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*The Effects of Campaign Spending in House Elections: New Evidence for Old Arguments**

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The question of how campaign spending affects election results remains open because the simultaneity problem has proven so intractable. Green and Krasno's (1988) recent attempt to solve the problem—and to demonstrate that marginal returns on spending are as great for incumbents as for challengers—again comes up short. A panel feature of the ABC News/*Washington Post* Congressional District Poll conducted during the 1986 elections offers a fresh perspective on the question. Analysis of *changes* in voting intentions during the final six weeks of the campaign shows that, as the tainted OLS studies have invariably suggested, the amount spent by the challenger is far more important in accounting for voter's decisions than is the amount spent by the incumbent.

Our understanding of the effects of campaign spending in elections to the U.S. House of Representatives remains at a curious impasse. In one sense research findings are clear and remarkably consistent over the eight elections since 1972, when usable spending data first became available: campaign expenditures appear to have sharply different electoral consequences for officeholders and their opponents. In campaigns against incumbents, the more challengers spend, the more votes they receive, and the more likely they are to win. The more incumbents spend, on the other hand, the lower their vote, and the greater their chances of losing.

No one has taken this to mean that incumbents routinely lose votes and elections by spending money. They merely spend more money the more strongly they are challenged, and the stronger the challenge, the worse the incumbent does. Taking the challenger's level of campaign spending into account, the incumbent's level of spending shows a quite small but positive relationship to the incumbent's number of votes and probability of winning, although the coefficients achieve statistical significance only when data from several years are combined to produce a very large number of cases (Jacobson 1989). The challenger's level of spending, by contrast, remains strongly and significantly related to both the vote and to the probability of victory without combining election years no matter what controls are introduced and no matter what functional forms are analyzed (Glantz, Abramowitz, and Burkhart 1976; Jacobson 1976, 1978, 1980, 1985, 1987a).

A straightforward explanation of these findings is that incumbents, exploiting the extensive communication resources available to every member of Congress, saturate their districts with information about themselves, their virtues and services, before the formal campaign begins. Further campaigning thus pro-

*I am obliged to Stephen Ansolabehere, Nathaniel Beck, and Mathew McCubbins for their helpful advice and instruction.

duces, at best, very modest additional gains in support. Challengers, in contrast, typically begin the campaign in obscurity. Because voters are demonstrably reluctant to vote for candidates they know nothing about, challengers have a great deal to gain by making themselves better (and, of course, more favorably) known to the electorate. Their level of campaign activity—largely, if not entirely, a function of campaign spending—thus has a strong influence on how well they do at the polls (Jacobson 1978, 1987b).

Despite their temporal stability, these findings remain open to serious question, for it has been obvious from the beginning of this line of research that the relationship between money and votes must be reciprocal. This is because the amount of money raised by candidates depends, in part, on how well they are expected to do on election day. Campaign spending may affect the vote, but the (expected) vote affects campaign contributions, and thus spending, because potential donors give more to candidates in races that are expected to be close. They are especially sensitive to the prospects of challengers; the better a challenger's apparent chances, the more money he or she receives from all sources. Contributions to incumbents increase with their anticipated vulnerability, mainly because threatened incumbents engage in more vigorous fund-raising (Jacobson 1980). This being so, ordinary least squares (OLS) models must produce biased and inconsistent estimates of the true parameters because endogenous variables (those which have a reciprocal effect on one another), treated as explanatory variables, are correlated with the error term (Johnston 1972, 343). In particular, OLS models may underestimate the effect of spending by incumbents and overestimate the effect of spending by challengers.

Accurate measurement of these effects is more than an academic exercise. To the degree that the marginal returns on campaign spending are greater for challengers than for incumbents, proposed limits on raising and spending money would reduce electoral competition below already abysmal levels (Jacobson 1978, 1979, 1987a). To the degree that returns on spending approach equality (or even favor incumbents), then laws that reduce the incumbent's usual spending advantage would enhance competition. Thus Donald Green and Jonathan Krasno's recent (1988) article arguing that spending benefits incumbents at least as much as their opponents stands as an important challenge to both prior analyses and to the policy conclusions derived from them. My purpose in this article is to point out some of the weaknesses in their analysis and to examine some new evidence that strongly reinforces the conventional findings.

Critique of Green and Krasno's Model

The core of Green and Krasno's argument is that the effect of spending by incumbents has been underestimated because it is endogenous and because previous models employing instrumental variables have not been identified properly. They propose a two-stage least squares (TSLS) model that uses the incumbent's spending in the previous election as an exogenous variable to estimate the

Table 1. Green and Krasno's Linear Model of Campaign Spending Effects in 1978 U.S. House Elections

Variable	Challenger's Vote		Incumbent's Spending
	%	%	
	OLS 1.1	TOLS 1.2	
Constant	12.680*** (1.765)	13.404*** (1.990)	27.499 (17.686)
Challenger's party strength	.520*** (.056)	.599*** (.057)	-.351 (.521)
Challenger's spending, 1978	.033*** (.006)	.049*** (.007)	.286*** (.052)
Incumbent's spending, 1978	-.002 (.007)	-.045*** (.013)	
Incumbent's spending, 1976			.816*** (.088)
Party	-3.331*** (0.922)	-2.916** (0.902)	7.859 (7.786)
Challenger's political quality	1.321*** (0.296)	1.432*** (0.289)	4.240 (2.532)
Adjusted R^2	.63	.57	.53
Number of cases: 236			

Note: Challenger's party strength equals percentage share of the vote won by the challenger's party's candidate in the previous election; expenditures are in \$1,000s; party is 1 if challenger is a Democrat, 0 otherwise; challenger's political quality scale takes values of 0 to 8; standard errors are in parentheses.

** $p < .01$; *** $p < .001$.

instrument for the incumbent's spending. Their interpretation is that, with other variables controlled, the incumbent's spending in the previous election represents a "propensity to spend money given his abilities and tastes for fund raising" (1988, 897) which is independent of the other variables in the system. These other variables are the challenger's party, district party strength, the challenger's expenditures, and the challenger's "political quality," a variable taking values from zero to eight depending on the challenger's degree of prior political experience and public prominence. Their equations are presented in Table 1.¹

Column 1.1 is Krasno and Green's ordinary least squares (OLS) regression

¹Green and Krasno graciously shared their data with me. The data used in this part of their analysis omit first-term incumbents and one excessively deviant case (a challenger who spent \$1.1 million).

of the challenger's vote on party, party strength, political quality, and spending by the incumbent and challenger (in \$1,000s) for the 1978 election. As usual, the OLS results indicate that, other things equal, challengers win votes by spending money while incumbents do not. Equation (column) 1.2 is the product of their TSLS analysis, which indicates that, contrary to the OLS result, marginal returns on campaign spending are virtually identical for incumbents and challengers. Taken at face value, these results require a drastic revision of our understanding of campaign spending effects. But there are several good reasons for skepticism about them.

First, consider the instrument for the incumbent's expenditures, which is computed from equation 1.3. Note that only the incumbent's expenditures in 1976 and the challenger's expenditures in 1978 seem to have a significant effect on the incumbent's expenditures in 1978. But these two variables are, as we would expect, rather strongly correlated with the challenger's vote in 1976 (.57 and .47, respectively), and the challenger's political quality is related to them as well (correlations of .25 and .55, respectively). Not surprisingly, then, the instrumental variable for incumbent spending is highly correlated ($R = .83$) with the other independent variables in equation 1.2.

One consequence of this degree of multicollinearity is that the coefficients on the challenger's party strength, political quality, and expenditures all increase over the OLS equation. Because values on these variables increase with the incumbent spending instrument, what challengers "lose" from the difference between the TSLS and OLS estimates of the effects of incumbent spending they regain through the difference between TSLS and OLS estimates of the other coefficients. Both equations predict very similar vote percentages for challengers.²

This does not by itself negate the TSLS results, but it puts them under severe suspicion that the instrument for incumbent spending is, in part, a proxy for party strength and challenger quality. Moreover, Abramowitz (n.d.) has shown that the instrument is contaminated by the strength of the incumbent's challenger in the prior election; with this bias eliminated, the estimated effect of incumbent spending becomes small and statistically insignificant.

