate model. While $\bar{d}$ is more extreme than $\hat{d}$, ($\bar{d} < \hat{d}$ if $\hat{d} <$ a), the d candidate acts as if the value of office is four times the value it would have were there a straight two candidate race. Because d chooses his policy knowing that the final policy outcome will be a weighted average of the winner's and the anchor's positions, d behaves as a more extreme candidate who is nonetheless more "electoralistic" than he would be in a standard two candidate election.

The first order condition of this problem is the following:

$$\frac{\partial P(\cdot)}{\partial d} \left[\frac{1}{4} \Delta U + K\right] = P(\cdot)\frac{1}{2} (d-\bar{d}) \qquad (22)$$

where $\Delta U = [(r-\bar{d})^2 - (d-\bar{d})^2]$.

The left hand side is the marginal benefit of convergence. The marginal increase in probability is multiplied by a utility term, which represents the benefit of holding office plus the difference in the ideologies of the parties. The right hand side is the marginal cost of convergence, which is increasing in both the probability of winning and the difference between d and the modified bliss point, $\bar{d}$.[18]

Several comparative statics results can be derived by applying the implicit function theorem to (22). Details of the derivations are given in Appendix. Here we report the results without proof.

i) $\bar{d} < d \leq r$ (23)

with the last inequality strict for sufficiently low values of K.

Note that it is possible that the following occurs in equilibrium:

$$\bar{d} < d < \dot{d} < r \tag{24}$$

That is, unlike in the previous cases, candidate d may choose a position which is even more left wing than his true ideal point. This is because the policy outcome, which is what both the voters <u>and</u> candidate d care about, is a linear combination of d's position and the anchor's position.

ii) Under mild sufficient conditions on parameter values (see Appendix) we obtain:

$$\frac{\partial d}{\partial a} < 0 \tag{25}$$

That is, the more right wing is the anchor the more left wing is the position chosen by the challenger d. The conditions needed on parameter values are first that $\frac{\partial^2 P(\cdot)}{\partial d \partial a}$ is close to zero; second, that in eqilibrium (r−d) is not too high, which implies that K has to be sufficiently high. The second condition implies that the polarization effect captured by (25) holds as long as d and r are not already too far apart. This result captures the "polarization trend" in this model with a mobile challenger.[19]

iii) Under another mild sufficient condition on parameter values (satisfied in the case of a uniform distribution of w) which is discussed in the Appendix, the "opposite party advantage" holds in this case as well. That is, it can be shown that condition (18) holds.

This concludes our analysis of elections with an incumbent with fixed position. To summarize, in several models based on different assumptions about candidates' motivation, degree of mobility in the policy space, and the information about voters' preferences, the basic opposite party advantage" result holds. Thus, the left (right) wing candidate is advantaged in an election when the senator holding the other seat is right (left) wing. Furthermore, in some of the models there is a tendency for the left (right) wing challenger to adopt a more extreme position the more extreme is the right (left) wing position of the anchor.

4. Empirical Results

Proponents of formal models traditionally argue that one of the values of their enterprise is the generation of nonobvious propositions that can be subjected to empirical test. Confirmation of such propositions not only supports the model that generates them, but also adds to knowledge by identifying unexpected relationships that inductive modes of analysis overlook. Our model generates two hypotheses that seem genuinely nonobvious:

1. Opposite party advantage. Other things equal, the Democratic Senate candidate is advantaged when the non-running Senator is a Republican, and vice-versa.

2. Extremes beget extremes. Other things equal, the more extreme the position of the non-running Senator, the more extreme (in the opposite direction) will be the position of the other party's candidate.

The second hypothesis is contingent on the objective function assumed for the candidates: it holds in the second and third cases analyzed above, but not in the first.[20] Moreover, testing the second hypothesis presumes accurate measurement of candidate positions relative to those of the median voters in their states.[21] But the first hypothesis is robust under all three objective functions considered, and requires no heroic feats of measurement. Thus, this section reports on a series of tests designed to examine the opposite party advantage hypothesis. Ceteris paribus, is it better for a Democrat (Republican) to run for the Senate when the non-running Senator is a Republican (Democrat)? Because the premise of the hypothesis is that parties are on opposite sides of the median voter, any test of the hypothesis — such as the one that follows — that does not isolate a pure set of such elections will be biased against the hypothesis because it mixes elections in which the hypothesis should hold with others in which it should not.

We have compiled a data set consisting of all post-war (1946–1986) Senate elections that saw two-party contests.[22] Because we use previous election results as right hand side variables in the analysis, the dependent variable (Senate vote) begins in 1952. The equations included other variables previously found to be important.[23]

- Senate incumbency—dummy variable
- Senate seniority — measured both as years of service and as log years
- presidential coattails — measured by both the national presidential vote and the state presidential vote (Campbell, 1990)
- economic conditions — measured by the increase in real GNP during the election year (Erikson, 1988; Fair, 1988; Chappel and Suzuki, 1989)[24]

- previous vote — lagged vote for the Senate seat in question (normally six years previously, but occasionally more recent if a special election were held)
- time trend — introduced to account for any secular national improvement in Republican senatorial fortunes
- midterm effect — dummy variable for control of the Presidency [Erikson, 1988; Alesina and Rosenthal (1989a,b)].

