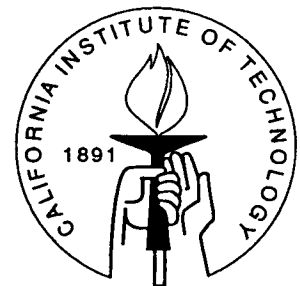


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CHANGE OR CONTINUITY IN PRESIDENTIAL POLITICS:  
A MULTINOMIAL PROBIT MODEL OF CANDIDATE CHOICE IN THE 1992 ELECTION

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# **CHANGE OR CONTINUITY IN PRESIDENTIAL POLITICS: A MULTINOMIAL PROBIT MODEL OF CANDIDATE CHOICE IN THE 1992 ELECTION**

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## **Abstract**

This paper examines the voting behavior of individuals in the 1992 presidential election. Employing a multinomial probit model we disprove several commonly held beliefs regarding the uniqueness of the election and the mood of the voters. We show the limited influence of the candidates efforts at ideological optimization. We show emphatically the dominance of the economy as an issue, and that Clinton, not Perot, was the beneficiary of economic discontent. We also demonstrate, via simulations of the outcome under hypothetical distributions of preferences, that the effect of the economy, while large, cannot by itself explain Bush's defeat. We also prove the surprisingly powerful impact of the candidates' position on abortion on voter's choices. And we disprove the stylized fact that the 1992 election was characterized by "angry voters." The results from the multinomial probit analysis also allow us to reject a voter-decision rule that would embody the principle of Independence of Irrelevant Alternatives.

# CHANGE OR CONTINUITY IN PRESIDENTIAL POLITICS: A MULTINOMIAL PROBIT MODEL OF CANDIDATE CHOICE IN THE 1992 ELECTION \*

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## 1 Introduction

The 1992 presidential election was a very significant election. It turned over the presidency to the Democratic party and thus marked the end of a twelve-year period of divided control of the branches of the American government. That this was done on the shoulders of a self-styled “New Democrat”, raises the possibility that this transition of power occurred only because the Democrats were able to present a ticket which was moderate enough to appeal to Democrats who supported Reagan and Bush. Some have interpreted this as a transition from a conservative era, and an electoral repudiation of the policies of three consecutive Republican administrations. However, this interpretation – – and what it implies for future politics – – would be fallacious if Clinton’s victory was a result of factors other than his “New Democrat” label.

The 1992 election was unusual because it occurred at the end of the worst four year stretch of economic performance in most voters’ memory’s. Disposable Per Capita Income grew a net of only 1% during George Bush’s term. In contrast, the two previous Reagan terms had generated net increases of 8.5% and 6.6%, and even Carter’s term had seen an increase of 7.3% (U.S. Census Bureau 1993). The state of the economy and the widespread economic distress in the early 1990’s, has led many to believe that the national economy was of prime importance in accounting for George Bush’s defeat.

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The 1992 election was also unusual because of the presence of a prominent, provocative, and well-funded challenger to the two-party, politics-as-usual system — H. Ross Perot. With his personal fortune, Perot was able to broadcast his way into the living rooms of America, and use his folksy image to lay out his plans for economic and political change. And over one-fifth of the voting electorate responded to Perot. For this reason alone, understanding the factors which drove support for Perot is important.

But the presence of Perot, a seemingly viable third alternative to politics - as - usual, presents both methodological and theoretical challenges for political scientists. There have been several important works in political science that deal with three-candidate elections (Converse et al. 1969, Rosenstone 1984). However, a three-candidate race is much more difficult to understand theoretically and empirically than a two-candidate race, since the assumptions of the usual models we apply — from the standard two-candidate spatial model of elections to probit and logit models — may be incorrect and inferences drawn from them may be erroneous. Spatial models of elections in one dimension usually depend on *two* candidates reaching equilibrium; with three candidates the situation is much less tractable. And economic voting models are based upon comparisons between *two* candidates. Finally, the usual logit and probit estimation techniques are based on a *binary* choice facing the voter.

In this paper we evaluate the different factors that affected the 1992 election. We introduce a methodological technique new to analyses of elections, multinomial probit, to handle the complexity of a three-candidate race in a way that is consistent with the substantive questions being examined. In doing so we explore three primary explanations of the election.

The first and most popular of these three prevailing wisdoms about the 1992 election is the “it’s the economy, stupid” school of thought. The electoral significance of the state of the economy is one of the most dominant strains in political science research on elections. There is a great deal of evidence that economic performance influences national elections (Fiorina 1981; Kiewiet 1983; Markus 1988; Rosenstone 1983; Tufte 1978). But there are two sources of contention in the literature about the exact significance of the influence of macroeconomics on micropolitics. The first debate centers on whether voters base their decisions on the larger state of the national economy or on their own economic situation (Kiewiet 1983; Kinder and Kiewiet 1981). The other debate is concerned with the temporal source of the voter’s information — whether they take into account the past performance of the economy (retrospective voting) or whether they are forecasting the future track of the economy under different administrations (prospective voting) (Downs 1956; Fiorina 1981; Key 1966; MacKuen, Erikson and Stimpson 1992; Miller and Wattenberg 1985).

The retrospective economic voting model would suggest that the election was a referendum on the lackluster performance of the economy under George Bush. But, this explanation of the election is inadequate as a decision rule for voters. Voters had two choices if they were to vote ‘no’ on Bush: Clinton *or* Perot. And retrospective voters had no information on Perot. A prospective model would suggest that the election was a move

by voters from the economic policies of Reagan and Bush which no longer seemed viable or productive, or more generally, Bush's much vaunted lack of attention to domestic economic affairs, to the "New Democratic" policies of an activist government attempting to deal with job provision, increasing international competitiveness, and revamping health care. This explanation of the election hinges on the three-fold perceptions of the voters about Bush's economics, Clinton's "New Democratic" agenda and Ross Perot's vision of gas-taxes and fiscal austerity. Neither model of voting offers any guidance as to how voters dissatisfied with the economy would choose between Clinton and Perot. Our analysis enables us to examine how voters who based their decision on a negative evaluation of the economy chose between the remaining two non-incumbent candidates.

A second popular account of the election is that Bush was unable to smear Clinton with the "L" word (liberal) as he did to Dukakis in 1988, and that this contributed to Bush's loss. Proponents of this model interpret the election as vindication of Clinton's acumen in taking correct positions on key issues, and of his campaign's skill in avoiding being characterized by Bush as something the electorate did not want. Such an account would imply that ideology and issues played a substantial role in the 1992 election. That ideology and issues have important roles in presidential elections is not in dispute (Carmines and Stimson 1980; Jackson 1975; Key 1966; Page and Brody 1972; Page and Jones 1979; Pomper 1972). Rather, the contemporary issue voting literature has focused on how much issues matter, and on which issues matter (Abramson, Aldrich and Rohde, 1983, 1987, 1990).

The usual formulation of issue voting follows the spatial model of voting, in which voters choose the candidate closest to themselves on the issues (Downs 1956; Enelow and Hinich 1984). This would require that voters were presented with candidates clearly distinguishable on their positions on several major issues (Shepsle 1972; Page 1978). To the extent that voters were not certain of these issue positions of the three candidates, they may not have been able to employ these issues in their decisions (Alvarez 1992). Such a model appears problematic in the presence of Ross Perot. For it would require that voters determine the issue placement of a third candidate who promised severe and identifiable changes in fiscal policy, but was unclear on many other issues. There were of course other factors — such as the media exposure of the candidates and their attempts to disseminate information about themselves to the voters — which were working to make such a voting rule *more* plausible. The 1992 election is one of the few in recent history in which two of the three candidates had their campaign platforms and pledges published and for sale at bookstores.

The third piece of folk-wisdom used to describe the 1992 presidential election is that it was influenced by a horde of alienated voters turned off by Washington and seeking to overturn the status quo. This is best summed up in the phrase "the angry voters", since the notion was that the electorate in 1992 was largely fed-up with politics as usual, with the partisan "gridlock" in Washington, and with the apparently ineffective policies coming from the federal government. The "angry voter" hypothesis seems to be a favored one among anecdotal coverage of the election, as shown by the title of Germond and

Witcover's (1993) account of the election: *Mad As Hell: Revolt at the Ballot Box, 1992*. Allegedly these angry voters were inspired to vote by the availability of an anti-status quo choice, and may have provided the basis for Perot's support. Presumably there is something that distinguishes "angry voters" from issue voters who prefer alternative policy choices.

The task at hand then is to test each of these three hypotheses. First, it is plausible that some could be rejected outright: perhaps there were no -- or almost no -- angry voters. Or it may be that issues were almost meaningless in 1992 given the dominance of the economy as an issue. And while the economy was most likely a dominant concern to voters in this election, did it help Clinton or Perot more? Finally, an important goal is to determine the *relative* impact of the economy, issues, and the angry-voter phenomenon.

In this paper we simultaneously examine each of these hypotheses with a multinomial probit model of the election. We demonstrate several interesting findings. First, it *was* the economy. Voter's opinions about the state of the national economy in 1992 were dramatically different than they were in 1988, and based on our estimates this had a large effect on their vote-choice. Second, we demonstrate that while the relative ideological position of the candidates was important to the voters, their perception of the two major party candidates was virtually unchanged from 1988. And we demonstrate that under virtually *any* ideological placement of the candidates the result of the election would have been unchanged. Finally, we demonstrate that while Perot *may* have been especially appealing towards angry voters, it remains for someone to demonstrate what these voters were angry about. For we show that voters interested in 'anti-government' reform (term-limits) were no more supportive of Perot than other voters, and that voters who were upset about the economy were no more likely to support Perot than other voters (such voters went overwhelmingly in Clinton's direction). We do, however, show that Perot voters were influenced by the issue Perot emphasized the most: the deficit. And we show that Bush's posturing on abortion had a surprisingly large impact.