In addition to these problems, it is clear that linear models of campaign spending effects are inadequate because diminishing returns must apply to campaign spending (Jacobson 1985). Green and Krasno recognize this and offer an alternative model which uses log transformations and interaction terms that involve the challenger spending variable.³ They do not, however, treat incum-

²Specifically,

$$\text{TSLS prediction} = -.297 + 1.009 \text{ OLS prediction}$$

$$(.720) \quad (.020)$$

$R^2 = .91$; standard errors are in parentheses.

³Green and Krasno (1988) also run separate equations for three ranges of spending: under

bent spending as other than linear. This is curious because everything we know about congressional campaigns indicates that diminishing returns should apply more forcefully, and at lower levels, to incumbent spending than to challenger spending.

Theory provides no guide in choosing the appropriate transformation to measure diminishing returns to campaign expenditures. The results using the customary logarithmic transformations are highly sensitive to how candidates who report no spending are treated (the log of zero is undefined). Simply adding \$1 to each candidate's total spending before taking its log produces equations that, from inspection of the residuals, seriously overestimate the effects of lower levels of campaign spending and underestimate the effects of higher levels of campaign spending. I therefore used the Box-Cox procedure to find the appropriate functional form. Box-Cox transformations take the form $X^* = (X^\lambda - 1)/\lambda$, where X is the variable to be transformed and λ may take any value from zero to one. The closer λ is to one, the more nearly linear the transformation; when $\lambda = 1$, $X^* = X$. As λ approaches zero, X^* approaches $\log(X)$.

The maximum likelihood procedure can be used to estimate λ , as well as βX^* and the other ordinary parameters, from a set of observations. The estimate of λ for challenger's expenditures from the 1978 data is .28 (SE = .04), suggesting that returns on spending by challengers diminish as spending increases, but not as sharply as a log transformation would have it. The coefficient on the transformed challenger spending variable was also positive and highly significant (1.156, SE = 0.17). The simultaneous estimation of a λ and coefficient for the transformed incumbent's spending variable produced a coefficient indistinguishable from zero, making it impossible to identify a value for λ . It is reasonable to assume, however, that returns on spending by incumbents, insofar as they exist, diminish at least as rapidly as returns on spending by challengers.

Further experimentation showed that estimates from this model were closely matched by a model that assumes that every candidate spent a minimum of \$5,000 and then uses the natural log transformation on campaign spending. The predicted values for the dependent variable derived from the two models are correlated at .993. Because the second model makes comparisons so much simpler, I used it for reporting purposes, but the reader should keep in mind that its choice was not arbitrary, but rather guided by the results of the Box-Cox procedure.

Equations 2.1 and 2.2 in Table 2 repeat Green and Krasno's analysis with transformed expenditure variables that allow returns on spending to diminish for

\$10,000, \$10,000 to \$100,000, and more than \$100,000. This puts most of the spending effects into the intercept and underestimates the effect of challenger spending in the \$100,000 to \$300,000 range by more than 100%. A nonlinear transformation of the spending variable is a much better solution to the problem of diminishing returns.

Table 2. Semilog Model of Campaign Spending Effects in 1978 U.S. House Elections

Variable	Challenger's Vote		Incumbent's Spending
	%	%	
	OLS 2.1	TOLS 2.2	
Constant	7.862*** (2.096)	12.967*** (2.606)	.886*** (.170)
Challenger's party strength	.419*** (.053)	.476*** (.057)	-.003 (.005)
Log challenger's spending, 1978	3.621*** (.377)	3.995*** (.404)	.166*** (.030)
Log incumbent's spending, 1978	-.245 (.577)	-2.146** (.852)	
Log incumbent's spending, 1976			.728*** (.050)
Party	-2.822*** (0.813)	-2.500** (0.840)	.099 (.067)
Challenger's political quality	.882*** (.262)	.906*** (.268)	.028 (.022)
Adjusted R^2	.71	.70	.68
Number of cases: 236			

Note: Challenger's party strength equals percentage share of the vote won by the challenger's party's candidate in the previous election; expenditures are in logged \$1,000s; candidates are assumed to have spent a minimum of \$5,000; party is 1 if challenger is a Democrat, 0 otherwise; challenger's political quality scale takes values of 0 to 8; standard errors are in parentheses.

** $p < .01$; *** $p < .001$.

both challengers and incumbents. I estimated robust standard errors for this and all subsequent analyses reported here in recognition of potential heteroscedasticity (White 1982). This semilog model fits the data, as well as theory, noticeably better than the linear model.⁴ The results also suggest that even if Green and Krasno's strategy for identifying the model is accepted, the challenger's expenditures have about twice the effect of incumbent's expenditures at any given level of spending.

A final reason for skepticism about Green and Krasno's findings is that they hold only for 1978. Table 3 reports the results from a replication of their analysis

⁴A Lagrange multiplier test allowed rejection of the null hypothesis (linearity) at $p < .001$.

Table 3. Coefficients on Campaign Spending from TSLs Models, 1976–86

Variable	1976	1978	1980	1984	1986
<i>Green and</i>					
<i>Krasno's model:</i>					
Challenger's spending	.072*** (.019)	.059*** (.008)	.054*** (.007)	.033*** (.009)	.029*** (.006)
Incumbent's spending	-.045* (.019)	-.050*** (.014)	-.023** (.008)	-.010 (.007)	-.009 (.005)
<i>Semilog model:</i>					
Log challenger's spending	4.346*** (0.476)	4.393*** (0.384)	4.802*** (0.488)	3.787*** (0.313)	2.877*** (0.299)
Log incumbent's spending	-2.109 (1.158)	-2.316** (0.868)	-1.655 (0.993)	-1.489 (1.057)	-1.523* (0.722)

Note: Standard errors are in parentheses; complete TSLs regression results are in Tables A1 and A2 in Appendix A.

* $p < .05$; ** $p < .01$; *** $p < .001$.

for five election years.⁵ For easier comparison, spending data have been adjusted for inflation (1978 = 1.00). The only departure from their model is that a simple dummy variable—whether or not the challenger has held elective office—is used to measure the challenger's quality (their more elaborate measure is not available for the other years). This makes little substantive difference, particularly for estimating the effects of incumbent spending. The two measures of quality are correlated at .80 for 1978; more crucially, the instruments calculated by using them are virtually identical.⁶

The TSLs regression coefficients and standard errors for the entire set of elections indicate that 1978 was the *only* election in which, even according to Green and Krasno's linear model, there was a rough parity between the effects of spending by incumbents and challengers. In other election years, the challenger's spending had a notably greater effect; in the two most recent elections, the coefficient on incumbent spending is small and fails to achieve statistical significance. The incumbent spending variable does at least as poorly in semilog TSLs

⁵The 1982 election is omitted because redistricting renders "challenger's party strength," as measured here, problematic. Two extreme cases were dropped from the 1986 election data: New York's 31st District, held by Jack Kemp, who spent \$2.6 million, and Florida's 18th District, represented by Claude Pepper, who spent \$1.4 million. Both were financing national campaigns, Kemp for President, Pepper for Social Security.

⁶The regression of Green and Krasno's instrument on the alternative produces a regression coefficient of 1.001 and a correlation coefficient of .997.

models for these years; its coefficient is always notably smaller than the coefficient for challenger spending, and in three of the five election years it falls short of statistical significance.⁷

There is strong reason to doubt, then, that Green and Krasno have succeeded in delivering "salvation for the spendthrift incumbent." They are certainly correct that spending by incumbents does have some positive effect on their vote. But their argument that the marginal effect of spending is about the same for incumbents and challengers, with the additional implication that it diminishes for challengers but not for incumbents, cannot be sustained. If it did, it would be difficult to imagine how incumbents *ever* lose. If "an incumbent who finds himself within three percentage points of defeat can increase his or her margin of victory to a decisive 60% by spending approximately \$180,000" (1988, 900), then few recent losing incumbents should have suffered defeat. The average losing incumbent in elections from 1978 through 1986 missed reelection by fewer than three percentage points. Two-thirds of them spent more than \$180,000; 28% of them spent more than \$300,000 (in 1978 dollars). In the 1982, 1984, and 1986 elections, only three of 45 losing incumbents spent less than \$180,000; a majority of them spent more than \$260,000 (again, in 1978 dollars; this is equivalent to \$437,000 in 1986 dollars). It is difficult to believe that, for most of these incumbents, more money would have changed the outcome.