We fully expected these variables to account for the lion's share of the variance in Senate elections over time. As it turned out, economic conditions, incumbency, lagged vote, and the midterm effect were important.[25] The most interesting question is whether the non-running Senator has any effect over and above these variables.

Note that the correct econometric specification for representing the anchor seat effect when testing the opposite party advantage hypothesis is not a dummy variable for the party of the anchor, as intuition might suggest. Let us return to our simplest model, with fixed party positions and no uncertainty. Assume that in every state, j, voters are uniformly distributed on [0,1] and that the parties take positions d_j, r_j. (There is no loss of generality here other than uniformity, since the origin and length of the space of some underlying national liberal-conservative continuum could vary across states without changing our results.) Assume that the party positions are sufficiently close to symmetric about the median (1/2) that all states have split delegations. The inequalities that define this situation are $r_j < 2-3d_j$ and $d_j > 2-3r_j$. The algebra of the model indicates that

$$V_{rj} = 100(2-r_j-d_j) - V_{raj}$$

where V_{rj} is the Republican vote percent, and V_{raj} is the Republican vote percent in the preceding election for the anchor.

Thus, each state would have a different intercept, and the coefficient on the anchor vote would be -1. In light of this argument it would not be correct to estimate an equation of the form:

$$V_{rj} = B_{oj} + B_1 I_j$$

where I_j is a dummy variable for the party of the anchor seat, and B_{ij} $i = 1, 2$ are coefficients.

In summary, then, the anchor vote is a proxy variable for the positions of the two parties. Indirectly, the plurality of the anchor influences the share of votes received by senators competing for the other seat.

Of course, there might be other states where party positions were such that one party always wins both seats. This could happen, for example, if both parties were to the same side of the median. For these states we would have

$$V_{rj} = B_{0j}.$$

In these states, regressing on either the anchor vote or an anchor dummy variable would be inappropriate. If our actual sample includes a mixture of split delegations and unified delegation states and we regressed on the anchor vote, our estimated regression coefficient would be less than 1.0, since it would be an average of the 1.0 from the split states, and the 0.0 from the unified states.

In real elections the relationship between the anchor position, the anchor vote and the current vote will be more complex than that generated by our simple model with a uniform distribution of preferences. It will depend on factors including (a) the distribution of voter preferences, (b) changes in voter preferences between elections, (c) the objectives of the candidates, (d) the relative weights of the anchor and contested seats. Consequently, the functional form of the relationship in general can not be specified. We can only ask whether past and current votes have a statistical relationship. As is commonly the case in empirical work, a linear term worked best; transformations, dummies, and interactions added little. Therefore, the results we report are based on equations in which the anchor vote affects the current vote in simple additive fashion.[26]

The first column of Table 1 contains a simple regression that accounts for about half the variance in post-war Senate elections. The estimates suggest that

1. Running as an incumbent is worth about four points.
2. Running in a mid-term election costs candidates of the president's party between 2 and 3 points. Thus, in the current period of Republican presidential dominance, Republican senatorial candidates are disadvantaged.

3. Every one point increase in GNP growth during the election year is worth about half a point for candidates of the presidential party.
4. There is a very small but significant Republican trend in post war Senate races.
5. There is quite a bit of slippage from one election to the next, as the coefficient on the vote six years earlier is only about .25.
6. The vote garnered by the non-running Senator two or four years earlier is negatively related to the vote in the next election, although the estimate is not significant.

The first four results are straightforward and in keeping with previous findings in the literature. The fifth finding is mildly surprising but quite in keeping with the image of Senate elections as volatile and idiosyncratic. The sixth finding is most intriguing: the opposite party advantage hypothesis meets with some weak support. With this bit of encouragement we pushed on.

In the second column of Table 1 the effects of the two previous elections have been estimated separately for elections contested by incumbents and those in which the Senate seat is open.[27] Now an interesting disparity appears. In incumbent-contested seats the vote in the election two years or four years earlier bears a significant negative relationship to the current vote ($t=1.7$, $p < .05$, one-tailed test). Roughly, there is a 7 percent "tax" or penalty on the party's previous vote margin. In open seat races, no such penalty appears. Instead, both the lagged vote and anchor vote have similar positive coefficients.

In the third column of the table we take the next logical step, that of dividing the effects of previous elections according to whether the election occurs in a presidential or off-year. This estimation reveals that the negative relationship between the votes in adjacent Senate elections is strongest in presidential election years with incumbents running.[28] Roughly speaking, in such elections for every vote a party's candidate got in the previous Senate election, the party's current candidate loses one fifth of a vote, a penalty of nearly 20 percent. No negative relationship emerges in mid-term years or in presidential years without incumbents running.[29] A reexamination of the model suggests a possible explanation for the presidential year finding. Middle-of-the-road voters, those whose ideal policy lies between those of the two parties, are those most likely to engage in "balancing" behavior (Figure 3). If presidential electorates contain more such moderate voters than the smaller mid-term electorates, then we would see more evidence of balancing behavior in the former.

