Beneath Stormy Waters: The Evolution of Individual Decision Making in the 1984 and 1988 Presidential Elections

Mitch Sanders
University of Rochester

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Abstract

The question of whether campaigns matter is an important one in political science, but any answer must be followed by a discussion of precisely how campaigns matter. I contend that presidential campaigns alter not only the nature and quantity of information used by voters, but also change the ways that individuals make electoral decisions. As information is disseminated about a particular dimension of choice, that dimension becomes more important in individual decisions. I develop a theoretical model of information and individual choice, and test it using data from the 1984 and 1988 presidential elections. My results indicate that campaigns change the ways in which individuals use information, and that these changes are only partially controllable by the candidates.

1. Introduction

This paper explores the idea that campaigns can affect individual electoral decisions independently of their effects upon individual perceptions. Voters and

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nonvoters, when making electoral decisions, will give more emphasis to information that is more certain. Because the quantity of information about each choice dimension varies over time, individual decision making methods will also change.[1] This paper provides theoretical justification and empirical evidence for this view of campaign effects.

In the second section I discuss the relevant literature on uncertainty. In section three I present a model of perceptual uncertainty and its evolution, and show how information and uncertainty affect the nature of individual choices. Sections four and five provide two different empirical tests of the theory for the 1988 election, and section six shows results for the 1984 election. In section seven I discuss the substantive implications of these results. Finally, section eight addresses issues of voter and candidate behavior in dynamic and uncertain electoral environments.

2. Literature Review

A campaign is a period when individuals acquire information and make electoral decisions, and candidates try to affect individual beliefs and actions. While previous research has shown the importance of all of these processes, many of the connections among them remain unexplored.

It has long been noted that candidates can affect *what* individuals decide by influencing *how* they decide. Determining the scope and nature of political competition is critical to victory or defeat, and this strategic idea has become part of the common wisdom of Presidential campaign managers. Roger Ailes, Bush's 1988 media manager, discussed the consequences of Bush's control of the campaign's agenda (Runkel 1989, 221):

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[1]Mathematically speaking, if $VOTE_i = f(\beta_1 X_{1i} + \beta_2 X_{2i} + ...)$, campaigns can affect the individual X_i, but independently of this, as aggregate phenomena they can also affect the βs.

To put it another (more homespun) way, if we view electoral decisions as political recipes, then information dissemination during a campaign can serve to alter the amount of each ingredient used in the mixture without affecting the ingredients themselves. For example, voters early in a campaign might combine two cups of partisanship and a pinch of issues, while late in a campaign voters blend two cups of partisanship, one cup of ideology, and a tablespoon of issues.

> We felt that as long as the argument was on issues that were good for us - crime, national defense, and what have you - that if we controlled the agenda and stayed on our issues, by the end we would do all right.

Susan Estrich, Dukakis's 1988 campaign manager, later recognized that dancing to Bush's tune may have been a mistake for Dukakis (Runkel 1989, 149):

> There were many people in the Democratic party who felt that the way for us to win was to keep Bush on the defensive the entire time - to try to find the equivalent of Lee [Atwater]'s six issues and beat George Bush day in and day out for six months. We decided not to do that. Hindsight may be 20/20. Perhaps we should have.

In the end, of course, the Bush campaign did much better than "all right," and the 1988 election illustrated the importance of focusing individual choices toward the dimensions that advantage a particular candidate. As Schattschneider (1960) noted, "the definition of the alternatives is the supreme instrument of power."

However, it is not sufficient to explain aggregate effects (election results) with aggregate causes (candidate strategies) without also specifying the behavior of individuals. Individuals must contend with a world where information is incomplete and costly, and therefore so must researchers. The importance of perceptual uncertainty has been shown in many and varied ways. Uncertainty plays a prominent role in rational choice theories of individual behavior (Downs 1957, Enelow and Hinich 1981, Enelow and Hinich 1984). Bartels (1986) shows empirically that uncertainty has an effect on vote choices roughly equal to the effect of issue distances. Page (1976) suggests that candidate emphasis of personal image over policy positions reduces the salience of issues, and Alvarez (1992) provides theoretical and empirical confirmation of the role of uncertainty in issue voting. Zaller (1989) and Franklin (1991) show that individual uncertainty about various factors changes during campaigns in response to new information.

Uniting these somewhat disparate stories creates an interesting picture. Individuals are uncertain about all relevant dimensions of choice (not only issue positions), and voters give more weight to information that is more certain. This provides a way for candidates, as important purveyors of information, to influence electoral outcomes over the course of a campaign.[2] The purpose of this paper is to rigorously justify these intuitions, and to exploit the empirical insights that

[2]These ideas can also provide an alternative explanation for the priming effects observed by Iyengar and Kinder (1987). They claim that priming occurs because of the increased accessibility

are provided by linking dynamic uncertainty, multidimensional candidate choices, and candidate strategies.

3. Theory

In this section I will provide an intuitive and mostly non-technical introduction to a model of uncertainty and individual choice. Additional details, and proofs of propositions, are provided in Appendix A.

Individual i's utility for candidate j at time t is a weighted sum of terms across all relevant decision dimensions k, as follows:

$$U_i(candidate\ \ j) = \alpha^* + \left(\sum_k \beta^*_{jk}(X_{ik} - \bar{\theta}_{ijkt})^2\right) + \nu$$

where X_{ik} is individual i's ideal point on dimension k, and $\bar{\theta}_{ijkt}$ is the belief that individual i would have about candidate j's position if she were perfectly informed.

Of course individuals are not perfectly informed, and candidate positions are perceived with uncertainty. For each individual, each perception is a draw from a probability distribution, as follows:

$$\hat{\theta}_{ijkt} = \bar{\theta}_{ijkt} + \varepsilon_{ijkt},$$

$$\varepsilon_{ijkt} \sim N(0, \sigma^2_{jkt})$$

The voter knows her "best guess" $\hat{\theta}_{ijkt}$, and reports this when making a survey response.[3] She also knows her "certainty" about this guess, expressed by the variance σ^2_{jkt}.[4]

of information (Iyengar and Kinder 1987, 64), but do not explicitly make uncertainty (or its reduction) a part of their explanation. Iyengar and Kinder also focus on the media, thus largely missing the important strategic elements described above. Their analysis is concerned mainly with attitudes, rather than actual voting behavior.

[3] In Bartels (1986), by contrast, individuals report their mean perception, and the variance becomes relevant for expected utility calculations.

[4] I make two important assumptions about this variance. First, in this specification, the variance of individual perceptions is identical for all individuals (with the caveat noted below). The idea here is that uncertainty is a function of information disseminated during a campaign, which as an aggregate phenomenon affects all individuals equally. This is clearly a simplification (Zaller 1992). I will relax this assumption in later estimation; see footnote 9 for more information.

I also assume that the variance of an individual's perception increases with distance from the

The essential problem facing the voter is that given $\hat{\theta}_{ijkt}$ and σ^2_{jkt} she cannot recover $\bar{\theta}_{ijkt}$ directly, but only as a probability distribution. This problem becomes even more vexing because σ^2_{jkt} changes over time with the dissemination of information about a particular dimension. If the voter merely substitutes $\hat{\theta}_{ijkt}$ for $\bar{\theta}_{ijkt}$ in the utility equation above, then her calculations will include a mix of the 'true" perception (measured by $\bar{\theta}_{ijkt}$) and perceptual error (measured by σ^2_{jkt}) (Enelow and Hinich 1984), and this mix will vary over time. This is not an appealing idea to the voter, who would like, if possible, to act at all times as if she were fully informed.

Fortunately, there is a solution that is both behaviorally plausible and mathematically tractable. Voters can use $\hat{\theta}_{ijkt}$ (in place of the elusive $\bar{\theta}_{ijkt}$) in their utility calculations – as long as the decision parameters β change with time to negate the effects of uncertainty. It is important to note that X_{ik}, $\bar{\theta}_{ijkt}$ and $\hat{\theta}_{ijkt}$ may change with time, but the process of parameter change is driven exclusively by σ^2_{jkt}.

If the amount of information increases linearly with time then parameter changes are also linear, so we can model these changes by including both $(X_k - \hat{\theta}_{jk})^2$ and $t * (X_k - \hat{\theta}_{jk})^2$ in our models. Even if information flows do not have this simple linear form, as long as the amount of information is changing we should expect to see the parameters on the independent variables change with time. Sections 4, 5, and 6 provide empirical tests of this theory for the 1988 and 1984 elections.

individual's ideal point. This can be seen as the individual-level analog to Enelow and Hinich's (1984) spatially dependent uncertainty. There are two justifications for this assumption, one related to theory and the other related to measurement. Enelow and Hinich (1984) show that risk-averse voters will tend to shy away from uncertainty, so a "preference" for a candidate on a particular dimension (expressed by placement of the candidate near the voter's ideal point) would not happen unless a relatively large amount of information were available. As discussed in Appendix A, this idea is robust to the presence of projection effects.

The measurement issue is that perceptions of candidates that are "far away" are less precise than perceptions of candidates that are "close." A (physical) spatial analogy is illuminating. Suppose an individual can measure distances with an accuracy of $\pm 10\%$. If she is asked to determine the distance between herself and an object that is actually five feet away, the maximum error will be six inches. But if the object is 100 feet away, her error will be proportionally the same (10%), but actually much larger (ten feet). The same logic applies to spatial models of voting, where a rough placement of a candidate as "far away" will be relatively imprecise.

4. Stormy Waters: 1988

I estimated the 1988 vote choice model using the American National Election Study Pre-Election Survey. The latent utility variable described in section three above is of course unobserved, but we can observe its manifestations in the actions of individuals. To do this, I used an ordered probit specification (Amemiya 1985, 292-93), and assigned individuals to the following categories:

$y = 0$: vote for Dukakis

$y = 1$: express a preference for Dukakis, but not vote

$y = 2$: no candidate preference

$y = 3$: express a preference for Bush, but not vote

$y = 4$: vote for Bush.

The skeptical reader may be wondering why I am modeling five actions in a two candidate race. This specification arises because even if we are only interested in how individuals decide between candidates, we cannot adequately model voting without also modeling abstention, and we cannot fully understand preference without also understanding indifference. If we truncate the sample by including only voters in our sample, parameter estimates will be adversely affected by a form of sample selection bias. Further, including indifference as a subset of abstention provides more information about electoral choices. See Appendix B for more details about these problems and their solution.

The independent variables in the model are designed to capture both long-term and campaign-specific effects on individual choice. Two independent variables, Party and Reagan Approval, represent voter predispositions in the 1988 election. There is an ideology variable for each candidate, representing the squared (Euclidean) distance between voter i's ideal point and their perception of the candidate's ideology. I have also included an issue variable for each candidate, which represents the squared distance between voter and candidate positions on crime and the environment, weighted equally. A "feelings" variable for each candidate represents the square distance between voter i's feelings about the candidate and her feelings toward an ideal candidate, and a "thoughts" variable for each candidate represents the squared distance between voter i's perceptions of candidate traits and the traits of an ideal candidate. Table 1 shows the ranges of these variables, and their mean values at the beginning and end of the campaign. More details about the construction of these measures can be found in Appendix B.

To measure the temporal changes implied by the theory developed in section three, most of the above variables will be interacted with the variable t, which measures the date of the interview divided by 100. For convenience, September 1 is set to be t=0.[5] Partisanship and Reagan approval were not contentious issues during the 1988 campaign, and I assume that they served as prior beliefs that were not updated by new information. These variables are included by themselves, without any time interaction. All of the other independent variables have interactive terms, including the intercept.[6] This model assumes that information changes linearly during a campaign, to test the empirical validity of Propositions 1 and 2. If these propositions hold, then voter decisions are made differently at different times during a campaign, and the parameter estimates for the time-interactive variables will be significantly different from zero. If information is increasing (i.e., $\eta > 0$ in Proposition 2), then the time interactive parameters will be positive for Dukakis and negative for Bush. [7]

Table 2 about here

[5]The use of a Taylor series approximation in Appendix A constrains the interaction variable to be a polynomial in t. Quadratic terms (and beyond) are not included because the marginal gains in efficiency and accuracy would be outweighed by the increased difficulty of interpretation.

In the 1988 sample, t ranges from .05 to .67. The period from September 6 to October 31 was divided into quarters by the NES, and each respondent was targeted for interviewing during a particular quarter. This targeting was 80% successful. The November period was set aside for "catch-up" interviews. This method makes it likely that there are no significant effects based upon interview timing.