Green and Krasno also attempt to compute an instrument for the challenger's spending, using early challenger receipts as the requisite exogenous variable. But early receipts are just as subject to electoral expectations as later receipts, so they are also endogenous. Early receipts are also highly correlated with total expenditures, so this "instrument" is simply a straight proxy for challenger spending. The simultaneity problem remains unsolved. Thus even if we were to accept their instrument for incumbent spending, the absence of a successful instrument for challenger spending leaves us in the dark about the true relative effect of spending by House challengers and incumbents.

Green and Krasno are to be commended for an imaginative attack on a thorny problem, but their results are not persuasive. Prior attempts to deal appropriately with these difficulties have also proven inconclusive (Jacobson 1978, 1980, and 1985; Welch 1981). The results of other TSLS models, where interpretable, merely repeat the ordinary least squares findings (Jacobson 1985), implying that simultaneity bias is small and that the OLS model is adequate after all.

These findings are by no means conclusive because it is not clear that any of the models is really identified (Green and Krasno 1988; Jacobson 1985; Welch 1981). Indeed, it may be that no simultaneous equation model of this sort can be identified. Any observable variable known to influence the vote should also af-

⁷Complete results for these equations are reported in Appendix A; the superior fit of the theoretically more appropriate nonlinear model to the data in every election year should be noted.

fect campaign contributions, and it is difficult to come up with any observable variable that would systematically affect contributions (especially to challengers) without also independently affecting the vote. Certainly conditions known to influence contributions would affect the expected vote, which would in turn affect contributions, and so on.

If all of the available exogenous variables influence both spending and votes, reciprocal effects can never be untangled using these techniques. Indeed, without additional information, we cannot be certain that campaign spending has any effect at all on election outcomes because we cannot prove conclusively that the strong, stable OLS results are not merely an artifact of well-informed contribution strategies that funnel the most money to the best challengers, who would do just as well without it.

Part of the difficulty is that these equations attempt to estimate dynamic processes with cross-sectional data; the endogenous variables, votes and expenditures, are measured after the campaign is over. But the process of raising and spending money and acquiring (or losing) support from voters occurs iteratively and, presumably, interactively over the entire course of the campaign. Thus it should be possible to get some analytical leverage by cutting into the process at different points in time in order to see how the endogenous variables *change* with respect to each other during the campaign period.

Specifically, if challengers really do win votes by spending money, the more they spend, the more their support among voters should increase from one time to the next. If dollars spent by challengers really are more productive than dollars spent by incumbents, the challenger's level of spending should have a greater impact on changes in vote intentions than does the incumbent's level of spending. A panel survey conducted during the 1986 elections offers some new evidence for testing these hypotheses.

The Survey

During the 1986 campaign, ABC News and the *Washington Post* sponsored a congressional district poll that surveyed more than 8,000 potential voters in 60 randomly selected House districts. Initial interviews were conducted by telephone during the third week of September. Respondents were asked about their partisan and ideological inclinations, opinions on a variety of national issues, demographic characteristics, and choice in the local House race. Those who said they were registered to vote were reinterviewed briefly during the final two weeks of the campaign to get an update on their intended vote and views on current national issues. Unfortunately, the poll asked no questions about the House candidates (other than the vote choice), so it did not take full advantage of its design. Still, the panel structure provides a unique opportunity for systematic analysis of changes in candidate preference during the final six weeks of the campaign.

A total of 3,808 respondents in the 38 districts in which a challenger faced an incumbent reported a vote choice in the second wave of the survey, and they

are the principal focus of this section. The number of voters per district varies from 35 to 253, but for 31 of the 38 districts, it falls between 67 and 120. One district was evidently half-sampled, and six districts promising hot contests were oversampled. Unequal samples do not affect the kind of analysis undertaken for this paper, so I have not weighted the observations. The 38 races represent all incumbent-challenger contests quite well, though there is a slight bias in favor of more competitive contests.⁸

Data on campaign spending by the challenger and incumbent running in the respondent's district were extracted from FEC reports and added to the survey as contextual data.⁹ Ideally, we would like to know how much the candidates spent between the first and second waves of the survey. This is not possible because the survey's time frame does not match the FEC's reporting schedule. Fortunately, it does not matter. The level of spending reported for any one period turns out to be very highly correlated with the level of spending reported for any other period, including the entire election cycle. Among challengers, correlations between total campaign spending and expenditures reported for the 1 July–30 September quarter, the primary election period, and the general election period range from .92 to .98. Relative differences in spending among campaigns remain stable across all periods. Total spending is thus an accurate proxy for spending between the waves of the survey, and this is the measure of spending used in the analysis. The results are insensitive to this choice; any of the subtotals (e.g., reported general election spending) would support the same substantive conclusions.

The Model

The basic model of the vote choice examined here is necessarily quite simple because of the limitations of the survey. The probability that a respondent intends to vote for the challenger is taken to be a function of the respondent's party identification, assessments of President Reagan's performance and economic trends, and the amounts spent by the local candidates on the campaign. The questions from which the survey variables were derived are listed, along with their codings, in Appendix B.

The selection of survey variables should require little explanation to anyone familiar with the literature on congressional elections. Party, presidential performance, and economic conditions are major components of most explanations of

⁸The mean two-party vote for challengers in the 38 districts sampled was 33.5% compared to 31.6% for all challengers in 1986; mean expenditures were \$145,692 compared to \$128,619; neither of these differences is statistically significant.

⁹At the behest of Samuel Kernell, Ken Mayer and Maurice Werdegar gathered data from the FEC on contributions and expenditures reported by each candidate in the sample for the various FEC reporting periods; I am grateful for their efforts. The summary figures on total spending for the entire campaign are from Barone and Ujifusa (1987). For this part of the analysis, spending figures are in 1986 dollars.

voting in midterm congressional elections (Jacobson 1987b; Jacobson and Kernell 1990; Tufte 1978). The effects of campaign spending may vary among voters with different partisan loyalties and political opinions, so the model ought to take these things into account. Of course, the effects of such variables are also of some interest in their own right.

The role of campaign spending in the model is a bit more complicated than it looks. Obviously, since we want to know whether candidates win votes by spending money, the amount spent is the proper variable to examine. But voters' decisions are not assumed to be affected by money per se; what matters is the quantity and content of information they acquire during the campaign (Jacobson 1987b). The available data tell us nothing about this; the survey asked no questions about voters' knowledge or evaluations of the candidates, and even if it did, we lack systematic information on campaign messages that might account for their responses. Basically, then, we have to assume that better-financed campaigns project a higher volume of more persuasive messages, and this is the source of any direct connection we may uncover between money and votes. The same assumption underlies the aggregate models discussed earlier, of course.¹⁰

The dependent variable—whether or not the respondent intends to vote for the challenger—is categorical, so an estimation technique appropriate to limited dependent variables is required. Probit and logit are the principal alternatives. I chose logit because some analyses involved unordered polychotomous dependent variables, and probit demands ordered categories (Maddala 1983). In analyses restricted to dichotomous dependent variables, the probability estimates from probit and logit models were indistinguishable. This is no coincidence; the cumulative normal and logistic distributions are very similar. Logit models estimate the probability, p , of an outcome as

$$p = \frac{1}{1 + e^{-(\alpha + \beta_1 X_1 \dots \beta_n X_n)}}$$

where e is the base of natural logarithms, α and the β 's are parameters, and the X 's are independent variables. Algebraic manipulation gives

$$\log(p/(1 - p)) = \alpha + \beta_1 X_1 \dots \beta_n X_n$$

which is estimated by the maximum likelihood procedure. Unlike linear regression coefficients, the coefficients in these models cannot be interpreted directly, so I use graphs to explicate them. As before, I employed the Box-Cox procedure to find the appropriate transformation for the spending variables. In this case,

¹⁰I also performed the analysis using the dichotomous measure of challenger quality (whether or not the challenger had held elective office) as one of the variables; although challenger quality was related to the vote decision in 1986 (Jacobson and Kernell 1990), with campaign spending controlled, it had no additional effect on the vote in any of the equations analyzed. I have thus omitted it from the analyses reported here.

$\lambda = .81$ for challengers' spending, which is close to linear. Once again, the estimate of λ for incumbents' spending was so imprecise as to be useless, so I entered this variable untransformed.

Analysis

To establish a basis for comparison, let us examine the determinants of a respondent's initial House preference. Equation 4.1 in Table 4 presents the logit estimates for the probability that the respondent preferred the challenger in the first (late September) wave of the 1986 survey. The signs on the survey variables have been inverted for respondents in districts with Democratic challengers so that party identification, approval of Reagan, and economic expectations have positive signs if respondent's positions are favorable to the challenger's party and negative signs if they are unfavorable.

