

The Aggregate Dynamics of Campaigns

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Daily interactions between partisan elites, the media, and citizens are the driving dynamic of election campaigns and the central determinant of their outcomes. Accordingly, we develop a theory of campaign dynamics that departs from previous top-down models of campaign effects in its emphasis on the reciprocal campaign interactions between these actors. We examine these interactions with daily data on campaign expenditures, media coverage, and voter support in the 2000 presidential campaign. We find that partisan elites, the media, and citizens each played critical and interdependent roles in creating the dynamics of the campaign and producing the closest election in decades. We also find that the Gore campaign was hindered by its delayed responsiveness to the Bush campaign and its unwillingness to reinforce positive media coverage of Gore with increased campaign expenditures.

Election campaigns are central events in the democratic life of the nation, the principal moments in which the three primary actors in the polity—partisan elites, the media, and citizens—interact with and seek to influence each other. Political campaigns, as a consequence, have much to teach us about how political influence operates in the United States. Today, this statement rests comfortably within the mainstream of elections and voting behavior research, but less than two decades ago, it would have raised considerable controversy. For despite the central place accorded campaigns in democratic theory, research from the 1940s into the 1990s drew a sobering conclusion: presidential campaigns mattered little. With voting largely determined by stable partisan attachments and economic fundamentals, the “minimal effects” thesis concluded that presidential campaigns were little more than a sideshow. Candidates and the media, it appeared, could sit out the campaign and citizens’ votes on election day would be little affected.

Recent research has largely overturned the minimal effects thesis. Employing more sophisticated theoretical frameworks and methodological approaches, this research finds that campaign strategies and events, and the media’s coverage of them, influence voter preferences and shape election outcomes, particularly in close elections (e.g., Campbell 2000, Holbrook 1996, Shaw 1999a, 1999b, and the citations

in Shaw 2006, 30–31, but see Norpoth 2005). We accept this fundamental finding of recent campaigns research: campaigns do matter. The critical next question then is how do campaigns matter? How do elites, the media, and citizens interact during campaigns, and how do these interactions shape election outcomes?

The question of how campaigns matter has been addressed along two tracks, depending upon whether scholars are examining presidential or congressional campaigns. Following standard practice in the political behavior literature, presidential election scholars largely employ a top-down perspective, in which influence flows from candidates through the media to citizens. Reciprocal influences from citizens to candidates, or from the media to candidates, are rarely explored (but see Geer 2006). The congressional elections literature, in contrast, has been greatly concerned with endogeneity in the relationship between campaign expenditures and voter support—just as campaign expenditures may increase voter support, so also may voter support increase campaign donations and by extension, campaign expenditures (Erikson and Palfrey 1998, 2000; Gerber 1998; Green and Krasno 1988, 1990; Jacobson 1978, 1980, 1990; Jacobson and Kernell 1983). Here, however, endogeneity has often been treated primarily as a methodological issue to be resolved in determining the role of money in congressional campaigns, rather than as

a substantive component of a broader theory of campaign interactions between elites, media, and citizens.

The key to understanding campaigns as democratic instruments, we argue, rests in examining endogeneity not as a methodological nuisance, but instead, as the critical substantive feature of campaigns. Campaigns matter as instruments for popular sovereignty precisely because elites, the media, and citizens seek to influence each other and the outcomes of elections. Campaigns lose much of their importance as democratic instruments if partisan elites alone are in the driver's seat, influencing voting preferences and media coverage through their expenditures, but unresponsive either to the concerns of citizens or the critical coverage of the media. Conversely, if citizens are the unmoved mover, influencing campaign expenditures and media coverage but not the reverse, their impact on politics extends well beyond casting ballots, but there is also little opportunity for the enlightenment of preferences, which is one of the critical benefits produced by election campaigns. Finally, if the media operate merely as stenographers, faithfully scribing elite discourse but offering no independent analysis, or merely mirror public preferences out of concern for their own financial viability, their capacity to serve as an independent fourth estate would be seriously circumscribed.

Understanding whether and how elites, the media, and citizens influence each other during election campaigns is, in short, central to evaluating campaigns as mechanisms for elite accountability and mass enlightenment. What is needed here is a dynamic perspective, for the three sets of actors seek to influence each other not merely at the start of campaigns, or at the end of campaigns, but instead, on a day to day basis over the course of campaigns. In view of this, we develop and test the implications of a theory of campaign dynamics that, to the best of our knowledge, for the first time links the reciprocal influences that the three central actors in the polity exert on each other during the course of election campaigns.