## 2 A First Look at the 1992 Election

Before proceeding to analyze a multivariate model we first examine the vote-choices made by voters, broken down by several different characteristics: their vote-choice in 1988, whether or not they voted in 1988, their evaluation of their personal finances, their evaluation of the national economy, their ideological proximity to the candidate, their partisan identification, gender, and their positions on term-limits, the deficit, and abortion. The data we use are from the National Election Study. It is the relationship between respondents' economic evaluations and their vote-choice that is most striking in Table 1. The more likely respondents were to evaluate the change in their own personal finances negatively, the less likely they were to vote for Bush; while the opposite was true for Clinton. This same relationship is even more pronounced when examining respondents' evaluations of the national economy and their likelihood of voting for Bush. Here we also see some hint of one of our most robust findings about this election: those most

dissatisfied with the national economy did *not* turn to Perot. Clinton and Perot split the non-Bush voters who felt the national economy had gotten better almost equally (15.8% for Clinton to 13.2% for Perot). But among non-Bush voters who felt the national economy had gotten *worse*, Clinton was the overwhelming choice relative to Perot (55.4% for Clinton to 18.6% for Perot).

Party identification has the expected implications for the two major party candidates: both draw more than 70% of their own partisans, though Bush has a significantly higher defection rate than Clinton. The Perot results are also as expected: he draws more strongly from independents than from partisans; and we see -- in line with Bush's weak hold on voters -- that Perot does better in an absolute sense among Republicans than Democrats. But for both sets of partisans Perot picks up approximately the same share of defectors: 68% of Republican defectors (135 out of 198) and 64% of Democratic defectors (114 out of 178).

Examining the change in behavior of voters from 1988 to 1992 reveals a rather striking fact: of the voters who supported Bush in 1988 but defected to another of the candidates in 1992, almost half voted for Perot. Not too surprisingly, the Dukakis voters stuck overwhelmingly with the Democratic party candidate. This finding can be interpreted in two -- mutually exclusive -- ways: Perot was taking voters from Bush; or, voters who would have defected from Bush anyway were going to Perot *rather than to Clinton*.

We examined respondents' position on term-limits for legislators as a means to test the 'angry-voter' hypothesis. If Perot's support really did come primarily from voters angry with Washington, then there should have been a high level of correlation between respondents' choosing Perot, and claiming to support term limits. Table 1 provides no support for this hypothesis. The majority of respondents favored term-limits (82.2%); but those favoring term limits were only slightly more likely to vote for Perot than those opposing term limits (18.9% vs 16.6%).

A corollary of the 'angry-voter' hypothesis is that additional voters could become mobilized because of Perot's candidacy and enter the electorate. We examined the choices of voters who did not vote in 1988, but did report voting in 1992. Those who did not participate in 1988 voted for the three candidates in roughly the same proportions as the electorate at large. This casts doubt on the interpretation that Perot's success was due to his ability to mobilize new voters: the new voters were no more likely to vote for Perot than were any other voters.

The deficit is an issue that straddles the "angry voter" and issue-voter hypothesis. One view is that the size of the federal deficit -- in the face of both major parties promise to shrink it -- is the ultimate symbol of government's lack of responsibility. However, another view is that the size of the deficit is simply an issue over which different people have different preferences. We do not have a response to a question directly concerning the size of the deficit. However, when asked in an open-ended question to name the most important problems facing the country 28.7% of respondents offered the deficit as one of their top three problems. 22.9% of respondents who listed the size of the deficit as one

of the three most important issues facing the country voted for Perot, while only 15.9% of those not listing the deficit voted for Perot. Thus the issue that Perot emphasized the most appeared to resonate with the voters.

Abortion might have been expected to be an issue. The three candidates had clearly identified positions on abortion, and Bush differed strongly from his two opponents. Bush was opposed to abortion, a stance underscored during the Republican convention and throughout the campaign. Conversely, pro-choice forces were unequivocal in their opposition to Bush. The NES gave respondents four choices to identify their position on abortion, ranging from 'abortion should never be permitted' to 'by law, a woman should always be able to obtain an abortion as a matter of personal choice.' Respondents choosing the three more anti-abortion alternatives were almost twice as likely to vote for Bush as respondents declaring themselves pro-choice. This suggests, provided that it is not a surrogate for other factors, and that abortion was a major issue in the 1992 election.

Before presenting the estimates of a multivariate model, we offer evidence bearing on the 'New Democrat' hypothesis. A central tenet of this hypothesis is that voters perceived Clinton differently than they perceived Dukakis. Table 2A shows respondents' self-placement, placement of Bush and Dukakis on the NES' 7-point liberal-conservative scale in 1988, placement of Bush, Clinton and Perot on the liberal-conservative scale in 1992, and the mean ideological distance between respondents and each of the candidates for both elections. Ideological distance between the respondent and the candidate was computed as the absolute value of the difference between the respondent's self-placement and *the mean of all respondents placement* of the candidate. Using the mean placement for the candidate, rather than the respondent's own placement of the candidate, greatly reduces problems of projection.

Table 2A reveals something very startling: the electorate certainly did not perceive Clinton to be a moderate Democrat. The mean placement of Clinton in 1992 (3.19) was actually .05 *to the left* of the mean placement of Dukakis in 1988 (3.24) on the NES 7-point liberal-conservative scale. Alternatively, Clinton's placement was 1.02 to the left of the overall respondent mean in 1992 (3.19 vs. 4.21), whereas Dukakis' placement was 1.13 to the left of the overall respondent mean in 1988 (3.24 vs. 4.37). Hence to the extent that Clinton moved closer to the center of the ideological spectrum, he did so by barely 10% of the distance Dukakis needed to move to reach the center. And finally, comparing the mean distance between Clinton and each voter and Dukakis and each voter we see respective scores of 1.46 and 1.50. Again, any way we examine the data, Clinton simply did *not* convince the electorate he was ideologically different that Dukakis.

Bush moved a slight bit to the left from 1988 to 1992 in respondents' perceptions: from 5.11 to 5.05. Thus the voters saw the two major party candidates in roughly the same positions in 1992 as they did in 1988. This suggests that Clinton's status as a 'new Democrat' could not have accounted for much towards his victory, because voters saw him as an old Democrat - - they perceived Clinton to be as liberal as Dukakis.

To present further evidence on the prima-facia implausibility of the 'New Democrat' theory Table 2B shows respondents' ideology by vote-choice for 1988 and 1992. Dukakis actually got a larger share of his vote-total from moderates and conservatives (33.9% and 25.5%, respectively) than did Clinton (31.5% and 20.2%, respectively).

These simple analyses provide some insight into the 1992 election. And in fact these insights are the central point of the paper. The data in Tables 1 through 2B suggest that the "angry voter" hypothesis may not be supportable, that Clinton's claim to be a new Democrat could not have affected the election, that abortion was a major issue in 1992, and that the economy was dominant and Clinton -- not Perot -- won the battle for the economic discontents. However, to take into consideration the three-candidate choice process, and to further develop the above findings and show that they are not the spurious artifacts of two-by-two tables, it will take multivariate analysis to truly disentangle the effects of different factors on individuals' vote-choices and to estimate the relative importance of different factors.

### 3 Methodological Issues and the Multinomial Probit Model

To estimate a model of the 1992 election using traditional techniques we could proceed in three ways: 1) ignore the Perot candidacy and estimate models of binomial choices between Clinton and Bush; 2) estimate an ordered probit model; or 2) estimate unordered logit models including Perot as a choice.

We think all of these techniques are badly flawed. The first technique ignores the preferences of almost 20% of the electorate. More importantly, we also think that throwing out the third candidate and estimating binary-choice models on the remaining candidates is selecting on the dependent variable in the worst possible way.<sup>1</sup> This is probably easiest to see in a case where one choice is clearly distinct from the others. For instance, to treat the Wallace voters in 1968 as missing data and then assume that they would have behaved as others of similar socio-economics status and issue-preferences behaved -- on the few issue-preferences we have measures of -- is to ignore a rather important fact about these voters: they did not behave as the Nixon/Humphrey voters behaved; they chose to vote for Wallace. And the fact that they voted for Wallace should suggest to us that they were different from the voters who chose not to vote for Wallace. The same logic applies to the Perot voters: they may be different than the Bush and Clinton voters.

The second approach, using ordered probit (McKelvey and Zavoina 1975) is also problematic. The ordered probit model assumes that the choices can be ordered on a uni-dimensional continuum. Since we are explicitly considering that voters may perceive multiple dimensions -- issues and the economy -- this model would be totally inappropriate.

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<sup>1</sup>Manski and Lerman (1977) show that such choice-based samples will generate inconsistent estimates.

The third technique, multinomial logit, makes the strong behavioral assumption of “Independence of Irrelevant Alternatives” (IIA). This assumption implies that the ratio of the probability of choosing the first candidate to the probability of choosing the second candidate is unchanged by the availability of the third candidate. It is useful to consider the practical implications of using a model and estimation technique that embody an assumption about the real world that might not be true. We consider this below.

Technically, IIA implies that the ratio of the probability of choosing an alternative  $j$  to the probability of choosing a second alternative  $k$  is not changed if more choices are added to or subtracted from the choice set. This can be written as:

$$\frac{P_{ij}|S_s}{P_{ik}|S_s} = \frac{P_{ij}|S_p}{P_{ik}|S_p} \quad \forall j, k, s, p \quad (1)$$

where  $P_{ij}|S_s$  denotes the probability of the  $i^{th}$  individual choosing alternative  $j$  out of set  $S_s$ ; and  $S_s$  and  $S_p$  denote two different sets of alternatives, with  $j, k$  in set  $S_p$ , and  $j, k$  in set  $S_s$ . This property is troubling when viewed from the perspective of several prominent theories of voter decision-making in elections. First, consider a spatial model of voting where individuals vote for the candidate closest to their ideal point in an issue-space. If we imagine a new candidate entering an election our intuition is that the new candidate would take most of his/her votes from the candidates closest to him/her in the issue space. This is not consistent with IIA: IIA imposes the constraint that the new candidate *must* take voters from each of the previous candidates at rates proportional to their share of the previous two-candidate vote.