Table 4. Logit Estimates of Voting Intentions, 1986

Variable	Equation Estimating Probability of:		
	Preferring Challenger	Switching to Challenger	Switching to Incumbent
	Wave I 4.1	Wave II 4.2A	Wave II 4.2B
Constant	-1.383*** (0.099)	-2.559*** (0.157)	-.838*** (.185)
Party identification	1.306*** (0.055)	.817*** (.085)	-.591*** (.107)
Approval of Reagan	.201*** (.067)	.126* (.053)	-.178* (.060)
Economic expectations	.285*** (.067)	.308*** (.109)	-.284* (.125)
Challenger's spending ($\lambda = .81$)	.00590*** (.00094)	.00447** (.00148)	-.00460** (.00175)
Incumbent's spending	-.00044 (.00032)	.00005 (.00051)	.00025 (.00060)
Percentage predicted correctly	79.3		73.7
Null	69.5		63.4
Number of cases: 3,808			

Note: The survey variables are described in Appendix B; challenger's spending is in \$1,000s, transformed by the Box-Cox procedure, $\lambda = .81$; see the text for further explanation; incumbent's spending is in \$1,000s.

* $p < .05$; ** $p < .01$; *** $p < .001$.

As expected, voters' intentions as of September were strongly influenced by partisanship and assessments of Reagan's performance and economic trends. Respondents were more likely to support a challenger if they identified with the challenger's party and held views on Reagan and the economy favorable to the challenger's cause (positive if the challenger was a Republican, negative if the challenger was a Democrat). The probability of supporting the challenger also increases with the challenger's level of spending. The coefficient on the incumbent's spending displays the correct sign, but it is substantively small and statistically insignificant.

The shape of the relationship between campaign spending and the initial voting intention is shown graphically in Figure 1. The curve illustrates how the probability of preferring the challenger varies with the challenger's level of campaign spending when the survey variables are set at their mean values and incumbent spending is entered as a linear function of challenger spending.¹¹ The range of variation is large. Other things constant, the probability of initially favoring the challenger increases from .15 to .44 as total spending rises from nothing to \$900,000 (the most spent by any challenger in this data set is \$895,746; keep in mind that total spending is a close linear approximation of spending measured over any period during the campaign).

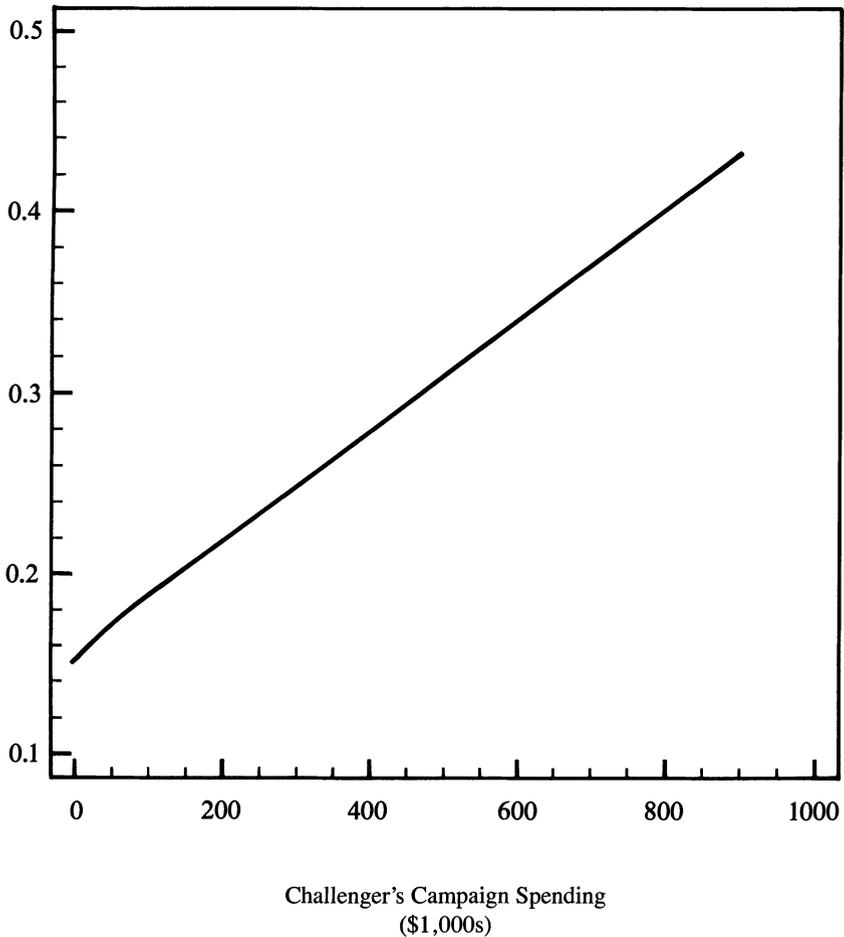
These results coincide nicely with the customary aggregate OLS findings. They are also subject to precisely the same doubts: campaign spending may reflect rather than elicit support among voters. This cannot be true in the same way of *changes* in candidate preferences, however. To the degree that contributions merely reflect accurate assessments of the challenger's electoral strength, support for the challenger will not increase systematically with campaign spending. To the degree that net changes in voting intentions favorable to the challenger increase with spending, we are on firmer ground in concluding that money has a direct effect on votes. Granted, a rise in electoral support should, if detected, inspire more campaign contributions, so the analysis is not entirely free of simultaneity problems. But because the *relative* level of spending by challengers varies so little over the campaign, and because there is no reason for believing that augmented support for challengers arose exogenously rather than through campaign activities in 1986, this is not a serious issue. Finally, if Green and Krasno are correct, incumbent spending should have an equally large but negative effect on net switches from the incumbent to the challenger.

Respondents could either confirm or switch their preference in the second

¹¹In 1986 as in previous years (Jacobson 1987b), there was a strong linear relationship between the challenger's level of spending and the incumbent's level of spending. The equation for the districts in the sample is

$$\text{Incumbent's expenditures} = \$245,344 + .91 \times \text{Challenger's expenditures} \\ (25,128) \quad (.10)$$

$N = 38$; Adjusted $R^2 = .66$; standard errors are in parentheses.

Figure 1. Probability of Preferring Challenger, Wave I

wave of the survey. This put them into one of four categories with respect to the challenger: (1) consistent supporters, (2) consistent opponents, (3) initial supporters who became opponents, and (4) initial nonsupporters who became supporters.¹² Table 5 shows the distribution of voters among these categories. Eighty-nine percent maintained stable vote intentions across both waves; only

¹²Respondents who expressed no preference in the first wave but did so in the second wave are classified as initial nonsupporters of the challenger. For some purposes they are treated as supporters of the incumbent. Only about 4% of the respondents fall into this category, and none of the findings would be any different if they were left out and only respondents who reported a vote choice in both waves were analyzed.

**Table 5. Vote Intentions in Waves I and II
of the 1986 ABC News/Washington Post Survey**

	Wave I		Marginal Totals
	Challenger	Incumbent ^a	
<i>Wave II:</i>			
Challenger	976 (25.6) ^b	233 (6.1)	1,209 (31.7)
Incumbent	186 (4.9)	2,413 (63.4)	2,599 (68.3)
Marginal totals	1,162 (30.5)	2,646 (69.5)	3,808 (100.0)

Note: ^aIncludes respondents with no preference in Wave I.