The incentives and resources of the three sets of actors lead us to expect that there are no unmoved movers in presidential campaigns. Candidates, the media, and citizens possess both the motives and the capacity to influence each others' activities over the course of campaigns. As a consequence, each plays critical and interdependent roles in shaping election outcomes. Critical to our conception of reciprocal influences is the dynamic responsiveness of actors during campaigns and the degree of persistence of their activities. We posit that candidates, the media, and citizens are able to play consequential roles in

shaping each others' actions because each is able to respond promptly, in a matter of days, rather than months, to the activities of each other. From a time series perspective, our theory thus leads us to expect long-remembered, or fractionally integrated processes and their associated decay rates, rather than either stationary or integrated processes, as a behavioral consequence of the incentives and resources that candidates, the media, and citizens possess to shape election campaigns.

We test our dynamic perspective by using a time series analysis. We examine the aggregate interactions between campaign expenditures, media coverage, and voter support on a daily basis following the July 4th holiday through election day in the 2000 contest between George W. Bush and Al Gore. We do so by using the 2000 presidential election data from the National Annenberg Election Survey to track voting intentions, which we term the expected vote, over the course of the campaign. We match this series with corresponding daily series on campaign expenditures and coverage of the two campaigns by the *New York Times*. We find that partisan elites, the media, and citizens each played critical and interdependent roles in creating the dynamics of the campaign and producing the closest election in decades. We also find that the Gore campaign was hindered in its overall effectiveness by its delayed responsiveness to the Bush campaign and its unwillingness to reinforce positive media coverage of Gore with increased campaign expenditures.

Toward a Theory of Aggregate Campaign Dynamics

In this section, we develop a framework for understanding aggregate campaign dynamics. Three features define this framework. First, our interest is in aggregate behavior, how aggregate campaign expenditures, aggregate media coverage, and aggregate voter support shape the dynamics of the campaign. The reason for our macrolevel interest is straightforward—it is in the aggregate that expenditures, media coverage, and voter support influence the campaign. A single dollar or voter preference has little influence on the eventual outcome of the election, but millions of dollars in expenditures and thousands of voter preferences aggregated determine the eventual winner on election day.

A static analysis of aggregate expenditures, media coverage, and voter support, however, cannot tell us

why a campaign unfolds as it does.¹ To answer this, we must set the macrolevel variables in motion and examine their effects over time. We agree with Holbrook, among others, that “a political campaign must be understood to be a process that generates a product, the election outcome, and like any other process, one cannot expect to understand the process by analyzing only the product” (1996, 153). Because our interest is in the process, we must examine over-time interactions of aggregate campaign expenditures, media coverage, and voter support during the campaign.

This leads us to the third central feature of our theoretical framework: the responsiveness of elites, the media, and citizens to each other. It means little to argue that these three actors influence the process of the campaign if they are not able to respond in a timely manner to the activities of each other. Campaign dynamics matter to the extent that each of the principal actors in the polity are able to respond effectively (within days, not months) to the actions of the others. And here effective responsiveness means not simply that a series changes in response to changes in the other series, but also that the responses are reciprocal. We argue that elites, the media, and citizens each possess both the incentives and resources for effective responsiveness during the campaign. In each of the following subsections, we examine our theoretical perspective on the relationships between these actors.²

The Relationship Between Voter Support and Campaign Expenditures

In the standard view of campaign effects, elite activities are exogenous—they are an unmoved mover, influencing voter preferences but uninfluenced in turn by these same preferences. This top-down model of information flows in campaigns is consistent with the perspective of much existing public opinion

research (e.g., Zaller 1992). In our view, however, this perspective on campaign effects is an oversimplification of reality, one that is inconsistent with both populist conceptions of public opinion (see Simon and Jerit 2007) and the campaign resources that elites possess to allow for responsiveness to public opinion.

The top-down perspective is challenged by an alternative, macrolevel perspective, which has provided considerable evidence of elite responsiveness to public opinion (e.g., Erikson, MacKuen, and Stimson 2002). If electoral concerns produce elite responsiveness between elections, as this literature demonstrates, it seems highly unlikely that elite activities during election campaigns themselves are fully exogenous to citizens. Instead, the same electoral imperatives that keep elites “honest” between elections should also ensure that campaign activities are responsive to changes in voter preferences during election campaigns.