Consider an extreme case of an election in a single-dimensional space that initially has two candidates. Say that one candidate is a liberal and the other a conservative (candidates numbers 1 and 2, respectively). And say voter  $i$  is a moderate who is indifferent between the two choices. Then:  $P_{i1} = P_{i2} = 0.5$ , and  $P_{i1}/P_{i2} = 1$ . Now add another conservative candidate to the set, who is indistinguishable from candidate 2. Presumably this would cause:  $P_{i1} = .5$ , and  $P_{i2} = P_{i3} = .25$ ; which would mean that  $P_{i1}/P_{i2} = 2$ .<sup>2</sup> This would violate the IIA condition. It is important to bear in mind that the set of probabilities presented here based on the entry of the third candidate here are assumed; we are in fact postulating a choice process for the voter by assuming these probabilities. One way to conceptualize this choice-process is to think that the voter groups similar alternatives in sets, then first chooses among the sets, and finally picks an alternative from within the chosen set.

IIA also rules out another of the hypotheses we are interested in testing: the ‘strong’ retrospective voting hypothesis. According to this hypothesis voters would decide whether or not they approved of George Bush, *then* decide which of the two alternatives to support should they deem Bush unacceptable. To see the problems IIA causes consider another hypothetical scenario. Say a voter is equally likely to choose Bush or Clinton in

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<sup>2</sup>This is the political science analog of the red-bus/blue-bus problem (McFadden 1974).

a two-candidate race:  $P_i(Bush) = .5$ , and  $P_i(Clinton) = .5$ . Hence:

$$\frac{P_i(Bush | \{B, C\})}{P_i(Clinton | \{B, C\})} = \frac{.5}{.5} = 1 \quad (2)$$

Now if this is a ‘strong’ retrospective voter, when Perot is added to the mix we would *still* have  $P_i(Bush) = .5$ , and if the voter were indifferent between Clinton and Perot we would have:  $P_i(Clinton) = P_i(Perot) = .25$ . Then:

$$\frac{P_i(Bush | \{B, C, P\})}{P_i(Clinton | \{B, C, P\})} = \frac{.5}{.25} = 2 \quad (3)$$

Hence IIA is violated. In fact IIA would be violated under *any* pair of probabilities of voting for Perot and Clinton so long as the voter retained a .50 probability of voting for Bush. Since such a plausible example violates IIA, it would be untenable to proceed with an estimation technique imposing IIA.<sup>3</sup>

### 3.1 Rationale Behind the Multinomial Probit Model

In order to answer the questions posed above and distinguish between the relative ‘correctness’ of the different folk-wisdoms and theories about the election a methodology is required that allows us to evaluate the effects of individual characteristics and candidate characteristics in a three-candidate setting. The multinomial probit model we employ allows us to do these things (Hausman and Wise 1978). We estimate coefficients for individual characteristics, as well as a single coefficient for a candidate-specific trait: ideological-distance from the respondent.

Models of binary choices generally deal with characteristics that vary by individual, not that vary by choice. The choices in such models can simply be described as ‘box number 1’ and ‘box number 2.’ In polychotomous choice models it may be more desirable to measure characteristics of the alternatives. The advantage of measuring characteristics of the alternatives is that one would know the effect of adding a choice with given characteristics. It also allows us to make use of known distinguishing features among the alternatives, rather than letting those characteristics be expressed by constants.

For characteristics of the alternatives only one coefficient is estimated per characteristic. For characteristics that vary by individuals we must estimate (M-1) coefficients per characteristic where M is the number of choices. Thus in the present case we estimate two coefficients per individual characteristic. One coefficient gives the effect of a change in the variable for the respondent’s utility of voting for Bush, the other coefficient gives the effect of a change in the variable for the respondent’s utility of voting for Clinton. There are no individual characteristic coefficients estimated for Perot. They are in effect normalized at zero, and hence the other coefficients can be interpreted as relative to Perot. The multinomial probit model allows us to avoid the potentially troubling IIA assumption in three-candidate races.

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<sup>3</sup>See King (1989) for a general discussion of why models should accurately reflect the substantive theory at hand.

## 3.2 The MNP Model

Following Hausman and Wise (1978) we begin by defining a random utility vector for each voter  $i$  over each of the three candidates in the 1992 election:

$$U_{ij} = a_i\psi_j + X_{ij}\beta + \varepsilon_{ij} \quad (4)$$

where  $a_i$  is a vector of characteristics unique to the voter  $i$ ,  $X_{ij}$  is a vector of characteristics unique to candidate  $j$  ( $j = 1, 2, 3$ ),  $\psi_j$  and  $\beta$  are vectors of parameters to be estimated, and  $\varepsilon$  is a disturbance term. We assume that the three error terms –  $\varepsilon_1$ ,  $\varepsilon_2$ ,  $\varepsilon_3$  – have a multivariate normal distribution. We assume that the error variances are homoskedastic, but allow the errors to be correlated across the candidates. So, with the multinomial probit model we can account for the error correlations across the three utility functions without assuming a specific structure for the choice process. As usual, we assume the individual votes for the candidate offering the highest utility. The estimation of this model is discussed in the Appendix.

The data we use to estimate the model come from the 1992 American National Election Study. Because very little data was available regarding voters' impressions of Perot (and since there was almost no objective data about him) we have only one choice specific variable in the model: the square of ideological distance between the voter and each candidate. And as discussed above, we estimate one coefficient for the effects of ideological distance across the three candidates; i.e.,  $\beta$ .<sup>4</sup> The distance between the voter's position and the candidate's position was constructed as the absolute value of the difference between the respondent's self-placement on the NES seven-point ideology scale and the candidate's mean placement on the same scale by all respondents.

By normalizing the Perot coefficients to be zero, we estimate two sets of  $\psi$  coefficients, one for Bush and the other for Clinton. The independent variables included in the model which measure individual characteristics are: *Education* (the respondent's years in school); *Gender* (a dummy variable coded 1 for females); *Age* (three dummy variables for voter age, 18-29, 30-44, and 45-59); *Turnout in Previous Election* (whether the respondent recalled participating in the 1988 election); and *Party Affiliation* (dummy variables for Democrats and Republicans). To account for the influences of economic evaluations on the respondent's vote choice, we used the respondent's assessment of the change in their personal finances over the past year, with pessimistic responses coded higher, and the respondent's assessment of the change in the national economy over the past year, with pessimistic responses coded higher.

To measure the impact of policy issues we included respondents' opinions on NES questions asking if it is the government's role to provide: jobs for citizen; health care; and assistance to minorities. Each of these responses was coded on a seven-point scale, with conservative responses coded higher. Furthermore, we measured respondents' opinion on abortion with a question offering four choices to describe their view of appropriate

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<sup>4</sup>We estimated models in which we relaxed this assumption. In those models, the three estimated coefficients for ideological distance were not statistically distinct from each other.

government involvement in the issue, with pro-choice responses coded higher. Respondents approval or disapproval of term limits for politicians was also included (approval coded higher). And Finally, respondent's assessment of whether the deficit was one of the three most important issues facing the country was included.

With this specification, we can determine the validity of the three major accounts of the 1992 election we discussed earlier. To examine the economic voting account, we look to the coefficients on the economic assessments variables. For the issues and ideology explanations, the estimated effects of both candidate ideology and respondent attitudes on the four policy issues will be important. Last, for the angry voter hypothesis, we are interested in the effects of respondents' evaluation of term limits and the deficit on voter choice.

### 3.3 The Multinomial Probit Results

The estimates of the multinomial probit model are presented in Table 3. The column on the far left gives the independent variable labels, and the other columns give the coefficients for Bush relative to Perot and Clinton relative to Perot, respectively. The estimated coefficients can be used to generate predicted probabilities for each individual voting for any of the three candidates. Using the mean probability as the predicted vote-share for each candidate, in the aggregate, our model predicts the proportions of voters for each candidate quite well. In the sample used to generate these estimates, 34.1% voted for Bush, 45.8% for Clinton, and 20.0% for Perot. Our model predicts a three-candidate vote outcome of 34.3% for Bush, 45.0% for Clinton, and 20.8% for Perot. First, and most importantly, our model estimates the vote shares in our sample well. Second, these estimated vote shares correspond very closely to the actual national popular vote shares: 43% for Clinton, 38% for Bush, and 19% for Perot.<sup>5</sup> The estimated probabilities can be used to generate predicted votes for each individual using the algorithm that we assign a person's vote to the candidate which that person has the highest estimated probability of voting for. Of the actual Bush voters, we correctly predict 86.8% of their votes; and of the actual Clinton voters, we correctly predict 89.4% of their choices. We correctly predict 19.1% of the votes of the actual Perot voters. The overall correct prediction rate for the multinomial probit model across the three candidates is 74.4%.

Before turning to individual coefficients, note two things about the interpretation of these results. The coefficients -- other than the coefficient for ideological distance -- were estimated by normalizing all the individual-specific coefficients for Perot voting to zero. Therefore, all of the coefficients but the ideological distance parameter must be interpreted as giving the effects of the particular variable for Bush or Clinton support, *relative* to support for Perot. Second, as with any non-linear model, determining the relative effects of each variable on the probability of supporting one of the three candidates is contingent upon the values of all other variables. Therefore, we will present additional

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<sup>5</sup>In the NES sample we use, there is a slight (3%) positive bias for Clinton, which our multinomial probit model reproduces.

analyses of these coefficients below to better illustrate the precise effects of each important variable.

Our discussion of the coefficient estimates is divided into two parts: a presentation of the social and demographic results, and a discussion of the issue and ideology results. To begin with the social and demographic coefficients, it is clear that the three candidates had distinct bases of support.<sup>6</sup> Both Bush and Clinton did better than Perot among educated voters, but the effect reaches statistical significance only for Bush. To allow for regional effects, we specified the model with three dummy variables, with the midwest being the excluded category. Bush did better among southern voters relative to midwestern voters, but worse among those from the east and west. Clinton, on the other hand, did better in all three of these regions, relative to Perot, with the regional impacts on the vote reaching statistical significance for Clinton in the east and south. Thus the clearest regional effect observed is Perot's poorer showing in the South, *ceteris paribus*, relative to the rest of the country.

Turning to gender, women were significantly less likely than men to vote for Perot, controlling for all of the other variables in the model. Furthermore, the coefficient for the gender variable is twice the magnitude for Bush as for Clinton. This is a surprising result given the 'gender-gap' between the parties, and given that even in 1992 the bivariate split among respondents showed Clinton doing 10 points better among women than among men. The age dummy variables were coded with the oldest respondents (60 and older) being the excluded category. The age coefficients demonstrate that both Bush and Clinton did better among older voters, while Perot appealed more to younger voters. Younger voters may have had less firm partisan allegiances and hence been more susceptible to Perot's appeal.