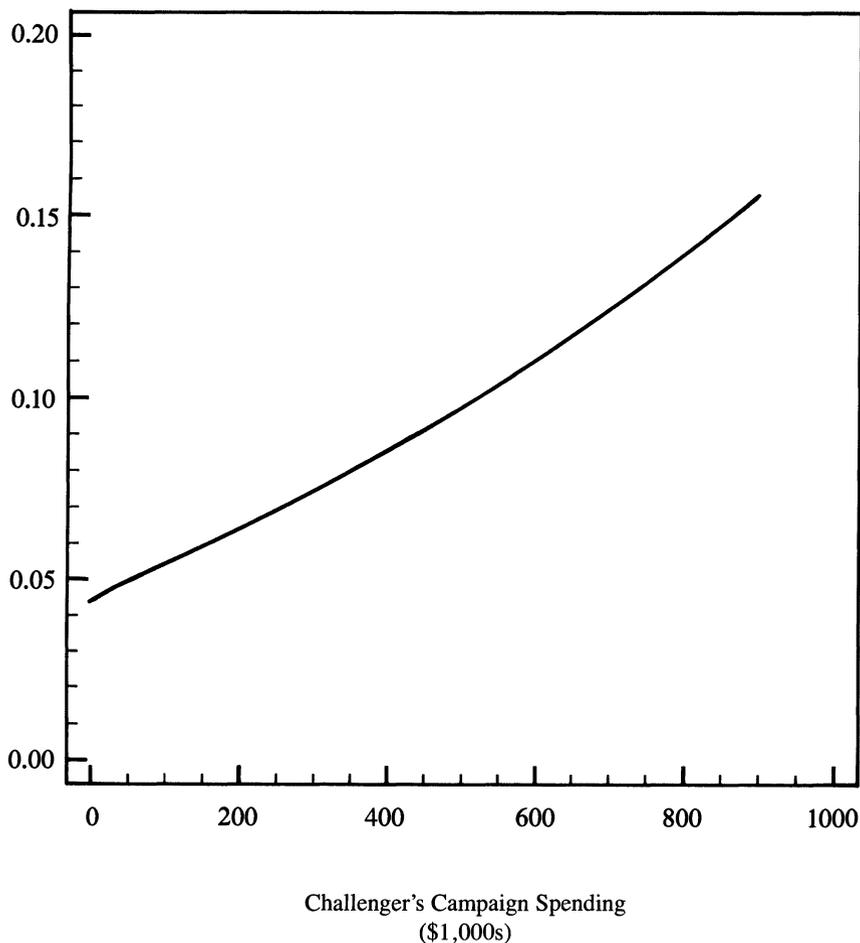
^bPercentage of respondents in category.

29% of the stable group consistently supported the challenger. Eleven percent changed their minds during the final weeks of the campaign; 56% of the switchers moved toward challengers, who thus, as a group, enjoyed a small net gain during this period.

If spending actually influences votes, changes in vote intentions should be related to levels of campaign spending. Specifically, the more challengers spend, the more votes they should attract from people who did not initially intend to vote for them, and the fewer votes they should lose from people initially on their side. Incumbent spending, if consequential, should counterbalance these effects. Theory suggests that changes in vote intentions should also reflect party identification (voters more likely to switch to candidates of their own party) and assessments of Reagan and the economy.

An unordered logit model permits a test of these propositions. The technique estimates coefficients measuring the effect of one or more independent variables on the probability that an observation falls into one category rather than another among a set of categories which, like those in Table 5, have no natural ordering. We can thus use the whole sample to assess the impact of the independent variables on a voter's likelihood of switching to or away from the challenger. This gives the estimates a common variance, which would not be the case if the sample were divided by initial vote intention and separate analyses were performed on each subset of respondents.¹³

¹³Of course, not all cross-category comparisons are relevant, and I do not present the results from those which are not. The results I do report are robust against variations in method; I got virtually identical results when I did divide the sample and so was able to estimate probit rather than logit models. Jeffrey Dubin and Douglas Rivers's SST was used for all statistical analyses.

Figure 2. Probability of Switching to Challenger

Equation 4.2A in Table 4 represents the unordered logit estimates for the probability that a respondent switches from opposition (or neutrality) to support of the challenger between the first and second waves of the survey. As expected, challengers are better able to persuade voters to switch from opposition to support when they identify with the challenger's party and hold opinions on Reagan and the economy favorable to the challenger. More important for my argument, the more the challenger spends, the more likely initial opponents are to become supporters; spending by the incumbent has no perceptible effect. Figure 2 shows

how the probability of switching to the challenger increases with the challenger's level of spending when the other variables set at their means (for voters initially opposing the challenger) and incumbent spending is treated as a linear function of challenger spending as before; it rises from .04 to .16 across the range of expenditures examined.

Equation 4.2B presents the logit coefficients for estimating the probability that a voter who initially intends to vote for the challenger switches to the incumbent. The coefficient on incumbent spending displays the correct sign but falls far short of statistical or substantive significance. Party identification and views on Reagan and the economy again have their expected effect, inhibiting desertion of the challenger when favorable to the challenger. Challengers also suffer fewer desertions the more they spend on the campaign. Figure 3 shows how the probability of switching to the incumbent varies with the challenger's level of campaign spending (with the other variables treated as before). It falls from .20 to .07 across this range of campaign spending.

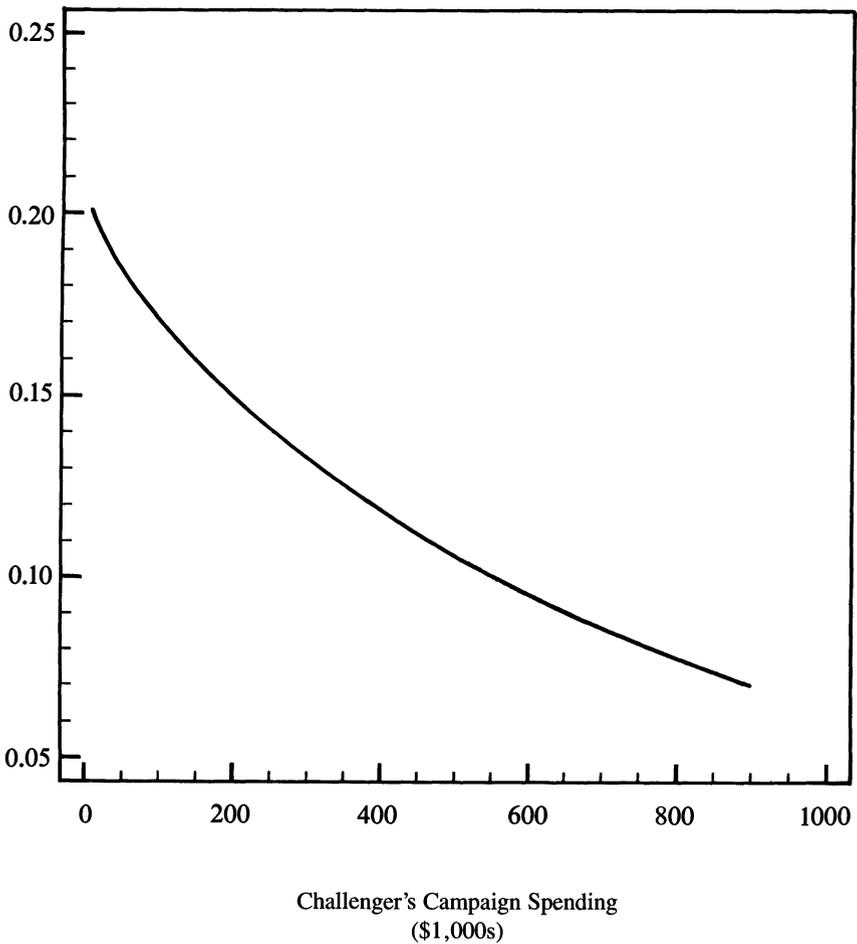
The summary effect of variation in levels of campaign spending by challengers can be measured by computing the weighted net effect of spending on switches in vote intention to and from the challenger as estimated by equations 4.2A and 4.2B. Weights are necessary because more than two-thirds of the voters initially intend to vote for the incumbent.¹⁴ The results of this exercise are displayed in Figure 4. Challengers suffered a net loss of support between the two waves of the survey if they spent less than \$204,000, with a maximum decline of about three percentage points for candidates who spent little or nothing. Challengers whose spending surpassed this threshold increased their vote share in nearly linear fashion; top spenders could add a net nine percentage points to their total.

By this evidence challengers' levels of spending have a substantial effect on changes in their level of support during the final five or six weeks of the campaign. The effect is especially striking because, as we observed in Figure 1, high-spending challengers have so much more support to begin with. Low-spending challengers begin far behind and fall further behind; high-spending challengers begin with the highest level of support and then add to it. We observe no "regression toward the mean," but rather its opposite.

Who Switches?

According to the logit equations, party identification and political opinions have powerful influences on the respondent's initial candidate preference and likelihood of revising it. These variables can therefore alter the relationship be-

¹⁴Specifically, the net shift in the vote percentage for the challenger is calculated as 69.5 times the probability of switching from the incumbent to the challenger minus 30.5 times the probability of switching from the challenger to the incumbent.