We wish to emphasize the importance of the results in Table 1. In any pair of temporally adjacent elections, regardless of whether incumbents are seeking reelection, researchers would expect to find a strong positive relationship between a party's vote in one election and its vote in the next, and one would expect the relationship to deteriorate as the elections become more separated in time. To underscore this point consider the relationship between current election results and previous results in House elections. In Table 2 the Republican vote in 1976–78–80 House elections is regressed on the Republican vote one election and two elections earlier.[30] As one would expect, the returns in both earlier elections are positively related to those in the current election, but those from the closer election have a much stronger relationship than those from the more distant election. Although this pattern is stronger for incumbents, it is clearly true for open seats as well, except for the anomolous insignificant negative coefficient for the 1978 mid-term (based on only 34 observations). Thus, a House candidate's vote bears a significant positive relationship to the vote for the (different) candidate of his party in the previous election. In contrast, as Table 1 shows, a Senate incumbent's vote has a significant negative relationship to the vote for his party's (different) candidate in the previous election, at least in presidential election years. This is a heretofore unnoticed empirical disparity.

In order to highlight even more clearly the surprising difference in the lag structure of House and Senate elections, we have run for the Senate the same regressions reported in Table 2 for the House. The coefficient on the first lag effectively zero, reversing the normal relationship in aggregate election returns (Table 3).

Finally, we have also tested whether voters seek to balance with their vote the overall composition of the Senate, rather than their state delegation. To control for this different type of balancing we defined a variable, Republican seat share in the Senate preceding the election under consideration. This variable was added to our regression but was never significant: the t-statistic on its coefficient never reached the value of 1. A theoretical account consistent with this finding runs as follows. Voters care both about national policy outcomes and about how the Senators of their state articulate the state positions. The focus of this paper, balancing at the state level, is relevant for the definition of the state position. National policy outcomes, in contrast, are affected by the interaction between the House, the Senate and the President. At the national level, the relevant balancing involves an executive-legislative interaction which is captured by the mid-term variable in our regression. That is, the voters are not interested in a balanced Senate per se, but in a balanced executive-legislative package.

5. Conclusion

This paper has developed a general model based on the notion that voters in Senate elections take account of the existence of the non-running Senator when deciding how to case their votes. Under several different assumptions regarding the candidate objective functions, the model predicts an "opposite party advantage:" Republican Senate candidates are somewhat advantaged when the non-running Senator is a Democrat, and vice-versa. This result is generally stronger the greater the influence of the non-running Senator relative to that of the one who will be chosen in the current election. Somewhat less robust but still rather pervasive is an "extremes permit extremes" result: the more extreme the position of the non-running Senator, the more extreme can be the position of the candidate of the opposing party. The reason is that the basic logic of the model is one of balancing. If an ideologue somehow wins election, moderate voters can only counter-balance her positions by choosing an opposite ideologue. It seems possible that in a dynamic extension of our models, the extremes permit extremes feature could give rise to a polarization process that would see a state's Senate candidates grow increasingly distant over time. We grant that the models discussed make heavier informational demands on voters than most political scientists would find plausible. But the voters need not know the specifics of the candidates' stands; rather, they need only have an impression of the position of the candidates relative to each other and to the non-running Senator. At any rate, the empirical analysis produces results of a qualified positive nature. At least in presidential elections, incumbents of one party suffer a vote penalty if the non-running Senator is of the same party. Given that half of all Senate elections occur in presidential years, and about three-quarters of incumbents seek re-election, about 40 percent of contemporary Senate elections fall into this category. Whatever the demands our model makes on voters, it is the only one of which we are aware that can account for this new finding.

Finally, we emphasize that although balancing behavior adds an interesting twist to party fortunes in Senate elections, it is certainly not the major determinant. It is still better to be an incumbent, to have a healthy economy (if your party's president is in office, a poor economy otherwise), and to have a strong party base in your state. Moreover, our equations explain just a bit more than half the variance in post-war Senate elections, consistent with existing characterizations that emphasize their volatility and unpredictability. Despite their noisy quality and the larger forces that are at work in Senate elections, however, at the margins small movements of votes can determine who wins and who loses. Balancing behavior may well underlie such movements.

Footnotes

1. The University of Nebraska sponsored a conference on the study of the Senate in October 1988, and Rice University and the University of Houston co-sponsored a conference on Senate elections in November 1990. In addition, the American National Election Studies (ANES) has recently completed the second wave of a projected three-wave study.

2. In the five elections of the 1980s, 95 percent of all House incumbents who sought re-election were successful; the comparable figure for the Senate was 80 percent.

3. Election surveys show that many more voters can place the Senate candidates on seven-point scales than can place the House candidates. And in 1980 the negative campaigns of conservative groups and PACS were viewed by many as the key to the Republican upsets. On the other hand, the Senate electoral landscape abounds with examples of Senators attacked for being out of touch with their states because of their national activities.

4. In the 1988 Senate elections, 78% of all votes cast were consistent with the party identification of the voter, about the same as the figure for House elections (79%).

5. The answer is not the easy one — the rise of two-party competition in the South. While there is a rise in split representation in the Southern states, it accounts for less than half the trend identified in Figure 1.