[6]Time-dependence of the intercept is theoretically distinct from the results of section three because it is not a consequence of increasing information. One possibility for testing the theory in section three would be to omit the interactions between t and the independent variables, and instead allow the thresholds of the ordered probit model to vary with time. This specification would reflect the notion that as *overall* uncertainty decreased with time, a given utility difference would be more likely to cause an individual to vote. In this specification, I would expect the thresholds to collapse toward zero.

The specification used above has the same features, and additionally allows examination of the effects of uncertainty along each dimension. The tests involving the intercept, then, in contrast to the possibility expressed in the previous paragraph, are designed to uncover net changes in the thresholds *in a particular direction.*

The results of Table 2 show that at the .05 level, the intercept does change. Thus, all else equal, for all the probability of voting for Bush increases as t increases, while the probability of voting for Dukakis decreases. The probability of abstention also changes with t, but these changes depend upon the other probabilities in the model. See Greene (1993) for more information.

[7]Recall that y^*, and hence y, expresses $U_i(Bush) - U_i(Dukakis)$. Increased distance from Bush should decrease the probability of voting for Bush, so the parameters on the Bush distance variables should be negative. Similarly, if information is increasing, then these distances should become *more* important, so increasing time should make these parameters *more* negative. The effect is precisely opposite for the Dukakis distance variables.

Table 2 presents parameter estimates for this model. Care must be taken when evaluating significance levels here, because the significance of a parameter at a given time depends upon both its original coefficient (not interacted with time) and the temporal effects measured by the parameters on the interaction terms. However, Table 2 does provide unambiguous evidence concerning the *changes* in parameters over time. The coefficient on Dukakis Ideology*t is correctly significant at the .05 level, and the coefficients on Bush Feelings*t and Bush Issues*t are correctly significant at the .10 level. Increased ideological distance from Dukakis increases the probability of voting for Bush, and a given increase in this distance has a greater effect later in the campaign. Similarly, Bush's deviations from voter ideal points on the feeling and issue dimensions become more important as time passes.

As predicted in section three, changes in aggregate beliefs are not necessary for changes in parameters. Figures 1 and 4 indicate that the mean of the distribution of Bush Feelings in the electorate changed over the course of the campaign, but the mean of Dukakis Ideology did not. Belief changes are also not sufficient for parameter changes, as the level of Dukakis Feelings changed, but the parameter did not. [8]

Overall, then, these results verify, as derived in section three, that the parameters of individual decision functions change over time with changing amounts of information. [9] Further, this process of parameter change was distinct from

[8] Figures 1-4 show the mean values of the independent variables during each of the sample periods, as well as the 90% confidence intervals around these means. So, for instance, the mean value of Dukakis Feelings in the period after t=30 is consistently outside the confidence interval for the period before t=25, indicating that feelings toward Dukakis changed significantly.

[9] The theory presented in section three also allows me to test whether different individuals respond differently to the changing information environment. If either I_{jk0} (initial amount of information) or η_{jk} (rate of information acquisition) varies across individuals, then γ_{jk} (the parameter that expresses the changing marginal effects of $(X_k - \hat{\theta}_{jk})^2$ on y^*) will also vary across individuals. Theory suggests that these differences could arise because of differing amounts of information (measured by the NES interviewer's rating of respondent political knowledge) or intelligence (measured by the NES interviewer's rating of respondent intelligence). Call these variables kn and ia, respectively.

It is possible to test whether $\frac{\partial \gamma_{jk}}{\partial\, kn} = 0$. This test involves running model (4), including each independent variable by itself (not interacted with anything), and the variables that have significant temporal effects from Table 2 (Dukakis Ideology, Bush Feelings, Bush Issues, and the intercept) each interacted with t and $t * kn$. The parameter on $t * kn$ equals zero if and only if $\frac{\partial \gamma_{jk}}{\partial\, kn} = 0$ (and similarly for a separate model concerning ia). Analogously to the test of temporal changes in individual beliefs about that dimension.

5. Choppy Waters: 1988, continued

The results presented above are constrained by the assumption that information is a linear function of time. This specification was designed to reflect the fact that information generally increases with time, and that the cumulative amount of information at time t can be represented (at least approximately, as shown in Appendix A) by a linear function of t. This presumes a steady and smooth increase in the amount of information disseminated. The real world, unfortunately, is generally more lurching and lumpy than steady and smooth. For instance, it is quite reasonable to believe that the amount of information available about a particular dimension, while generally following a linear trend, will increase more rapidly at certain times during the campaign.

To remedy this, I will estimate a sequence of models based upon different but overlapping sub-samples of the 1988 NES respondents, each containing individuals interviewed during a particular three-week period.[10] Use of this three-week mov-

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effects presented above, this is a test of whether temporal effects differ across levels of knowledge or intelligence, not a test of whether temporal effects exist (this having been established by the results of Table 2). Since the question of differential temporal effects is relevant only for those dimensions where temporal effects exist, I have confined the analysis to variables where the coefficient on $t * (X_k - \hat{\theta}_{jk})^2$ was significantly different from zero in Table 2.

I have not included full results from these models. None of the interactions with $t * kn$ were significant, and the only significant relationship with $t * ia$ is on the Dukakis Ideology dimension. Here, the parameters on Dukakis Ideology change over time for all individuals, but they change less for less intelligent individuals.

These non-findings (and the one positive finding) accord well with the theory presented in section three. There are two contradictory influences on politically sophisticated individuals. First, we might expect that for a given amount of information available, a more politically sophisticated individual can extract and use more information than a less sophisticated individual. Thus, we might expect the reduction in uncertainty to be proportionally greater for sophisticated individuals. However, these individuals (most likely) also had more precise information at the beginning of the campaign, meaning that this new information has a relatively smaller effect on their beliefs. For Dukakis Ideology only the first of these effects was operating, as Dukakis was a relatively unknown quantity before the 1988 election. Therefore, we see that the process of enhanced information extraction was not damped by the existence of prior information on this dimension.

Still, out of six possible individually variant effects only one was significant. Hence, in the sections that follow I will not consider these effects further.

[10] I will index samples by t, where t represents the beginning date of the sample, and t=0 on

ing window will shed greater light on the evolution of decisions during the 1988 campaign. These models do not attempt to parametrize the cumulative amount of information in the campaign, and do not restrict parameters at time t to be linear functions of parameters at time 0.

I estimated ordered probit models for each sample, and since the nature of the sample already provided controls for time, temporal interactions were not included. Figures 5,6,7,8,9,and 10 translate the coefficients for all samples into marginal effects for two hypothetical voters. Voter D, the "strongly pro-Dukakis voter", has independent variables such that she has a high probability of voting for Dukakis. Voter B, the "moderately pro-Bush voter" has independent variables such that she has a noticeable but not overwhelming preference for Bush over Dukakis. Table 3 describes these voters, and the changes in the model's independent variables that are used to generate Figures 5-10.

Table 3 about here

In Figures 5,6, and 7, line B indicates the probability that the moderately pro-Bush voter will vote for Bush. Additionally, in Figure 5 line B2 represents P(vote Bush) for a voter who is identical to voter B, but more distant from Dukakis on the ideological dimension. In Figure 6 line B3 shows P(vote Bush) for a voter who is identical to B, but who feels slightly worse about Bush. In Figure [redacted] 7, line B4 shows P(vote Bush) for a voter who is identical to B, but slightly more Republican. The phenomenon of interest in each of these figures is the distance between the two lines, which represents the marginal effect of a change in one independent variable on P(vote Bush).

Figure 5 about here
Figure 6 about here
Figure 7 about here

In Figures 8, 9, and 10 the line D indicates the probability that the strongly pro-Dukakis voter will vote for Dukakis. Figures 8, 9, and 10 show marginal effects analogous to those in Figures 5, 6, and 7, respectively.

September 1, 1988. The starting and ending dates of the sample increase in increments of one day. Thus, in the 1988 NES sample, t ranges from .05 to .47. Sample t_5 contains individuals whose time of interview is in the interval September 6-26, sample $t_6$contains individuals whose time of interview is in the interval September 7-27, and so on, ending in sample t_{47}, covering the interval October 18-November 7.

Figure 8 about here
Figure 9 about here
Figure 10 about here

These figures confirm the theoretical results of section three, and provide a more detailed look at the empirical results of section four. First, the probability of voting for Dukakis shows a secular decrease, while the probability of voting for Bush shows a secular increase. More importantly, the marginal effects of the independent variables change over time. The effect of ideological distance from Dukakis increases notably for both the pro-Dukakis and pro-Bush voters, as evidenced by the increasing gap between the lines in Figures 5 and 8. Figures 6 and 9 show a similar, but weaker, effect for Bush Feelings. By contrast, Figures 7 and 10 show that the effect of partisanship remained virtually constant, confirming the prediction that party identification serves as a prior belief that was not affected to additional information during the campaign.

6. Still Waters: 1984

The 1984 vote choice model was estimated using data from the 1984 American National Election Study. The 1984 model is similar to the 1988 model, with Reagan substituted for Bush, and Mondale substituted for Dukakis. There are two additional differences. Reagan approval is excluded from the 1984 model, and the only issue variable used is attitude toward relations with the USSR. Results are presented in Table 4.

Table 4 about here

The most notable feature of the 1984 results is the almost complete lack of significant temporal effects. But since several interaction coefficients are near statistical significance, I explored further by estimating a model that included all of the original independent variables, along with each independent variable multiplied by an indicator variable which equals 1 if the individual was interviewed after t=0.36. The coefficient on Reagan Feelings when $t \leq 0.36$ is -0.306; for $t >$ 0.36, the coefficient on Reagan Feelings is -0.196. The coefficient is significantly smaller in magnitude (at the .05 level) in the later period, meaning that feelings toward Reagan exert *less* of an influence on vote choice as time passes.[11] In the

[11]The indicator variable equals one for 47.9% of respondents. I have omitted the full results from this model. As stated above, there is only one significant temporal effect. The Reagan

context of the theory above, this must mean that individuals have less information about affective feelings toward Reagan as time passes.

Although this result is unexpected, it is consistent with the information theory presented in section three. As long as at least one candidate is providing messages relating to a certain dimension, the net amount of information increases. If both candidates provide messages, the effect will be even greater. I have so far assumed that each candidate will be delivering a distinct message that is consistent over time. Now, however, consider a candidate who delivers two distinct and contradictory messages at different times. Even if these messages cancel each other, and leave the voter unable to update her placement of the candidate, the act of contradiction means that the voter knows less, and is therefore less confident, than before the contradictory message was delivered. Two contradictory messages obliterate each other, leaving the voter with less information, and leading to decreased importance of the contradictory dimension. The substantive meaning of this statistical finding will be discussed in section seven below.

7. Discussion

Lee Atwater, the manager of George Bush's 1988 Presidential campaign, summarized the Ailes/Atwater campaign philosophy as follows:

> We believe in really two things. One is the importance of staying on the offensive, and the other is the importance of controlling the agenda.

Evidence indicates that this strategy worked on two levels. Figure 2 shows that the electorate's feelings about Dukakis worsened. In this respect, the Bush campaign was able to alter political perceptions of Dukakis, and alter them in ways favorable to Bush.

But the point of this paper is that campaign information affects decision rules independently of political perceptions. There is ample evidence that this was the case in 1988. Bush consistently had an advantage over Dukakis on ideology, and the Bush campaign hammered that message home.[12] Bush pejoratively labeled

Issues variable (not interacted) is significant in this model, while it is not significant in Table 4. Other than the Reagan Feelings variable described above, there were no other substantive differences between the two models.

[12]This can be seen in Figures 3 and 4. Bush's squared distance hovered around 3, while Dukakis's hovered around 4.5.

Dukakis as a "liberal" and a "card-carrying member of the A.C.L.U.," and Bush criticized Dukakis's veto of a Massachusetts bill requiring the pledge of allegiance. Bush used TV ads to pin Dukakis with responsibility for the fouling of Boston Harbor and the malfunctioning of the Massachusetts prison furlough program. Bush also benefitted from (but did not directly sponsor) advertising and TV coverage of the Massachusetts furlough program's most famous alumnus, Willie Horton. Tubby Harrison, polling consultant for Dukakis, described the result (Germond and Whitcover 1988):

> The liberal-conservative ideology became a very important factor, perceived ideology became a very important factor and that's what you're basically talking about. You're talking about pledge [of Allegiance], you're talking about defense ... That whole thing is "The Liberal" and the liberal who is soft on crime, soft on defense.