Campaigns invest heavily in sophisticated polling operations for precisely this purpose (Gelman and King 1993; Shaw 2006). If we assume that campaigns invest their resources rationally, we must assume that the activities of campaigns change in response to voter preferences over the course of the campaign. And empirical evidence demonstrates that they do. Geer (2006) finds that as the salience of an issue increases among citizens, challengers become increasingly likely to attack incumbents on this issue. We expect that campaign activities exhibit a similar responsiveness to changes in the expected vote. As a consequence of this elite responsiveness to changing voter support, citizens are able to exert a considerable influence on campaign activities over the course of the campaign. Indeed, the modern polling operations of campaigns virtually assure that they do.

What does it mean then, if we treat campaign effects as exogenous to voter preferences when, in fact, they are in part endogenous to these same preferences? We overstate elite influence while understating the influence that voters exercise over the course of the campaign. To identify the separate effects of campaign expenditures on voter preferences, we must also consider the effects of past preferences in shaping expenditures decisions.

What is the time frame of responsiveness? Does voter support change instantaneously in response to campaign expenditures? Do expenditures themselves change instantly in response to changes in voter support? Both prior empirical evidence and theoretical considerations lead us to expect that responsiveness is neither instantaneous nor transient. Shaw (1999b), for example, demonstrates that campaign debates

¹The problems created by a static perspective can be seen in the congressional elections literature’s treatment of the endogeneity between campaign donations and voter support, which is measured at the end of the campaign. Scholars have proposed various solutions to the problem of simultaneity bias in the effects of money in congressional campaigns. A review of the approaches is given in the web appendix. Our approach is to test whether there is an endogenous relationship between money, votes, and the media rather than imposing exogeneity assumptions on the data via the method chosen, such as OLS would do.

²See Sattler, Freeman, and Brandt (2008) for a related endogenization of the economy and polity in their innovative time series analysis.

have a delayed effect that grows over the ten-day period following the debate. Similarly, we should expect that the effects of campaign expenditures are likely to diffuse slowly through the electorate via interpersonal discussions among voters. For their part, campaigns will not respond instantly to changes in voter support. Instead, campaigns are likely to examine trends in opinion polling over several days. Expenditures adjustments follow the analysis of such polling data.

The Relationship Between Expenditures of the Campaigns

We expect that presidential campaigns' expenditures are responsive to the opposing campaign's expenditures. In contrast to most congressional campaigns, presidential campaigns approximate the ideal type of a balanced campaign, with the opposing sides roughly evenly matched in financial resources and campaign expertise (Gelman and King 1993). Although one campaign may enjoy an advantage in funds from their primary campaign, the campaigns receive equal public funding following their conventions, allowing them to respond to their opponent's strategic decisions.³ Because presidential elections are the top prize in American politics, the campaigns are likely to attract the top campaign consultants in each party, producing a rough parity in strategic expertise (Shaw 2006, 23). Campaign responsiveness is thus a consequence of the balanced nature of presidential campaigns.

We expect that campaign expenditure responsiveness will occur over a timeframe of days during the campaign. Campaigns must become aware of their opponents' expenditures before they can respond in kind. Moreover, expenditures changes are unlikely to be transient single-day responses, but instead are likely to be sustained over several days.

The Relationship Between Campaign Expenditures and Media Coverage

In seeking to influence voters, expenditures are also designed to influence the media's narrative of the campaign. Johnston, Hagen, and Jamieson (2004),

³The campaigns may not, of course, benefit equally from external expenditures by 527 groups or the parties. Our analysis does not include these outside expenditures and only includes expenditures under the direct control of the campaigns themselves.

for example, document how Bush campaign expenditures worked in tandem with media coverage to raise concerns about Gore's trustworthiness (see also Johnston and Hagen 2003). We likewise expect that campaign expenditures affect both the level and tone of media coverage during campaigns.

There is also a reciprocal influence from media coverage to expenditures that has been underexplored. To the extent the media are not a wholly owned subsidiary of campaigns, and we expect they are not, media coverage will exhibit some independence from campaign expenditures. Journalistic norms of objectivity and independent analysis virtually ensure this (Althaus 2003). Campaigns, in turn, will find it in their interest to adjust expenditures in response to shifts in news coverage. Given the strong effects of negative information on voters (Geer 2006; Lau 1982, 1985), campaigns may seek to counter this information with increased expenditures before a negative narrative frame takes root. Likewise, campaigns may increase expenditures in order to reinforce negative media coverage of their opponent.

