*Political Behavior, Vol. 13, No. 2, 1991*

# HOW TO VOTE, WHETHER TO VOTE: Strategies for Voting and Abstaining on Congressional Roll Calls

Linda R. Cohen and Roger G. Noll

**This paper develops and tests a theory of voting and abstaining on Congressional roll calls. The theoretical model assumes that the voting behavior of legislators is oriented toward reelection, and that constituents vote retrospectively. Among the predictions of the theory are that supporters of a program are more likely to abstain than opponents, that conflicted legislators are more likely to vote on the losing side (but will abstain when the vote is very close), and that indifferent legislators will abstain when votes are not close but trade their votes when the outcome is uncertain. The empirical test is based on a series of votes on appropriations for the Clinch River Breeder Reactor from 1975 to 1982. We estimate a nested logit model of, first, the probability of voting for Clinch River, and second, the probability of abstaining from the vote, conditional on preferences regarding the program. All of the empirical results are consistent with the theoretical predictions, and most are statistically significant by conventional standards. The implication is that the abstention decision, as well as yes or no votes, can be purposive, and that the pattern of abstentions is not random among supporters and opponents.**

The purpose of this paper is to develop and to test an extension of the formal theory of roll call voting in Congress. The points of departure for this theory are, first, the "electoral connection" to legislator behavior on the floor, and, second, the availability of the option to abstain as well as to vote for or against a measure. With respect to the first, the formal theory

Linda R. Cohen, Department of Economics, University of California, Irvine, California 92717. Roger G. Noll, Department of Economics, Stanford University, Stanford, California 94305-6072. The authors gratefully acknowledge research support from the Brookings Institution and the University of Michigan School of Law, and useful comments on an earlier draft by Randall Calvert, Morris Fiorina, Rodney Fort, Amihai Glazer, Keith Krehbiel, Thomas Romer, Kenneth Shepsle, Rodney Smith, Barry Weingast, the UCI Public Choice Study Group, and the Hoover Workshop on Collective Choice.



0190-9320/91/0300-0097$06 50/0 

links the concepts of retrospective voting and negative voting by constituents to roll call votes by their representatives. With respect to the second, the theory examines how the opportunity to abstain affects logrolling agreements among legislators and signaling activities between legislators and constituents.

Nearly all research on congressional roll call voting focuses exclusively on recorded votes and announced pairs.[1] Unpaired abstentions are usually assumed to occur randomly, such as when a legislator misses a plane or is too ill to be wheeled to the floor on a gurney. Whereas our work incorporates the possibility for random abstention, the theory and evidence reported here supports the view that the decision whether to vote is linked to the decision about how to vote in complex and asymmetric ways, owing to the relationship between floor votes and constituency support that are suggested by the "electoral connection" literature.

The specific implications of our research are as follows. First, abstention is more likely to occur among the coalition that expects to win a vote than among the losers. Second, legislators whose constituency is conflicted by a proposal are more likely to vote on the losing side when a measure is not expected to be close, and more likely to abstain when the outcome is uncertain. Third, indifferent voters, who are the primary candidates for a logroll, are more likely to vote when the outcome is uncertain, but more likely to abstain when one side is certain to win, because the former situation is more likely to give rise to a successful logrolling agreement. Fourth, because of the asymmetry in abstentions among winners and losers and in voting among conflicted legislators, actual voting margins are likely to understate the actual popularity of a measure, and may affect the actual outcome of a vote. Fifth, for the same reasons, as a technical matter statistical analyses of roll call votes that ignore the abstention option produce biased and inefficient estimates of the effects of independent causal factors on the decision about how to vote.

The first section of the paper presents a formal theory of voting and abstaining in which the latter is purposive and constituency oriented rather than random. The second section tests the theory using a time series of essentially identical votes in the House of Representatives. A test of the theory requires observing multiple votes on more or less the same issue and having readily available measures of constituency support, but with variance in the margin by which the measure passes or fails. The votes used here are a series of proposals to kill the Clinch River Breeder Reactor, beginning in 1975 and ending in 1982, because it provides the variance in floor pluralities and underlying constituency support that is required to test the theory.

**TABLE 1. Participation Rates in the House of Representatives**

| Year | 25th %ile | 50th %ile | 75th %ile | 90th %ile |
|---|---|---|---|---|
| 1975 | 96 | 93 | 89 | 83 |
| 1976 | 95 | 91 | 85 | 71 |
| 1977 | 96 | 93 | 88 | 82 |
| 1978 | 95 | 91 | 83 | 72 |
| 1979 | 95 | 92 | 86 | 79 |
| 1981 | 96 | 93 | 88 | 81 |
| 1982 | 96 | 92 | 86 | 76 |

Source: *CQ Almanac*, National Research Corp., for 1975 to 1982.

## I. VOTING AND ABSTAINING IN CONGRESS

Most members of Congress vote on nearly all roll calls. In the House of Representatives, median participation rates are typically above 90%. In recent years, 75% of all members have voted on well over 80% of all roll calls; 90% vote on over 70% of roll call votes (see Table 1). Moreover, on virtually all roll call votes, the outcome is virtually certain and winning margins are very large. High rates of voting combined with virtually certain outcomes are at odds with a naive instrumental theory of voting. Instrumental voting supposes that legislators vote to influence the outcome of the roll call and to guarantee the achievement of a quorum. In practice, neither the outcome nor the achievement of a quorum is in doubt in the overwhelming majority of roll call votes.

High participation rates in Congress have not elicited the same interest among theorists as has the apparent paradox of voting among the electorate.[2] The most common explanation holds that abstention is harmful to legislators because their constituents are likely to interpret a poor participation record as evidence of poor representation. If so, abstention costs can exceed voting costs in the legislative arena most of the time.

High participation rates and constituency-oriented voting also can be explained by viewing roll call votes as a signaling activity. Mayhew (1974), for example, sees roll call voting as a way legislators signal their constituents about their stand on issues. According to a narrow interpretation of his analysis—the interpretation that Mayhew puts forth—only the signal itself, and not the legislative outcome, is important. This rationale will indeed lead legislators to vote whenever establishing a signal is worthwhile electorally, that is, whenever establishing a position helps the legislator in subsequent elections. This view is supported by Downs' analysis (1957) of the importance of ideology for parties, and in subsequent reinterpretations and extensions in the context of a legislature.[3] The argument is that legislators who are perceived as having clear ideological positions achieve an electoral advantage because voters can more easily evaluate how such legislators will act in the future. A clear policy orientation is obtained by voting on numerous roll calls, irrespective of the outcome of the votes.

Fiorina (1974) analyzes a model similar to Mayhew's. The legislative outcome is ignored in his analysis of individual legislators, who are assumed to consider only the electoral consequences of voting in support of or in opposition to constituency groups. In this context, Fiorina develops specific predictions about abstention by legislators. First, a member who faces a conflictual constituency (i.e., constituent groups with opposing views on an issue) may prefer to take no public position rather than to go on record as opposed to an electorally important group of constituents. In this case a signal might cause more harm than good. Second, legislators who are satisfied with maintaining a given probability of reelection may abstain rather than vote even if abstention will be counted against them by constituents. The latter is due in part to the opportunity cost of voting. If voting precludes undertaking other activities, a legislator may further nonelectoral goals by abstaining. Alternatively, abstention may be active nonsupport (or "shirking"), which is not subject to as stringent penalties from constituents as would result from a vote in opposition to their wishes.

Fiorina's empirical work provides no support for either of his theoretical hypotheses. He suggests that the problem may be that the data used in his tests are insufficient. In particular, he proposes that standard empirical measures of constituency characteristics do not adequately identify either conflictual constituencies on specific votes or the extent to which legislators pursue different electoral strategies.

Our analysis differs from previous studies by including the possibility that the expected outcome of a vote affects the electoral consequences of voting. We not only incorporate the view that a legislator may represent a diverse constituency but also consider the possibility that the salience of an issue to the constituency depends in a predictable fashion on the actions of the legislature at large. Our hypothesis is an extension of the ungrateful voter and retrospective voting hypotheses: Voters base their evaluations of incumbents primarily on recent performance, are likely to count their representative's vote against them as more significant than a vote for them, and are more likely to notice their representative's legislative role when their preferred position on an issue of concern to them is defeated than when it succeeds.

These assumptions follow naturally from Mayhew's (1974) and Fenno's (1978) descriptions of how members perceive the process by which issues become salient. Members worry that at the next election seemingly indifferent voters will become energized by a challenger pointing out the failings in their representative's record. Logically, such challengers are more likely to focus on issues about which voters are dissatisfied. Thus, when a policy fails to carry the day in the legislature, it is more likely that its advocates in the electorate will be made aware of how their representatives voted on it, or whether they voted at all.

The principal results of our theoretical analysis are as follows. First, a legislator is more likely to abstain on bills that are less salient to constituents. Second, because issues are more likely to be salient to losing constituents, abstention is more prevalent among the majority. Moreover, abstention among members of the winning side is more common when the outcome of the vote is certain. The more skewed the vote would be if everyone voted, the more skewed turnout will be in favor of the minority side. If the outcome is less certain, unconflicted legislators on either side of the issue are less likely to abstain. Hence even in the absence of instrumental voting, turnout and closeness are correlated among unconflicted legislators.