Had Harrison been prone to using the language of political methodology, he might have said that the marginal effect of ideological distance from Dukakis increased during the 1988 campaign, as Figures 5 and 8 confirm.

Bush's campaign was effective not because it changed individual's ideological distance from Dukakis – it did not. Instead, it made these dimensions, where Bush had a comparative advantage, more relevant for individual voting decisions. As an example, Ed Rollins discussed the furlough issue, and expressed the insight that the campaign was not only about raising negatives, it was about exploiting those that already existed (Runkel 1989, 126):

> The reason the [furlough] issue worked and worked so effectively was ... it reinforced the negative impression that people had about Dukakis, that he was a Massachusetts liberal who was against the death penalty and soft on crime.

The Bush campaign recognized what the Dukakis campaign did not – that a candidate can achieve an electoral advantage by finding and exploiting the choice dimensions that provide a comparative advantage.

A corollary of this notion is that response by Dukakis to Bush's issues was largely futile. The theoretical and empirical evidence presented in this paper, and anecdotal evidence from the campaign managers, indicate that this was indeed the case. Bush did not change the public's average ideological distance from Dukakis (see Figure 4), and it seems unlikely that Dukakis could have succeeded in overcoming his ideological disadvantages. Bush succeeded in making these disadvantages more relevant for individual decisions, but Dukakis could not have gained from engaging Bush on this particular battleground. In section three I showed that additional information about a choice dimension – regardless of whether that information came from Bush or from Dukakis himself – made that dimension more relevant for individual voting decisions. In the case of ideology, the result would have been further erosion in Dukakis's support.

Instead, as Susan Estrich recognized, fertile electoral territory lay elsewhere, and responding to Bush's issues was not as effective as creating new issues would have been (Runkel 1989, 255):

> Now, I think a more effective response might have been a counterattack on something else, on a different topic. My own view was that the best you could do on furloughs was respond to it effectively. Ultimately, if the debate was a debate about furloughs, we weren't going to win that. We had to be debating something else, whether it was Iran-Contra or Noriega or Dan Quayle or the cost of George Bush's house in Kennebunkport.

Lee Atwater concurred (Runkel 1989, 112):

> What I was worried about, I think we were all worried about: It was obvious that the Dukakis campaign was going to try not to allow issues to drive the campaign, to try to make competence or some other obscure issue drive the campaign. If they were able to do that, they would have won.

But instead of utilizing such strategies, Dukakis ceded control of the agenda, and the election, to Bush. Atwater, during the campaign, and Estrich, afterwards, recognized the truth of Schattschneider's dictum: "he who determines what politics is about runs the country."

Late in the campaign, Dukakis ran ads criticizing political handlers (Runkel 1989, 157-58; Germond and Whitcover 1988, 411) and finally found an issue that resonated with the American public. Bush's campaign tactics enabled him to define the debate and his opponent, but they had unintended consequences. Figure 1 indicates that the level of feelings about Bush declined as the campaign progressed, and Figures 6 and 9 show that the effects of these feelings became more important. Even when Bush's personality was not directly at issue, his campaign style provided information about his character, and affected the nature of individual decisions.

In the end, though, Bush's negative campaigning strategy worked, or at least it did not backfire. As Susan Estrich put it (Runkel 1989, 9):

> In the last few weeks of the campaign [Bush] may have paid some price for running a negative campaign, but he paid a much smaller price than Michael Dukakis did.

Estrich recognized the efficacy of Bush's strategy, and the missed opportunities for Dukakis (Runkel 1989, 128):

> Should we have adopted the same approach? Not the same issues, obviously. Our issues would be different against them, but it would be the same kind of negative campaign. We did the same polling and focus groups they did. We made a decision, however, to run a positive campaign on a different set of issues. That may have been a mistake, but our approach was not the same as theirs.

The approach was not the same, and neither was the result. Instead of his double-digit summertime lead over Bush, Dukakis on election day found himself with a seven-point deficit in the only survey that really mattered.

The 1984 election was quantitatively and qualitatively different from the 1988 election. Reagan vs. Mondale was a contest that pitted a popular and well-known incumbent against a challenger who, it seems, never really had a chance. In a June 23, 1984 memo Lee Atwater wrote that, "in a very real sense, the election is over." (Germond and Whitcover 1984, 466) With an apparent lock on the electoral college, Reagan could pursue a strategy of "aloof and insulated incumbency" that Mondale could never effectively challenge. Reagan, and to a lesser extent Mondale, were well-known quantities even before the fall campaign. Reagan and Mondale, unlike Bush and Dukakis, did not have the same opportunity to define themselves, or each other. Table 4 corroborates this story nicely. Most of the dimensions of choice were significant throughout the fall campaign, and there were only minor temporal effects. With a large store of existing information, new information disseminated during the fall campaign could have only scant effect.

But Reagan, through his actions, was delivering messages that were important to the American public. The most compelling drama in the 1984 election involved "the age issue." Reagan's rambling and generally lackluster performance in the first debate had led to questions about whether he was able to execute the responsibilities of the presidency (Abramson, Aldrich, and Rohde 1984, 58). Mondale tried to exploit this in the second debate, but instead ended up on the wrong end of perhaps the most effective one-liner in American political history as the age issue almost totally disappeared.[13] Reagan, rambling in the first debate but strong in the second, left the electorate with mixed messages – and therefore more uncertain information. As this happened, feelings toward Reagan became less relevant to vote choices.

It perhaps should not be so surprising that this decreasing salience occurs on the feeling dimension as opposed to, say, the issue or ideological dimensions. Mixed signals about character, indirectly sent, would be immune to the charges of "flip-flopping" that would bedevil a candidate who sent distinct and contradictory messages about issues or ideology. Reagan sent affective information through the nature of his campaign, and, like Bush in 1988, felt the unintended consequences. Candidates send messages *indirectly, through their actions,* and the evidence indicates that voters are attentive to these messages. Campaigns, like all human activities, are a mixture of deliberate and unintended effects.

8. Conclusion

This paper has demonstrated that information in presidential campaigns alters individual decision making by changing the ways that individuals combine information across the relevant dimensions to make electoral choices. In section three I showed that changes in beliefs and changes in decision parameters are theoretically distinct. This was confirmed by the empirical results of sections four and five, where for certain dimensions parameters changed over time but aggregate beliefs did not.

There are ample opportunities for further research in this regard. It will be worthwhile to analyze other elections, to more effectively discern the contextual effects upon individual decision making.[14] The results on individual differences

[13]Reagan, responding to a question about how well he could function in a crisis situation, said "I will not make age an issue in this campaign. I am not going to exploit, for political purposes, my opponent's youth and inexperience."

[14]To move beyond 1984 and 1988, in either direction, will require models for dealing with three-candidate elections. As expressed in Appendix B, modeling abstention is as important as modeling vote choice, but with three candidates the unidimensional scale used in this paper is inadequate. Instead, it is necessary for individuals to make three pairwise comparisons, and

in temporal effects are preliminary, and further research in this regard holds the promise of theoretical and empirical progress. Section six hints that uncertainty may actually increase over time if there are contradictory messages, and more analysis of this effect is necessary to determine whether it is an interesting anomaly, a persistent result, or a statistical artifact. Finally, I intend to pursue the trail of the changing intercept, to discern whether these effects are caused by the campaign or occur independently of candidate actions.

Loose ends remain, of course, and preliminary answers have bred important new questions. For now, though, this study has reduced some of the uncertainty about the nature of campaign effects upon electoral decisions. By linking dynamic uncertainty with multidimensional candidate choices, I have described the evolution of individual decision making during presidential campaigns. My theoretical model indicates that the dynamic information environment during a campaign alters the ways in which individuals combine information to make decisions. Empirical tests confirm this hypothesis, as parameters and marginal effects change for certain dimensions. Finally, these effects have substantive explanations, as the precise nature of the changes depends upon the context of a particular campaign.

A. Propositions and Proofs

The model presented here is a spatial model of expected utility maximization. Each voter's utility for each candidate (candidates are labeled $j \in \{j_1, j_2\}$) is a weighted linear combination of the Euclidean distance between the voter's ideal point and the candidate's position on each relevant dimension. The variable y^* discussed in this section represents voter *i's* candidate utility differential, or $U_i(j_1) - U_i(j_2)$. This section is concerned with the nature of the theoretically important (but empirically unobserved) variable y^*.

If voters are uncertain about candidate positions due to perceptual uncertainty, and this perceptual uncertainty changes over time, then voter i's reported placement of candidate j on dimension k at time t must be expressed as:

$$\hat{\theta}_{ijkt} = \bar{\theta}_{ijkt} + \varepsilon_{ijkt} \tag{A.1}$$

evaluate whether the expected utility differentials exceed the relevant thresholds of indifference. To model this, I plan to use a variant of McFadden's random utility model (which would ordinarily lead to the multinomial logit model), in which choice probabilities depend upon both utilities and indifference thresholds.

where ϵ is a disturbance term that can vary over time.[15] Each individual makes vote decisions based upon the following latent utility variable (subscript i dropped for convenience):

$$y^* = \alpha^* + ... + \beta^*_{jk}(X_k - \bar{\theta}_{jkt})^2 + ... + \nu \tag{A.2}$$

where X_k is voter i's ideal point on dimension k, ν is a random disturbance, and β^*_{jk} is constant for all i, t.

The hypothesis here is that the difference between the mean of an individual's candidate placement and the individual's ideal point has a constant effect upon expected utility. A mean distance of one unit always has the same effect on expected utility, and a two-unit distance always has four times the effect of a one-unit distance. Voters, while recognizing that their perceptions are uncertain, would like for uncertainty to be irrelevant to their decision making.

But if a voter reports her perecptions using equation (A.1) we cannot estimate model (A.2), since $\bar{\theta}_{jkt}$ is unobserved. Instead, we must use the following model, which uses $\hat{\theta}_{jkt}$ directly:

$$y^* = \alpha + ... + \beta_{jkt}(X_k - \hat{\theta}_{jkt})^2 + ... + \nu \tag{A.3}$$

Note that in model (A.3), β_{jkt} is not necessarily constant for all t. The challenge now is to use a decision-making model like (A.3) to estimate a behavioral process like (A.2).

There are two related justifications for model (A.3). The first is the idea presented above, that voters report perceptions using (A.1), making (A.3) the only model available to researchers. This begs the question of why voters report $\hat{\theta}_{ijkt}$ instead of $\bar{\theta}_{ijkt}$, when the latter is directly relevant to their decision calculus as expressed in (A.2) and the former is not. The answer is part of the second justification for model (A.3), that voters know $\hat{\theta}_{ijkt}$ but not $\bar{\theta}_{ijkt}$. That is, the voter may say, "I place Bush at 4 on the ideology scale," but recognize that this placement is composed of a "true" placement (which would presumably be known to the voter with sufficiently precise information), and some random component representing the fact that information is imprecise.

Even if the voter knows $\hat{\theta}_{ijkt}$ and σ^2_{jkt}, she cannot determine $\bar{\theta}_{ijkt}$ exactly, but only as a probability distribution. The expected value of this distribution is, of

[15]Equation A.1 follows Bartels's (1986, 710) model of perceptual uncertainty. Note also that $\bar{\theta}_{ijkt}$ (and even X_k) can also vary across t, but as shown later in this section, the process of parameter change depends only upon ε_{ijkt}.

course, $\hat{\theta}_{ijkt}$ (since $\bar{\theta}_{ijkt} = \hat{\theta}_{ijkt} - \varepsilon_{ijkt}$, and $E(\varepsilon_{ijkt}) = 0$), and confidence intervals will shrink with increasing information. Viewed this way, we have not learned anything about the differences between (A.2) and (A.3). But $E(X_{ik} - \hat{\theta}_{ijkt})^2 = (X_{ik} - \bar{\theta}_{ijkt})^2 + \sigma^2_{jkt}$, so $\hat{\theta}_{ijkt}$ and $\bar{\theta}_{ijkt}$ are not identical from an expected utility percpective. Also, as shown below, σ^2_{jkt} depends upon $\bar{\theta}_{ijkt}$, and this endogeneity makes precise determination of $\bar{\theta}_{ijkt}$ impractical.