Again, we expect neither immediate nor transitory responsiveness. Media coverage will change not in response to a single day's increase in campaign expenditures, but to a sustained increase in expenditures. Likewise, a sustained spate of negative media coverage will need to be countered with a sustained increase in campaign expenditures over several days.

The Relationship Between Media Coverage and Voter Support

Top-down models of opinion formation often view the media as a simple conduit for elite discourse (Zaller 1992). In this view, the media exert no independent influence on public opinion and instead simply index their coverage to the relative balance of elite statements (Bennett 1990). This indexing hypothesis seems to be implicit in Gelman and King's (1993) study of campaign effects, in which they argue that the balanced nature of presidential campaigns produces media coverage that informs voters of economic and political fundamentals such as the state of the economy, issue positions, and the like.

Recent research, however, challenges the indexing hypothesis, as content analysis demonstrates that the media bring in oppositional viewpoints, including from other media sources (Althaus 2003). The media are not simply a mirror of elite discourse, but rather offer an alternative, critical perspective on issues and events. Important for the effects of campaign

expenditures, Jasperson and Fan (2004) demonstrate that the effect of campaign advertising on voter support is filtered through media coverage and media evaluation of advertisements. As a consequence, we expect that the media play a critical role in shaping voter support during the campaign and are not merely stenographers for elite discourse. Moreover, because of this evaluative role, we expect the media to influence voter support above and beyond the existence of campaign events, such as national conventions and presidential debates.

It is important to distinguish between positive and negative media coverage of candidates. Research consistently finds that citizens are more responsive to negative coverage than to positive coverage (e.g., Geer 2006; Lau 1982, 1985). Lau traces the effectiveness of negative information in presidential campaigns to the greater salience of negative information and to the fact that citizens are more cost averse than gain acceptant. As a consequence, we expect negative coverage to have a greater effect on voting preferences.

Another central concern of political psychology, information processing, also carries implications for the dynamics of the expected vote. Although online processing appears to be the default for most forms of information processing, this is not the case during campaigns. Instead, media presentation of comparative information regarding candidates appears to force politically nonsophisticated citizens (but not the politically sophisticated) to abandon the online default in favor of memory-based processing (Rahn, Aldrich, and Borgida 1994, see also Redlawsk 2001). This heterogeneity in information processing carries important expectations for persistence in the expected vote series. If all citizens were to engage in online processing, this would produce a unit-root expected vote series, as campaign shocks would permanently affect citizens' online tallies (Wlezien and Erikson 2001, 2002). Alternatively, if as we expect, nonsophisticates are more likely to engage in memory-based processing while sophisticates are more likely to engage in on-line processing, this heterogeneity will produce a fractionally integrated expected vote series (see Granger and Joyeux 1980).

Just as we expect that the media exert an independent effect on voter preferences, we also expect that media coverage is responsive to changes in voter support over the course of the campaign. In an era when corporate profit motives are increasingly driving news coverage (Bennett 2005), the media must be particularly attuned to the preferences of voters, their consumers. We should not be surprised, therefore, that a critical component of horserace coverage is the

candidates' relative standing with voters in opinion polls.⁴

As with the other relationships, we expect that the interrelationship between media coverage and voter support unfolds over a period of days during the campaign. Campaign information presented by the media will be transmitted via social networks to many voters in the days after it is initially aired or published (e.g., Katz and Lazarsfeld 1955). Similarly, we do not expect immediate and transient responsiveness of the media to changes in voter support. In "following the polls," the media adjust their coverage not to transient changes in voter support, but instead to trends that develop over the course of multiple days.

Our theoretical framework, in summary, predicts that elites, the media, and citizens exert effective responsiveness to each other during campaigns. This responsiveness occurs within a matter of days in campaigns and is ensured by candidates' financial resources and electoral incentives, journalistic norms and financial imperatives, and citizens' cognitive processing.

Examining Campaign Effects: The Data

To disentangle the influence of citizens, elites, and the media over the course of a campaign, we use daily measures of the behavior of each set of actors. The 2000 National Annenberg Election Survey (NAES) offers, for the first time, daily data on voter preferences over the course of a presidential campaign.⁵ We

⁴Shah et al. (1999) find that the expected vote did not Granger cause media coverage of the candidates in the 1984, 1988, and 1996 presidential elections. However, Shah et al.'s polling data are not daily and there are gaps during which the expected vote is not observed. In contrast, we examine the influence of voter support on media coverage using daily data for both series, which afford a much stronger test.