6. Figure 2 was computed from the first dimension of the D-NOMINATE scaling with linear trend in legislator positions. For details on the scaling procedure, see Poole and Rosenthal (1991). While the distance between

Senators of different parties is declining over time, the distance between Senators of the same party is also declining over time. In fact, the ratio of the first curve (Senators of different parties) and the average of the latter two (Senators of the same party) shows an increasing trend. At any rate, what is most relevant for our model is the dispersion of Senators' position relative to the distribution of voters' preferences; there is no reason why the latter should be constant over time. Thus, one cannot say for certain how changes in the distance between the Senators compare to changes in the distribution of voters' preferences.

7. There is evidence, although it is disputed (for a survey see Brady, Brody and Ferejohn, (1989) that Senators move toward the center as their election draws near. Even if true, that does not alter the fact that they remain relatively distant from each other.

8. Using the new available 1988 American National Election Studies Senate data, Erikson (1989) shows that the distributions of Democrat and Republican Senate candidates (as viewed by the relevant state electorates) do not overlap. That is, the most conservative Southern Democrat is seen as to the left of the most liberal Eastern Republican.

9. With one exception: The identical insight has been exploited by Michael Krassa (1989). The idea is a natural extension of the models of President-House voting developed in Fiorina (1988) and Alesina and Rosenthal (1989a,b).

10. On rare occasions an incumbent dies or retires and the election to fill the vacant seat occurs at the same time as the regular election for the other seat. By our count this has happened only 14 times in more than 725 Senate contests since 1946, so we will ignore that possibility in what follows.

11. It should be noted that in our model balancing occurs within each state. Thus, the opposite party advantage refers to each state race viewed separately. This, of course, stems from our model of voter's preferences, embodied in (1). More generally, voters may want to balance, with their vote, the Senate as a whole. In this case, the "opposite party advantage" would be enjoyed by, say, a Republican candidate running when the majority of the Senate is Democratic. In the empirical part of the paper we will test (see below) whether balancing occurs at the state level or at the level of the Senate as a whole.

12. Two senators of the same party are always elected if both parties (and the anchor) are on the same side of the median.

13. An additional case is one in which one of the two candidates is an incumbent which is senior even to the anchor. Details of this case are available from the authors.

14. Without this uncertainty the model would be trivial since for any combination of policy positions the electoral result would be perfectly predictable. In such a model, even ideological candidates would fully converge [Calvert (1985)].

15. See Alesina and Rosenthal (1989a,b) for an identical formalization of uncertainty about voters' preferences.

16. If $\frac{\partial^2 P(\cdot)}{\partial d^2} \leq 0$ holds, the second order condition of this problem is satisfied. Henceforth, we assume that this sufficient condition is satisfied.

17. See note 14.

18. See note 14.

19. In a dynamic model this condition may suggest that there is a limit to the "dynamic polarization trend."

20. Additionally, in the case where parties have fixed positions (because of reputational or other considerations), the hypothesis evidently would not hold.

21. It is easy enough to scale the roll call votes of sitting Senators, though not all critics would be convinced that problems of measurement equivalence over time can be overcome. Unfortunately, ascribing positions to defeated challengers and state electorates is more difficult, though Wright and Berkman (1986) point out that this information is available for 1982 at least.

22. Given the nature of the hypothesis being tested we naturally had to omit the elections in which special Senate elections occurred at the same time as the regular election. Additionally, we eliminated those races in which third parties got more than 10 percent of the vote, and races in which the losing candidate got less than 15 percent. Cumulatively, these decision left us with a total of 458 observations, but only fifty from the states of the old Confederacy.

23. We estimated models that allowed each state to have a different intercept (that is, "normal vote"). For such "fixed effects" models it is well known that OLS provides consistent estimates of the other linear parameters but inconsistent estimates of the error variance and the intercepts. Since our interest is in the linear parameters for the independent variables, the inconsistency problem is not a concern except insofar as the biased error variance affects significance tests. Since the bias is on the order of 1/T, where T is the number of observations per state, the bias is not a serious

problem, given that we average 11 observations per state. In standard fixed-effects models, there would be an identical number of times-series observations for each state. As this is not true in our case (because of omitted elections (see previous footnote) we wrote a GAUSS program (available on request) that estimates the model for varying numbers of observations.

24. We examined a number of measures of national economic conditions as well as state real income figures generously provided by John Chubb. GNP growth gives the strongest results.

25. Neither measure of the presidential vote (national, state) was ever significant when GNP was in the equations. Seniority did not improve the fit of the equations beyond the simple dummy variable for incumbency. We ran the equations with and without a trend term; though significant, excluding it has no effect on other coefficients.

26. There is another justification for a linear specification. In the generalized version of the model (appendix), the magnitude of the opposite party effect varies directly with the "power" or influence of the anchor Senator. If we take the latters' electoral margins, or mandates, as one element of their "power," then the strength of the opposite party advantage should vary directly with the vote margin of the anchor Senator. Thus, there is substantive, as well as statistical justification for including the actual magnitude of the anchor vote.

27. The summary statistics indicate that we can reject the hypothesis that the coefficients are identical in the two types of elections ($p < .03$). We also estimated the effects of other variables separately for the two types of elections but found no significant differences.