These hypotheses are confirmed by our empirical study. In our analysis of roll call votes on the Clinch River Breeder Reactor, we find that in years when the project was relatively uncontroversial (i.e., the project was supported by a large majority), abstention was significantly more common among supporters of the project than among its opponents. When the project's fate was uncertain, and the plurality dropped to under 3%, abstention occurred almost exclusively among legislators we identified as in the middle of the road, neither supporting nor opposing it. On the vote that killed the project, the pattern of abstention switches, becoming more prevalent among opponents (the majority) than among the new minority of proponents. Moreover, controlling for other individual sources of abstention (e.g., the number of conflicted members, election year biases, and other factors considered by Fiorina), turnout and winning margins are strongly correlated.

Our model predicts complex relationships between voting behavior, turnout, and constituency characteristics. When the constituency includes electorally significant groups on both sides of the bill, and when no group is dominant, the model predicts that if legislators vote, they will support the losing side. The result follows from the saliency assumption: Losers are more likely than winners to notice their representative's actions, so that legislators do better if they risk alienating winners rather than losers. If the expected vote is close so that the outcome is difficult to predict, these legislators are more likely to abstain. Thus the reverse prediction exists for representatives from conflicted districts than those from consensual districts. For the former group, closeness and turnout are negatively correlated. In general, this group is more likely to abstain than are members from consensual districts, but there are exceptions. For example, when the vote is a landslide, the conflicted group is more likely to vote (on the losing side) than are members of the majority. If a district contains conflicting groups and one side dominates the other, the model predicts another set of legislator actions, conditioned on anticipated legislative outcomes and the extent of dominance.

The data are too sparse to test the multiplicity of conditional outcomes predicted by the model, although nearly all of the results are consistent with our predictions. The study statistically confirms two specific forms of strategic voting and abstention. Unlike previous studies, we find a significant positive correlation between conflict and abstention, controlling for legislative outcomes. Furthermore, conflicted members are more likely to abstain when the legislative outcome is close than when there is a landslide; a reverse voting pattern is observed among unconflicted legislators.

## II. A MODEL OF ROLL CALL VOTES WITH STRATEGIC ABSTENTION

Consider a legislator who values holding office in the current legislative period by the amount $U_0$, and who values holding office in the future by $U$. $U$ can be regarded as the discounted present value of holding office in subsequent terms, with holding office in each term conditional on reelection in all previous elections. The critical assumption is that in order to realize $U$ a legislator must be reelected in the next election, an event that occurs with probability $P$.

Let

$$P = P(R, S, A) \tag{1}$$

where $R$ denotes the extent to which constituents like an incumbent's recorded votes, $S$ is the voters' evaluation of their representative's activities that have nothing to do with roll call votes (e.g., constituency service or committee work), and $A$ is the voters' evaluation of their representative's rate of abstention on roll calls. Both $S$ and $A$ depend on the rate of abstention. Because $S$ depends on the time that the legislator spends on nonvoting activities, more frequent voting implies a smaller value for $S$, but a larger value of $A$. We assume that neither $S$ nor $A$ depends on any specific vote, and that $S$ exhibits declining marginal returns to time freed by abstention.

Let $m$ be the number of roll call votes cast by a legislator, and $n$ be the total number of roll call votes in the legislature during one term. We assume that for $m$ sufficiently close to $n$, $P(\cdot, S(m), A(m))$ is a decreasing function of $m$, which implies that the abstention rate that maximizes reelection probability is nonzero. Furthermore, because $P$ is bounded between zero and one, it must be concave in its arguments at least near its upper bound. Most incumbent legislators have healthy probabilities of reelection; consequently, we assume that $P$ is strictly concave in all of its arguments.

Let $V_k$ denote the legislator's action on issue $k$, where the choices are to vote for the bill ($V_k = Y$), to abstain ($V_k = a$), or to vote against it ($V_k = N$). Define $G_k$ to be the number of groups that are potentially concerned about issue $k$. Following the notation in Fiorina (1974), let $x_{jk} > 0$, $y_{jk} < 0$, and $z_{jk} < 0$ be the changes in $R$ if group $j$ finds issue $k$ to be salient and the legislator votes according to the wishes of group $j$, abstains, or votes against the group, respectively. Finally, let $v_{jk}$ be the evaluation of the legislator's action, $V_k$, by group $j$, if the group decides that the issue is salient. Thus $v_{jk}$ is equal to one of the triple $(x_{jk}, y_{jk}, z_{jk})$.

Define $c_{jk}(W)$ and $c_{jk}(L)$ to be the representative's subjective estimates that group $j$ will find issue $k$ salient at the next election if the bill passes or fails, respectively. If group $j$ supports the bill, we assume that

$$c_{jk}(L) > c_{jk}(W) \tag{2}$$

and the converse if the group opposes the bill.

Let $p_k$ be the legislator's (subjective) probability that the bill passes. For simplicity, we assume that $p_k$ depends only on $V_k$, the legislator's action on issue $k$. This assumption implies that decisions about whether and how to vote have no effect on the fate of other issues. As a practical matter, this assumption is implicit in all empirical studies of roll call voting, but is unrealistic because it ignores the possibility of vote trading.

The legislator's estimate of $R$, written as $ER$, is the sum of the evaluations given by each group, conditional on groups finding the issue salient:

$$ER = \sum_{k=1}^{n} \left( \sum_{j=1}^{G_k} (d_{jk} \cdot v_{jk}) \right) \tag{3}$$

where $d_{jk} = 1$ with probability $c_{jk}(L)$ if the bill fails, and $d_{jk} = 1$ with probability $c_{jk}(W)$ if the bill passes.

Finally, define the legislator's objective function as:

$$\underset{\{V_1, V_2, \ldots, V_n\}}{\text{maximize}} \quad E\,[U_0 + P(R, S, A) \cdot U] \tag{4}$$
$$\text{subject to (1), (2), and (3),}$$

where $E$ is the expectation operator.[4] As is customary in empirical studies of roll call votes, we will consider only a single decision, $V_k$, by a legislator, and so henceforth will suppress the subscripts, $k$, that refer to the issues decided during a term. The implicit assumption is that a legislator has already decided to vote $m - 1$ times on $n - 1$ votes, and to abstain on the other $n - m$ votes. The only decision remaining is whether to abstain again, for a participation rate of $(m - 1)/n$, or to cast a vote (and, if so, how to cast it), for a participation rate of $m/n$. Let $\overline{R}$ be the evaluation by voters of the legislator's actions on the other $n - 1$ roll call votes.

## Case 1: Consensual Constituencies

A constituency is consensual on a particular bill if all groups within the constituency either do not care about it, or agree as to whether it should pass or fail. Consequently, in analyzing the legislator with a consensual constituency we can suppress the subscript $j$. Consider two legislators who are symmetric in all respects except that their respective constituent groups are on opposite sides of the bill. We suppose that the constituents of Member 1 prefer to see the bill pass, that those of Member 2 prefer to see it fail, and that the probability that the bill passes is greater than 1/2 ($p > 1/2$). We denote the two legislators by superscripts 1 and 2. Then

$$x^1 = x^2;\ y^1 = y^2;\ z^1 = z^2;$$
$$c^1(L) = c^2(W);\ c^1(W) = c^2(L);\ c^1(L) > c^1(W).$$

Define $c^i = p \cdot c^i(W) + (1 - p) \cdot c^i(L)$ for $i = 1,2$, where $c^i$ can be interpreted as the legislator's subjective probability that roll call vote will be salient. Then the assumptions imply[5]

$$c^2 > c^1. \tag{5}$$

Denote the circumstance when legislators vote the interests of their constituency as $V = V+$, and when they vote against the interests of the constituency as $V = V-$. Then the legislator picks $V$ by comparing the consequences of the triple $(V+, V-, a)$ as follows:

$$E(V+) = c^i \cdot P(x + \overline{R}, S(m), A(m)) + (1 - c^i) \cdot P(\overline{R}, S(m), A(m)) \tag{6.1}$$

$$E(V-) = c^i \cdot P(z + \overline{R}, S(m), A(m)) + (1 - c^i) \cdot P(\overline{R}, S(m), A(m)) \tag{6.2}$$

$$E(a) = c^i \cdot P(y + \overline{R}, S(m - 1), A(m - 1)) + (1 - c^i) \cdot P(\overline{R}, S(m - 1), A(m - 1)) \tag{6.3}$$

for $i = 1,2$. Clearly, (6.1) is larger than (6.2), so that representatives would never vote against their constituents' preferences. But the comparison between (6.1) and (6.3) is ambiguous, and depends on $x$, $y$, and the shapes of functions $S$, $A$, and $P$.

Voting becomes more attractive relative to abstaining for larger values of $c^i$.[6] Thus, because of (5), the member on the losing side is more likely to vote than the member on the winning side. Furthermore,

$$(7) \qquad \frac{dc^1}{dp} = c^1(W) - c^1(L) < 0 \text{ and } \frac{dc^2}{dp} = c^1(L) - c^1(W) > 0.$$

Thus, as the probability of the bill passing increases from 1/2, members on the winning side will find abstention increasingly attractive relative to voting, while their counterparts on the losing side will experience the opposite effect. We summarize these results in Proposition 1:

> *Proposition 1*: Ceteris paribus, representatives from consensual districts that are on the losing side are more likely to vote than representatives from consensual districts on the winning side. Furthermore, as the probability of the bill passing (or failing) increases from 1/2, the difference in voting participation rates among the minority and majority becomes more pronounced.