The last social and demographic variable in our model focuses on whether the 1992 voter participated in the 1988 election. The hypothesis we are testing here focuses on one of the interpretations of the 1992 election: that Perot was able to mobilize hordes of disaffected or normally uninterested voters, with his crusade against "politics as usual." However, what we find is that people who participated in the 1988 election were more likely to vote for Perot relative to Bush, but less likely to vote for Perot relative to Clinton, when compared to people who did report voting in 1988. In other words, those who did not vote in 1988, the voters who were mobilized to participate in the 1992 election, were more likely to prefer Bush, the incumbent, than the two alternatives. Hence, again, we find no support for the "angry voter" scenario.

Next, we focus on the issue and ideology coefficients in the model. The estimated effects of ideological distance between the voter and each candidate is negative and statistically significant, as expected. The closer a voter was to one of the three candidates, the more likely she was to support that candidate, *ceteris paribus*. As to the effects of the

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<sup>6</sup>The reader used to seeing 'race' as a variable in models of vote-choice in American national elections will not find it here. So few blacks in the sample voted for Perot that it was impossible for us to estimate the coefficient. However, we ran the model on a sample of only whites and got essentially identical results.

economy on this election, we see a very interesting pattern of results. First, in line with much recent work on economic voting (e.g., Kinder and Kiewiet, 1981), we find that a voter's assessment of her personal financial condition does not influence which candidate she supported in 1992. However, we see a very strong effect of the voter's assessment of the state of the *national* economy over the past year. Respondents who perceived that the national economy had deteriorated over the past year were significantly more likely to support Perot relative to Bush; but were even more likely to support Clinton relative to Perot. Hence Clinton seems to have been the big winner from the negative perceptions on the economy.

The partisan dummy variables (with independents being the excluded category), produce results as anticipated. Self-styled Republicans were overwhelmingly likely to support Bush relative to Perot, while professed Democrats supported Clinton relative to Perot. Interestingly, we also see that Republicans were more likely to support Perot relative to Clinton. Thus Perot's edge amongst Republican defectors exhibited in Table 1 stands up here. But his advantage among Democratic defectors disappears when other factors are controlled for.

Of the five specific issues we examine in this model, we see that only two had significant influences on the choice between Bush and Perot: government-sponsored health care and abortion rights. These results show that those who supported a government-run health care system were more likely to support Perot relative to Bush. This is not too surprising, since most voters must have perceived that Bush was against a state-run health care system, while Perot's position may have been unclear. Additionally, those who were "pro-life" supported Bush and those who were "pro-choice" supported Perot, which is again not too surprising given the clear stands taken by both Bush and Perot on this issue. This also demonstrates that respondents' opinion on abortion was not acting as a surrogate for other factors in Table 1. The impact of abortion on Bush is quite large.

For the Clinton versus Perot comparison, we again see two significant issue effects. The first is related to government-sponsored health care. Recall that on issue positions higher numbers denote more conservative responses, and lower numbers denote more liberal responses. Hence the positive coefficient on health-care for Clinton relative to Perot suggests that those who supported a government sponsored health care system in the fall of 1992 were more likely to support Perot relative to Clinton. This might come as some surprise, given Clinton's recent health care proposals. However, respondents are being asked to place themselves on a scale ranging from no government involvement, to an extreme government option. Since Clinton was not a strong supporter of a true "single-payer" health care system during the election, it might be that those voters who favored such a system were simply not persuaded that Clinton's professed concern about health-care would translate to the desired action if elected. The second issue of importance in the choice between Clinton and Perot is government assistance for minorities. Here we see that those who supported continuation of such assistance by the national government were much more likely to support Clinton than Perot. Given that these were the only significant coefficients for issue variables distinguishing Clinton and Perot, and given that

these effects seem neither large nor compelling, issues probably were *not* what separated Clinton from Perot in the minds of the voters.

Additionally, notice that some issues did not appear to influence voter choice in 1992. Perhaps the most interesting, given the intense amount of discussion of it in the media, is that the issue of term limits for politicians really did not matter in the election. If anything, those who supported term limits were marginally less likely to support Perot relative to either of the two candidates, which leads us to believe that term limits was not the critical focus of the “angry voters”, or that it led them to support Perot. Furthermore, note that in an election year with a slumping economy, the issue of government provision of jobs really had no effect on voter choice. Despite all of Clinton’s campaign rhetoric about the importance of a government role in the economy, the question of government provision of jobs did not seem to matter as much as simple assessments of the state of the national economy.

Last, notice that we estimate sizeable correlations between the error terms in the multinomial probit model. The largest correlations involves Clinton with Bush and Clinton with Perot (-.45 and -.44, respectively). Both of these are statistically significant, and since they are bounded at 0 and 1 they are really quite large. But most importantly, the fact that these covariances are statistically different from zero states that we cannot ignore the error covariances in this dataset. In fact, these significant error covariances imply that the IIA assumption is violated in the 1992 election.

### 3.4 Measuring the Effects of the Independent Variables

Since the coefficients in Table 3 are translated into probabilities in a complex way we present ‘first differences’ in Table 4 (King 1989). This shows the change in estimated probability of choosing each of the 3 candidates based on different changes in the independent variables. For instance, the first row shows the estimated probabilities of an individual choosing Bush, Clinton, or Perot if they felt their personal finances had improved in the past year. The second row indicates the predicted probabilities for the same respondent had they felt their personal finances had gotten worse in the past year. The difference between the predicted probabilities represents the effect of the given change in the personal finances variable. Since the changes in probabilities for changing one independent variable depend upon the values of the other independent variables we performed all these calculations on a hypothetical individual who would have had virtually identically probabilities of supporting each candidate. This “modal” voter was female, of average education, believed the economy and her personal finances were unchanged over the past year, was an independent and from the south, had voted in 1988, was middle-aged (30-44), approved of term limits for politicians, was at modal positions on the issues, and at sample average distances from each candidate.

This modal voter who felt that her personal finances had improved was actually more likely to vote for Bush than either of the other two candidates; and would prefer Clinton

to Perot. However, if this voter felt that her personal finances had gotten worse in the past year then she would have been indifferent between Clinton and Bush, and actually would even have been less likely to vote for Perot than Clinton or Bush. However, this effect is dwarfed by the effect of a voter changing her view on the state of the national economy. The voter who felt that the national economy had gotten better was much more likely to vote for Bush than either of the other two candidates. However, should the same voter feel that the national economy had gotten worse she was likely to switch his allegiance to Clinton. The differences are staggering: Bush goes from a 35% advantage to a 25% deficit (.49 vs .24)! Nowhere else do we see such a large shift in voting probabilities, and it suggests the potential impact of economic evaluations.

The other effect that is very large is the impact of abortion. If our modal voter were pro-life, she would have had over a 62% likelihood of voting for Bush. However, if the same voter were pro-choice instead of pro-life then according to our estimates her probability of voting for Bush would drop from .62 to .28, and her probability of voting for Clinton would rise from .22 to .38. Hence a 40% advantage for Bush over Clinton would swing to a 10% deficit. Thus voters really were affected by the candidates' positions on abortion.

The effects of changes in ideology are measured as follows. The 'near' row gives the probability of the model voter choosing each candidate if she were one unit away from that candidate on the ideological scale. The 'far' row gives the probability of the modal voter choosing the appropriate candidate if she were 2.4 units from the candidate on the ideological scale. Thus for each of the candidates, movement away from a voter would reduce the voter's probability of voting for that candidate by approximately .12. We return to a more detailed analysis of this below.

It is interesting as well to look at the effects of the other issues in this election. The results associated with government provision of minority assistance show that it was a highly important issue. If the modal voter believed the government should support minorities, she had an estimated probability of supporting Clinton of .48, which drops to .20 if she believed that the government should not provide assistance to minorities. The opposite effects are observed in Table 4 for Bush and Perot voting, since the probability that the modal voter supports either of them is greater if the voter believes in no government assistance instead of government help for minorities. Lastly, just as seen in Table 3, the voter's opinion on term limits, which should characterize "angry voting", clearly had negligible effect upon the probabilities of voting for any of the three candidates.

### **3.5 Effects of Candidate Ideological Movement**

While the effect of ideology presented in Table 4 looks large, the apparent impact of candidate ideology may be misleading. It is true that a shift in one voter's preference causes a large swing in probabilities of that voter choosing different candidates. But it would be a mistake to think that by choosing a different ideological position (or by

forcing his opponents to appear to represent a different ideological position) a candidate could have significantly raised his vote-share. For, by improving his ideological proximity relative to some voters, a candidate must simultaneously worsen his ideological proximity to other voters. To test the effect of strategic behavior on the part of the candidates with regards to positioning themselves on the liberal-conservative dimension we simulated the effect of each candidate moving along the ideological space, holding the position of the other two candidates unchanged. Figures 1(a) - 1(c) show the predicted vote-share of each candidate as Bush, Clinton, and Perot, respectively, are moved along the liberal-conservative dimension. The most striking observation is that Bush did *not* move too far to the right in the election. According to our estimates, his maximum vote-share (34.6%) would have occurred had he been positioned at 4.60. Since the electorate thought he was at 5.05, he was very close to his optimal position; and his predicted vote-share among at his perceived position was 34.3%. Had Bush moved too far to the left he would have lost votes - mostly to Perot. Clinton's vote-share remains almost constant no matter where Bush was perceived to be. This makes sense. Since Perot was the nearest candidate to Bush on the ideological spectrum, any movement by Bush should have its greatest impact on Perot.

Similarly, Clinton was also close to his optimal ideological position. His vote-share would have been maximized (47.3%) had he been perceived to be at 4.0 on the ideological scale. His perceived position was 3.19, which gave him a predicted vote-share of 46.4%. The interesting thing to note here is that Bush would have had to have managed to push the public's perception of Clinton *way* over to one extreme or the other in order for Clinton's vote-share to have dropped below Bush's vote share. In fact, since the likely place for Bush to try to push perception of Clinton was to the left, Clinton would not have dropped below Bush until he hit the very edge of the scale. This is a position on the scale that candidates are simply not likely to be perceived to be at.