The virtue of equation (A.3), and the results of Proposition 1 (see below), is that the voter (and the researcher) does not need to recover $\bar{\theta}_{ijkt}$, but can satisfy the assumptions in model (A.2) using only $\hat{\theta}_{ijkt}$ and $I_{jk}(t)$ (again, see below).

The model discussed above is mathematically tractable, but it is also behaviorally plausible. Rather than attempting to extract $\bar{\theta}_{ijkt}$ from $\hat{\theta}_{ijkt}$ and σ^2_{jkt}, the voter is required merely to adjust β_{jkt} to account for changing information.

To do so, it is necessary to specify a form for the variance of ε in (A.1). I make the following assumptions:

A1) $\varepsilon_{ijkt} \,\tilde{}\, N(0, \sigma^2_{jkt})$

A2) $\sigma^2_{jkt} = \dfrac{\delta(X_k - \bar{\theta}_{jk})^2}{I_{jk}(t)}, I_{jk}(t) > 0, \delta > 0$

Assumption A1 states that the variance of ε varies with time, but is constant across individuals.[16] Assumption A2 describes the relationship between time and variance, and is loosely based on Enelow and Hinich (1981). Since $\delta > 0$, variance increases with distance from the individual's ideal point. This is reasonable for three related reasons. First, a rough placement of a candidate as "far away" will be relatively imprecise. Second, since risk-averse voters shy away from uncerainty, placement of a candidate at or near the voter's ideal point would not happen without a relatively large amount of information. This may not be the case when we have projection or persuasion effects (Brody and Page 1972), but A2 is reasonable even given this reversal of causation (where the voter chooses between candidates before fully evaluating their traits). A voter will project, or be persuaded, only if she is "certain" of her candidate choice, and A2 captures this notion of certainty.

The other innovation is that the variance of candidate placements changes with the amount of information available. The function $I_{jk}(t)$ represents the cumulative amount of information available about candidate j on dimension k at

[16] I will later relax the assumption of constant variance across individuals. Also see Zaller (1989, 1992) for ample evidence that individuals are affected differently by information, and Franklin (1991) for evidence that the variance of individual perceptions depends upon individual demographic characteristics. I have postponed consideration of these effects because my main purpose here is to explore temporal effects, independent of any other effects.

time t. This characterization of the belief distribution is consistent with Bayesian updating of prior beliefs with new information, but has some distinctive features. It is not particularly concerned with the updating of beliefs (that is, the mean of the distribution), instead considering the mean fixed for a given point in time. More importantly, this specification allows the variance of individual perceptions to increase if individuals have less information, which Bayes's rule does not. Nevertheless, the basic intuition is the same: individuals are more certain if they have more information, and less certain if they have less information.[17]

Given equations (A.1) through (A.3), and assumptions A1 and A2, the following proposition is true:

Proposition 1 For all j,k there exists a function $R_{jk}(t)$ such that $\beta_{jkt} = R_{jk}(t) * \beta_{jk0}$. Further, if $I_{jk}(t) > 0$, $\frac{\partial I_{jk}(t)}{\partial t} \geq 0 \; \forall t$, then $R_{jk}(t) \geq 1$, and $\frac{\partial R_{jk}(t)}{\partial t} \geq 0$.

Proof:

From (3), $y^* = \alpha + ... + \beta_{jkt}(X_k - \hat{\theta}_{jk})^2 + ... + \nu$

Without loss of generality, consider the expected utility derived by individual i from candidate j along dimension k at time t (subscript i omitted):

$\beta_{jkt}E(X_k - \hat{\theta}_{jkt})^2$

$= \beta_{jkt}E(X_k - (\bar{\theta}_{jkt} + \varepsilon_{jkt}))^2$, from (1)

$= \beta_{jkt}E(X_k^2 - 2X_k\bar{\theta}_{jkt} - 2X_k\varepsilon_{jkt} + \bar{\theta}_{jkt}^2 + 2\bar{\theta}_{jkt}\varepsilon_{jkt} + \varepsilon_{jkt}^2)$

$= \beta_{jkt}E(X_k^2 - 2X_k\bar{\theta}_{jkt} + \bar{\theta}_{jkt}^2 + \varepsilon_{jkt}^2)$, since $E(\varepsilon_{jkt}) = 0$

$= \beta_{jkt}((X_k - \bar{\theta}_{jkt})^2 + \sigma_{jkt}^2)$, from A1

$= \beta_{jkt}((X_k - \bar{\theta}_{jkt})^2 + \frac{\delta(X_k - \bar{\theta}_{jkt})^2}{I_{jk}(t)})$, from A2

$= \beta_{jkt}(1 + \frac{\delta}{I_{jk}(t)})(X_k - \bar{\theta}_{jkt})^2$

From (3.2), $\beta_{jkt}(1 + \frac{\delta}{I_{jk}(t)}) = \beta_{jk}^* \; \forall t$

[17]In the special case where the cumulative amount of information is always increasing, the specification above is equivalent to Bayes's Rule (for normally distributed priors and sample data from a normal distribution) as long as individuals use Bayes's Rule in such a way that the variance of the sample mean is inversely proportional to the amount of information in the sample (See Iversen 1984 for more information). The Central Limit Theorem makes these assumption quite plausible.

The concept of having less information is not defined with Bayes's rule (where the variance of an estimate can never decrease). This notion is perhaps pathological, but as seen in section six, not impossible.

So $\beta_{jkt}(1+\frac{\delta}{I_{jk}(t)}) = \beta_{jk0}(1+\frac{\delta}{I_{jk}(0)})\ \forall t$

$$\frac{\beta_{jk0}}{\beta_{jkt}} = \frac{(1+\frac{\delta}{I_{jk}(t)})}{(1+\frac{\delta}{I_{jk}(0)})} = S_{jk}(t)$$

$0 < S_{jk}(t) \leq 1$ when $I_{jk}(t) \geq I_{jk}(0) > 0$ (assume $I_{jk}(t)$ is differentiable everywhere).

Further, $\frac{\partial S_{jk}(t)}{\partial t} = \left(1+\frac{\delta}{I_{jk}(0)}\right)^{-1}\left(\frac{-\delta}{(I_{jk}(t))^2}\right)\frac{\partial I_{jk}(t)}{\partial t} \leq 0$ if $\frac{\partial I_{jk}(t)}{\partial t} \geq 0$

Let $R_{jk}(t) = \frac{\beta_{jkt}}{\beta_{jk0}} = (S_{jk}(t))^{-1}$. Since $0 < S_{jk}(t) \leq 1$ when $I_{jk}(t) \geq I_{jk}(0) > 0$, if $I_{jk}(t) > 0, \frac{\partial I_{jk}(t)}{\partial t} \geq 0\ \forall t$, then for all t, $R_{jk}(t) \geq 1$, and $\frac{\partial I_{jk}(t)}{\partial t} \geq 0$. Q.E.D.

Note that $R_{jk}(t) = 1$ if $\frac{\partial I_{jk}(t)}{\partial t} = 0$. □

Proposition 1 states that each voter's decision calculus, measured by the coefficients in model (A.3), changes with time to negate the effects of uncertainty. If β_{jkt} did not vary with t, equation (A.3) would give greater weight to the utility from dimension k when the variance is larger. To ensure that this weight remains constant as required by the decision making assumptions in (A.2), the coefficients in model (A.3) must increase as information becomes more certain, and variance decreases. As long as the amount of information always (weakly) increases with time, Theorem 1 states that later coefficients will have (weakly) greater magnitude than earlier coefficients.[18] Note that this proposition is true solely because of the changes in variance over time, and is independent of the changes (if any) in the individual or aggregate values of the independent variables.

In the special case where the cumulative amount of information changes linearly with time, the following proposition is true:

Proposition 2 If $I_{jk}(t) = I_{jk}(0) + \eta_{jk} * t$, then $\beta_{jkt} \approx (1+\gamma_{jk}t) * \beta_{jk0}$, where γ_{jk} is a constant , $\gamma_{jk} = 0$ if and only if $\eta_{jk} = 0$, $\gamma_{jk} \geq 0$, $\frac{\partial \gamma_{jk}}{\partial \eta_{jk}} \geq 0$.

If $I_{jk}(t) = I_{jk}(0) + \eta_{jk}t$, then:

[18]Strictly speaking, negative coefficients will be smaller (i.e., more negative) for larger t. They will have larger absolute value, however, leading to greater influence.

$$\frac{\beta_{jkt}}{\beta_{jk0}} = \frac{(1+\frac{\delta}{I_{jk}(0)})}{(1+\frac{\delta}{I_{jk}(0)+\eta_{jk}t})} = R_{jk}(t).$$

By a Taylor series expansion of $R_{jk}(t)$ about $t = t^*$, we have[19]:

$R_{jk}(t) \approx R_{jk}(t^*) + (t-t^*)\frac{\partial R_{jk}(t)}{\partial t}_{t=t^*}$

where $R_{jk}(t^*) \geq 1$, $\frac{\partial R_{jk}(t)}{\partial t}_{t=t^*} \geq 0$ from the proof of Proposition 1 above.

Let $\zeta_{jk} = R_{jk}(t^*)$, $\gamma_{jk} = (t-t^*)\frac{\partial R_{jk}(t)}{\partial t}_{t=t^*}$

As above, $\beta_{jkt} \approx ((\zeta_{jk} - \gamma_{jk}t^*) + \gamma_{jk}t)\beta_{jk0}$. Initial conditions require that $(\zeta_{jk} - \gamma_{jk}t^*) = 1$,

So $\beta_{jkt} \approx (1+\gamma_{jk}t)\beta_{jk0}$, or $\beta_{jkt} \approx \beta_{jk0} + \gamma_{jk}\beta_{jk0}t$, where $\gamma_{jk} \geq 0$.

Further, $\gamma_{jk} = \frac{\partial R_{jk}(t)}{\partial t}_{t=t^*} = (1+\frac{\delta}{I_{jk}(0)})(1+\frac{\delta}{I_{jk}(0)+\eta t^*})^{-2}(I_{jk}(0)+\eta t^*)^{-2}(\delta)(\eta_{jk})$,

so $\frac{\partial \gamma_{jk}}{\partial \eta_{jk}} > 0$, and for $\delta > 0$ (as assumed in A2), $\gamma_{jk} = 0$ if and only if $\eta_{jk} = 0$.

□

As in the general case above, Proposition 2 states that later coefficients have larger magnitude than earlier coefficients (as long as information is strictly increasing). Further, the magnitude of the coefficients increases more rapidly if the rate of information dissemination is higher.

Given Proposition 2, equation (A.3) can be expressed as:

$$y^* = \alpha + ... + \beta_{jk0}(1+\gamma_{jk}t)(X_k - \hat{\theta}_{jkt})^2 + ...\nu \qquad (A.4)$$

$$= \alpha + ... + \beta_{jk0}(X_k - \hat{\theta}_{jkt})^2 + \gamma_{jk}\beta_{jk0}(X_k - \hat{\theta}_{jkt})^2 t + ...\nu \qquad (A.5)$$

The most important implication is that the marginal effect of $\hat{\theta}_{ijk}$ on y^* changes with time as β_{jkt} changes. Further, we have a model that accounts for these changing marginal effects, and can be easily estimated. For each dimension k where the amount of information changes during a campaign, we can estimate the changing marginal effect of $\hat{\theta}_{ijk}$ on y^* by including both $(X_k - \hat{\theta}_{jk})^2$ and $t * (X_k - \hat{\theta}_{jk})^2$ as independent variables.[20] As noted in Proposition 2, these temporal

[19]Note that the use of the Taylor series expansion is a device to derive the time-interactive model of sections four and six from the behavioral assumptions of section three. Therefore t^* is arbitrary, and does not appear directly in the models estimated in section .

[20]Note also that $\frac{\partial y^*}{\partial t} = 0$ if $\gamma_{jk} = 0$ for all j,k.

effects follow directly from the dissemination of information about a particular choice dimension.[21]

B. Construction of Variables

B.1. Dependent Variable

As discussed in Appendix A above, even if we are only interested in how individuals decide between candidates, we cannot adequately model voting without also modeling abstention, and we cannot fully understand preference without also understanding indifference.