The relationship between closeness and turnout among representatives from consensual districts turns on the value constituents place on the outcome of the vote, that is, the magnitude of $x$ and $|y|$. To investigate this relationship, we first establish precise conditions for when legislators vote or abstain. Define $c^*$ to be the value of $c$ for which abstaining (6.3) is equivalent to voting with the preferences of the constituency (6.1). Setting (6.3) = (6.1), and rearranging terms, yields:

$$(8.1) \quad c^* = \frac{P(\overline{R},S(m-1),A(m-1)) - P(\overline{R},S(m),A(m))}{P(x+\overline{R},S(m),A(m)) - P(\overline{R},S(m),A(m)) + P(\overline{R},S(m-1),A(m-1)) - P((y+\overline{R}),S(m-1),A(m-1))}.$$

The saliency threshold $c^*$, varies between zero and infinity, depending on $x$ and $y$. If $x$ and $y$ are near zero, the denominator in (8.1) goes to zero and $c^*$ approaches infinity. When $x$ and $|y|$ are large, $c^*$ converges to:

$$(8.2) \qquad \overline{c^*} = \frac{P(\overline{R},S(m-1),A(m-1)) - P(\overline{R},S(m),A(m))}{1 + P(\overline{R},S(m-1),A(m-1)) - P(\overline{R},S(m),A(m))}.$$

Because of the concavity of P, and the practical reality that for nearly all legislators P is almost unity, the numerator in (8.2) is likely to be very small, so that $\overline{c^*}$ is essentially zero.

Saliency levels for legislators are bounded between $c(L)$ and $c(W)$. Thus, if $c^*$ lies outside of these bounds, the member either always votes or always abstains.[7]

Rearrangement of (5) provides the relationship between $c^*$ and the probability of passage, $p^*$, that makes a legislator indifferent between voting and abstaining. For Member 1, $p^*$ is given by

$$(9.1) \qquad p^* = 1 \qquad \text{for } c^* < c(W)$$

$$(9.2) \qquad p^* = \frac{c(L) - c^*}{c(L) - c(W),} \qquad \text{for } c(W) \le c^* \le c(L)$$

$$(9.3) \qquad p^* = 0 \qquad \text{for } c^* > c(L)$$

where $p > p^*$ implies a preference for abstention and $p < p^*$ implies a preference for voting. The abstention threshold for $p^*$ declines as the detection threshold, $c^*$, increases. Because $c^*$ is larger as $x$ and $y$ move away from zero, the implication is that $p^*$ is positively related to $x$ and $|y|$. That is, if the magnitude of the punishment voters will inflict on a detected violation $(x + |y|)$ increases, Member 1 will have to be more certain of an outcome favorable to constituents in order to decide to abstain. For sufficiently large values of $x$ and $|y|$, $c^*$ will be less than $1/2[c(L) + c(W)]$, and hence $p^*$ will exceed 1/2. Hence, Member 1 will abstain only when the bill is highly likely to pass. Likewise, Member 1 will abstain when $p < 1/2$ only if $x$ and $|y|$ are sufficiently small.

The consequence of (8.1) and (9.1) is that for large values of $x$ and $|y|$ Member 1 votes whenever $p$ is less than $p^*$ and Member 2 votes whenever $p$ is greater than $(1 - p^*)$. If $p^*$ is greater than 1/2, both members vote when $p$ is in the interval $((1 - p^*), p^*)$. We thus obtain the following result:

> *Proposition* 2: As the probability that the bill passes approaches 1/2, abstention declines among representatives from consensual districts in which constituents place a high value on the outcome of the vote.

Note that as $p$ approaches 1/2, a member's vote may be decisive. This provides an added incentive to vote, for abstention might make the issue both more salient and more likely to be resolved unfavorably to constituents. Consequently, instrumental voting enhances the effects in Proposition 2.

For small values of $x$ and $|y|$, $c^*$ is large and, for Member 1, $p^*$ is less than 1/2: The legislator votes only if constituents are likely to lose and the issue is highly likely to be salient. In this case a reduction in $p$ toward 1/2 results in more of the minority abstaining, with the difference not picked up by an increase in voting among symmetric members of the majority. The effect on votes is summarized in Proposition 3:

*Proposition 3*: As $p$ approaches 1/2, total participation of legislators from districts with small stakes in the issue declines, with the increased abstentions arising from the losing side.

Note, however, that decisiveness and logrolling considerations work against Proposition 3. Consequently, the simplifying assumptions of our model may lead to an incorrect prediction for this case. Specifically, on close votes, legislators with no real stake in the issue might be able to command a high price in a vote trade because their votes are more likely to be decisive.

### Case 2: Conflictual Districts with Groups of Equal Influence

The unhappy legislators from conflictual districts must act to make the best of a bad situation. We consider here a member with two groups that are identical except for disagreement over the appropriate outcome of the bill:

$$x_1 = x_2 = x;\ y_1 = y_2 = y;\ z_1 = z_2 = z; \tag{10.1}$$

$$q_1 = p{\cdot}c(W) + (1 - p){\cdot}c(L) \tag{10.2}$$

$$q_2 = p{\cdot}c(L) + (1 - p){\cdot}c(W) \tag{10.3}$$

where $q_1$ is the probability that the winning group inspects the member's vote, and $q_2$ is the probability that the losing group inspects. We assume that group 1 supports the bill, so $c(L) > c(W)$.

Taking the expected value in (4) yields

$$\begin{aligned} E(Y) = {} & c(L)c(W)P(x + z + \overline{R}, S(m), A(m)) \\ & + (1 - c(L))(1 - c(W))P(\overline{R}, S(m), A(m)) \\ & + [q_1 - c(W)c(L)]P(x + \overline{R}, S(m), A(m)) \\ & + [q_2 - c(W)c(L)]P(z + \overline{R}, S(m), A(m)) \end{aligned} \tag{11.1}$$

$$\begin{aligned} E(N) = {} & c(W)c(L)P(x + z + \overline{R}, S(m), A(m)) \\ & + (1 - c(L))(1 - c(W))P(\overline{R}, S(m), A(m)) \\ & + [q_1 - c(L)c(W)]P(z + \overline{R}, S(m), A(m)) \\ & + [q_2 - c(L)c(W)]P(x + \overline{R}, S(m), A(m)) \end{aligned} \tag{11.2}$$

$$\begin{aligned} E(a) = {} & c(L)c(W)P(2y + \overline{R}, S(m - 1), A(m - 1)) \\ & + (1 - c(L))(1 - c(W))P(\overline{R}, S(m - 1), A(m - 1)) \\ & + [c(W) + c(L) - 2c(W)c(L)]P(y + \overline{R}, S(m - 1), A(m - 1)). \end{aligned} \tag{11.3}$$

If $p > 1/2$, then group 2 will be on the losing side, and $q_2 > q_1$. Proposition 4 follows from a comparison of (11.1) and (11.2):

> *Proposition 4*: Members from a conflictual district with no dominant group will vote on the losing side of the bill if they do not abstain.

From (11.3) it follows that the expected value of abstention does not depend on $p$. The probabilities that the two groups notice a legislator's action shift symmetrically with $p$. The action of the member when $p$ declines to 1/2, then, depends on how (11.2) changes. Substituting from (10.2) and (10.3):

$$\frac{dE(N)}{dp} = (c(L) - c(W))[P(x + \bar{R}, S(m), A(m)) - P(z + \bar{R}, S(m), a(m))] > 0, \tag{12}$$

so when $p$ declines to 1/2, the value of voting declines. For $p < 1/2$, the legislator's strategy is based on (11.1). In this case, by an argument identical to (12), $\dfrac{dE(Y)}{dp} < 0$, so when $p$ increases to 1/2, the value of voting still declines. Summarizing these results:

> *Proposition 5*: When the probability of a bill passing approaches 1/2, legislators from conflictual districts with no dominant group increase their rate of abstention.

Comparing members from conflictual and consensual districts is complicated by evaluating the relative sizes of $x$, $y$, and $z$ in one large group versus two small groups. Assume that the total change in $R$ due to abstention when both conflictual groups consider the issue salient is equal to the value placed on abstention by the one group in the consensual district, that is, $y$ in (6.3) equals $2y$ in (11.3). Then subtracting (6.3) from (11.3) and rearranging terms yields the following:

$$\begin{aligned} (13)\quad & E(a|\text{conflict}) - E(a|\text{consensus}) = \\ & [c(L) + c(W) - 2c(L)c(W)]P(y + \bar{R}, S(m-1), A(m-1)) \\ & - [pc(W) + (1-p)c(L) - c(L)c(W)]P(2y + \bar{R}, S(m-1), A(m-1)) \\ & - [pc(L) + (1-p)c(W) - c(L)c(W)]P(\bar{R}, S(m-1), A(m-1)) \\ & = (I + J)P\left(\frac{D+E}{2}, \cdot\right) - IP(D, \cdot) - JP(E, \cdot) \end{aligned}$$

where

$$
\begin{aligned}
D &= 2y + \bar{R} \\
E &= \bar{R} \\
I &= pc(W) + (1 - p)c(L) - c(L)c(W) \\
J &= pc(L) + (1 - p)c(W) - c(L)c(W).
\end{aligned}
$$

Because $y < 0$, $E > D$, so that by concavity of $P$, expression (13) is positive if $I \geq J$, and for some values of $I < J$. This occurs whenever $p \leq 1/2 + \beta$, for some $\beta > 0$. However, if $p$ is sufficiently close to one, and the probability of salience for the majority in that case is sufficiently small ($c(W)$ close to zero), then the expression in (13) can be negative. With similar assumptions about the relative values of $x$ and $z$ for the conflictual and consensual cases, a comparison of (11.1) or (11.2) with (6.1) shows that the value of voting is smaller for conflictual legislators than for consensual ones, with the same exception holding when $p$ is close to one and $c(W)$ is close to zero. The following results then hold for relative abstention between the two groups:

> *Proposition 6a*: Ceteris paribus, legislators from conflictual districts with no dominant group are more likely to abstain than losing members from consensual districts.
>
> *Proposition 6b*: Ceteris paribus, when the probability of the bill passing is close to 1/2, legislators from conflictual districts with no dominant group are more likely to abstain than are members from consensual districts.
>
> *Proposition 6c*: Ceteris paribus, when the probability of the bill passing is close to 1, and the saliency level for legislators in the majority is low, members from conflictual districts are less likely to abstain than winning members from consensual districts.