28. Given suggestions in the Congressional literature about important changes in House elections during the mid-1960s, we also tried estimating separate coefficients for pre-1966 and post-1966 races. No significant differences emerged.

29. Note that the effects of previous elections for the <u>same seat</u> are plausible. The relationship is much stronger when incumbents run than when they do not. The relationship is again stronger in presidential years than in off-years.

30. Returns from the 1950s did not pool with those from the 1970s, consistent with the mid-1960s transformation in House elections. We did not include elections from the 1960s because of the extensive redistricting that took place in the middle of that decade. The same 85% cut-off was used as in the Senate analysis (footnote 19).

References

Alesina, Alberto. 1988. "Credibility and Policy Convergence in a Two-Party System with Rational Voters." American Economic Review, Vol. 78(4):796-806.

__________ and Howard Rosenthal. 1989a. "Partisan Cycles in Congressional Elections and the Macroeconomy." American Political Science Review, June, Vol. 83:373-98.

__________. 1989b. "Moderating Elections." National Bureau of Economic Research Working Paper No. 3072.

__________, John Londregan and Howard Rosenthal. (1990). "A Political Economy Model of the United States." Unpublished.

Alford, John R. and John R. Hibbing. 1989a. "The Disparate Electoral Security of House and Senate Incumbents." Prepared for the 1989 American Political Science Association Annual Meeting.

__________. 1989b. "Electoral Sensitivity in the United States Congress." Prepared for the 1989 Western Political Science Association Annual Meeting.

Bernheim, Douglas, Bezael Peleg and Michael Whinston. 1987. "Coalition Proof Nash Equilibria. 1. Concepts." Journal of Economic Theory, June, Vol. 2:1-12.

Brady, David, Richard Brody and John Ferejohn. 1989. "Constituency Preferences and Senatorial Actions: Modeling the Representation of Constituency Interests." Prepared for the Conference on Electing the Senate, University of Houston and Rice University.

Calvert, Randall. 1985. "Robustness of the Multidimensional Model, Candidate Motivations, Uncertainty and Convergence." American Journal of Political Science, June, Vol. 29:69-95.

Campbell, James E. and Joe A. Summers. 1990. Presidential Coattails in Senate Elections. *American Political Science Review*, Vol. 84:513-524, June.

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

Erikson, Robert. 1989. "The Puzzle of Midterm Loss." Journal of Politics, Vol. 50:1012-1029.

__________. 1989. "Roll Calls, Reputations, and Representation in the US Senate." Prepared for the Conference on Electing the Senate, University of Houston and Rice University.

Ferejohn, John A., Morris P. Fiorina and Edward W. Packel. 1980. "Non-equilibrium Solutions for Legislative Systems." *Behavioral Science*, Vol. 25:140-148.

Fiorina, Morris. 1988. "The Reagan Years: Turning to the Right or Groping Toward the Middle." In B. Cooper, et al., eds., The Resurgence of Conservatism in Anglo-American Democracies, Duke University Press: Durham, NC, 430-459.

__________. 1974. *Representatives, Roll Calls, and Constituencies*. Lexington, MA: Lexington Books.

Greenberg, Joseph. 1989. "Deriving Strong and Coalition Proof Nash Equilibria from an Abstract System." Journal of Economic Theory.

Huntington, S.H. 1977. "A Revised Theory of American Party Politics." *American Political Science Review*, Vol. 44:669-677.

Jacobson, Gary. 1990. The Electoral Origins of Divided Government. Boulder, CO: Westview Press.

Kramer, G.H. 1977. "A Dynamical Model Political Equilibrium." *Journal of Economic Theory*, Vol. 16:310-334.

Krassa, Michael A. 1989. "Compositional Voting and the Rational Preference for Polarized Representation." Prepared for the Conference on Electing the Senate, University of Houston and Rice University.

Poole, Keith T. and Howard Rosenthal. 1984a. "U.S. Presidential Elections 1968-1980: A Spatial Analysis." American Journal of Political Science, May, Vol. 28:282-312.

_________. 1984b. "The Polarization of American Politics." Journal of Politics, Vol. 46:1061-1079.

_________. 1985a. "A Spatial Model for Legislative Roll Call Analysis." American Journal of Political Science, Vol. 29:357-84.

_________. 1991. "Patterns of Congressional Voting." American Journal of Political Science, forthcoming.

Shepsle, Kenneth A. and Barry R. Weingast. 1984. "Uncovered Sets and Sophisticated Voting Outcomes with Implications for Agenda Institutions." *American Journal of Political Science Review*, 28:49-74, February.

Wright, Gerald C., Jr. and Michael B. Berkman. 1986. "Candidates and Policy in United States Senate Elections." *American Political Science Review*, Vol. 80:567-590., June.

Wittman, Donald. 1977. "Candidates with Policy Preferences: A Dynamic Model." Journal of Economic Theory, February, Vol. 14:180-189.

_________. 1983. "Candidate Motivation: A Synthesis of Alternatives." American Political Science Review, Vol. 72:142-157.

__________. 1990. "Spatial Strategies When Candidates Have Policy Preferences." in Enelow, James and Melvin Hinich, eds., Advances in the Spatial Theory of Elections. Cambridge University Press, 66-98.