⁵The National Annenberg Election Survey 2000 is from the Annenberg Public Policy Center (Romer et al. 2004). A previous notable attempt at tracking campaign dynamics was the National Election Study's Rolling Thunder study. Weekly surveys were conducted during the 1984 presidential campaign and resulted in important work by e.g., Abramowitz (1987); Clarke and Whitely (1990); and West 1991. Those data consisted of 46 weekly cross-sections, with an average of just 76 completed interviews per week. The 2000 NAES has an average of more than 249 valid responses *per day* on the expected vote question and provides richer data with the advantage of being appropriate for time series analysis.

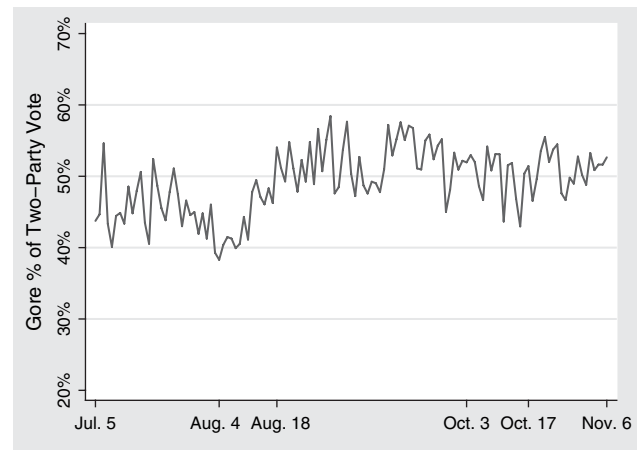
use this impressive resource for the expected vote for president and add daily data on campaign expenditures from the Federal Election Commission and daily data on media coverage from the *New York Times*.

The NAES consisted of a rolling cross-section design, in which new national samples were drawn each day during the 2000 campaign, starting in December 1999. Our analysis focuses on the general election and starts with the beginning of the summer campaigns on the day after the July 4th holiday. We thus examine 125 days of the general election campaign. Our analysis is based on the voting preferences of 36,744 respondents.⁶ The design of the study lends itself well to studying the effects of a campaign. Researchers can get new data points following every major campaign event. Since campaign dynamics occur quickly, a daily measure is important (see Freeman 1990 for an important discussion of time aggregation bias). This allows us to test theories regarding campaign dynamics that have previously been untested due to the lack of available data over the course of campaigns.

We begin by looking at Al Gore's share of the two-party vote (Figure 1). During the summer, the expected vote favored the Bush campaign. Gore's support ranged from the low 40s to the high 40s, only occasionally besting Bush, and never staying in the lead beyond a single day. Gore's support dropped further as the Republican Convention came to an end and Bush received his federal funds for the fall campaign on August 4th. Gore's support remained muted until just before the Democratic National Convention in the middle of August. Enjoying a particularly large postconvention bounce beginning on August 18, Gore generally remained the front-runner until the presidential debates began in October. At this point, his fortunes soured. Gore's support steadily eroded as the debates progressed, rebounding only after the third and final debate on October 17th. The final weeks of the campaign were marked first by a rough parity between the candidates and, at the end, a slight edge for Gore that translated into a popular vote advantage on election day.

A second source of data for the analysis is daily Federal Election Commission (FEC) data on total candidate expenditures. The data are aggregated for

FIGURE 1 Daily Expected Vote



each candidate into a daily time series, recording how much each candidate spent on any given day of the campaign. The use of expenditures instead of receipts is important because candidates can only seek to influence the campaign and voters by spending money. Information is transmitted when a candidate *spends* money. Candidates spend money to buy campaign ads, send out mailings, and engage in other activities that provide information directly to voters.

Bush had a slightly longer period of time to spend his federal funding for the general election because the Republican Convention was held first.⁷ Bush began spending his money early and spent a great deal of money in the days surrounding the Democratic Convention. These expenditures did little to limit Gore's postconvention bounce and left Bush behind in cash on hand. As a result, Gore spent more during parts of September than Bush. Both candidates began spending in larger amounts as the campaign drew to a close.