Perot's vote share would have been maximized had he been perceived to be at 4.24 on the ideological scale, where his predicted vote share would have been 20.1%. This is virtually indistinguishable from his actual mean perceived position of 4.31. Thus any movement from Perot's perceived middle-of-the-road position would have cost him votes. And the overall findings from this simulation are clear: ideological movement by the candidates would not have affected the election in a significant way.

### 3.6 Effects of Changes in the Distribution of Preferences

Table 5A shows opinion on the economy and government policy towards abortion in 1988 and 1992. What this table suggests may have accounted for Clinton's victory is the huge shift in respondent opinion on the state of the national economy from 1988 to 1992. In 1988 only 31.2% of respondents felt the economy had gotten worse in the past 12 months. In 1992 this percentage had more than doubled to over 72% of respondents. The shift in opinion in respondents' personal finances is not nearly as severe; but is still significant. Thus if voters chose to base their decision on the economy this shift could have been dev-

astating for Bush. Additionally, there is a significant shift in respondents' self-professed opinion on abortion from 1988 to 1992. In 1992 respondents were much more likely to identify themselves as pro-choice (49.9%) than respondents in 1988 (36.0%). Since the question involves government involvement in abortion we think the responses may reflect more a changed perception of the status-quo regarding government involvement than an actual change in respondents' own preferences. But the potential effect on the lone anti-abortion candidate would be significant under either interpretation. Again, the movement of opinion was in a direction highly unfavorable to Bush.

Table 4 indicated the effects of a single voter changing their preferences or opinions on the issues. And Figures 1(a)-1(c) showed the effect of the candidates moving their ideological position. The other interesting counterfactual effect to examine is what would have happened under different economic circumstances. What we would really like to know is: Was it the economy, stupid? To see this, we want to know what would have happened if voters had the same opinions about the economy that they did in 1988. To simulate this outcome we examined the distribution of voter preferences on the two questions relating to the economy -- their personal finances and their view of the national economy -- for 1988 and 1992. Then we randomly re-assigned opinions about the economy for the 1992 respondents so that the aggregate distribution of opinions matched the 1988 aggregate distribution.<sup>7</sup> We then computed the probability of voting for each candidate using these hypothetical values for the economic variables, and the respondents' actual values for all of the other variables. The result of these calculations are reported in Table 5B.

The first row of Table 5B shows the predicted vote-share for each candidate given the actual values for 1992. The second row gives the predicted vote share if respondents' opinions about their personal finances are adjusted to match the 1988 distribution. The third row shows the predicted vote share if respondents' opinions about the national economy are adjusted to match the 1988 distribution. And finally the fourth row gives the predicted vote-shares if respondents opinions about both their personal finances and the national economy are adjusted to match the 1988 distributions. The table offers a striking revelation: Bush would have lost the 1992 election *even if* voters beliefs about the economy were identical to their beliefs in 1988! However, the magnitude of the loss would have been lessened severely. Under the counter-factual scenario the gap between Bush and Clinton is cut by more than two-thirds: moving from a 11.9% blowout to a 3.4% contestable race. Perot's share of the vote-total turns out to be essentially independent of economic circumstances: he goes from 20.1% to 20.6%.

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<sup>7</sup>This was done by comparing the 1992 distribution of preferences on the national economy for our subsample of 909 voters that we estimated our model on to the 1988 distribution. For respondents who rated the economy as 'worse' in 1992 we randomly reassigned 58% of them to the 'same' category. We randomly reassigned 64% of the respondents who rated the economy as 'same' in 1992 to the 'better' category. This gave us a distribution matching 1988. A similar procedure was performed for ratings of respondent's personal finances.

## 4 Conclusion and Discussion

Between Perot's candidacy, the state of the economy, and the overwhelming Democratic victory, there were many important and unusual characteristics of the 1992 election. Our results have highlighted the important aspects of this election, and have provided grist for the debate over the interpretation of this presidential contest. The 1992 election did return to the Democrats unified control over two of the three branches of American government. But, was this because the Democrats succeeded in nominating a more moderate candidate? Was this victory due to Clinton's much-discussed "New Democratic" credentials?

Our results appear to discount this interpretation. On one hand, our model shows that candidate ideology did matter to voters in 1992, controlling for many other political issues. However, the electorate perceived Clinton to be just as liberal as they had seen Dukakis in 1988, and so it cannot be that Clinton won the election by appearing more moderate than had Dukakis. Furthermore, our simulations for the effects of hypothetical ideological movements of the candidates showed that Clinton was well-positioned, and that any movement closer to the center would have netted only about a 1% change in the vote.

Another common interpretation we have rebuked is the "angry voter" hypothesis. Voters were angry, but they were angry about the state of the economy - not the state of government.

However, one of the common interpretations of this election was that the economy played a key role in Clinton's success. Our analysis demonstrates that the national economy was a dominant factor in the 1992 election. And we have been able to demonstrate that it was Clinton, and not Perot, who obtained a great deal of his support from the lingering effects of economic recession. Voters in 1992 overwhelmingly were convinced that the national economy was in bad shape, and many voted for Clinton for this very reason.

But had voters perceived the national economy to be in good shape, Bush still might not have won the election. Other than the status of the economy and the ideological positions of the candidates, a number of economic and social issues were prominent in the 1992 election. From a set of these issues — abortion, health care, and racial issues — Clinton obtained the remainder of his support.

We think a coherent story of the 1992 election is as follows. First, the overwhelming dissatisfaction with the economy was a large nail in Bush's coffin. But it wasn't necessarily fatal. Perceptions of the economy had Bush starting the race 8.5% behind where he was in 1988. This is not in and of itself enough to have cost him the race. Under 1988 perceptions of the economy Bush would *still* have lost to Clinton by 3.4%. Thus there were obviously other factors at work in Bush's demise. Apparently voters were not happy with Bush in 1992, beyond the effect of the economy. Bush did not have quite the correct ideological position: but his move to the right in the liberal-conservative space

does not appear to have directly cost him more than 0.3% of the vote. However, given the powerful influence of abortion in determining respondents' vote choice it is quite plausible that Bush's pro-life stance was quite costly. The family values night at the Republican convention may have imposed substantial political costs on Bush.

We don't think there is too much to say about Ross Perot beyond what has been long known about American elections: money buys votes, and money even buys votes in Presidential elections amidst the din and storm of the campaign (Jacobson 1978, Nagler and Leighley 1990). In our analysis, Perot's appeal seemed to have little systematic component. He did *not* grab the votes of people most dissatisfied with economic performance, nor most desiring change in Washington. Again we have found little support for the "angry voter" hypothesis, especially as an explanation for the votes Perot received in 1992.

Last, this election has led us to employ a new methodology to analyze presidential election voting: multinomial probit. Most elections in the United States involve only two candidates, and political science has well-known theoretical and methodological tools to study those elections. As we have argued in this paper, elections involving more than two candidates present particular problems for these models. These problems are not intractable, but require the use of new methodological tools to insure that the results we obtain are not influenced by improper assumptions.

## 5 Appendix 1

### 5.1 Derivation of the Multinomial Probit Model

#### 5.1.1 The Basics of the model

The multinomial probit model allows us to estimate the coefficients of the model without worrying about the implications of the IIA assumption — since we do not have to assume the errors are identically and independently distributed. Instead, we can assume the errors are correlated, and actually estimate these error correlations. Here, we present the details of the multinomial probit model, which follows a framework originally proposed by Hausman and Wise (1978); though we deviate from those authors in the specification of the covariance matrix of the error terms. First, we develop the basics of a multinomial probit model for a three-candidate election. We then describe our modeling of the error variances. Last, we discuss practical matters of estimation.

We define a random utility function for voter  $i$  over each candidate  $j$ , where  $j = 1, 2, 3$ :

$$U_{ij} = \bar{U}(X_{ij}, a_i) + \varepsilon(X_{ij}, a_i) = X_{ij}\beta + a_i\psi_j + \varepsilon_{ij}, \quad (5)$$

here  $X_{ij}$  is a vector of characteristics unique to the candidate choice  $j$ ,  $a_i$  is a vector of characteristics unique to the individual decision maker  $i$ ,  $\varepsilon$  is a random variable, and  $\bar{U}$  defines the systematic component of the utility function of a voter.  $\bar{U}$  is assumed to have the following functional form:

$$\bar{U} = \bar{U}(X_{ij}, a_i) = X_{ij}\beta + a_i\psi_j \quad (6)$$

Note that we are assuming that  $\bar{U}$  is a linear function of both the characteristics specific to the choice ( $X_{ij}$ ) and the individual ( $a_i$ ), with respective parameters  $\beta$  for the choice-specific characteristics and  $\psi_j$  for the individual-specific characteristics. The latter coefficient is subscripted by  $j$  to indicate that the effects of the individual-specific characteristics vary across choices.