Appendix

In the text we assumed that the anchor and the new senator weigh equally in policymaking. In this appendix we derive the results for a more general formulation of the problem in which these weights are allowed to differ. Specifically, we assume that the new senator will be junior relative to the anchor; thus, the former has a weight of $q \leq 1/2$ in policy formation while the latter has a weight $(1-q) \geq 1/2$. In this situation, voter i's utility function, rather than equation (1) would be given by:

$$U_i = - (qn + (1-q)a - i)^2 \tag{A-1}$$

The extension of the fixed position case to a generic value of q is straightforward and is left to the reader. For the case of mobile candidates, we first note that equation (7), for the probability of a d victory, has to be replaced by:

$$\text{prob [d wins]} = F(q \frac{d + r}{2} + (1-q)\ a - \frac{1}{2}) \tag{A-2}$$

Condition (8) still holds; it is, in fact, strengthened if $q < 1/2$.

1) Derivation of $\frac{\partial d}{\partial a}$ for case 2.

Assume that, in equilibrium, $r < d$. The first order condition (17) can be rewritten as an implicit function:

$$H(d,r,a) = \frac{\partial P(\cdot)}{\partial d}\,[K - (d-\hat{d})^2] - 2P(\cdot)(d-\hat{d}) = 0 \tag{A-3}$$

The implicit function theorem implies that:

$$\frac{\partial d}{\partial a} = - \frac{\partial H/\partial a}{\partial H/\partial d} \tag{A-4}$$

Applying the implicit function theorem to (A-3) one obtains:

$$\frac{\partial d}{\partial a} = - \frac{\frac{\partial^2 P(\cdot)}{\partial d \partial a}[K - (d-\hat{d})^2] - 2\frac{\partial P(\cdot)}{\partial a}[d-\hat{d}]}{\frac{\partial^2 P(\cdot)}{\partial d^2}[-(d-\hat{d})^2] - 4\frac{\partial P(\cdot)}{\partial d}(d-\hat{d}) - 2P(\cdot) + \frac{\partial^2 P(\cdot)}{\partial d^2}K} \tag{A-5}$$

The second order condition (see footnote (14)) implies that the denominator of (A-5) is negative. Thus $\partial d/\partial a < 0$ if and only if:

$$\frac{\partial^2 P(\cdot)}{\partial d \partial a} < \frac{2\frac{\partial P(\cdot)}{\partial a}[d-\bar{d}]}{K - (d-\hat{d})^2} \tag{A-6}$$

As emphasized in the text, condition (A-6) is satisfied in the case of a uniform distribution of w. Consider instead the case in which w has a unimodal and symmetric distribution. Then, to the right of the mode $F''(\cdot) < 0$ and to the left $F''(\cdot) > 0$. From (7), since r and a are fixed positions on the right of 1/2, in equilibrium, for sufficiently large K, $P(\cdot) \geq 1/2$. In this case $F''(\cdot) \leq 0$ and $\frac{\partial^2 P(\cdot)}{\partial d \partial a} \leq 0$ so that (A-6) is satisfied.

2) Derivation of (18)

Using (A-2) it is immediate to show that:

$$\frac{\partial P(\cdot)}{\partial a} = F'(\cdot)(1-q) \tag{A-7}$$

$$\frac{\partial P(\cdot)}{\partial d} = F'\frac{q}{2} \tag{A-8}$$

Using (A-7) and (A-8), it follows that:

$$\frac{dP(\cdot)}{da} = F'[(1-q) + \frac{q}{2}\frac{\partial d}{\partial a}] \tag{A-9}$$

Thus, $dP/da > 0$ if and only if:

$$\frac{\partial d}{\partial a} > -\frac{2(1-q)}{q} \tag{A-10}$$

Finally, note that:

$$\frac{\partial P}{\partial d} = \frac{1}{2}\frac{q}{1-q}\frac{\partial P(\cdot)}{\partial a} \tag{A-11}$$

Substituting (A-5) into (A-10), the latter can be rearranged as follows:

$$\frac{\frac{\partial^2 P(\cdot)}{\partial d^2}[K - (d-\hat{d})^2] - 2\frac{\partial P(\cdot)}{\partial a}[d-\hat{d}]}{\frac{\partial^2 P(\cdot)}{\partial d^2}[K - (d-\hat{d})^2] - 2\frac{q}{1-q}\frac{\partial P}{\partial a}[d-\hat{d}] - 2P(\cdot)} < \frac{2(1-q)}{q} \qquad \text{(A-12)}$$

which implies:

$$q\frac{\partial^2 P(\cdot)}{\partial d \partial a}[K - (d-\hat{d})^2] > 2(1-q)\frac{\partial P(\cdot)}{\partial d^2}[K - (d-\hat{d})^2]$$

$$- 2q\frac{\partial P(\cdot)}{\partial a}(d-\hat{d}) - 4P(\cdot)(1-q) \qquad \text{(A-13)}$$

Assuming the sufficient second order condition of footnote 14, then the right hand side of (A-13) is negative. As long as the cross partial derivative in the left hand side is not too high (in absolute value), (A-13) is satisfied. Thus, conditions (A-6) and (A-13) are jointly satisfied in the case of a uniform distribution of w; or in the case of a symmetric unimodal distribution of w as long as, in equilibrium, the election is sufficiently close, that is $P(\cdot)$ is sufficiently close to 1/2.