Our third data source is a content analysis of daily front-page campaign stories in the *New York Times*. Front-page stories are more likely to be accessible to the public and often contain messages emphasized by the candidates (Gurian and Haynes 1993; Haynes and Rhine 1998). The *New York Times* is also a proxy measure of overall media coverage, as the national newspapers are considered the prestige press, and their coverage serves as a guide for what is important to other media outlets (e.g., Bartels 1996; Son and Weaver 2005; Sparrow 1999). Additionally, the national newspapers and television networks generally agree in their assessments of candidate performance

⁶The 2000 NAES is the first survey to provide a daily measure of the expected vote during a U.S. presidential campaign. Unfortunately, no expected vote series to date is long enough and at regular intervals to enable a time series approach for congressional elections.

⁷The web appendix includes figures of the Bush and Gore expenditures and media series.

and prospects (Marshall 1983). For these reasons, Mutz (1995) argues that newspaper readers and television viewers will receive approximately the same account of the nomination campaign.

The *New York Times* stories are coded on a negative-positive-neutral basis for each candidate.⁸ Each word of the story is coded, and the number of words of each type of coverage is aggregated into daily time series. In this analysis, we employ two daily media series for each candidate: their positive media coverage and their negative media coverage, which varied during the campaign. Coverage increased just before the party conventions in late July and early August. Both candidates saw spikes in positive coverage surrounding their conventions. Coverage also increased in the leadup to election day.

A frequently expressed criticism among Democratic observers is that Bush received more favorable coverage than did Gore during the 2000 campaign. We find no evidence to support this criticism. *T*-tests demonstrate no differences in levels of positive or negative coverage between Bush and Gore in the *New York Times* (at a $p < .10$ level). In short, there is no evidence of systematic bias in favor of, or against, either candidate in the campaign.

A Dynamic Model of Campaigns

We begin our analysis of the 2000 campaign by examining the persistence of the expected vote and its response to shocks. Substantively, this is an important question because it reveals how long an increase (or decrease) in the expected vote will last after a shock. Do early increases in candidate support persist, making it difficult for candidates running behind to catch up? Or do shifts in voter support quickly evaporate, perhaps as elections return to fundamentals of partisan loyalties or economic performance? This is critical, as it speaks to how campaign effects play out over the course of a campaign. Methodologically, it is vital to correctly estimate persistence and model this persistence (including any fractional persistence) to ensure valid inferences about the dynamics in our multivariate model (e.g., Box-Steffensmeier, DeBoef, and Lin 2004; Lebo, Walker, and Clarke 2000; Maddala and Kim 1998; Parke 1999).

Persistence in the Expected Vote

The advantage of using fractional integration is that we gain precision by no longer having to consider only stationary or integrated series for the characterization of d . This increased precision adds a large area of consideration between 0 and 1. If d is less than 1, but larger than zero, the series is not stationary, but fractionally integrated and thus fractional differencing is needed. If one mistakenly first differences when fractional differencing is indicated, then this over-differencing removes the low frequency component of the series.

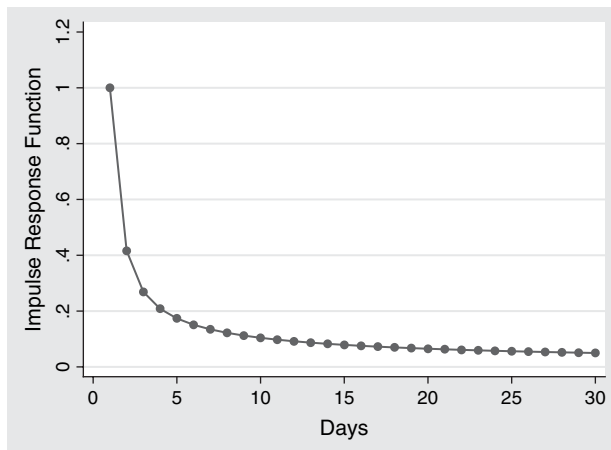
Lebo, Walker, and Clarke (2000) provide an excellent survey of many common political series and find overwhelming evidence that almost all of these series are fractionally integrated. Granger and Joyeux (1980) provide methodological foundations for why we would expect this. They show that aggregating heterogeneous dynamic microprocesses with autoregressive behavior results in a macroprocess that is fractionally integrated. Our conception of cognitive processing leads us to expect that microlevel voter support is both heterogeneous and autoregressive and thus that the macrolevel expected vote will exhibit fractional integration (see also Box-Steffensmeier and Smith 1996).