Downs (1957, 265) recognized that individuals will vote only if the expected utility difference between the two candidates exceeds some threshold. Below this threshold, an individual will not be willing to incur the costs of voting in order to receive the expected benefits. Downs's contribution is that he models turnout and vote decisions as economic decisions, where actions depend upon the interaction of costs and benefits. The turnout issue has vexed rational choice theorists ever since Downs (see Riker and Ordeshook 1968, Barry 1970, Ferejohn and Fiorina 1975, Ledyard 1984), and the current state of the field is that it is not clear exactly how costs, benefits, and probabilities should be combined in models of turnout (Aldrich 1993). Here, I will presume that voting is an act with *some* costs and *some* benefits, with the precise source of each not precisely determined.

Empirically, we have a latent utility variable $y^* = U_i(j_2) - U_i(j_1)$ that represents the expected utility difference between the two candidates. Each individual uses a decision rule as follows:

vote for j_1 if $y^* < \mu_1$
abstain if $\mu_1 \leq y^* \leq \mu_2$
vote for j_2 if $y^* > \mu_2$

If we presume that $y^* = X\beta + \varepsilon$,where ε ˜ $N(0,1)$,then we have an ordered probit model, (where $\Phi(z)$ represents the cumulative normal distribution at z):

[21] Before going further, I should elaborate on a subtle but important point. Individual electoral decisions are continually evolving, and all individuals are always subject to the temporal effects discussed in section three. In other words, we may see an individual interviewed at time t_1 with parameter vector β, independent variables X_k, and decision y, but any of these elements can change if we interview the same individual at a later time. Incorporating the date of the NES interview (as in sections four, five, and six) provides a snapshot into individual decisions at that time, but the fact of being interviewed by the NES does not serve to fix any of an individual's decision parameters.

P(vote j_1) = $\Phi(\mu_1 - X\beta)$
P(abstain) = $\Phi(\mu_2 - X\beta) - \Phi(\mu_1 - X\beta)$
P(vote j_2) = $1 - \Phi(\mu_2 - X\beta)$

There are two main conclusions to be drawn from this specification. First, nonvoters are subject to the same decision process as voters, and hence are theoretically and empirically interesting. Further, all electoral behavior (that is, voting and abstention) can be accounted for using an ordered probit model (Amemiya 1985, 292-93).

More importantly, if we truncate the electoral sample by including only voters, we will suffer from a form of sample selection bias, and commit some important modeling errors. Even if we are only interested in candidate choices among voters, the usual binary probit model misspecifies the choice probabilities. The ordered probit model specified above has

$$P(vote\ j_1 |\ vote\ j_1\ or\ vote\ j_2) = \frac{\Phi(\mu_1 - X\beta)}{\Phi(\mu_1 - X\beta) + 1 - \Phi(\mu_2 - X\beta)} \tag{B.1}$$

However, a bivariate probit model will requre:

$$P(vote\ j_1 |\ vote\ j_1\ or\ vote\ j_2) = \Phi(\mu - X\beta') \tag{B.2}$$

Hence the likelihood function is misspecified *even in the sample of voters,* and β' will not consistently estimate β.[22] To put it another way, ignoring the middle category of nonvoters causes serious problems for parameter estimates. Therefore, even in two candidate races, it is important to explicitly model the third choice – abstention.

The fourth and fifth categories are relevant because even within the sample of non-voters, some individuals may have candidate preferences that are expressed in surveys, but not expressed at the polling place. Deacon and Shapiro (1975) develop a model of voting behavior in California referenda. They argue that voters, even once they are in the voting booth, will abstain from voting on a proposition if the utility difference between the alternatives is not sufficiently large. Of course, as discussed above, this condition is not easily satisfied; getting voters into the voting

[22]Note that when $\mu_1 = \mu_2$ equations (B.1) and (B.2) are identical. This makes perfect sense. The case $\mu_1 = \mu_2$ arises only when all individuals vote, so there are no nonvoters to wrongly ignore.

booth (in theory, or in practice) requires more than an assumption. This result is important because it is analogous to another costless decision – the decision of an individual to support a candidate, or express a preference for a candidate on a survey (Ansolbahere and Brady 1989). Even nonvoters can have preferences, if the perceived utility difference is sufficiently large, and modeling these can provide additional information about the parameters individual decisions.

Combining Downs's (1957) model of costly decisions with Deacon and Shapiro's (1975) insight about costless decisions, it is clear that there are two relevant thresholds for each candidate. An individual will express a preference for candidate j_1 over candidate j_2 if the perceived utility difference y^* exceeds the first threshold, and will vote for j_1 over j_2 if y^* exceeds the second, larger, threshold. This model of individual decision can be estimated by an ordered probit model with five categories. For the purposes of analysis I will often estimate a five category model but collapse the three middle categories into a single category of abstention. Nevertheless, the conceptual, theoretical and empirical distinction between categories remains important.

Given the theory presented above, individuals were assigned to categories as follows (1988):

y=0: Vote Dukakis - Preference for Dukakis at first interview, validated vote. n=478

y=1: Prefer Dukakis, not vote- Preference for Dukakis at first interview, no validated vote. n=349

y=2: No Candidate Preference - Indifferent at first interview. n=303

y=3: Prefer Bush, not vote - Preference for Bush at first interview, no validated vote. n=379

y=4: Vote Bush - Preference for Bush at first interview, validated vote. n=531

This assignment to categories was not without controversy. Regardless of their preferences or their vote intentions, individuals were assigned to the Vote categories only if their vote was validated by the NES. In the 1988 pre-election interview 179 individuals expressed an intention to vote but did not express a preference for either candidate. Since the theory presented above does not allow the possibility of voting without candidate preference, these individuals were assigned to the Indifference category. Further, 185 individuals switched their preferences from the pre-election to the post-election interview, and 83 of these claimed to have voted for a candidate other than the one they preferred in the pre-election interview. These individuals were assigned to categories based on their pre-election preference and their validated vote, as presented above. This was done for two reasons. First, individuals who actually voted were seen as having credible intentions to vote. Second, pre-election preference was considered more important, since I am most interested in individual behavior at the time of the first interview, and how decisions change during the campaign.

Category populations for 1984 were as follows:

y=0: Vote Mondale. n=493

y=1: Prefer Mondale, not vote. n=321

y=2: No Candidate Preference. n=307

y=3: Prefer Reagan, not vote. n=417

y=4: Vote Reagan. n=719

B.2. Independent Variables

Variable numbers (Vxxx) refer to the relevant National Election Study.

B.2.1. 1988

PARTY ranges from -3 (Strong Democrat) to 3 (Strong Republican). PARTY=(v274-3). Missing values set to 0.

REAGAN APPROVAL built from V140 and V141.

IDEOLOGY. Respondent ideology constructed from seven point scale of V228 and three point scale of V229. One point on the V229 scale was considered equivalent to one-half point on the seven point IDEOLOGY scale, built from V228. Candidate ideology taken from V231, V232. Candidate ideological distance was set to 0 if either respondent or candidate ideology was missing.

FEELINGS. Built from V214-V217 for Bush, V218-V221 for Dukakis. Each positive affective response was worth 0.25, each negative affective response was worth -0.25, all other responses were worth 0. FEELINGS variables use distance from an ideal candidate, whose position on the FEELINGS variable is 1 (4 positive feelings, 0 negative feelings).

THOUGHTS. Built from V275-V283 for Bush, V284-V292 for Dukakis. Each positive response was worth 0.4, each negative response was worth 0.1, and all other responses were worth 0.25. THOUGHTS variables use distance from an ideal candidate, whose position on the THOUGHTS variable is 3.6 (9 positive thoughts, 0 negative thoughts).

ISSUES. Built from V632 and V633 for Bush, V634 and V635 for Dukakis. the voter's ideal point is considered to be 1 for each variable. Missing values coded as 2.5. ISSUES variable is the square of the sum of both issue distances.

B.2.2. 1984

PARTY ranges from -3 (Strong Democrat) to 3 (Strong Republican). PARTY=(v318-3). Missing values set to 0.

IDEOLOGY. Respondent ideology taken from V122, Reagan ideology from V126, Mondale ideology from V130. Candidate ideological distance was set to 0 if either respondent or candidate ideology was missing.

FEELINGS. Built from V212-V215 for Reagan, V219-V222 for Mondale. Each positive affective response was worth 0.25, each negative affective response was worth -0.25, all other responses were worth 0. FEELINGS variables use distance from an ideal candidate, whose position on the FEELINGS variable is 1 (4 positive feelings, 0 negative feelings).

THOUGHTS. Built from V320, V321, V323, V324, V326, V327, V329, V330, V332 for Reagan, V336, V337, V339, V340, V342, V343, V345, V346, V348 for Mondale (some items from 1984 survey omitted because no equivalent items existed for 1988). Each positive response was worth 0.4, each negative response was worth 0.1, and all other responses were worth 0.25. THOUGHTS variables use distance from an ideal candidate, whose position on the THOUGHTS variable is 3.6 (9 positive thoughts, 0 negative thoughts).

ISSUES. Respondent position taken from V408, Reagan position taken from V409, Mondale position from V410. ISSUES set to 0 if either candidate or respondent placement was missing.

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TABLE 1

UNIVARIATE STATISTICS FOR INDEPENDENT VARIABLES AT THE BEGINNING AND END OF THE 1988 CAMPAIGN

		9/6 - 9/26		10/17 - 11/7	
	Min. Max	Mean	(Std. Dev.)	Mean	(Std. Dev.)
Party	-3,3	-0.103	(2.039)	-0.213	(2.071)
Reagan Approval	1,4	2.675	(1.137)	2.712	(1.144)
Dukakis Ideology	0,49	4.484	(7.081)	4.217	(6.779)
Bush Ideology	0,49	3.107	(5.842)	2.952	(5.435)
Dukakis Feelings*	0,4	1.079	(1.123)	1.253	(1.231)
Bush Feelings*	0;4	0.958	(1.013)	1.112	(1.136)
Dukakis Thoughts *	0,7.29	1.310	(0.987)	1.471	(1.021)
Bush Thoughts	0,7.29	1.522	(1.172)	1.586	(1.229)
Dukakis Issues	0,36	11.802	(8.390)	11.782	(8.092)
Bush Issues	0,36	9.888	(8.323)	10.029	(8.128)
n		748		601	

* means differ at .05 level, two-tailed

TABLE 2

PARAMETER ESTIMATES FOR 1988 TIME-INTERACTIVE MODEL

	COEFFICIENT	t-RATIO
One	0.587**	3.431
time trend, t	0.838**	2.154
Party	0.275**	18.301
Reagan Approval	0.170**	5.620
Dukakis Ideology	-0.0039	-0.440
Dukakis Ideology*t	0.060**	2.398
Bush Ideology	-0.0085	-0.726
Bush Ideology*t	-0.016	-0.488
Dukakis Feelings	0.214**	3.325
Dukakis Feelings*t	-0.052	-0.310
Bush Feelings	-0.085	-1.141
Bush Feelings*t	-0.305*	-1.655
Dukakis Thoughts	0.124*	1.835
Dukakis Thoughts*t	0.032	0.171
Bush Thoughts	-0.225**	-3.108
Bush Thoughts*t	0.299	1.558
Dukakis Issues	0.020**	2.434
Dukakis Issues*t	-0.013	-0.592
Bush Issues	-0.0076	-0.966
Bush Issues*t	-0.035*	-1.708
$\mu(0)$	0	-
$\mu(1)$	0.830**	20.235
$\mu(2)$	1.598**	30.886
$\mu(3)$	2.512**	44.708
n	2040	
−2*LLR	1776.6**	

** coefficient significant at p=.05, two-tailed

* coefficient significant at p=.10, two-tailed

% correctly predicted (5 categories): 50.5%

% correctly predicted (3 categories): 62.9%

TABLE 3

DESCRIPTION OF THE STRONGLY PRO-DUKAKIS VOTER (AND CHANGES), DESCRIPTION OF THE MODERATELY PRO-BUSH VOTER (AND CHANGES).