3) Derivation of (23)

Problem (21) is analogous to the model analyzed in Calvert (1985) and Alesina (1988). Result (23) follows directly from those papers.

4) Derivation of (25)

Assume that, in equilibrium, $d < r$. For a general value of q, we define $\bar{d} = \frac{\hat{d} - (1-q)a}{q}$. Using this expression, the generalized version of the first-order condition (22), ca be written as an implicit function $H(\cdot)$:

$$H(d,r,a) = \frac{\partial P(\cdot)}{\partial d}\,[q^2\Delta U + K] - P(\cdot)2q^2(d - \bar{d}) = 0 \qquad \text{(A-14)}$$

where ΔU is defined in the text.

$$\frac{\partial H}{\partial d} = \frac{\partial^2 P(\cdot)}{\partial d^2}\,[q^2\Delta U + K] - 4q^2\,\frac{\partial P(\cdot)}{\partial d}(d-\bar{d}) - P(\cdot)2q^2 < 0 \qquad \text{(A-15)}$$

Condition (A-15) represents the second order condition of this problem, which has to be satisfied to guarantee that the solution is a maximum.

$$\frac{\partial H}{\partial a} = \frac{\partial^2 P(\cdot)}{\partial d\partial a}[q^2\Delta U + K] + 2q(1-q)\frac{\partial P(\cdot)}{\partial d}(r-d) - 2q^2\,\frac{\partial P(\cdot)}{\partial a}(d-\bar{d}) - 2q(1-q)P(\cdot) \qquad \text{(A-16)}$$

Thus, it follows that $\partial d/\partial a < 0$ if and only if $\partial H/\partial a < 0$, which holds if and only if:

$$\frac{\partial^2 P(\cdot)}{\partial d\partial a} < \Delta = \frac{2q^2\,\frac{\partial P(\cdot)}{\partial a}(d-\bar{d}) + 2q(1-q)P(\cdot) - 2q(1-q)\frac{\partial P(\cdot)}{\partial d}(r-d)}{q^2\Delta U + K} \qquad \text{(A-17)}$$

Once again, this condition is satisfied in the uniform case. In fact, if $\partial P/\partial d\partial a = 0$, (A-17) holds if $\Delta > 0$. The denominator of Δ is positive. The expression in the numerator is positive as long as:

$$(r-d) < \frac{2q^2 \frac{\partial P(\cdot)}{\partial a}(d-\bar{d}) + 2q(1-q)P(\cdot)}{2q(1-q)\frac{\partial P(\cdot)}{\partial d}} \qquad \text{(A-18)}$$

Thus, as long as d is sufficiently close to r, (A-18) is satisfied.

5) Derivation of (18) for case 3

Following the same steps as for Case 2, one can show that for case 3 (18) holds if:

$$\frac{\frac{\partial^2 P(\cdot)}{\partial d \partial a}[q^2 \Delta U + K] + 2(1-q)\frac{\partial P(\cdot)}{\partial d}(r-d) - 2q^2 \frac{\partial P(\cdot)}{\partial a}(d-\bar{d}) - 2q(1-q)P(\cdot)}{\frac{\partial^2 P(\cdot)}{\partial d^2}[q^2 \Delta U + K] - 4q^2 \frac{\partial P(\cdot)}{\partial d}(d-\bar{d}) - 2q^2 P(\cdot)} < \frac{2(1-q)}{q} \qquad \text{(A-19)}$$

Consider, for simplicity, the uniform case, so that $\partial^2 P/\partial d \partial a = 0$.
After rearranging, (A-9) reduces to

$$q^3 \frac{\partial P(\cdot)}{\partial d}(r-d) > 2(1-q)\frac{\partial^2 P(\cdot)}{\partial d^2}[q^2 \Delta U + K] - 2q^3 \frac{\partial P(\cdot)}{\partial a}(d-\bar{d}) - 2q^2(1-q)P(\cdot) \qquad \text{(A-20)}$$

Assuming that $\partial P(\cdot)/\partial d^2 \leq 0$ which is a sufficient second order condition, (A-20) is always satisfied because the left hand side is non negative and the right hand side is strictly negative. Thus, as long as the cross partial $\frac{\partial^2 P(\cdot)}{\partial d \partial a}$ is not too large in absolute value (see above for discussion), then $dP(\cdot)/da > 0$.

6) Open seat competition

Consider the situation in which both candidate d and r are mobile, since neither of them is the incumbent. Given the results by Wittman (1983) and Calvert (1985), Cases 1 and 2 can be easily analyzed. It is immediate to show that in both cases, in equilibrium one obtains:

$$\hat{d} < d \leq r < \hat{r} \qquad \text{(A-21)}$$

The comparative statics results discussed above for these two cases easily generalize. Some interesting issues arise in Case 3. For this case the problem becomes:

$$\max_{d} P(\cdot)[(r-\tilde{d})^2 - (d-\tilde{d})^2 + K] \qquad \text{(A-22)}$$

$$\max_{r} (1 - P(\cdot)[(d-\bar{r})^2 - (r-\bar{r})^2 + K] \qquad \text{(A-23)}$$

where $\bar{r} = \frac{\hat{r} - (1-q)a}{q}$. Also we assume that the benefits of being in office (K) of being in office (K) is the same for both parties. We also need an additional sufficient condition for the second order condition, i.e., $\partial^2 P(\cdot)/\partial r^2 \geq 0$.