## Case 3: Conflictual Districts with a Dominant Group

Legislators from conflictual districts with a dominant group behave much as their colleagues from consensual districts when the dominant group is likely to lose, and switch over to behaving like members in Case 2 when the likelihood that the dominant group will win becomes large. In the latter case, members desert the dominant group not for abstention, as their consensual colleagues would, but for supporting the losing side. The switching probability depends on how dominant the dominant group is. When the groups are quite similar, switches to the losing side occur at a probability of winning that is near to one-half, and the behavior of these members resembles that of the legislators from conflictual districts without a dominant group. When the groups are very unequal in strength, switching behavior occurs only when the probability of the dominant group winning approaches one, and members behave like consensual legislators over most of the range of $p$. We eschew formal proof of these conclusions here because the model parallels that of the previous two cases, but is considerably messier.

Participation rates for these members is complex. Legislators from districts with a clearly dominant group increase their participation rate (voting with the dominant group) near $p = 1/2$. However, participation does not decline monotonically as $p$ becomes larger. Instead, it increases after $p$ passes the switching probability. Propositions 6(a), 6(b), and 6(c) generalize in a logical fashion for these legislators, and their participation rates fall between those of the other two types of legislators.

## III. AN EMPIRICAL TEST

To test the preceding propositions we analyzed a series of votes on appropriations for the Clinch River Breeder Reactor (CRBR) (see Table 2). CRBR was the primary component of the federal government's R&D effort in commercial nuclear power between 1965 and 1983. The reactor was to demonstrate an advanced design that would compliment the nation's light-water reactor industry. It was cofinanced by the federal government and

**TABLE 2. Votes on Funds for Clinch River, House of Representatives**

| | Proponents | | Opponents | | Vote Margin | | Abstentions | |
|---|---|---|---|---|---|---|---|---|
| Year | # | % | # | % | # | % | # | % |
| 1975 | 237 | 54.5 | 146 | 33.6 | 91 | 20.9 | 51 | 11.9 |
| 1976 | 218 | 50.3 | 182 | 42.0 | 36 | 8.3 | 32 | 7.7 |
| 1977a | 215 | 49.4 | 205 | 47.1 | 10 | 2.3 | 14 | 3.5 |
| 1977b | 249 | 57.2 | 165 | 37.9 | 84 | 19.3 | 20 | 4.9 |
| 1978 | 200 | 46.2 | 155 | 35.8 | 45 | 10.4 | 77 | 18.0 |
| 1979 | 241 | 55.4 | 186 | 42.8 | 55 | 12.6 | 7 | 1.8 |
| 1981 | 211 | 48.6 | 191 | 44.0 | 20 | 4.6 | 31 | 7.4 |
| 1982 | 196 | 45.2 | 217 | 50.0 | 21 | 4.8 | 20 | 4.8 |

Note: The votes are as follows 1975: HR3474, vote to prohibit use of funds in FY76 on Clinch River; 1976: HR13350, vote to limit the federal share of cost overruns over $2.5 billion to 50%; 1977a: HR6796, vote to limit federal share of cost overruns over $2.5 billion to 50%; 1977b: HR 6796, vote to authorize $33 million, instead of $150 million, for Clinch River; 1978: HR12163, vote to reduce Clinch River funding by $159 million; 1979: HR3000, vote to allow termination of Clinch River; 1981: HR4144, vote to delete $228 million for Clinch River; 1982: HR631, vote to bar use of funds in continuing resolution from Clinch River. In each case a "nay" vote was pro-Clinch River. Note that one member—the speaker—always abstains unless there is a tie vote, which never occurred in this case. We did not include the Speaker in our analysis.

the nation's nuclear utilities. Expenditures on the demonstration plant totaled about $2 billion over its lifetime, and between 1976 and 1981 amounted to several hundred million dollars annually. Most of this was for contracted components. In fact, construction at the plant never began, and the program died in the first term of the Reagan Administration amidst a flare of controversy about cost overruns, safety and environmental consequences, nuclear proliferation concerns, and technical and economic questions about the overall value of the technology. Along the way it enjoyed the support of two Republican presidencies (Nixon-Ford and Reagan), and opposition from President Carter, who proposed canceling it during each year of his administration.

The roll call votes in the House of Representatives took place over an eight-year period. Each vote is an amendment to an annual appropriation bill, and is roughly commensurate in terms of content. Six amendments propose deleting funds for the reactor, in each case by a sufficient amount to end the project. Two votes involve a contract change that would require private participants to assume a greater portion of cost overruns; success on this amendment also would have meant project cancellation (see the notes to Table 2). Two of the votes took place on the same day, and so voting and participation on each could have been affected by the vote on the other. Initially we analyze them as independent votes, and subsequently we discuss the potential dependent effects.

In order to test the theory in Section II, we first estimate a model of voting for or against the bill. The procedure is to estimate a logit model of the probability of voting in favor of the program, conditional on not abstaining, on the basis of the positions taken by representatives who voted or were part of an announced pair. The equation is then used to estimate an index of support for CRBR for all members of the House, which is equivalent to the estimated probability of voting in favor of the project.[8]

The model is based on work described elsewhere (Cohen and Noll, 1991). In brief, the probability that a member will vote in favor of the project depends on party, ACA score, membership on the relevant oversight and appropriations subcommittees, the amount of project expenditures in the member's district, and the importance of nuclear power in the member's state. We estimated equations for each vote and then tested to see which years pooled.[9] The votes pool within, but not across, three periods, which correspond both to the three presidential administrations and to different phases of the project. The votes in Period 1 (1975–1976) occurred before contracts were finalized. Period 2 (1977–1979) covers the period of major contract expenditures, and Period 3 (1981–1982) occurred when the economics of the project had become especially bad. The model that is used here pools all of the votes. Each independent variable that has

**TABLE 3. Definitions and Statistics for Vote Prediction Variables**

*Definitions:*

| | |
|---|---|
| Vote: | For those voting or paired, +1 if voted in favor of CRBR, 0 if voted against. |
| Party: | 1 if Republican, 0 otherwise |
| ACA: | Score on the Americans for Constitutional Action scale (0 = "liberal," 100 = "conservative"). GP 1: ACA score if in 1975 or 1976, 0 otherwise. GP 2: ACA score if in 1977, 1978, or 1979, 0 otherwise. GP 3: ACA score if in 1981 or 1982, 0 otherwise. |
| Plans: | Ratio of nuclear plants in the state to the number of districts in the state (Gp 1, 2, 3 as for ACA). |
| Comm: | 1 if a member of relevant committees, 0 otherwise (Gp 1, 2, 3 as for ACA). |
| H Fund: | 1 if district had contracts for over $1 million, 0 otherwise. These contracts were mostly signed in late 1976 and started being funded in 1977 (Gp 1, 2, 3 as for ACA). |
| B/C: | Benefit-cost ratio for the technology, based on annual official estimates of when breeder reactors would be commercial, their contributions to electricity generation in the U.S., and their cost relative to alternatives. |
| Pres.: | $P(t) \cdot S(it)$, where $P(t)$ is 1 for Ford and Reagan (who supported the program) and (−1) for Carter, and $S(it)$ is 1 if Congressman $i$ is a member of the president's party in year $t$ and 0 otherwise. |

*Statistics*

| | Variable | Mean | Standard Deviation |
|---|---|---|---|
| $y$ | Vote for CRBR | .550 | 0.497 |
| $X1$ | Constant | 1.000 | 0.000 |
| $X2$ | Party ($R$ = 1) | 0.359 | 0.480 |
| $X3$ | ACA Gp 1 | 37.849 | 33.352 |
| $X4$ | ACA Gp 2 | 41.374 | 33.541 |
| $X5$ | ACA Gp 3 | 43.239 | 33.422 |
| $X6$ | Plants Gp 1 | 0.494 | 0.366 |
| $X7$ | Plants Gp 2 | 0.462 | 0.341 |
| $X8$ | Plants Gp 3 | 0.399 | 0.328 |
| $X9$ | Comm Gp 1 | 0.037 | 0.188 |
| $X10$ | Comm Gp 2 | 0.073 | 0.260 |
| $X11$ | Comm Gp 3 | 0.063 | 0.243 |
| $X12$ | H Fund Gp 1 | 0.026 | 0.160 |
| $X13$ | H Fund Gp 2 | 0.032 | 0.175 |
| $X14$ | H Fund Gp 3 | 0.031 | 0.173 |
| $X15$ | B/C | 0.193 | 0.122 |
| $X16$ | Pres | −0.070 | 0.621 |