	D				B			
	[redacted]	D2	D3	D4	[redacted]	B2	B3	B4
Constant	1	1	1	1	1	1	1	1
Party	-2	-1	-2	-2	0.5	2.0	0.5	0.5
Reagan Approval	1	1	1	1	3	3	3	3
Dukakis Ideol.	4	4	9	4	4	4	9	4
Bush Ideol.	9	9	9	9	mean	mean	mean	mean
Dukakis Feelings	mean	mean	mean	mean	1.5	1.5	1.5	1.5
Bush Feelings	2.25	2.25	2.25	4	1	1	1	2.25
DukakisThoughts	mean	mean	mean	mean	2	2	2	2
Bush Thoughts	3	3	3	3	mean	mean	mean	mean
Dukakis Issues	mean	mean	mean	mean	13	13	13	13
Bush Issues	20	20	20	20	mean	mean	mean	mean

Note: "mean" equals the mean of the variable in question for the particular sample used. Underlined entries differ from the baseline models [redacted] D and B.

TABLE 4 - PARAMETER ESTIMATES FOR THE 1984 TIME-INTERACTIVE MODEL

	Coeficient	t-ratio
One	1.630**	11.571
t	-0.045	-0.119
Party	0.242**	16.200
Mondale Ideology	0.022**	3.702
Mondale Ideology*t	-0.022	-1.422
Reagan Ideology	-0.013**	-2.141
Reagan Ideology*t	0.0068	0.433
Mondale Feelings	0.164**	2.562
Mondale Feelings*t	0.188	1.165
Reagan Feelings	-0.333**	-5.348
Reagan Feelings*t	0.233	1.342
Mondale Thoughts	0.122**	2.508
Mondale Thoughts*t	-0.0045	-0.036
Reagan Thoughts	-0.198**	-3.821
Reagan Thoughts*t	-0.054	-0.368
Mondale Issues	0.0057	0.602
Mondale Issues*t	0.0069	0.280
Reagan Issues	-0.0046	-0.672
Reagan Issues*t	-0.013	-0.697
n	2257	
-2*LLR	1921.9**	

** coefficient significant at p=.05, two-tailed

% correctly predicted (5 categories): 50.8%
% correctly predicted (3 categories): 62.7%

Figure 1. Average Bush Feelings 1988 (showing 90% confidence intervals)

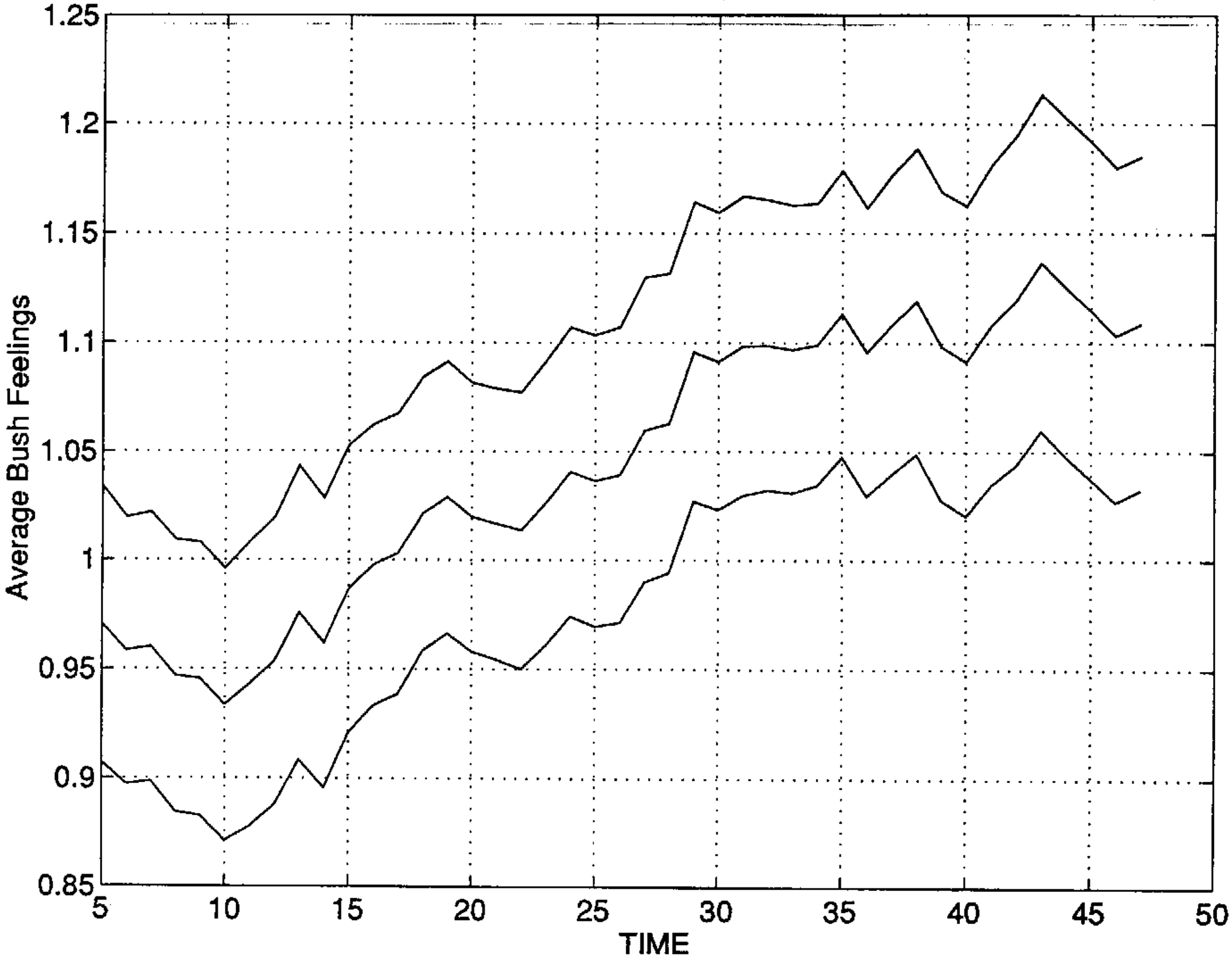

Figure 2. Mean Dukakis Feelings 1988 (showing 90% confidence intervals)

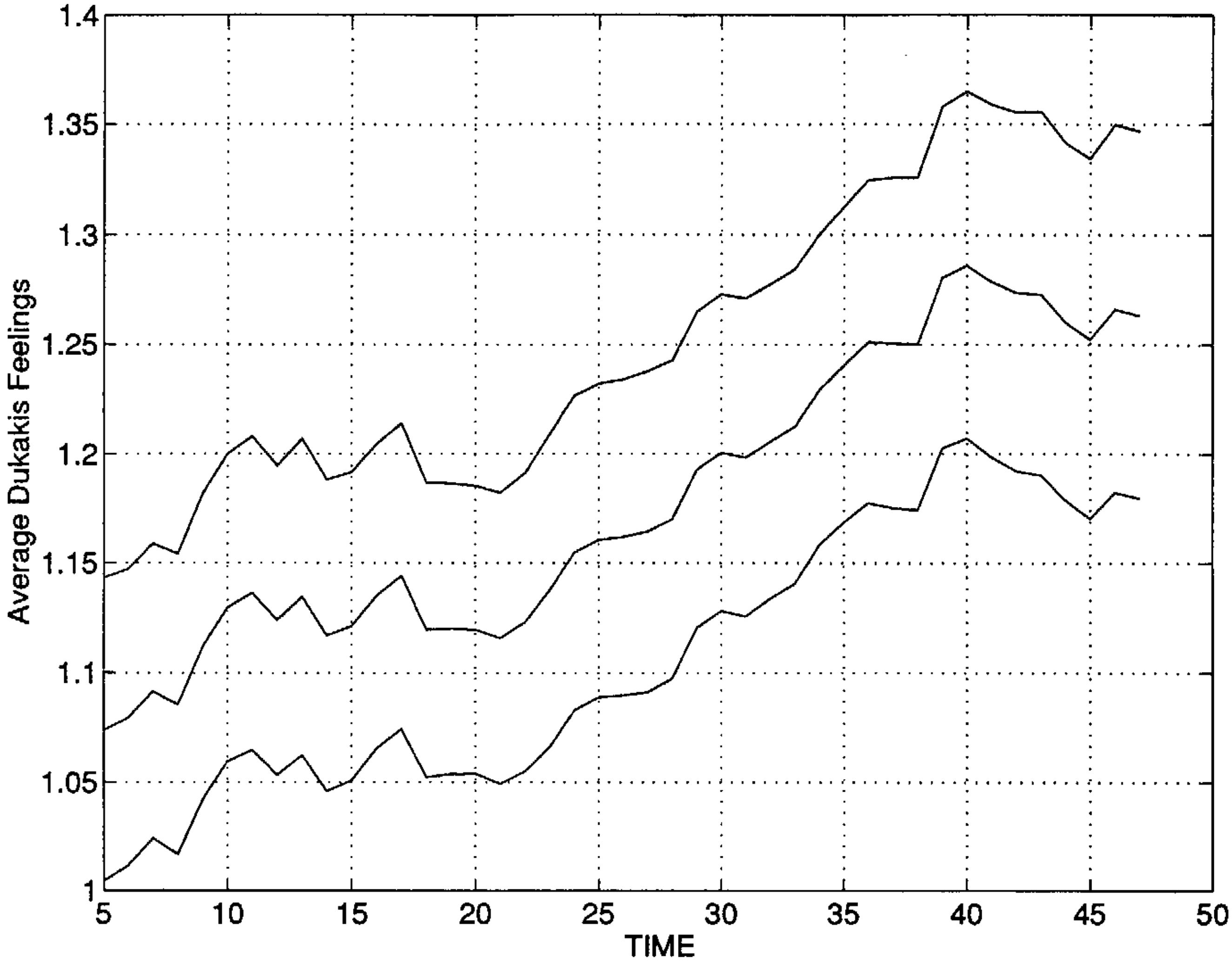

Figure 3. Average Bush Ideology 1988 (showing 90% confidence intervals)

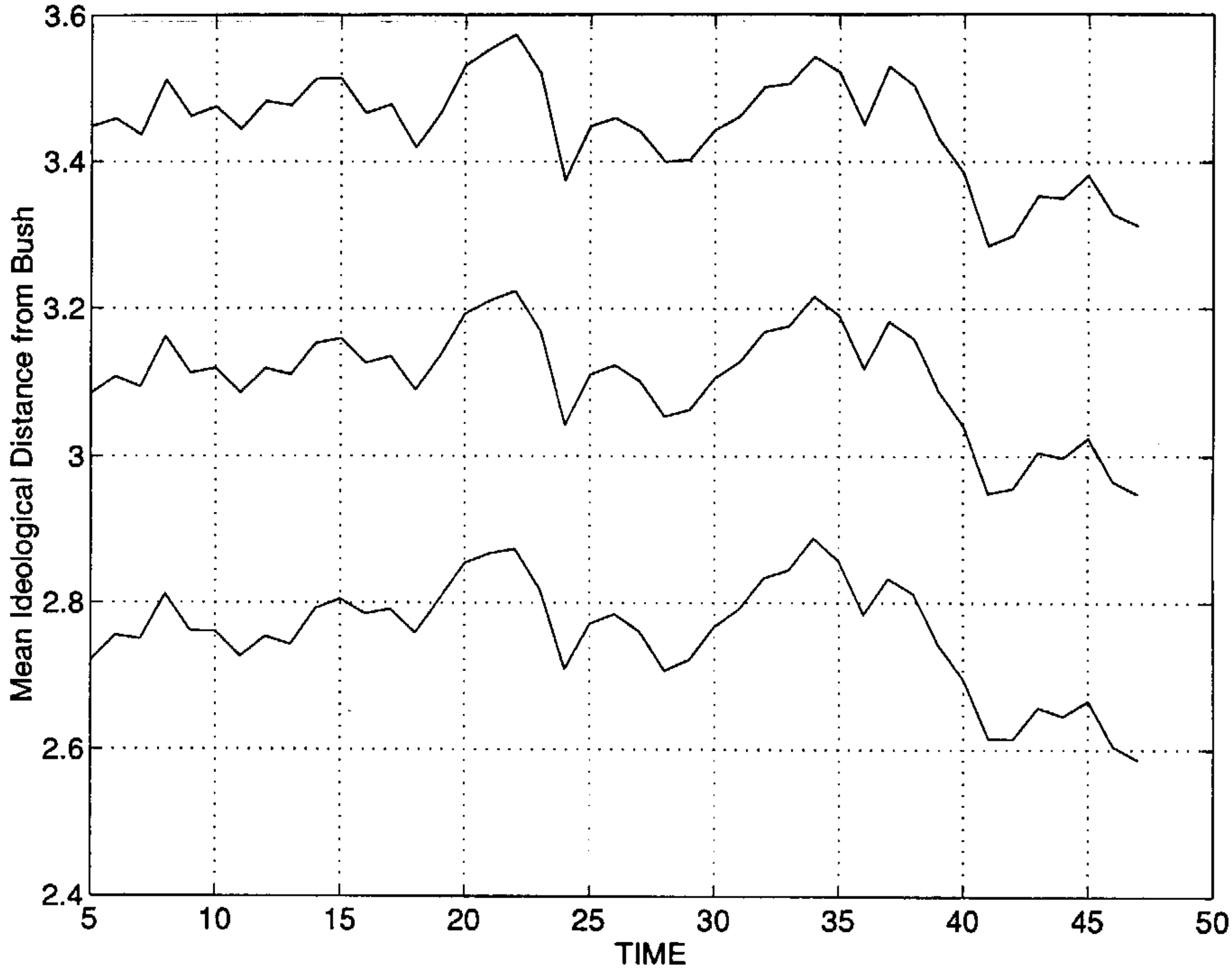

Figure 4. Mean Dukakis Ideology 1988 (showing 90% confidence intervals)