Problem (A-22) and (A-23) is identical to the model analyzed by Wittman (1983) and Calvert (1985) if $\tilde{d}$ and $\bar{r}$ are interpreted as the original ideal points of the two candidates in a model without an anchor. Define $\hat{d}^o$ and $\dot{r}^o$ as the solution of that problem, i.e., of (A-22) and (A-23) interpreted as a Wittman/Calvert problem with no anchor. Define d^* and r^* the solution of (A-

22) and (A-23) with the interpretation of the present paper. The two solutions differ because in our model P(·) is defined in (7), while in a Wittman/Calvert model we would have $P = F(\frac{d+r}{2} - 1/2)$.

The following results hold:

$$d^* = \frac{\hat{d}^o - (1-q)a}{q} \tag{A-24}$$

$$r^* = \frac{\hat{r}^o - (1-q)a}{q} \tag{A-25}$$

$$P(\hat{d}^o, \hat{r}^o) = P(d^*, r^*, a) \text{ for } \forall a \tag{A-26}$$

Thus, the solution to our problem is a linear transformation of the Wittman/Calvert solution, identical to the linear transformation applied to the candidates' bliss points. The basic intuition is that the presence of the anchor transforms the utility function of both the candidates and the voters identically. Simple algebra implies the following results:

1) if $a > r^o$ then $d^* < d^o$; $r^* < r^o$. That is if the anchor is "far right" (more right than the Wittman/Calvert position), then both positions (d^* and r^*) move to the left relative to d^o and r^o;

2) symmetric results hold if $a < d^o$;

3) if the anchor is "moderate," i.e., $d^o \leq a \leq r^o$, then $d^* \leq d^o$ and $r^* \geq r^o$, with strict inequalities if a is strictly included in $(\hat{d}^o, r^o)$. That is, a "moderate" anchor pushes the two candidates in opposite directions.

Table 1

Senate Elections*

Variable	1		2	
GNP	0.444 (.111)		0.426 (.110)	
Incumbency	4.336 (.573)		3.784 (.600)	
Trend	0.084 (0.037)		0.093 (0.037)	
Midterm	−2.630 (0.572)		(−2.678) (0.567)	
Vote %: Same Seat	0.266 (.035)	all seats	0.343 (0.060)	incumbents running
Vote %: Anchor Seat	−.033 (.041)	all seats	−0.075 (0.043)	incumbents running
Vote %: Same Seat	–		0.134 (0.070)	open seats
Vote %: Anchor Seat	–		0.135 (0.071)	open seats
R^2	0.54		0.55	

Table 1 (Continued)

Variable	3	
GNP	0.368 (0.124)	
Incumbency	3.693 (0.596)	
Trend	0.101 (0.037)	
Midterm	-2.823 (0.625)	
Vote %: Same Seat	0.446 (0.070)	on-years, incumbents running
Vote %: Anchor Seat	-0.177 (0.056)	on-years, incumbents running
Vote %: Same Seat	0.200 (0.098)	on-years, open seats
Vote %: Anchor Seat	0.092 (0.098)	on-years, open seats
Vote %: Same Seat	0.274 (0.065)	midterms, incumbents running
Vote %: Anchor Seat	-0.007 (0.051)	midterms, incumbents running
Vote %: Same Seat	0.077 (0.088)	midterms, open seats
Vote %: Anchor Seat	0.170 (0.091)	midterms, open seats
R^2	0.56	

*The dependent variable is the Republican share of the two party vote. Standard errors are in parentheses.

Table 2

Lag Structure in House Elections: 1980, 1978, 1976.*

Dep. Variable: VR	All	Incumbent	Open
VR_{t-2}	.87 (0.029)	.96 (0.029)	.34 (0.085)
VR_{t-4}	.02 (0.029)	.01 (0.029)	.13 (0.093)
n	885	773	103
R^2	.69	.76	.35

	Presidential Years (1976,1980)		Midterm Year (1978)	
	Incumbent	Open	Incumbent	Open
VR_{t-2}	.97 (0.034)	.47 (0.113)	.91 (0.063)	−.04 (0.135)
VR_{t-4}	−.02 (0.033)	−.01 (0.120)	.10 (0.067)	.56 (0.153)
n	524	69	249	34
R^2	.76	.33	.76	.49

*Constants are not reported, but were included in the regressions. n is the number of observation of each regression. VR is the Republican share of the two party votes. Standard errors are in parentheses.

Table 3

Lag Structure in Senate Elections: 1976, 78, 80*

Dependent Variable: VR	All	Incumbents
VR_{t-2} or VR_{t-4}	.06 (.098)	-.01 (.107)
VR_{t-6}	.57 (0.103)	.66 (0.114)
n	82	61
R^2	.28	.37

* The open seat results are not presented due to the lack of degrees of freedom for this regression.