We assume that the random elements of the utility functions,  $\varepsilon_{ij}$ , have a multivariate normal distribution with mean zero and covariance matrix:

$$\Sigma_i = \begin{bmatrix} \sigma_{i,1}^2 & & \\ \sigma_{i,12} & \sigma_{i,2}^2 & \\ \sigma_{i,13} & \sigma_{i,23} & \sigma_{i,3}^2 \end{bmatrix} \quad (7)$$

Now we assume that the voter chooses the candidate who will bring them the greatest utility. This gives the following expression for the probability that the individual would choose the first of the three alternatives:

$$\begin{aligned} P_{i1} &= Pr[(U_{i1} > U_{i2}) \quad \& \quad (U_{i1} > U_{i3})] \\ P_{i1} &= Pr[(\bar{U}_{i1} + \varepsilon_{i1} > \bar{U}_{i2} + \varepsilon_{i2}) \quad \& \quad (\bar{U}_{i1} + \varepsilon_{i1} > \bar{U}_{i3} + \varepsilon_{i3})] \\ P_{i1} &= Pr[(\varepsilon_{i2} - \varepsilon_{i1} < \bar{U}_{i1} - \bar{U}_{i2}) \quad \& \quad (\varepsilon_{i3} - \varepsilon_{i1} < \bar{U}_{i1} - \bar{U}_{i3})] \end{aligned} \quad (8)$$

Following Hausman and Wise (1978), we let

$$\eta_{i,21} = \varepsilon_{i2} - \varepsilon_{i1}, \quad (9)$$

$$\eta_{i,31} = \varepsilon_{i3} - \varepsilon_{i1}. \quad (10)$$

The joint distribution for the  $\eta_{i,j1}$  will be bivariate normal, with covariance matrix:

$$\Omega_{i1} = \begin{bmatrix} \sigma_{i,1}^2 + \sigma_{i,2}^2 - 2\sigma_{i,12} & \sigma_{i,1}^2 + \sigma_{i,3}^2 - 2\sigma_{i,13} \\ \sigma_{i,1}^2 - \sigma_{i,13} - \sigma_{i,12} + \sigma_{i,23} & \sigma_{i,1}^2 + \sigma_{i,3}^2 - 2\sigma_{i,13} \end{bmatrix} \quad (11)$$

$$(12)$$

This allows us to write the probability that voter  $i$  will choose candidate 1 as:

$$P_{i1} = \int_{-\infty}^{\frac{\bar{v}_{i1} - \bar{v}_{i2}}{\sqrt{\sigma_{i,1}^2 + \sigma_{i,2}^2 - 2\sigma_{i,12}}}} \int_{-\infty}^{\frac{\bar{v}_{i1} - \bar{v}_{i3}}{\sqrt{\sigma_{i,1}^2 + \sigma_{i,3}^2 - 2\sigma_{i,13}}}} b_1(\eta_{i,21}, \eta_{i,31}; r_1) d\eta_{i,21} d\eta_{i,31} \quad (13)$$

with  $b_1$  being the standardized bivariate normal distribution and  $r_1$  being the correlation between  $\eta_{i,21}$  and  $\eta_{i,31}$ :

$$r_1 = \frac{\sigma_{i,1}^2 - \sigma_{i,13} - \sigma_{i,12} + \sigma_{i,23}}{\sqrt{(\sigma_{i,1}^2 + \sigma_{i,2}^2 - 2\sigma_{i,12})(\sigma_{i,1}^2 + \sigma_{i,3}^2 - 2\sigma_{i,13})}} \quad (14)$$

Similar expressions for  $P_{i2}$  and  $P_{i3}$  can be easily obtained.

To simplify exposition, we define:

$$\bar{U}_{12} = \bar{U}_{i1} - \bar{U}_{i2} = (X_{i1}\beta + a_i\psi_1) - (X_{i2}\beta + a_i\psi_2) \quad (15)$$

with similar expressions for the remaining  $\bar{U}_{jk}$ . We then define:

$$\tilde{U}_{12} = \frac{\bar{U}_{i1} - \bar{U}_{i2}}{\sqrt{\sigma_{i,1}^2 + \sigma_{i,2}^2 - 2\sigma_{i,12}}} \quad (16)$$

which again produce similar definitions for  $\tilde{U}_{jk}$ . This allows us to facilitate writing our earlier expressions for:  $P_{i1}$ ,  $P_{i2}$ , and  $P_{i3}$  as follows:

$$P_{i1} = \int_{-\infty}^{\tilde{U}_{12}} \int_{-\infty}^{\tilde{U}_{13}} b_1(\eta_{i,21}, \eta_{i,31}; r_1) d\eta_{i,21} d\eta_{i,31} \quad (17)$$

### 5.1.2 Parameterization of the Error Variances and Estimation

We can now estimate the model, once we have determined how to parameterize the error variances.<sup>8</sup> Using the covariance matrices defined above, we can identify and estimate selected elements of the utility function errors,  $\Sigma_i$  (Keane 1992). In our empirical work,

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<sup>8</sup>In this section we drop the  $i$  subscript for the sake of exposition.

we assume homoskedasticity; i.e., we assume that  $\sigma_1^2 = \sigma_2^2 = \sigma_3^2 = 1$ .<sup>9</sup> Whereas in their seminal work Hausman and Wise posited the error variances to be linear functions of independent variables, we estimate directly values for the error covariances,  $\sigma_{12}$ ,  $\sigma_{13}$ ,  $\sigma_{23}$  (referred to in the text as:  $\sigma_{BC}$ ,  $\sigma_{BP}$ , and  $\sigma_{CP}$ . These estimates can be considered error correlations, due to our normalization of the error variances.

### 5.1.3 Model Estimation

For this model, the likelihood is given by:

$$L = K + \sum_{i=1}^N \sum_{j=1}^J y_{ij} \log P_{ij} \quad (18)$$

$$(19)$$

There are a number of ways in which this model can be estimated. We have used the computationally intensive maximum-likelihood approach, in which we estimate directly the coefficients and error covariances via MLE (Hausman and Wise 1978).

However, the amount of computational time is an important consideration in this model. The model converges much quicker if analytical derivatives rather than numerical derivatives are used in the maximization routine. In general, we write these as:

$$\frac{\partial L}{\partial \beta_k} = \sum_{i=1}^N \sum_{j=1}^J \frac{y_{ij}}{P_{ij}} \frac{\partial P_{ij}}{\partial \beta_k} \quad (20)$$

$$\frac{\partial L}{\partial \psi_{kj}} = \sum_{i=1}^N \sum_{j=1}^J \frac{y_{ij}}{P_{ij}} \frac{\partial P_{ij}}{\partial \psi_{kj}} \quad (21)$$

$$\frac{\partial L}{\partial \sigma_l} = \sum_{i=1}^N \sum_{j=1}^J \frac{y_{ij}}{P_{ij}} \frac{\partial P_{ij}}{\partial \sigma_l} \quad (22)$$

where  $l$  references the three covariance terms we estimate in this model.

The partial derivatives on the right-hand sides of each of these expressions take certain forms. For  $\beta_k$ ,

$$\begin{aligned} \frac{\partial P_i}{\partial \beta_k} = & \phi(\tilde{U}_{12}) \Phi \left[ \frac{\tilde{U}_{13} - r_1 \tilde{U}_{12}}{\sqrt{1-r_1^2}} \right] \left( \frac{X_{1k} - X_{2k}}{\sqrt{\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}}} \right) + \\ & \phi(\tilde{U}_{13}) \Phi \left[ \frac{\tilde{U}_{12} - r_1 \tilde{U}_{13}}{\sqrt{1-r_1^2}} \right] \left( \frac{X_{1k} - X_{3k}}{\sqrt{\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}}} \right) \end{aligned} \quad (23)$$

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<sup>9</sup>We tested this assumption in some alternative specifications and found no evidence that any of these three error variances violate this assumption.

Next, for  $\psi_{1k}$ ,

$$\begin{aligned} \frac{\partial P_1}{\partial \psi_{1k}} = & \phi(\tilde{U}_{12})\Phi\left[\frac{\tilde{U}_{13}-r_1\tilde{U}_{12}}{\sqrt{1-r_1^2}}\right]\left(\frac{a_k}{\sqrt{\sigma_1^2+\sigma_2^2-2\sigma_{12}}}\right) + \\ & \phi(\tilde{U}_{13})\Phi\left[\frac{\tilde{U}_{12}-r_1\tilde{U}_{13}}{\sqrt{1-r_1^2}}\right]\left(\frac{a_k}{\sqrt{\sigma_1^2+\sigma_2^2-2\sigma_{12}}}\right) \end{aligned} \quad (24)$$

Similar expressions for the partials of  $P_2$  and  $P_3$  with respect to  $\beta_k$  and  $\psi_{jk}$  can be obtained.

The partial derivatives of the choice probabilities with respect to the covariance terms, though, are slightly more complicated. For example,

$$\begin{aligned} \frac{\partial P_1}{\partial \sigma_{12}} = & -\phi(\tilde{U}_{12})\Phi\left[\frac{\tilde{U}_{13}-r_1\tilde{U}_{12}}{\sqrt{1-r_1^2}}\right]\left(\frac{\tilde{U}_{12}}{2(\sigma_1^2+\sigma_2^2-2\sigma_{12})}\right)(-2) - \\ & -\phi(\tilde{U}_{13})\Phi\left[\frac{\tilde{U}_{12}-r_1\tilde{U}_{13}}{\sqrt{1-r_1^2}}\right]\left(\frac{\tilde{U}_{13}}{2(\sigma_1^2+\sigma_2^2-2\sigma_{13})}\right)(0) + \\ & \phi(\tilde{U}_{13})\phi\left[\frac{\tilde{U}_{12}-r_1\tilde{U}_{13}}{\sqrt{1-r_1^2}}\right]\left(\frac{1}{\sqrt{1-r_1^2}}\right)* \\ & \left(\frac{-\sqrt{4-4\sigma_{13}-4\sigma_{12}+4*\sigma_{13}\sigma_{12}}-(4\sigma_{13}-4)(1-\sigma_{12}-\sigma_{13}+\sigma_{23})*.5*\frac{1}{-\sqrt{4-4\sigma_{13}-4\sigma_{12}+4*\sigma_{13}\sigma_{12}}}}{4-4\sigma_{13}-4\sigma_{12}+4*\sigma_{13}\sigma_{12}}\right) \end{aligned} \quad (25)$$

The other derivatives of the choice probabilities and covariance terms are similar.

#### 5.1.4 Multinomial and Independent Probit

In our analysis we began *without* placing restrictive assumptions on the error covariances across the three choices. Not surprisingly, the most restrictive approach would be the easiest to estimate. Were we to impose the IIA assumption, and proceed believing that the errors have zero covariances, we could estimate certain alternative models, such as unordered logit or independent probit. For interested readers, we include in Table A-1 the independent probit estimates of our model.