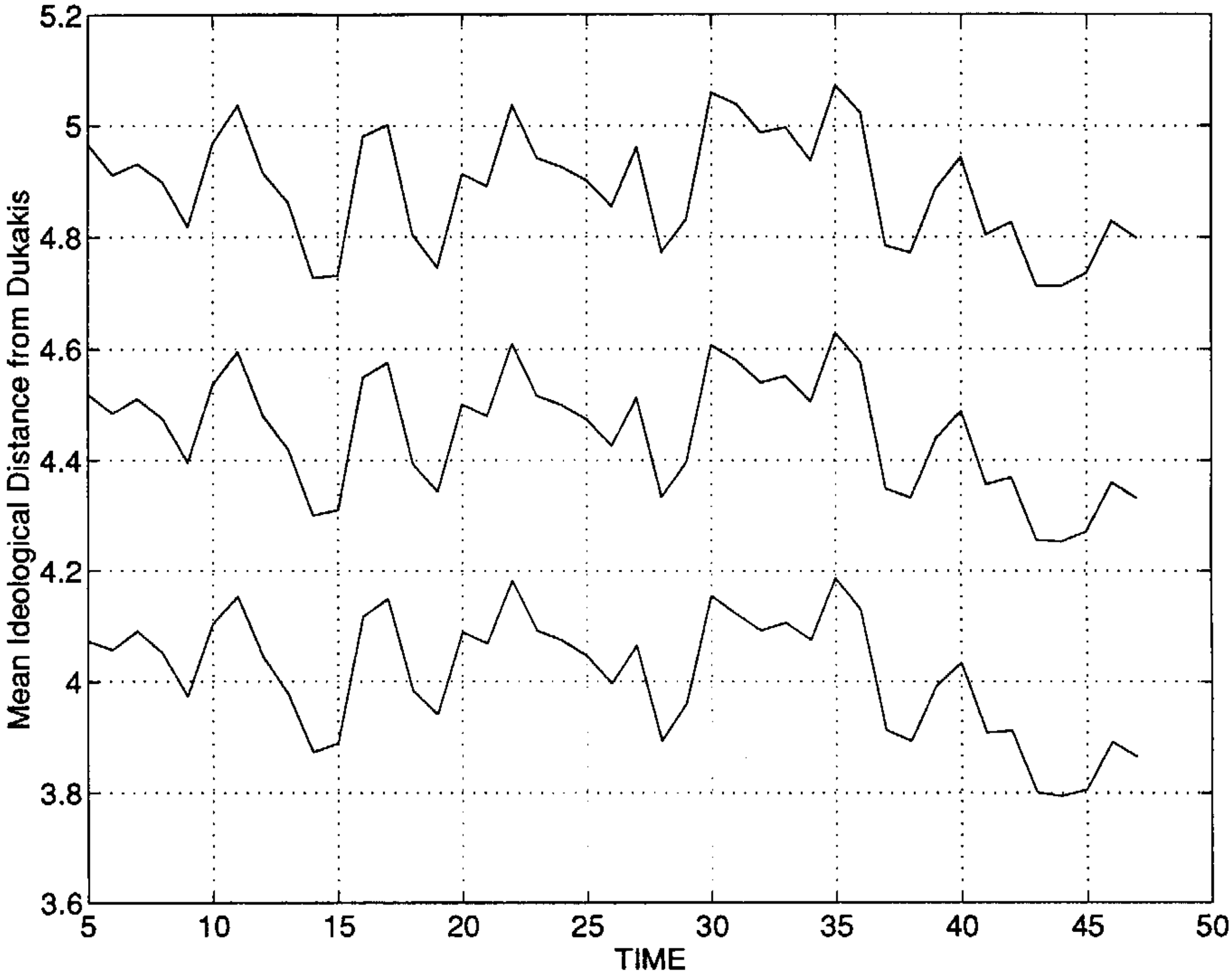

Figure 5. Marginal Effects of Dukakis Ideology on P(VOTE=BUSH)

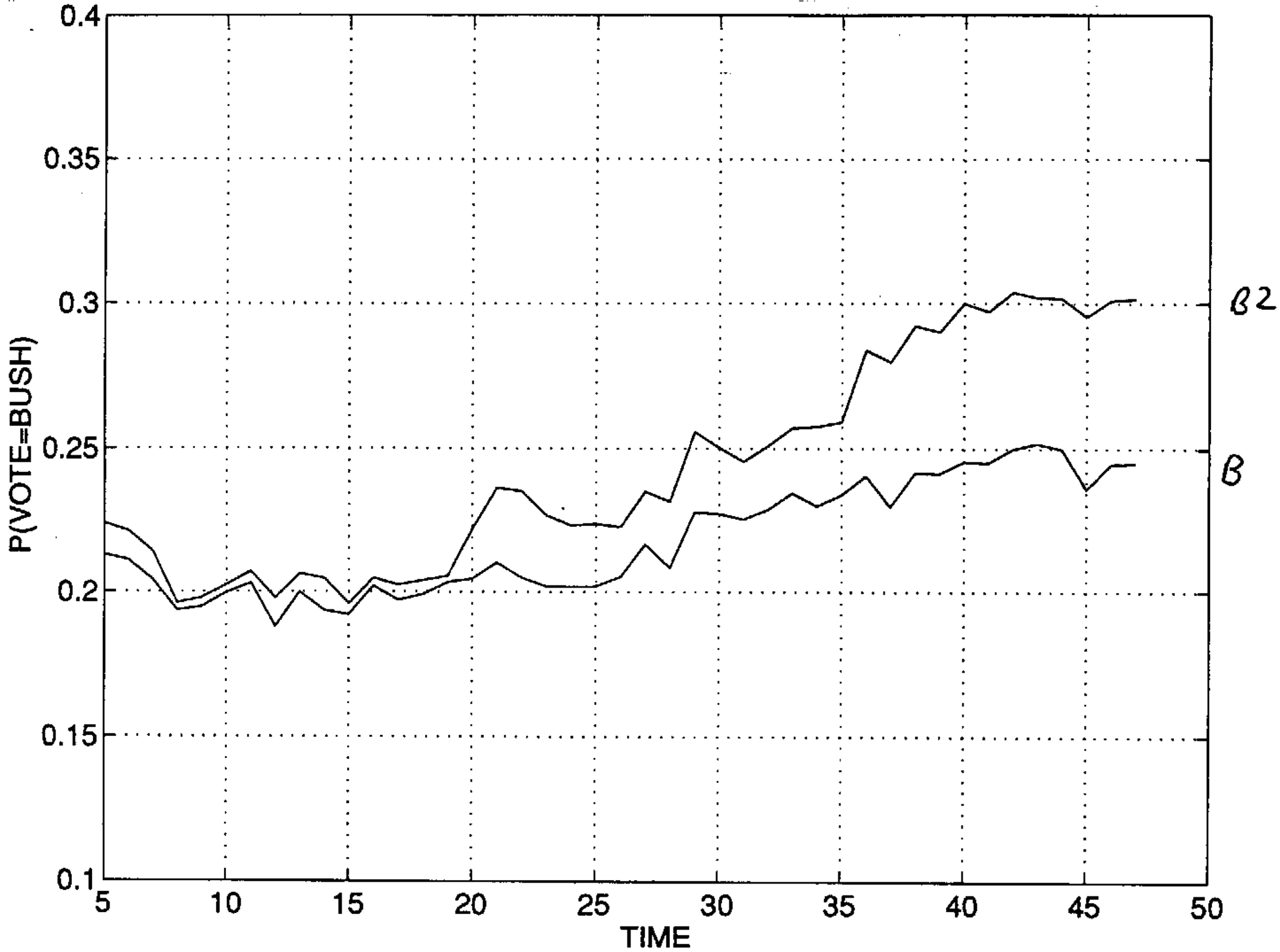

Figure 6. Marginal Effects of Bush Feelings on P(VOTE=BUSH)

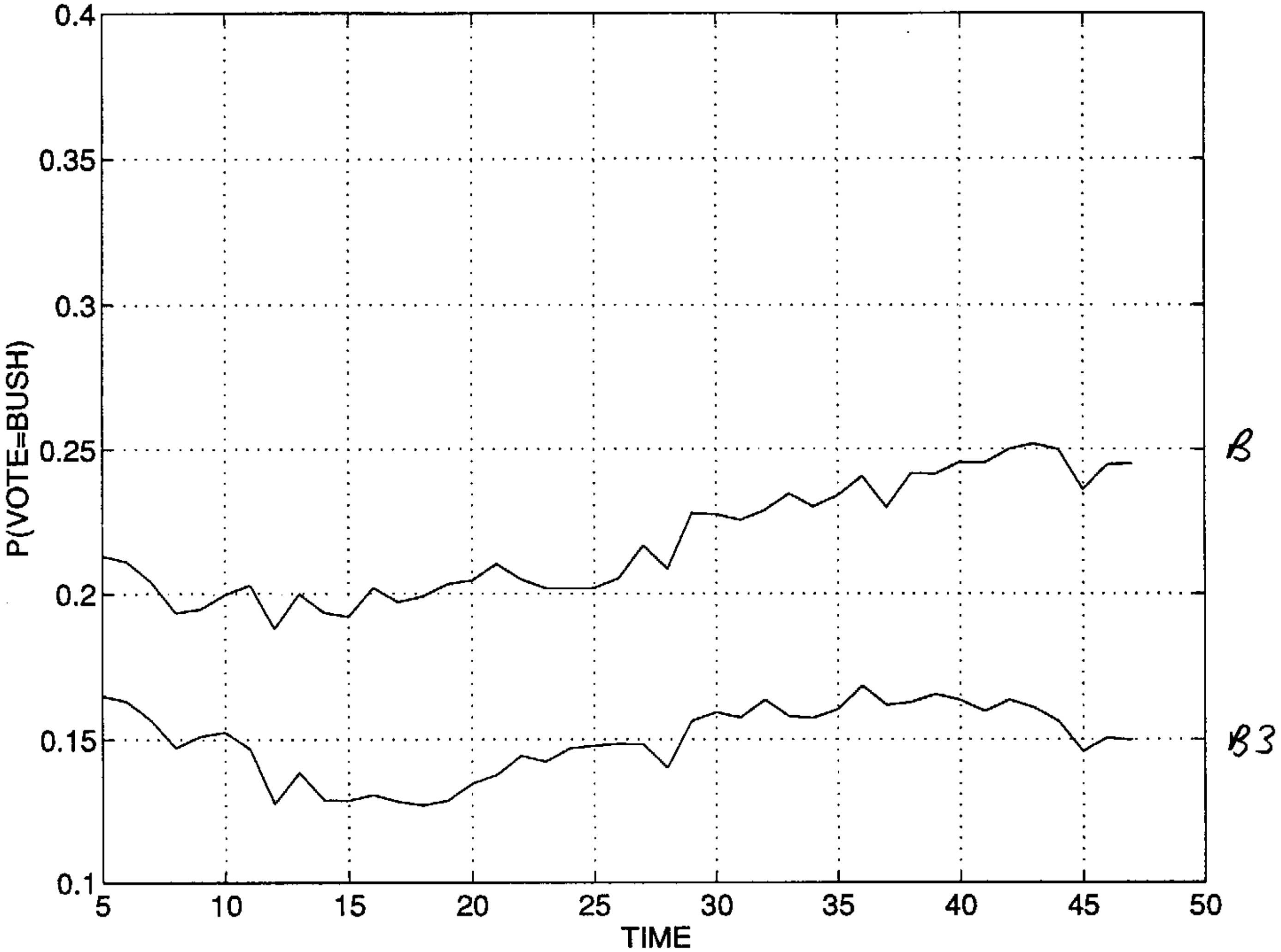

Figure 7. Marginal Effects of Party on P(VOTE=BUSH)