Figure 3. Probability of Switching to Incumbent

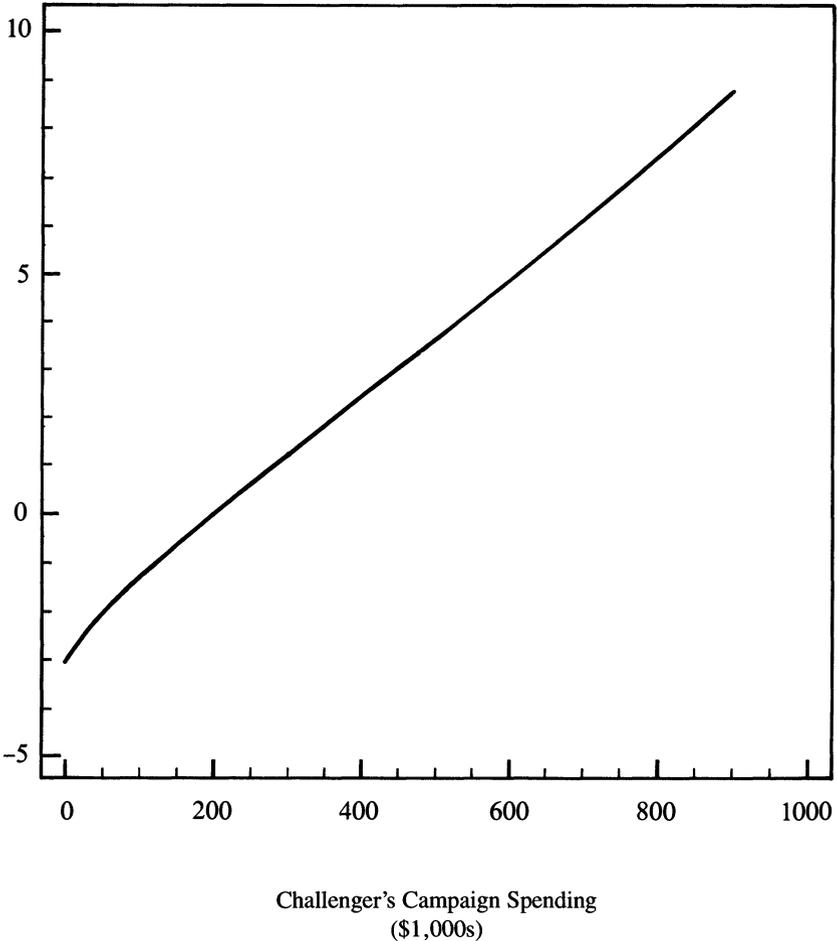
tween campaign spending and the vote decision because logit models are inherently interactive; the magnitude of the effect of any independent variable depends on the values taken by the other independent variables. Equations 4.2A and 4.2B allow us to explore the consequences of the challenger's campaign spending for voters with different partisan identities. The relevant probabilities are computed as before, but with partisanship set at its alternative values.

Figure 5 shows how the probability of switching to support of the challenger varies with the challenger's level of spending and the respondent's party identi-

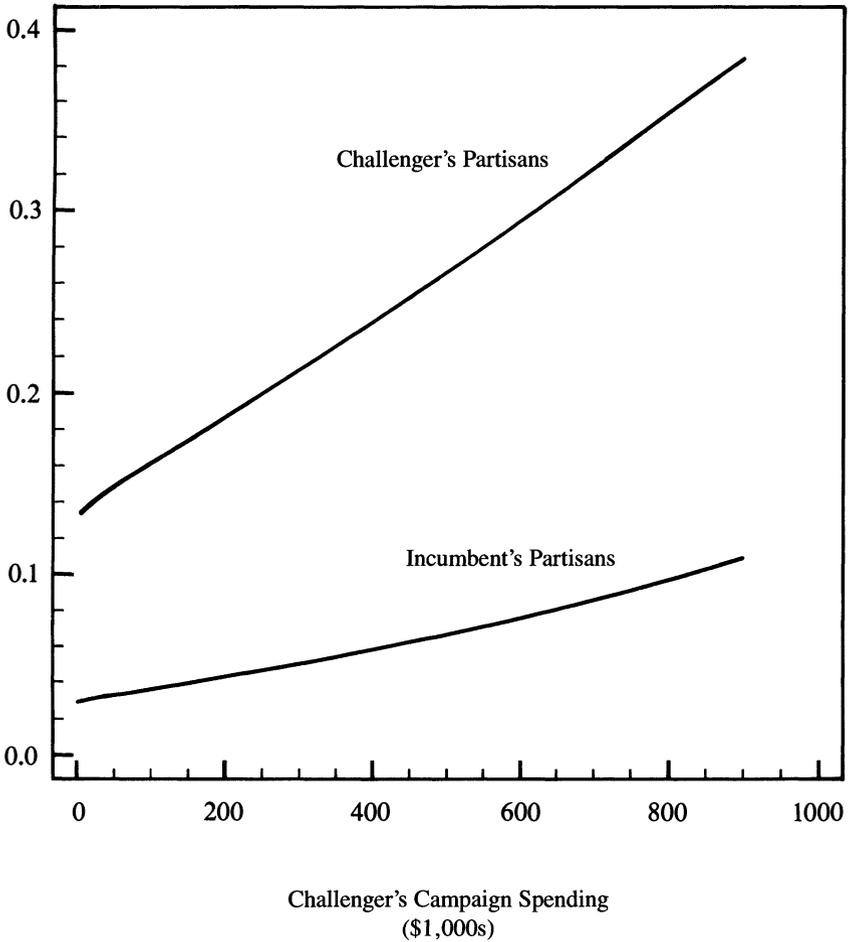
fication. Plainly, the challenger's level of spending has a much larger influence on the behavior of fellow partisans; their probability of returning to the fold between the two waves of the survey increases from .13 to .39 as campaign spending increases from nothing to \$900,000. Respondents who identify with the incumbent's party are also more likely to switch to the challenger the more the challenger spends, but the increase is considerably smaller (from .03 to .11) across this range of spending.

In absolute terms, however, greater spending by challengers attracts votes

Figure 4. Net Vote Shift to Challenger



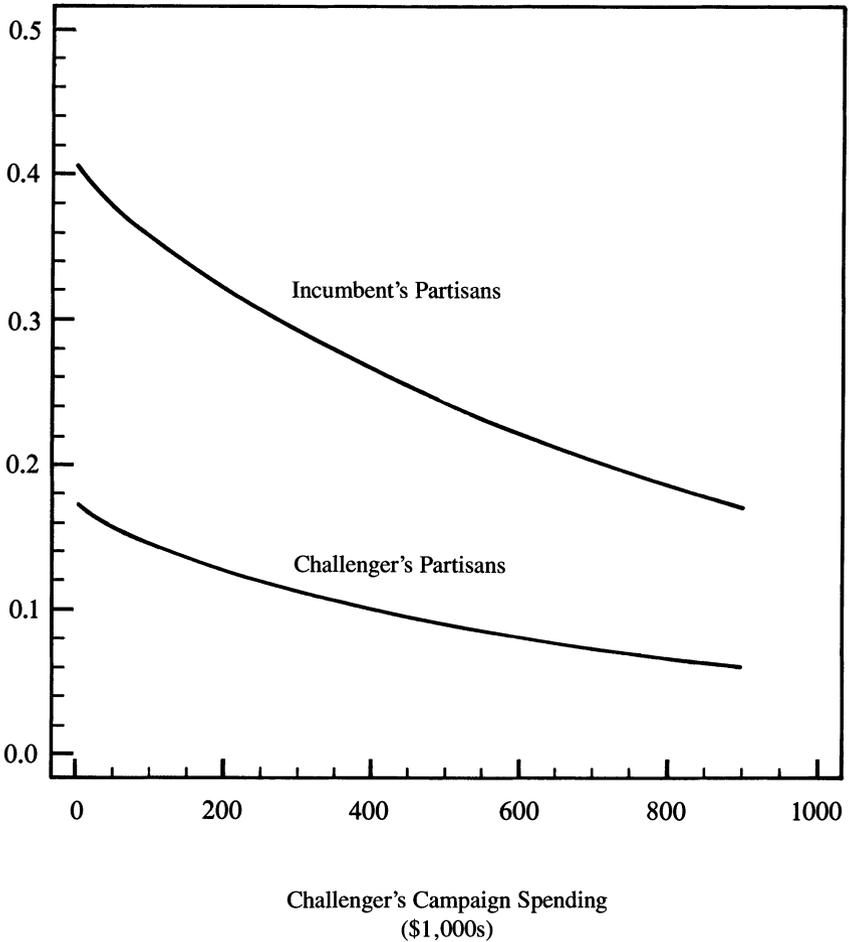
**Figure 5. Probability of Switching to Challenger
(Party Identifiers)**



from supporters of both parties much more even-handedly. This is because 71% of the initial nonsupporters identified with the incumbent's party, while only 22% identified with the challenger's party; hence, for example, a challenger who spent \$900,000 should attract 5.6% of initial opponents from among his or her own partisans and 5.6% from among the incumbent's partisans.¹⁵

¹⁵The precise calculations are $(.383 - .134) \times 22.4\% = 5.6\%$ and $(.108 - .029) \times 70.9\% = 5.6\%$.