**Table 1**  
**Vote-Choice By Economics, Ideology and Anger in the 1992 Election**

		<b>Bush</b>		<b>Clinton</b>		<b>Perot</b>	
		<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>
<i>Personal Finances</i>	Better	42.7	217	38.2	194	19.1	97
	Same	38.6	225	46.3	270	15.1	88
	Worse	21.5	121	58.1	327	20.4	115
<i>National Economy</i>	Better	71.1	54	15.8	12	13.2	10
	Same	51.3	196	30.9	118	17.8	68
	Worse	26.0	309	55.4	659	18.6	221
<i>Ideological Proximity</i>	Bush	59.1	321	21.7	121	19.2	107
	Clinton	7.2	27	77.1	290	15.7	59
	Perot	29.9	120	47.1	189	22.9	92
<i>Party Identification</i>	Republican	70.2	466	9.5	63	20.3	135
	Independent	22.9	33	41.0	59	36.1	52
	Democrat	7.6	64	78.9	667	13.5	114
<i>Vote Choice in 1988</i>	Bush	55.0	410	23.6	176	21.4	160
	Dukakis	5.2	25	83.1	403	11.8	57
	Did Not Vote	29.5	80	50.6	137	19.9	54
<i>Term Limits</i>	Favor	35.5	435	45.6	559	18.9	232
	Oppose	24.2	64	59.2	157	16.6	44
<i>New Voter</i>	Voted-88	34.7	436	47.6	598	17.6	221
	Not-Vote88	29.5	80	50.6	137	19.9	54
<i>Deficit</i>	Not Imp	32.9	342	51.3	534	15.9	165
	Important	36.9	176	40.3	192	22.9	109
<i>Abortion</i>	Pro-Life	47.5	66	40.3	56	12.2	17
	Only-Rape	46.3	202	37.8	165	15.8	69
	When-Needed	42.2	100	39.2	93	18.6	44
	Pro-Choice	22.3	180	57.4	464	20.3	164
<i>Entire Sample</i>		34.2	564	47.8	793	18.2	301

**Table 2A:**  
**Distribution of Respondent Placements of Self and Candidates on Ideology**

	1988	1992
Respondent Self-Placement	4.37	4.21
Bush Ideology <sup>a</sup>	5.11	5.05
Bush: Ideological-Distance <sup>b</sup>	1.24	1.31
Dukakis Ideology <sup>a</sup>	3.24	–
Dukakis: Ideological-Distance <sup>b</sup>	1.50	–
Clinton Ideology <sup>a</sup>	–	3.19
Clinton: Ideological-Distance <sup>b</sup>	–	1.46
Perot Ideology <sup>a</sup>	–	4.31
Perot: Ideological-Distance <sup>b</sup>	–	1.15

<sup>a</sup> Mean placement of candidate by respondents.

<sup>b</sup> Mean ideological distance between candidate and respondent.

**Table 2B**  
**Vote-Choice By Ideology: 1988 and 1992**

Respondent Ideology		1988		1992		
		Bush	Dukakis	Bush	Clinton	Perot
<i>Liberal</i>	%	6.9	40.6	5.7	48.3	22.9
	N	36	169	27	290	59
<i>Moderate</i>	%	25.8	33.9	25.2	31.5	35.7
	N	134	141	120	189	92
<i>Conservative</i>	%	67.2	25.5	69.1	20.2	41.5
	N	349	106	329	121	107
<i>Total</i>	%	55.5	44.5	35.7	45.0	19.3
	N	519	416	476	600	258

**Table 3**  
**Multinomial Probit Estimates For a Three-Candidate Model**  
**(Perot Coefficients Normalized to Zero)**

Independent Variables	Coefficients for:	
	Bush	Clinton
Ideological Dist.		-.10*
		.02
Constant	.90*	-.78*
	.10	.10
Education	.17*	.004
	.05	.05
Region (East)	-.18	.37*
	.09	.09
Region (South)	.29*	.58*
	.09	.09
Region (West)	-.13	-.03
	.09	.10
Gender (Female)	.44*	.25*
	.08	.09
Personal Finances	-.05	.03
	.05	.05
National Economy	-.16*	.25*
	.05	.06
Democrat	-.23*	1.55*
	.10	.09
Republican	1.16*	-.86*
	.09	.10
Gov't Jobs	.08	-.007
	.05	.05
Gov't Health Care	.12*	.07
	.04	.05
Gov't Minority Ass.	.01	-.20*
	.05	.05
Abortion	-.41*	.01
	.06	.07
Term Limits	.07	.09
	.09	.09
Deficit	-.68*	-.004
	.09	.09
Age: 18-29	-1.0*	-.66*
	.09	.10
Age: 30-44	-.74*	-.63*
	.09	.09
Age: 45-59	-.59*	-.12
	.09	.10
Voted-88	-.32*	.26*
	.09	.10
$\sigma_{BC}$		-.45*
		.10
$\sigma_{BP}$		.02
		.10
$\sigma_{CP}$		-.44*
		.10

LL = -568.19; Percent-Correct = 70.6; Number of Observations = 909

Note: Maximum-likelihood estimates with their estimated standard errors below. \* indicates an estimate significant at the p=.05 level.

**Table 4**  
**Effects of Anger, Economics, and Issues in the 1992 Election**

		Probability of Voting For:		
		Bush	Clinton	Perot
<i>Personal Finances</i>	Better	0.42	0.31	0.27
	Worse	0.35	0.35	0.29
	<b>Difference</b>	0.07	-0.05	-0.02
<i>National Economy</i>	Better	0.54	0.19	0.27
	Worse	0.24	0.49	0.27
	<b>Difference</b>	0.29	-0.30	0.00
<i>Voter Ideology<sup>a</sup></i>	Near	0.46	0.39	0.31
	Far	0.32	0.28	0.20
	<b>Difference</b>	0.14	0.11	0.12
<i>Health Care</i>	Gov't	0.32	0.32	0.36
	Private	0.46	0.33	0.21
	<b>Difference</b>	-0.14	-0.01	0.15
<i>Jobs Provision</i>	Gov't	0.32	0.36	0.32
	Private	0.46	0.29	0.25
	<b>Difference</b>	-0.14	0.07	0.07
<i>Minorities</i>	Assist.	0.30	0.48	0.22
	No Assist.	0.46	0.20	0.33
	<b>Difference</b>	-0.17	0.27	-0.11
<i>Abortion</i>	Pro-Life	0.62	0.22	0.16
	Pro-Choice	0.28	0.38	0.34
	<b>Difference</b>	0.34	-0.16	-0.18
<i>Term Limits</i>	For	0.39	0.33	0.28
	Against	0.38	0.32	0.30
	<b>Difference</b>	0.01	0.01	-0.02
<i>Deficit</i>	Not Imp	0.39	0.33	0.28
	Important	0.22	0.40	0.38
	<b>Difference</b>	0.17	-0.07	-0.09

Note: Table entries are the predicted probabilities of a hypothetical individual voting for Clinton, Bush or Perot based on different values of the row-variable. The profiles of this hypothetical voter are discussed in the text.

<sup>a</sup> Probabilities for each of the candidates in the voter-ideology row are based on the ideological distance between the voter and the particular candidate.

**Table 5A**  
**Distribution of Respondent Preferences on the Economy**

	1988			1992		
Personal Finances	Better 42.4	Same 32.8	Worse 24.8	Better 30.3	Same 35.0	Worse 34.7
National Economy	Better 18.8	Same 50.0	Worse 31.2	Better 4.6	Same 23.1	Worse 72.3
Abortion	Pro-Life 64.0		Pro-Choice 36.0	Pro-Life 50.1		Pro-Choice 49.9

**Table 5B**  
**Effects of Mass Changes in Respondent Preferences: 1988 Economy Simulation**

		Predicted Vote Share for:		
		Bush	Clinton	Perot
Sample (N=909)	1992	34.0	45.9	20.1
Respondent Finances - 1988		34.2	45.7	20.0
National Economy - 1988		37.6	41.5	20.9
Respondent Finances and National Economy - 1988		38.0	41.4	20.6

**Table A-1**  
**Independent Probit Estimates For a Three-Candidate Model**  
**(Perot Coefficients Normalized to Zero)**

Independent Variables	Coefficients for:	
	Bush	Clinton
Ideological Dist.		-.08*
		.02
Constant	.93	-.43
	.74	.73
Education	.17*	.02
	.06	.06
Region (East)	-.16	.29
	.24	.22
Region (South)	.29	.49*
	.22	.22
Region (West)	-.11	-.04
	.24	.23
Gender (Female)	.44*	.23
	.18	.16
Personal Finances	-.05	.02
	.06	.05
National Economy	-.16*	.19*
	.07	.09
Democrat	-.19	1.26*
	.32	.25
Republican	1.16*	-.57*
	.29	.28
Gov't Jobs	.08	-.002
	.06	.05
Gov't Health Care	.11*	.07
	.05	.05
Gov't Minority Ass.	.007	-.16*
	.06	.05
Abortion	-.41*	-.02
	.09	.09
Term Limits	.07	.08
	.23	.20
Deficit	-.66*	-.05
	.18	.17
Age: 18-29	-1.0*	-.62*
	.30	.28
Age: 30-44	-.75*	-.57*
	.24	.24
Age: 45-59	-.57*	-.14
	.27	.26
Voted-88	-.31*	.20
	.24	.22

LL = -568.26

Percent-Correct = 70.6

Number of Observations = 909

Note: Maximum-likelihood estimates with their estimated standard errors below. \* indicates an estimate significant at the p=.05 level.