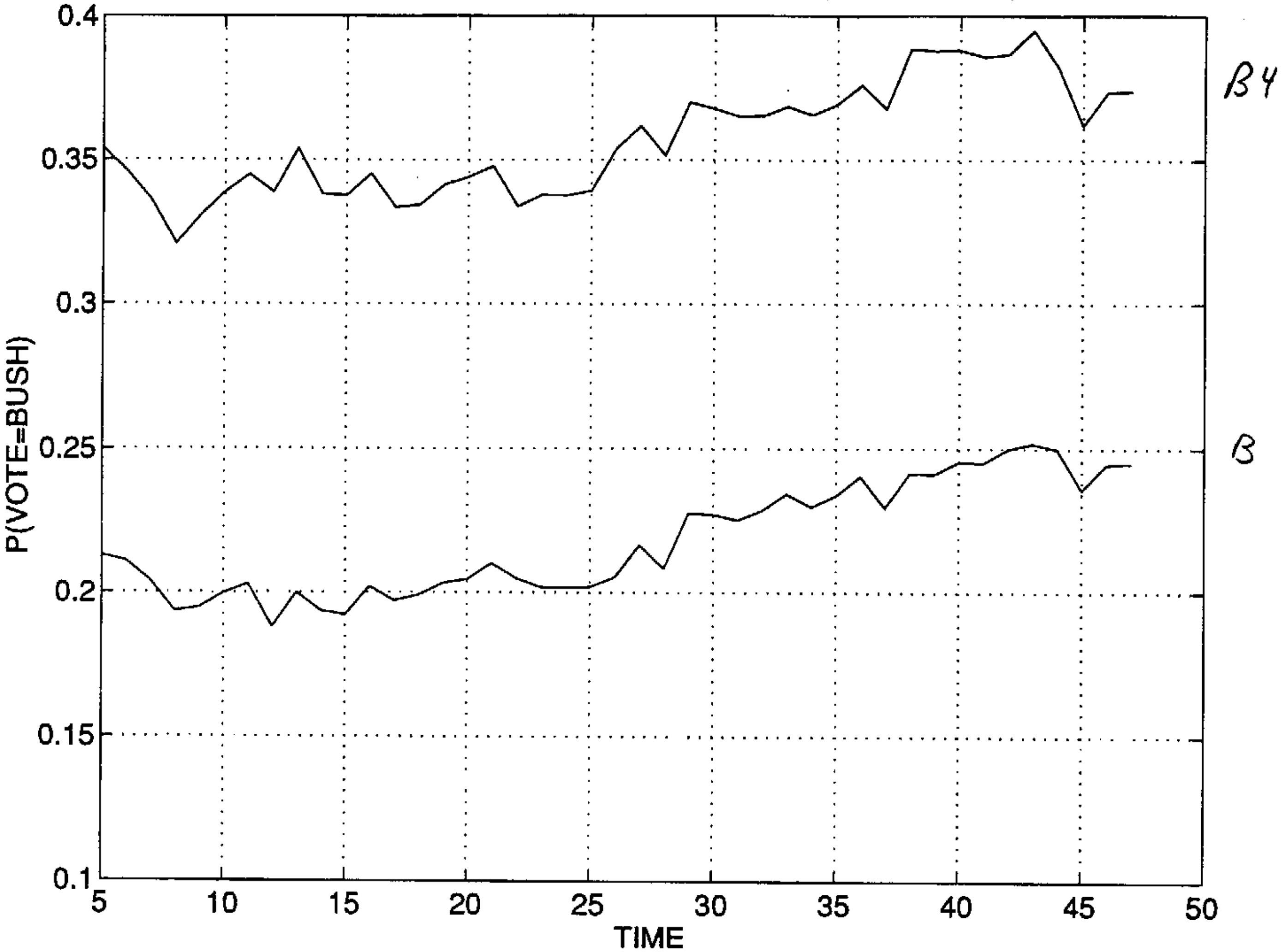

Figure 8. Marginal Effects of Dukakis Ideology on P(VOTE=DUKAKIS)

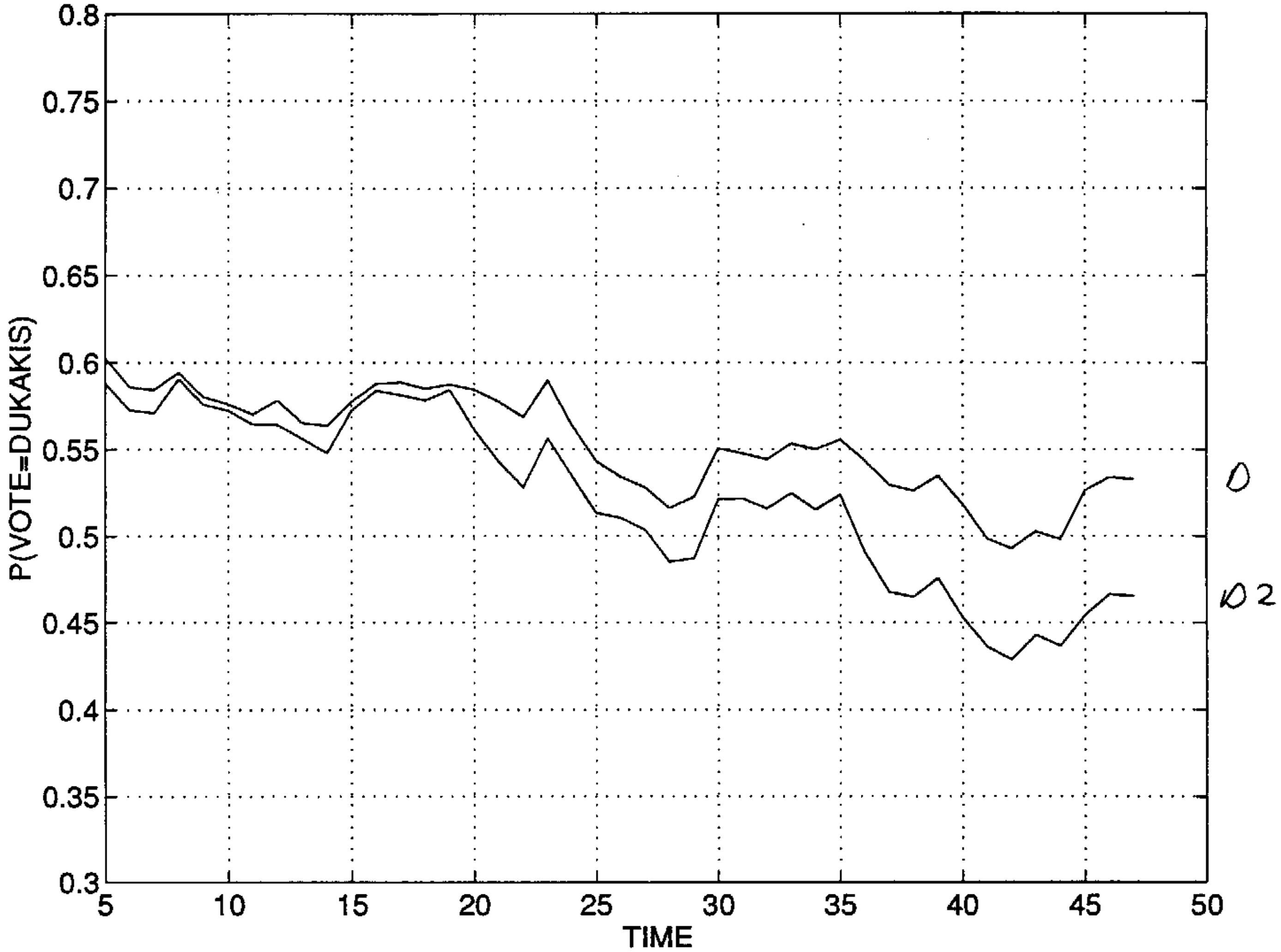

Figure 9. Marginal Effects of Bush Feelings on P(VOTE=DUKAKIS)

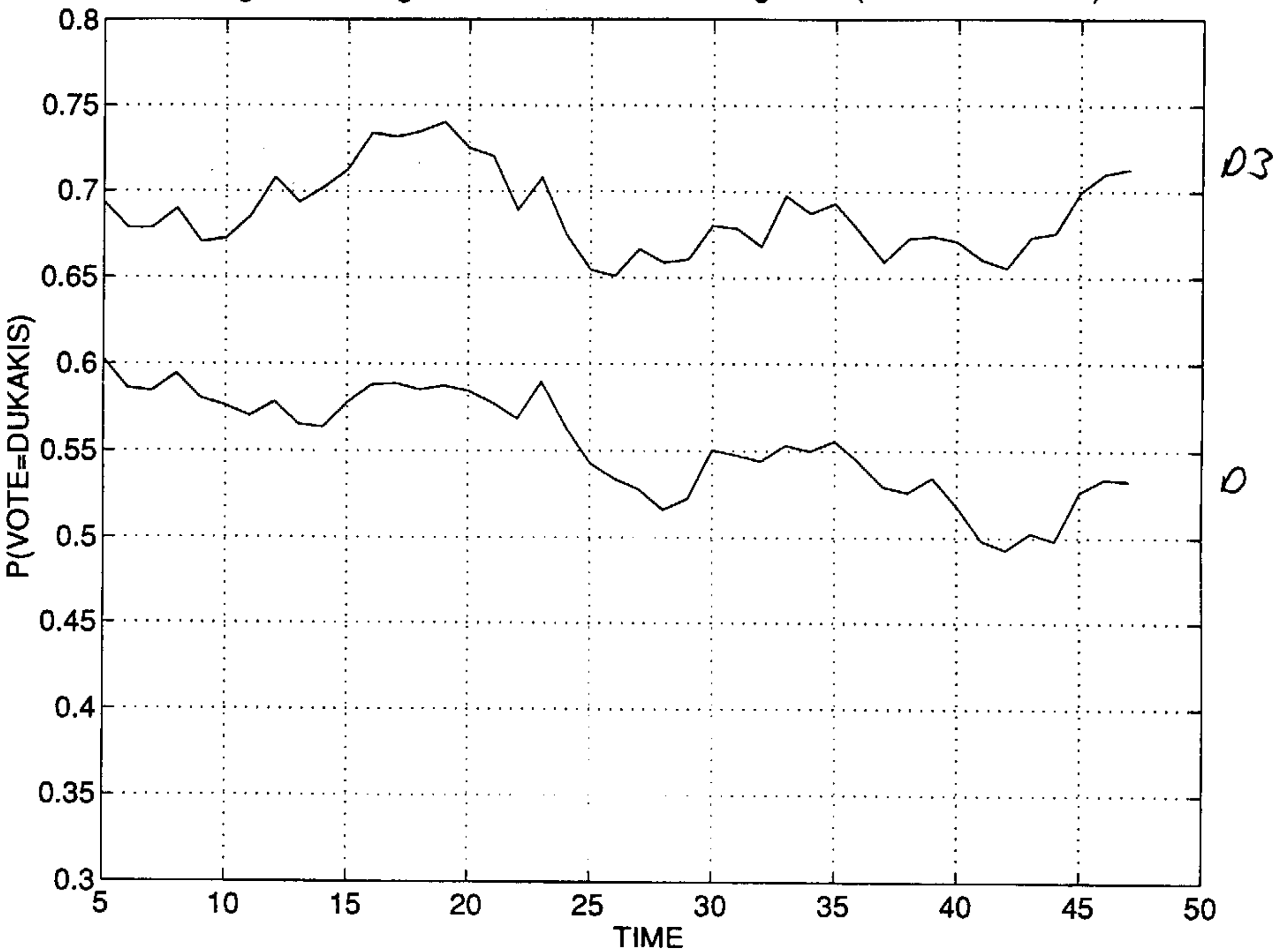

Figure 10. Marginal Effects of Party on P(VOTE=DUKAKIS)