**TABLE 4. Binary Logit Results: Probability of Voting in Favor of Clinch River Conditional on Voting**

Observations: 3214 Degrees of Freedom: 3198

$-2^*$ Log Likelihood: 3198.617

Percent in Favor: .550 Percent Correctly Predicted: 765

| var* | Coef | Std. Error | *T*-Stat | *P*-Value |
|---|---|---|---|---|
| $X1$ Constant | −2.2928 | 0.2246 | −10.2073 | 0.0000 |
| $X2$ Party ($R$ = 1) | −1.3506 | 0.2556 | −5.2847 | 0.0000 |
| $X3$ ACA Gp 1 | 0.0624 | 0.0038 | 16.3003 | 0.0000 |
| $X4$ ACA Gp 2 | 0.0586 | 0.0029 | 20.1941 | 0.0000 |
| $X5$ ACA Gp 3 | 0.0469 | 0.0035 | 13.5256 | 0.0000 |
| $X6$ Plants Gp 1 | 0.3412 | 0.2748 | 1.2418 | 0.2143 |
| $X7$ Plants Gp 2 | 0.6910 | 0.1918 | 3.6025 | 0.0003 |
| $X8$ Plants Gp 3 | 1.1194 | 0.2947 | 3.7967 | 0.0001 |
| $X9$ Comm Gp 1 | 2.4863 | 0.6580 | 3.7783 | 0.0002 |
| $X10$ Comm Gp 2 | 0.9538 | 0.2520 | 3.7855 | 0.0001 |
| $X11$ Comm Gp 3 | 1.2842 | 0.3803 | 3.3769 | 0.0007 |
| $X12$ H Fund Gp 1 | 0.3885 | 0.5908 | 0.6575 | 0.5108 |
| $X13$ H Fund Gp 2 | 1.8097 | 0.4567 | 3.9623 | 0.0001 |
| $X14$ H Fund Gp 3 | 0.8637 | 0.5163 | 1.6727 | 0.0944 |
| $X15$ B/C | 0.0244 | 0.7682 | 1.3336 | 0.1823 |
| $X16$ Pres | −0.0725 | 0.2434 | 0.2980 | 0.7657 |

a different impact in the three periods enters the equation interacted with dummy variables for the three time periods, thereby making the pooled regression a legitimate procedure. In addition, we include two longitudinal variables, one measuring current information about the efficiency of the project and the other measuring presidential support. Precise definitions and variable summary statistics are contained in Table 3, and the regression coefficients in the logistic voting equation are shown in Table 4.

The average percent of representatives who voted in favor of the project, among those who voted, is 55% for all eight votes. The equation correctly predicts 76.5% of the votes. Figures 1 through 7 give another indication of the goodness of fit. These show for each vote the distribution in quintiles of predicted support probabilities among those who vote yes, those who vote no, abstainers, and the entire sample. The graphs consistently show that the distributions for those who vote no cluster at the bottom, while the distributions for those who vote yes are skewed toward the top.

The first set of tests of our theoretical model involves comparisons of the distributions of support scores for voters and abstainers as shown in the figures. If legislators abstained only on the basis of voting costs ($S(m)$), the

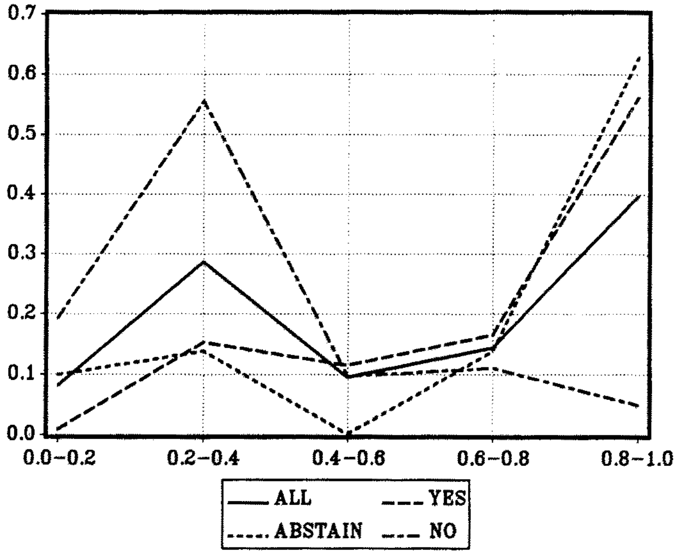


FIG. 1. Congressional voting, 1975.

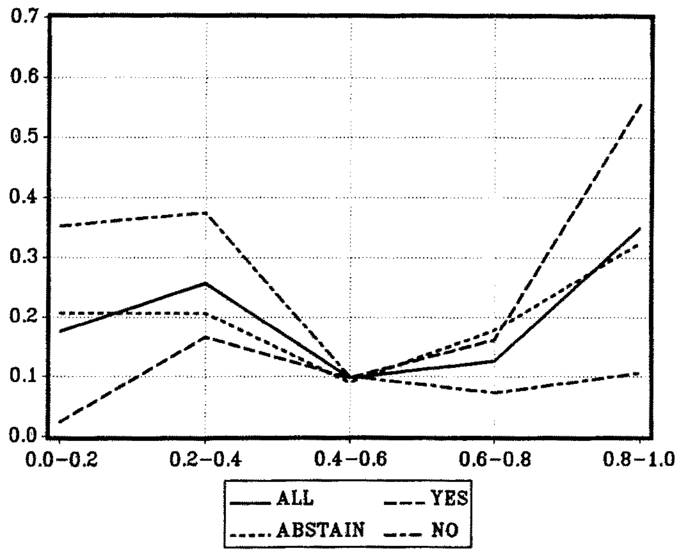


FIG. 2. Congressional voting, 1976.

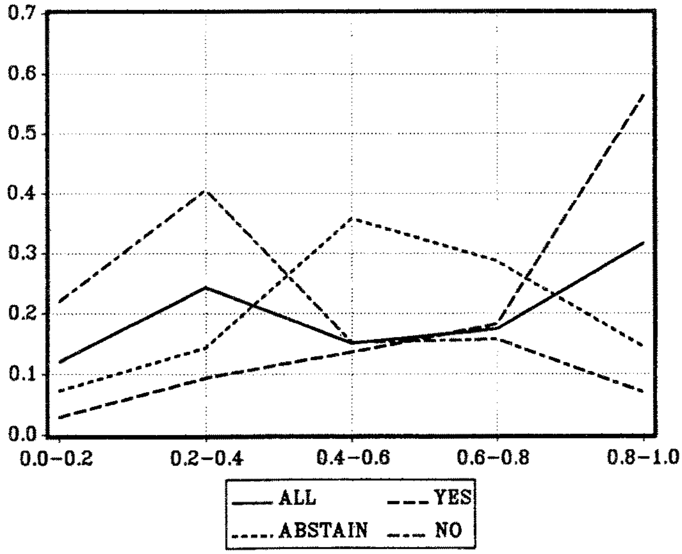


FIG. 3. Congressional voting, 1977A.

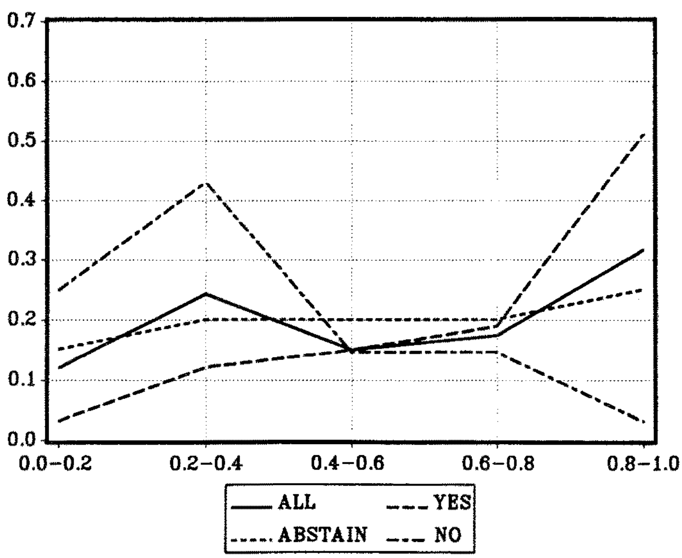


FIG. 4. Congressional voting, 1977B.