**Figure 6. Probability of Switching to Incumbent
(Party Identifiers)**



The results of the equivalent analysis for respondents who initially intended to vote for the challenger are displayed in Figure 6. For this group, campaign spending has the more dramatic effect on the behavior of voters who identify with the incumbent's party; their probability of returning to their party's incumbent declines from .41 to .17 as the challenger's spending rises from nothing to around \$900,000. Campaign spending is not so decisive for the challenger's own

partisans; their likelihood of deserting to the incumbent drops from .17 to .06 over the same range of expenditures.

Once again, the difference measured in actual voters is a good deal smaller, because 82% of the challenger's supporters in Wave I identify with the challenger's party, while only 13% identify with the incumbent's party. A little arithmetic shows that about 25% of the additional voters whose support would be retained by a challenger who spends \$900,000 would come from the incumbent's party.¹⁶

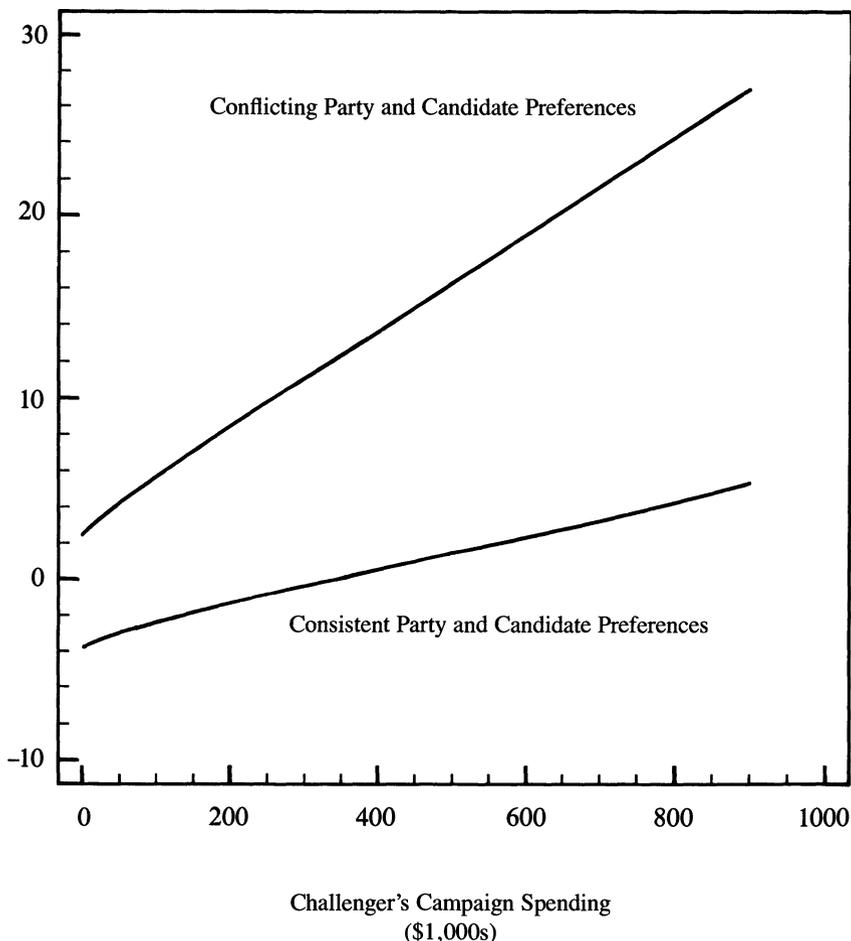
The logistic distribution takes a flattened *S* shape, constraining independent variables to have their largest effect near the middle of the probability range and to make the least difference at the extremes, so the partisan differences shown in Figures 5 and 6 are, in a sense, a consequence of method. But they are also open to an intuitively attractive substantive interpretation. They suggest that the challenger's campaign spending (i.e., campaigning) has its sharpest effect on people whose initial intention is to desert their party's candidate. This certainly makes sense; voters with conflicting party and candidate preferences should be more volatile and open to persuasion. The more vigorous the challenger's campaign, the more likely the conflict is to be resolved in the challenger's favor.

This point is illustrated more fully by Figure 7, which compares the net effects of the challenger's spending on voters whose initial candidate choices were, and were not, consistent with their party identification. As before, net effects are calculated by subtracting the probability of losing supporters from the probability of winning nonsupporters, multiplied by the percentage of respondents in each initial category. Clearly, spending has a much larger net effect among respondents who begin with conflicting party and candidate preferences. The figure suggests that a challenger would move from a net gain of two percentage points up to a net gain of 27 percentage points among these voters as campaign expenditures increase from nothing to \$900,000. Among voters who begin with consistent party and candidate choices, the challenger would go from a four-percentage-point loss to a five-percentage-point gain across this range of spending. Still, because four times as many voters have consistent preferences as have inconsistent preferences, most of the votes a challenger is projected to gain by spending money come from voters whose initial candidate and party choices were not in conflict.¹⁷

¹⁶The calculations are $(.173 - .059) \times 82.1\% = 9.3\%$ and $(.406 - .170) \times 13.2\% = 3.1\%$.

¹⁷Respondents whose opinions on the administration and the economy ran counter to their initial House choice were also more strongly affected by the challenger's level of campaign spending (see Jacobson 1988).

**Figure 7. Net Vote Shift to Challenger
(Party Identifiers)**



Concluding Remarks

The panel feature of the ABC/*Washington Post* Congressional District Poll opens a new avenue for examining the connection between money and votes in House elections. By disclosing changes in voting intentions during the campaign, it skirts a major source of the simultaneity problem besetting previous studies of the money-votes relationship. Analysis of changes in voting intentions strongly reinforces conclusions derived from the suspect aggregate OLS models.

Campaign spending is crucial to House challengers. The more they spend, the more net votes they pick up. The more incumbents spend, the more net votes they lose. This does not mean that their expenditures are useless or worse; on the contrary, the discovery that challengers who spent little money *lost* support during the campaign (Figure 4) suggests that incumbents do have something to gain from campaigning.¹⁸ But the marginal gains incumbents derive from campaign spending do not, on average, offset the marginal losses produced by the challenges to which the incumbents are, in a graduated fashion, responding.

The equations estimated here suggest that a challenger's level of spending can make as much as a 12-percentage-point difference in votes gained or lost during the final six or so weeks of the campaign. This is not to argue that money is *sufficient* to account for a difference of this magnitude; the campaign message matters (and higher-quality candidates with more persuasive messages no doubt raise and spend more money). But no matter how persuasive the message, it will not do any good if voters do not hear it, so the money, if not sufficient, is almost certainly *necessary*.

This does not exhaust the probable influence of campaign spending on votes. Although the available data cannot speak directly to this issue, it is hard to believe that money spent by the challenger prior to Wave I of the survey did not also add votes. On average, challengers reported making about 30% of their total expenditures between 1 July and 30 September, and some money was spent even earlier. In theory, campaign spending should have been even more productive earlier in the campaign because marginal returns are steeper at lower levels of spending. Amply funded challengers would presumably use the summer months to enhance name recognition, which demonstrably pays off in greater support, while poorly funded challengers lingered in obscurity. It thus seems reasonable to extrapolate the September–October findings back to earlier periods, though precision and certainty await a panel study with earlier waves.