Figure 1a

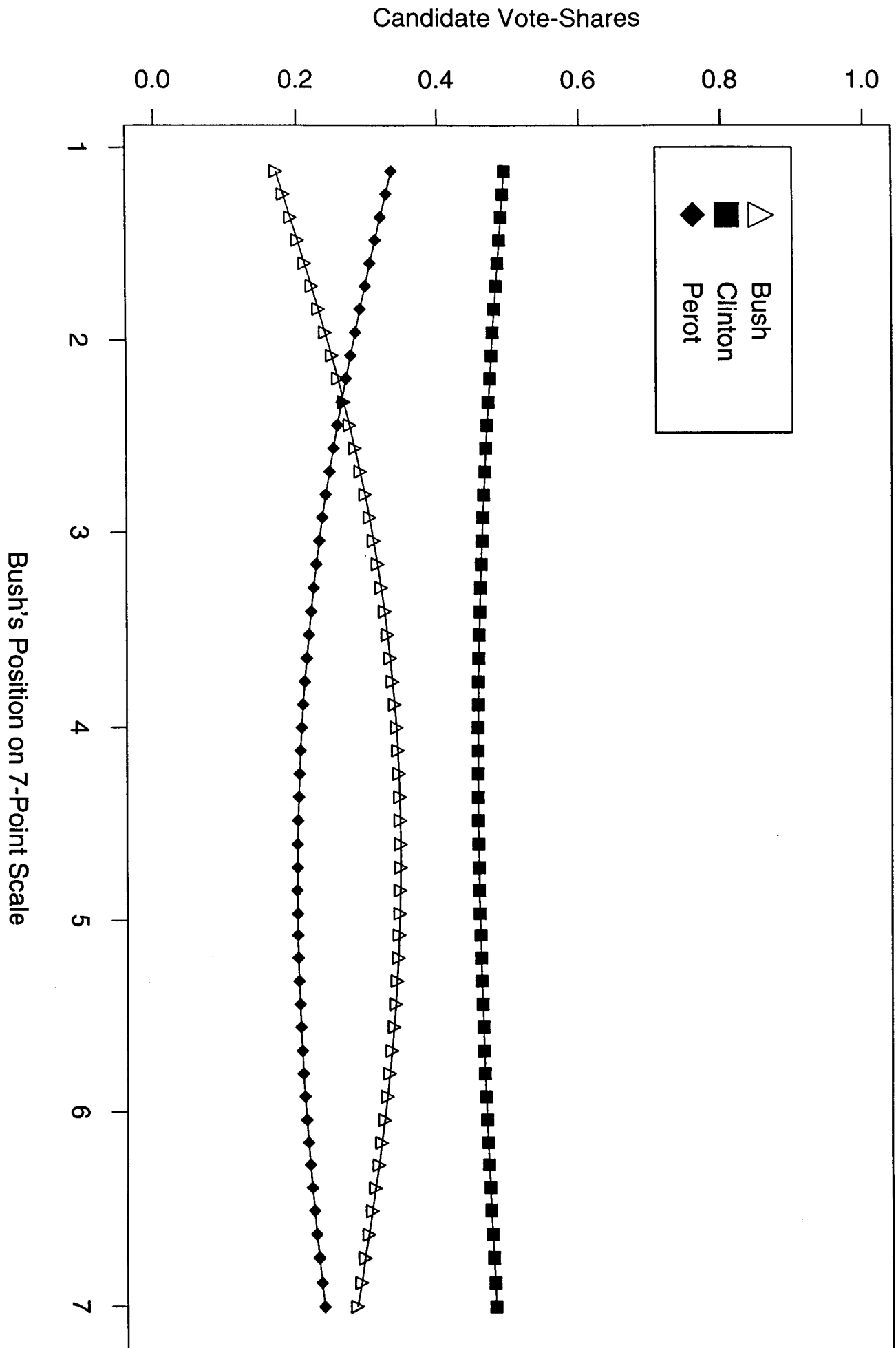


Figure 1b

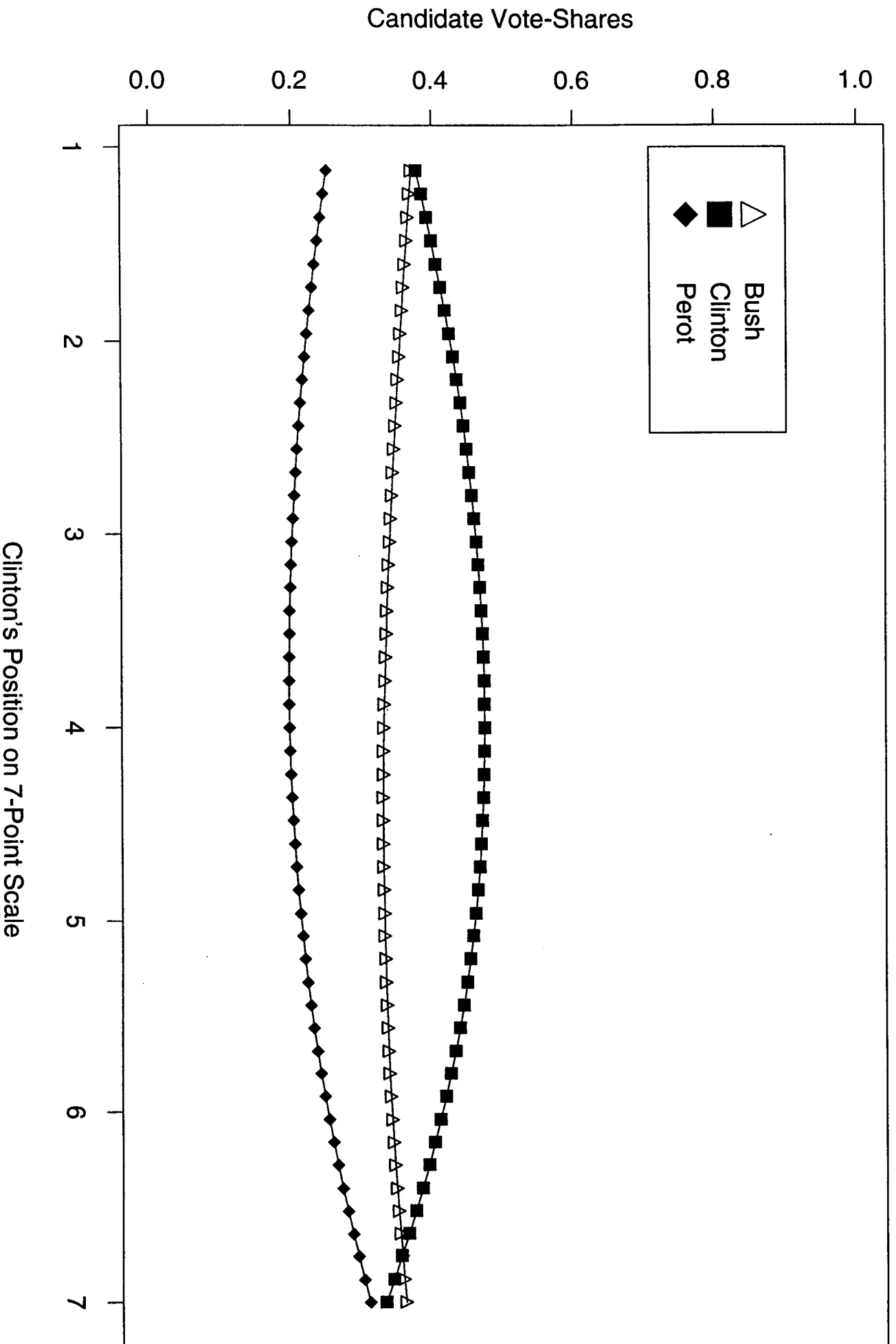
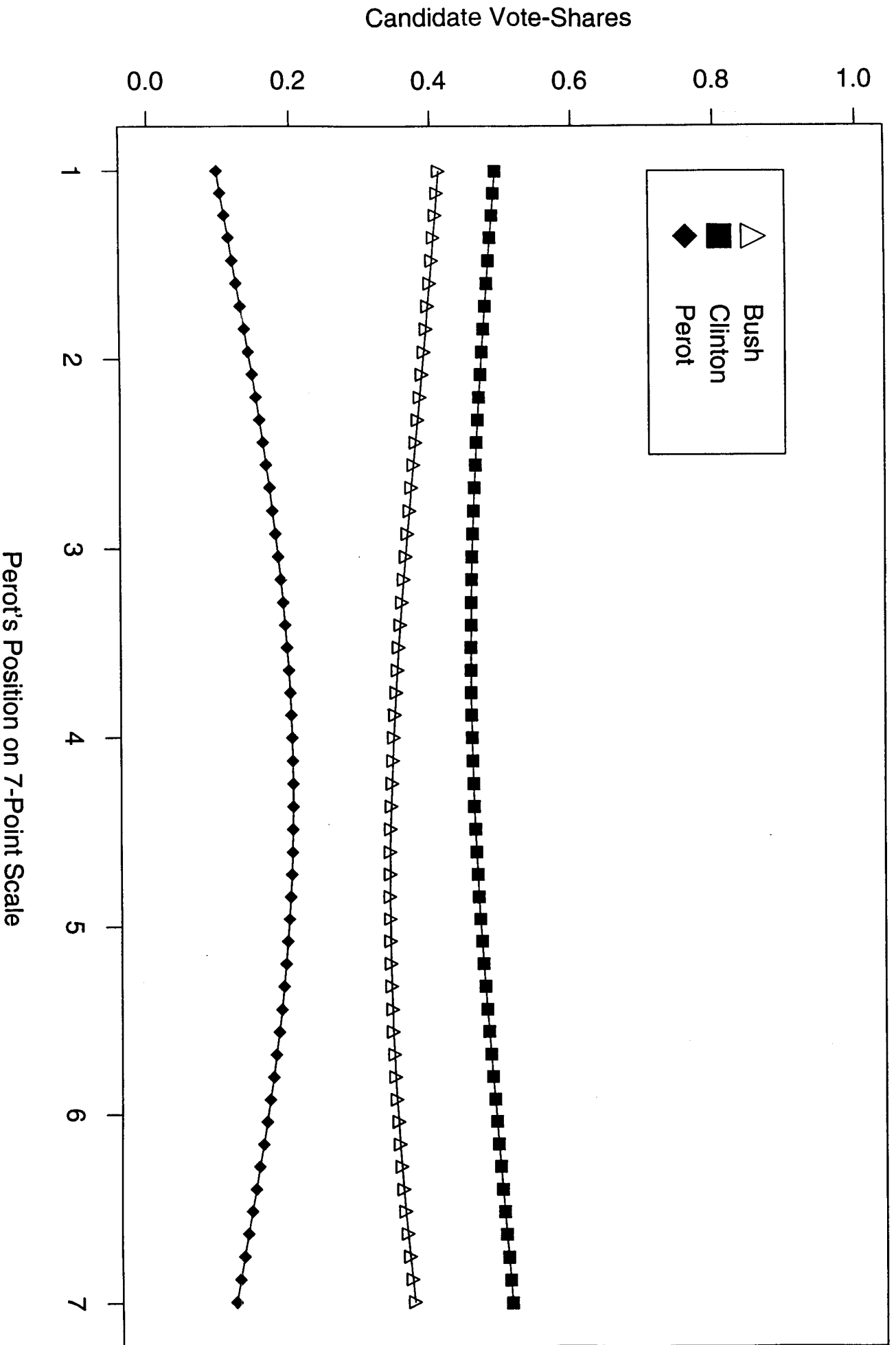


Figure 1c



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