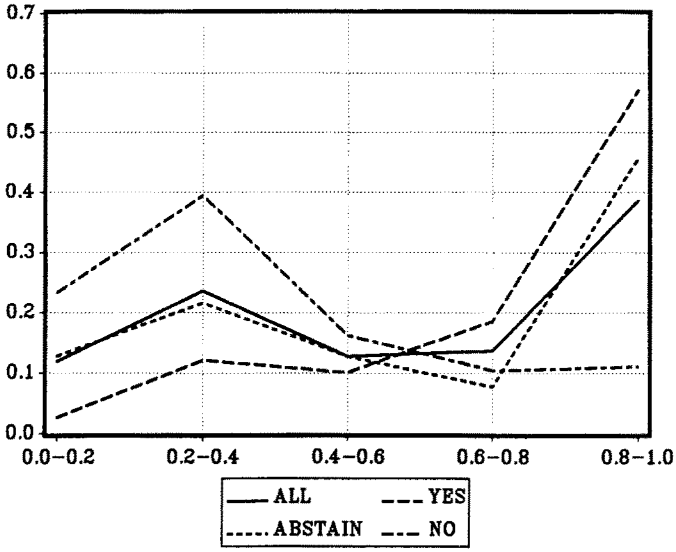


**FIG. 5.** Congressional voting, 1978.

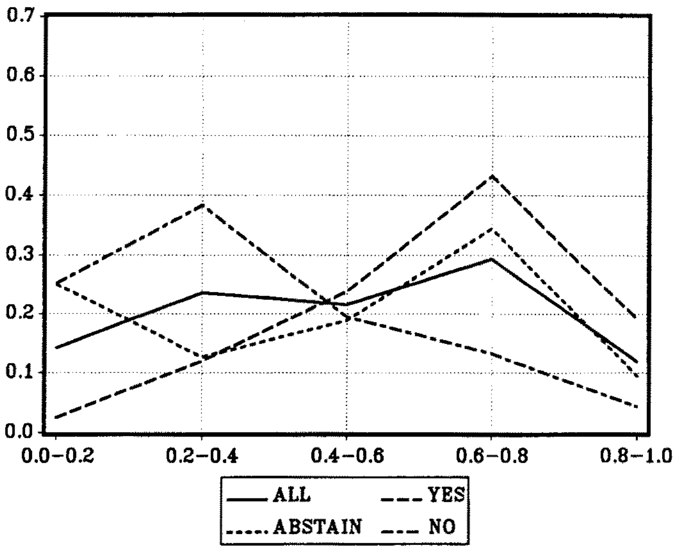


**FIG. 6.** Congressional voting, 1981.

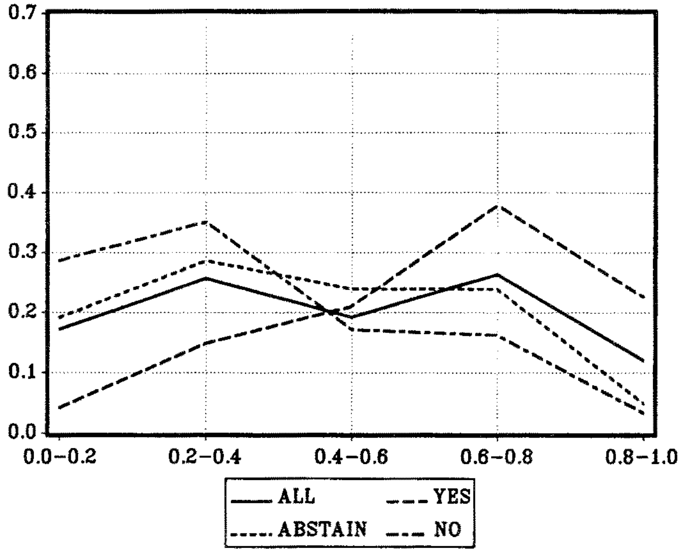


**FIG. 7.** Congressional voting, 1982.

probability of abstention would be unrelated to any aspect of the CRBR vote, so that the distribution of abstainers shown in the graphs would be roughly the same as the distribution for voters. If legislators vote on the basis of the intensity of their preferences about the issue, we would expect to see less abstention among members with both high and low support scores than among members who scored in the middle. If both effects are present, the distribution of abstainers should be skewed to the winning side, but should exhibit a central clustering, and no greater probability of abstention among winners than among losers with equally intense preferences. This means that the skewness in the distribution of abstainers would be less than the skewness among voters.

None of these patterns is shown in the figures, except that the second pattern is observed in the 1977a roll call. In Figures 1, 2, 4, 5, and 6, the distribution of abstainers is more skewed toward the top end than is the distribution for the entire population, and the former resembles the distributions for representatives who voted in favor of the bill. For the most lopsided vote—1975, which passed with a 21-point plurality—the distribution of abstainers is dramatically skewed to the right. Indeed, the fraction of members who have estimated support scores over .8 is greater for abstainers than for those who voted in favor of the bill, while the abstention rate was much lower in the lower two quintiles than in the other three. The 1982 vote, when the project finally failed, shows the opposite distribution. The skewness in the distribution of abstainers is not as dramatic as in 1975, and the plurality was much smaller (5%). Nevertheless, abstainers were less likely to be in the top quintiles than the population as a whole, and more likely to be in the bottom quintiles (i.e., among the victors).

For all votes taken together, but excluding the close 1977 vote, 9.5% of legislators abstained who had logit scores below .4 or above .6; however, among legislators with logit scores indicating that they were on the winning side, the abstention rate was 11.5%. On the losing side, the abstention rate was 8.0%. The hypothesis that the probability of abstention is the same among winners and losers is rejected at the .001 level of significance. Thus, the pattern of votes among legislators who are not indifferent confirms our prediction that winners abstain more frequently than losers.

The only cliffhanger in this sample is the 1977a vote, which supported the project by a vote of 215 to 205. The distribution of abstainers is markedly different from the other votes. It is skewed slightly toward the winning side, but exhibits an inverse U-shape, whereas the distribution of all members' scores is U-shaped (e.g., more legislators at the ends than in the middle). This pattern, too, is consistent with our theory, which predicts that abstention when the vote is close occurs predominantly among members whose constituents are indifferent or who are conflicted and fear punishment by either side. In the model reported in Table 4, both indifferent and conflicted members score in the middle, around .5. Indifferent members have low scores for issues that determine support and opposition, and hence wind up in the middle. Conflicted members receive high scores on factors determining both support and opposition, which cancel each other, and hence they too wind up in the middle. Thus, higher relative abstention by members with mid-range support scores on this roll call is in accord with our predictions for bills with low expected pluralities.

The two votes in 1977 were consecutive amendments to the same bill. Figures 3 and 4 show distributions of legislators who voted and abstained on the two bills. Because they took place the same day, we would expect that much of the random variation—that due to the time required to cast a vote—would be correlated in the two votes. In particular, because the first vote was so close, we expect most unconflicted legislators to vote. Once there, they might be expected to vote on the second bill as well. In fact, the number of abstainers on the second vote was lower than for other votes with comparably high margins of victory. In addition, the distribution of abstainers is not as skewed as for other votes with high margins of victory.

Nevertheless, the two votes did have interesting differences. To begin, only six members abstained on both votes: Twenty-two members cast a vote on one proposal, but not on the other. Moreover, the distribution of abstainers is substantially different for these two votes. The first has a strong central concentration, while the second is much flatter, and shifts in the direction of the side that wins. This is consistent with the hypothesis that conflicted legislators abstained on the close vote, but signaled on the lopsided one, while indifferent legislators traded votes the first time, but abstained on the second. Thus, while the first vote apparently reduced abstentions for the second, the two votes show the change in participation patterns predicted by Propositions 1–6.

The second set of tests is based on a regression analysis of the probability of abstentions, conditional on the legislator's intensity of preferences as estimated from the voting model. We first consider a modified model of simple instrumental voting. In it, the probability of abstaining is a logistic function of the following variables:

1. The intensity of support or opposition, measured by the absolute value of the difference between the predicted support variable and .5, as calculated from Table 4.
2. A dummy variable that is 1 if the legislator is on the relevant oversight or appropriations subcommittee, on the expectation that these legislators are more likely to be part of a cohesive coalition to vote on the measure regardless of their predicted level of support or opposition to the project.
3. The expected closeness of the vote, which is here measured as the absolute value of the difference between the fraction of the vote for CRBR and 1/2.
4. Three variables to measure conflict.
   (a) One indicator of conflict is that the legislator's district has a strong nuclear presence but the legislator is not a strong proponent or opponent of CRBR. During the sample period, nuclear plants were controversial. A member who was not committed to the nuclear side (with a high support value) or the antinuclear side (with a correspondingly low support value) might find that the best way to avoid trouble would be to abstain.
   (b) The legislator's district might receive substantial contracts (in excess of $100,000) on the project but otherwise the legislator does not have a high predicted support value, again owing to ideology and party. Local pork barrel considerations could cause conflict for members whose other characteristics predict opposition to the program.
   (c) A legislator who had constituency-based reasons to support the program and who was a Democrat would be in conflict with the president during the Carter administration. Also, because the Democratic Party had traditionally been in favor of the project, and the president was strongly opposed, legislators not strongly committed for or against the project would find that voting would put them in

conflict with either their party's president or its congressional branch.

5. The legislator's voting participation score for the year of the vote controls for differences among legislators in the value of holding office and in general voting costs ($U_0$, $U$, $S$, and $A$), as well as for differences in the base levels of their probabilities of reelection ($P$). While the legislator's actions on these votes affect this score, the influence is negligible because there are hundreds of roll call votes in each year.