The analysis also supports some plausible inferences about how the electorate responds to campaign spending. Levels of spending make a larger difference for voters whose initial candidate choice clashes with their party identification: the more a challenger spends, the more likely such conflicts are to be resolved in the challenger's favor. The level of spending has a smaller effect on the behavior of voters who do not face such conflicts, but because a large majority of voters fall into this latter category, it contributes equally to the *number* of votes the challenger can add by campaigning more vigorously.

Finally, the substantial impact on voters of campaign spending by challengers, along with the comparative ineffectiveness of the incumbents' reactive

¹⁸Incumbents now conduct full-scale campaigns even when the opposition is imperceptible; the constant term in the equation reported in note 10 indicates that an incumbent would spend, on average, \$245,344 if the challenger spent nothing. When challenger spending is low, the incumbent is evidently able to pick up some net support during the campaign.

spending, reinforces the argument that legal ceilings on campaign spending in House elections, unless set so high as to be, for all practical purposes, pointless, would only make it more difficult for challengers to defeat incumbents.

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APPENDIX A
Complete Results for TSLs Models in Table 3

Table A1. Estimates of Green and Krasno's TSLs Linear Model, 1976-86

Variable	TSLs Equations				
	1976 (212) ^a	1978 (236) ^a	1980 (233) ^a	1984 (236) ^a	1986 (255) ^a
Constant	10.722*** (1.939)	14.112*** (1.873)	13.239*** (1.847)	16.968*** (1.646)	8.693*** (1.477)
Challenger's party strength	.736*** (.061)	.645*** (.067)	.625*** (.056)	.552*** (.065)	.591*** (.051)
Challenger's spending	.072*** (.019)	.059*** (.008)	.054*** (.007)	.033*** (.009)	.029*** (.006)
Incumbent's spending*	-.045* (.019)	-.050*** (.014)	-.023** (.008)	-.010 (.007)	-.009 (.005)
Party	-3.281** (1.096)	-2.608** (1.055)	-2.792** (0.921)	-6.720*** (0.915)	4.649*** (0.669)
Challenger has held elective office	2.365 (1.323)	3.703*** (1.396)	2.639* (1.203)	2.594** (1.118)	3.315** (1.081)
Adjusted R ²	.64	.53	.64	.63	.64
	Instrumental Variable Equations				
Constant	29.457* (12.754)	28.366* (14.045)	38.180 (25.165)	78.359*** (18.335)	58.836** (19.067)
Incumbent's spending, last election	.483*** (.085)	.804*** (.088)	.986*** (.175)	.639*** (.116)	.652*** (.070)
Challenger's spending	.372*** (.079)	.317*** (.048)	.708*** (.149)	.552*** (.060)	.475*** (.069)
Challenger's party strength	.104 (.462)	-.183 (.513)	-1.749 (0.916)	-1.242 (.822)	-.343 (.648)

Table A1 (continued)

Variable	Instrumental Variable Equations				
	1976 (212) ^a	1978 (236) ^a	1980 (233) ^a	1984 (236) ^a	1986 (255) ^a
Party	-2.859 (7.506)	8.636 (7.897)	-22.188 (17.761)	-6.412 (10.560)	-.759 (9.524)
Challenger has held elective office	21.762** (7.718)	7.070 (10.502)	-.686 (22.329)	33.126* (16.314)	35.644* (14.351)
Adjusted R^2	.48	.52	.56	.62	.63

Note: The dependent variable for the TSLS equations is the challenger's percentage share of the two-party vote except for 1978, where, following Green and Krasno, I use the challenger's percentage share of the total vote. The dependent variable for the instrumental variable equations is the incumbent's expenditures. Challenger's party strength equals percentage share of the two-party vote won by challenger's party's candidate in the previous election; incumbent and challenger's expenditures are in \$1,000s and are adjusted for inflation (1978 = 1.00); party = 1 if challenger is a Democrat, 0 otherwise; elective office = 1 if challenger has held elective office, 0 otherwise. Standard errors are in parentheses.

^aNumber of observations.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table A2. Estimates of TSLS Semilog Models, 1976-86

Variable	TSLS Equations				
	1976 (212) ^a	1978 (236) ^a	1980 (233) ^a	1984 (236) ^a	1986 (255) ^a
Constant	9.403* (3.929)	13.250*** (2.763)	12.433*** (3.669)	16.888*** (4.164)	10.535*** (3.094)
Challenger's party strength	.634*** (.048)	.493*** (.058)	.436*** (.055)	.421*** (.049)	.502*** (.049)
Log challenger's spending	4.346*** (0.476)	4.393*** (0.384)	4.802*** (0.488)	3.787*** (0.313)	2.877*** (0.299)
Log incumbent's spending*	-2.109 (1.158)	-2.316** (0.868)	-1.655 (0.933)	-1.489 (1.057)	-1.523* (0.772)
Party	-3.370*** (0.801)	-2.362** (0.851)	-3.045*** (0.785)	-6.402*** (0.602)	4.427*** (0.607)
Challenger has held elective office	-.129 (.958)	2.812* (1.119)	1.174 (0.918)	1.520 (0.951)	1.997* (0.945)
Adjusted R^2	.74	.69	.73	.74	.70

Table A2 (continued)

Variable	Instrumental Variable Equations				
	1976 (212) ^a	1978 (236) ^a	1980 (233) ^a	1984 (236) ^a	1986 (255) ^a
Constant	1.859*** (0.273)	.873*** (.172)	1.273*** (0.201)	1.960*** (0.282)	1.385*** (0.240)
Log incumbent's spending, last election	.442*** (.070)	.724*** (.050)	.637*** (.050)	.569*** (.072)	.689*** (.052)
Log challenger's spending	.250*** (.035)	.180*** (.027)	.291*** (.027)	.187*** (.025)	.137*** (.022)
Challenger's party strength	-.005 (.005)	-.002 (.004)	-.012** (.004)	-.010 (.005)	-.005 (.004)
Party	.066 (.079)	.105 (.067)	.050 (.055)	-.006 (.007)	-.011 (.048)
Challenger has held elective office	.115 (.090)	.040 (.089)	.013 (.066)	.174* (.080)	.086 (.060)
Adjusted R ²	.52	.68	.73	.57	.65

Note: The dependent variable for the TSLs equations is the challenger's percentage share of the two-party vote except for 1978, where, following Green and Krasno, I used the challenger's percentage share of the total vote. The dependent variable for the instrumental variable equations is the natural log of the incumbent's expenditures. Challenger's party strength equals percentage share of the two-party vote won by challenger's party's candidate in the previous election; incumbent and challenger's expenditures are in natural logarithms of \$1,000s, adjusted for inflation (1978 = 1.00), with a designated minimum of \$5,000 per candidate; party = 1 if challenger is a Democrat, 0 otherwise; elective office = 1 if challenger has held elective office, 0 otherwise. Standard errors are in parentheses.

^aNumber of observations.

* $p < .05$; ** $p < .01$; *** $p < .001$.

APPENDIX B

Survey Questions and Variable Codes

All questions are from the ABC/*Washington Post* Congressional Election Poll, conducted in mid-September and late October 1986.

1. Vote Intention

"Thinking about the U.S. House of Representatives election this November in the congressional district where you live, if that election were being held today, for whom would you vote (Democratic Candidate), the Democratic candidate, or (Republican Candidate), the Republican candidate?"
Translated to:

Wave I

0 Incumbent or undecided

1 Challenger

Wave II

- 0 Incumbent
- 1 Challenger

NB: The following variables were multiplied by -1 for respondents in districts with Democratic challengers before entering them into the equations in Table 4.

2. *Party Identification*

"Generally speaking, do you usually think of yourself as a Republican, a Democrat, an independent, or what?" [If independent] "Do you lean more toward the Democratic party, Republican party, or neither?" (Wave I)

- 1 Republican or lean Republican
- 0 Pure independent
- -1 Democratic or lean Democratic

3. *Reagan Job Rating*

"Do you approve or disapprove of the way Ronald Reagan is handling his job as president?" "Is that approve (disapprove) strongly or approve (disapprove) somewhat?" (Wave I)

- 2 Approve strongly
- 1 Approve somewhat
- 0 Don't know; not apply
- -1 Disapprove somewhat
- -2 Disapprove strongly

4. *National Economy*

"Do you think the nation's economy is getting better, getting worse, or staying the same?" Asked in both waves; Wave I response used in Equations 2.1 and 2.2, Wave II response used in all other equations.

- 1 Getting better
- 0 Staying the same; don't know; not apply
- -1 Getting worse

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