**TABLE 5. Definition of Variables, Vote/Abstain Analysis**

| Variable | Name | Explanation |
|---|---|---|
| $Y$ | Abstention | This is $+1$ if abstained, 0 if voted or paired |
| $V_{it}$ | Predicted Support | Legislator $i$'s probability of supporting CRBR in year $t$, calculated from Table 3 |
| $M_t$ | Support | Percentage of votes favoring CRBR in year $t$ |
| $X1$ | Constant | |
| $X2$ | Intensity | $\lvert V_{it} - .5\rvert$ |
| $X3$ | Importance of Win/Loss | $(V_{it} - .5)*(M_t - .5)$ |
| $X4$ | Middle Group, 1982 | 1 if $.4 < V_{it} < .6$ and $M_t < .5$, zero otherwise |
| $X5$ | Middle Group, 1977a | 1 if $.4 < V_{it} < .6$ and $.5 < M_t < .52$, zero otherwise |
| $X6$ | Losing Supporters | 1 if $V_{it} > .6$ and $M_t < 1.2$, zero otherwise |
| $X7$ | Close Winners: Supporters | 1 if $V_{it} > .6$ and $.5 < M_t < .52$, zero otherwise |
| $X8$ | Easy Winners: Supporters | 1 if $V_{it} > .6$ and $M_t > .52$, zero otherwise |
| $X9$ | Winning Opponents | 1 if $V_{it} < .4$ and $M_t < .5$, zero otherwise |
| $X10$ | Close Losers: Opponents | 1 if $V_{it} < .4$ and $.5 < M_t < .52$, zero otherwise |
| $X11$ | Lopsided Losers: Opponents | 1 if $V_{it} < .4$ and $M_t > .52$, zero otherwise |
| $X12$ | Committee | 1 if member of oversight subcommittees, zero otherwise |
| $X13$ | Nuclear Conflict | (Plants in district)$*[1 - 2\lvert V_{it} - .5\rvert]$ |
| $X14$ | Pork Conflict | (Spending in district)$*(V_{it} - .5)$ |
| $X15$ | Party Conflict | $(1 - 2*\lvert V_{it} - .5\rvert)*$(1 if Democrat in 1977–78), zero otherwise |
| $X16$ | Closeness | $\lvert M_t - .5\rvert$ |
| $X17$ | Participation | Vote participation score for congressman $i$ in year $t$. |

**TABLE 6. Abstention Analysis, Model 1**

Observations: 3472 Degrees of Freedom: 3464

−2* Log Likelihood: 1699.326

| Var | Name | Coeff. | Std. Error | *T*-Stat | *P*-Value |
|---|---|---|---|---|---|
| *X*1 | Constant | .7630 | .4634 | 1.6464 | .0997 |
| *X*2 | Intensity | 1.5632 | .6983 | 2.2385 | .0252 |
| *X*12 | Committee | −1.0272 | .4024 | −2.5528 | .0107 |
| *X*13 | Nuclear Conflict | .8227 | .3848 | 2.1382 | .0325 |
| *X*14 | Pork Conflict | −4.0379 | 2.1282 | −1.8973 | .0578 |
| *X*15 | Party Conflict | .1831 | .2892 | .6330 | .5267 |
| *X*16 | Closeness | 6.4251 | 1.8514 | 3.4703 | .0005 |
| *X*17 | Participation | −.0487 | .0045 | −10.9184 | .0000 |

The procedures for measuring these variables are reported in Table 5. Table 6 contains the results of the estimation, where the dependent variable takes the value of one if the legislator abstains.

As predicted by Proposition 2, abstentions are more likely if vote margins are large (*X*16). They are also less likely for committee members (*X*12). The conflict variables all have the predicted sign, and are significant for the two distributive-ideology conflicts. The remaining conflict variable, positing a party-ideology conflict, is not significant.

The sign of the variable measuring issue importance is positive, suggesting that abstention is more likely among strong proponents and opponents than among indifferent legislators. This conflicts with a simple instrumental model of voting, but is consistent with the model in Section II. To consider

**TABLE 7. Abstention Analysis, Model 2**

Observations: 3472 Degrees of Freedom: 3463

−2* Log Likelihood: 1685.555

| Var. | Name | Coeff. | Std. Error | *T*-Stat | *P*-Value |
|---|---|---|---|---|---|
| *X*1 | Constant | 1.2070 | .4779 | 2.5255 | .0116 |
| *X*2 | Intensity | .6718 | .7258 | .9256 | .3547 |
| *X*3 | Inportance of Win/Loss | 13.1652 | 3.6855 | 3.5721 | .0004 |
| *X*12 | Committee | −1.1744 | .4052 | −2.8981 | .0038 |
| *X*13 | Nuclear Conflict | .7440 | .3777 | 1.9697 | .0489 |
| *X*14 | Pork Conflict | −4.3434 | 2.1718 | −1.9999 | .0455 |
| *X*15 | Party Conflict | .3174 | .2881 | 1.1019 | .2705 |
| *X*16 | Closeness | 4.8390 | 1.9495 | 2.4822 | .0131 |
| *X*17 | Participation | −.0507 | .0045 | −11.1664 | .0000 |

**TABLE 8. Abstention Analysis, Model 3**

Observations: 3472 | Degrees of Freedom: 3458

−2*Log Likelihood: 1675.322

| Var. | Name | Coeff. | Std. Error | *T*-Stat | *P*-Value |
|---|---|---|---|---|---|
| $X1$ | Constant | 1.5025 | .4748 | 3.1646 | .0016 |
| $X4$ | Middle Group (1982) | .0606 | .5233 | .1159 | .9077 |
| $X5$ | Middle Group (1977a) | .0461 | .5309 | .0869 | .9308 |
| $X6$ | Losing Supporters (1982) | −.4274 | .4924 | −.8681 | .3853 |
| $X7$ | Close Winners: Supporters | −.6612 | .4877 | −1.355 | .1752 |
| $X8$ | Easy Winners: Supporters | .6863 | .2651 | 2.5883 | .0096 |
| $X9$ | Winning Opponents (1982) | −.2724 | .4247 | −.6414 | .5213 |
| $X10$ | Close Losers: Opponents | 1.4251 | .6348 | −2.244 | .0248 |
| $X11$ | Lopsided Losers: Opponents | .0689 | .2666 | .2584 | .7961 |
| $X12$ | Committee | −1.2049 | .4088 | −2.9475 | .0032 |
| $X13$ | Nuclear Conflict | .5385 | .3453 | 1.5595 | .1189 |
| $X14$ | Pork Conflict | −4.2947 | 2.1862 | −1.9644 | .0495 |
| $X15$ | Party Conflict | .4886 | .2997 | 1.6303 | .1030 |
| $X17$ | Participation | −.0501 | .0046 | −10.9959 | .0000 |

this further, we estimated two additional models. In Model 2, predicted support is interacted with the extent to which the vote is a landslide in the same direction. As hypothesized in Proposition 1, if a legislator is on the losing side and cares strongly about the bill, abstention should be less likely than for members on the winning side. This asymmetry can be captured by $X3$, which will be negative for losers and positive for winners. The results of this model are reported in Table 7. The coefficient of the variable $X3$ is positive, as expected, and highly significant.[10]

Model 3 further disaggregates legislators on the winning side, on the losing side, and in the middle according to the outcome of the vote: for the vote that went against the project, for the vote that was extremely close, and for the votes that comfortably supported the project. The results are shown in Table 8. Vote margin is omitted in this equation, as it is subsumed in variables $X4$–$X11$.

The results correspond to the model in Section II as follows.

*Propositions 1 and 4*: Proponents of CRBR are statistically more likely to abstain when they win ($X8$) than when they lose ($X6$).[11] The difference in voting for the two cases among opponents is not significant. The vote where the project was defeated was much closer than the votes where the project prevailed. Consequently, we expect that Proposition 2—that turnout is stronger when the expected margin is close—confounds these interpretations to some extent, strengthening the observed difference in voting among proponents and weakening it among opponents. Thus we find on balance that the longitudinal evidence supports the expected turnout bias on the side of the losers.

The cross-sectional evidence is clearer, and supports the hypothesis. For votes where the project prevails, supporters are much more likely to abstain than opponents (*X*8 and *X*11). For the 1982 vote, opponents are more likely to abstain than proponents, but the difference is not statistically significant. On the close vote, the middle group (*X*5) was more likely to abstain than either the high group (*X*7) or the low group (*X*10), although only the latter is statistically significant by conventional standards.

*Proposition 2*: Proponents of CRBR are significantly more likely to vote when the vote is close (*X*7) than when they win (*X*8); opponents of CRBR are most likely to vote when the vote is close (*X*10). Further support for Proposition 2 is tested in Model 2: The coefficient of margin (*X*16) has the predicted sign and is highly significant.

*Propositions 3 and 5*: Because of the small cell size, we could not disaggregate conflict variables by vote outcome, so *X*5 measures abstention for both indifferent and conflicted members. The signs of the coefficients are as predicted: The middle group was more likely to abstain on the close vote (*X*5) and the fairly close vote when the project was defeated (*X*4) than on the remaining votes, although in neither case is the difference significant.

*Propositions 6a, 6b, 6c*: Support for these propositions is described above. In particular, for the close vote, the middle group was more likely to abstain than other legislators. In addition, the coefficients of *X*13, *X*14, and *X*15 indicate that legislators with identified conflicts are generally less likely to vote.

## IV. CONCLUSIONS

The model of legislator voting presented here builds on the precept of constituency-based voting that, in one form or another, underlies rational actor studies of legislators. To this model we add an explicit hypothesis about when issues are salient to constituents, and when they are likely to be less salient. The hypothesis implies that legislative outcomes influence constituents' evaluations of their legislators, even when neither legislators nor voters vote instrumentally.

We derive a series of testable predictions about voting and abstention from this model, which we test in an empirical analysis of a group of roll calls in Congress. Our empirical study, involving only eight votes, provides substantial support for the main propositions. We find overall evidence for the model, although not all of the relationships pass a test of statistical significance.

A remaining question is what effect these voting patterns have for legislative outcomes. Our results all go in the direction of depressing pluralities. In the absence of the factors considered here, more legislators would vote with the majority relative to the minority.

In electoral voting models abstention has a theoretical impact on outcomes. Garvey (1966) demonstrates that if abstention is due to voter indifference or, alternatively, to voter alienation, the median voter result of Black and its application to candidates by Downs (1957) does not occur. Consequently, the causes of voting are not just of interest to understanding turnout and pluralities in simple majority games, but also to understanding outcomes.

The effect of abstention on outcomes in Congress has not been explored. Our results that abstention may be predictably biased suggest that the abstention-outcome relationship may be nontrivial in Congress as well.

The key element of the model in Section II is the saliency assumption: An issue is more likely to be electorally salient to constituents who are dissatisfied by the legislative outcome than by those who are happy with it. This proposition provides a theoretical basis for negative voting in the electorate. Our study thus provides a link between legislative behavior and the recent literature on the extent of negative voting in elections (Fiorina and Shepsle). The linking mechanism is partly in the behavior of challengers, who raise an issue only if constituents are likely to be displeased with the incumbent's record with respect to it. Otherwise, the issue will remain nonsalient (the challenger fails to raise it and voters are ignorant) or noncontroversial (the candidates agree). Thus, negative voting, if observed, would actually reveal the combined effects of rational ignorance by voters and strategic campaigning by challengers.

A strong prediction from our analysis is that members from conflictual districts with no dominant group are likely to vote in favor of the subconstituency that supports the losing side. The empirical support for this hypothesis is weak. For identified conflicts that pitted distributive district benefits against ideology, we did not identify a minority vote bias. While ideology may reflect a district constituency as well, other work has suggested that in such a situation distributive benefits are likely to win out, perhaps because the member has ample opportunities to mend ideological fences. In our study the conflicted member may thus fall into the "dominant constituency" set, whose voting behavior is predicted to follow a pattern of higher abstention rates, but not necessarily support for the minority position.

A test of this hypothesis awaits analysis of a data set that has comparable conflicts. In lieu of statistical evidence, we offer the following anecdote. In 1977 Senator Domenici introduced a bill to impose fees on users of inland waterways. Predictably, barge interests opposed the bill, while railroad interests supported it. Senators from states with one or the other constituency took the expected positions. When a critical amendment came up for a roll call, Senator Percy of Illinois, a state with substantial barge and railroad interests, was a senator in trouble. T. R. Reid (1980) described the scene on the Senate floor:

> All this time a distinguished, silver-haired man had been standing by himself at the front of the chamber with a look of anguish on his face. This was Percy, who was following the roll call vote by vote, checking the tally clerk's ballot sheet now and then to check the totals. When the presiding officer began to announce that "all time has expired," the vote stood at 51 "nays" to 43 "ayes"—and then Percy finally voted: "aye." With that, he might be able to mollify both sides. He would tell the barge interests in his state that he supported them by voting for Stevenson's study amendment, and he could tell the railroads back home that he had waited until he was sure they would win before he voted against them.

## NOTES

1. An exception is the analysis of abstention reported in Fiorina (1974).
2. An extensive literature is devoted to why citizens vote in elections. Formal models avoid the "paradox of voting" by inserting noninstrumental parameters into the citizen's voting calculus, or by proposing modifications in voters' decision rules. These models can be consistent with large turnout and large pluralities. Because the basic problem they address is free riding in large, secret ballot elections, we believe that they describe second-order effects for explaining turnout in Congress. Consequently, we concentrate on another set of considerations that build on models of behavior by representatives rather than voters. See, for example, Uhlaner (1989), Palfrey and Rosenthal (1984), Ferejohn and Fiorina (1975), Ledyard (1984), and Niemi (1976).
3. For example, see Glazer and Grofman (1989).
4. The model can be further enriched by allowing the legislator's value of holding office, $U_0$, to depend on legislative outcomes. Because results from this modification parallel those obtained in the simpler model, we omit this complication from the analysis. However, note that if a given issue is unlikely to be salient to any constituent, or if the probability of reelection is close to one regardless of how the legislator votes on the roll call, then personal tastes will determine both whether and how a legislator votes.
5. Proof: $$\begin{aligned} c^2 > c^1 &\leftrightarrow p \cdot c^2(W) + (1 - p) \cdot c^2(L) > p \cdot c^1(W) + (1 - p) \cdot c^1(L) \\ &\leftrightarrow p\, c^1(L) + (1 - p) \cdot c^1(L) > p \cdot c^1(W) + (1 - p) \cdot c^1(L) \\ &\leftrightarrow c^1(L) > c^1(W). \end{aligned}$$
6. Proof: Compare $E(V+) - E(a)$ at $c^i = 0$ and $c^i = 1$. If the value of one more abstention is positive when the vote is not inspected, then $E(a) > E(V+)$ at $c^i = 0$. But at $c^i = 1$, this can be reversed if $x$ is sufficiently large compared to $|y|$. More generally, at any value of $c^i$, an increase in $c^i$ gives more weight to the first terms in (6.1) and (6.3), and so increases $E(V+) - E(a)$.
7. In solving expression (4), a legislator will abstain if the net effect of three factors is beneficial. Two of these are $S(m)$ and $A(m)$, which have the same effect on $P$ for all bills. The third is the differential effect of $x + R$ compared to $y + R$, which depends on the details of the bill in question. Hence, if a legislator finds it valuable to vote $m - 1$ times (instead of $m$), the specific bill on which the abstention occurs will be the one for which the

effect of $x$ and $y$ is smallest. The legislator will continue to add abstentions until the effect of $x$ and $y$ becomes sufficiently large, and the net benefit from $S(m)$ and $A(m)$ becomes sufficiently small, so that abstention is no longer worthwhile. Of course, these results depend on the probability that a legislator's abstention will be detected when constituents do not get what they want. The results summarized in the text can be interpreted as saying that if $x$ and $y$ are sufficiently close to zero, no feasible probability of detection of abstention is great enough to induce a legislator to vote rather than to abstain.

8. The validity of our procedure depends on whether this process is accurately characterized by a nested logit model, where legislators condition the decision whether to abstain on whether they favor or oppose the bill, and where the latter decision is made on the basis of exogenous factors that determine their support. Errors are introduced into the model because the estimated intensity of support in the abstention equation is noisy, and biases can be introduced if either equation is misspecified. However, the extent to which the estimates are inconsistent is not clear. We leave further modeling efforts on this problem to future research.
9. This procedure allowed us to test for changes in the underlying politics: for example, that investment in nuclear plants by local utilities was a factor in the political calculus of representatives in certain years and not in others, that ideological perceptions or party influences varied, that the importance of spending varied, and that changes in the performance of the program influenced support for it. These results are described in full in Cohen and Noll (1991).
10. The measures of conflict have roughly the same coefficients as in Model 1, and collectively are more significant.
11. The relevant statistical hypothesis regarding the variables interacting margins and which side won are whether pairs of coefficients differ, not whether either differs from zero. The hypotheses are that $X8 > X6$ and $X8 > X11$ are accepted at the 99% confidence level, that $X5 > X10$ is accepted at the 95% confidence level, and that $X5 > X7$ is accepted at the 70% confidence level.

## REFERENCES

Cohen, Linda R., and Roger G. Noll (1991). *The Technology Pork Barrel*. Washington: Brookings Institution.

Downs, Anthony (1957). *An Economic Theory of Democracy*. New York: Harper.

Fenno, Richard F., Jr. (1978). *Home Style: House Members in their Districts*. Boston: Little, Brown.

Ferejohn, John A., and Morris P. Fiorina (1975). The paradox of not voting: A decision theoretic analysis. *American Political Science Review* 69: 920–925.

Fiorina, Morris P. (1974). *Representatives, Roll Calls, and Constituencies*. Lexington, MA: Lexington Books.

Fiorina, Morris P., and Kenneth A. Shepsle (forthcoming). Negative voting: An explanation based on principal-agent theory. In *Information and Democratic Processes*, John Ferejohn and James Kuklinski (eds.). Urbana: University of Illinois Press.

Garvey, Gerald (1966). The theory of party equilibria. *American Political Science Review* 60: 29–38.

Glazer, Amihai, and Bernie Grofman (1989). Why representatives are ideologists though voters are not. *Public Choice* 61: 29–39.

Ledyard, John O. (1984). The pure theory of large two-candidate elections. *Public Choice* 44: 7–41.

Mayhew, David R. (1974). *Congress: The Electoral Connection*. New Haven: Yale University Press.

Niemi, R. M. (1976). Costs of voting and non-voting. *Public Choice* 27: 115–120.

Palfrey, Thomas R., and Howard Rosenthal (1984). A strategic calculus of voting. *Public Choice* 41: 7–53.

Reid, T. R. (1980). *Congressional Odyssey: The Saga of a Senate Bill*. San Francisco: W. H. Freeman.

Riker, William, and Peter Ordeshook (1968). A theory of the calculus of voting. *American Political Science Review* 52(1): 25–42.

Uhlaner, Carole (1989). Rational turnout: The neglected role of groups. *American Journal of Political Science* 33(2): 390–422.