We measure the persistence of the expected vote by estimating the order of integration (d). This tells us how quickly the effects of shocks to a process die out over time. When $d = 0$, the series has no long-term memory, and an increase or decrease in the process due to external shocks dies out completely and quickly as soon as the shocks are over. When $d = 1$, the series has permanent memory, which means the effect of the shocks lasts forever. A series is fractionally integrated when d is between 0 and 1. The persistence of the series increases as the value of d increases. "In general, a time series process may exhibit both long-term, persistent memory, which is captured by the fractional parameter d , and short-term, transient memory, which is captured by the stationary autoregressive and moving average parameters p and q " (Box-Steffensmeier, DeBoef, and Lin 2004). This is referred to as an autoregressive fractionally integrated moving average process or ARFIMA (p, d, q).

The ARFIMA model estimate for the expected vote is $(0, d, 0)$ where $d = 0.376$. The persistence of the series is illustrated in Figure 2. The impulse response function shows that 40% of the initial change to the expected vote remains one day later, about 21% two days later and 13% after a week. Campaign shocks, in short, die out relatively quickly, although a small residual effect remains afterward.

⁸The coverage is of each candidate or their campaign and was gathered by four coders. Coding details are provided in the web appendix. All data will be archived at ICPSR.

FIGURE 2 Impulse Response Function for the Expected Vote



We employed Robinson's semi-parametric estimator to estimate d for each of our time series.⁹ The results confirm that it is critical to account for fractional integration. The null hypothesis that $d = 0$ is rejected for five of our seven series (the expected vote, Gore expenditures, positive Bush media coverage, positive Gore media coverage, and negative Gore media coverage); the null hypothesis that $d = 1$ is rejected for all seven series. The majority of our series are fractionally integrated.

Multivariate Analysis

We address autocorrelation in our multivariate analysis to avoid spurious correlation and therefore incorrect statistical inferences. We do so by "prewhitening" or transforming our series into white noise residuals of their ARFIMA model to purge autocorrelation and ensure stationarity before examining the multivariate interactions (e.g., Mills 1992; Pierce and Haugh 1977). Box-Steffensmeier, DeBoef, and Lin point out that "the procedure can be considered a modification to the Box-Jenkins transfer function model (Box and Jenkins 1976), which is based on transforming both the input and the output series using the ARIMA model for the input series"

⁹Sowell's exact maximum likelihood estimator is an alternative approach for estimating d . For Sowell's estimator, the values of p and q must be specified and estimation of the full ARFIMA model is conditional on those choices (Baum and Wiggins 2000). Like any semi-parametric estimator, Robinson's approach imposes fewer assumptions and is thus preferred by many authors. Lebo, Walker, and Clarke (2000) examine 17 empirical series and conduct Monte Carlo comparisons to conclude that Robinson's estimator is preferred. We use Robinson's estimator and test the residuals to see if lingering AR or MA components remained. None were found for any of the series using Bartlett's test, which follows Lebo, McGlynn, and Koger (2007), among others.

(2004, 524). We use the more nuanced ARFIMA model. Using our estimates of d , we transform the five fractionally integrated series so they are stationary.¹⁰ Our analysis thus employs five fractionally differenced series and two nondifferenced series.

The seven series are analyzed in a multivariate context where all series are allowed to be endogenous.¹¹ The idea of Granger causality testing is to estimate an equation in which y is regressed on lagged values of y and lagged values of x and the null hypothesis is that x does not Granger cause y (Granger 1969). If one or more of the lagged values of x are statistically significant, we reject the null and conclude that x Granger causes y . Freeman (1983) states that "The notion of Granger causality is based on a criterion of incremental forecasting value. A variable x is said to 'Granger cause' another variable y , if y can be better predicted from the past of x and y together than the past of y alone, other relevant information being used in the prediction" (1983, 328).¹² The idea of Granger causality is extended in the Vector Autoregression (VAR) framework and is attractive because, among other things, the approach imposes fewer and weaker structural assumptions about the interactions among the variables than alternative modeling approaches (e.g., Box-Steffensmeier, Freeman, and Pevehouse 2009; Enders 2004; Freeman, Williams, and Lin 1989; and Hamilton 1994).

VAR model specification includes choosing the appropriate lag length: the number of periods (days in our analysis) during which series are allowed to exert

¹⁰Monte Carlos show that failure to account for fractional dynamics results in a high likelihood of spurious regression. Using our estimates of d , we include the series in their fractionally differenced form in the VAR (e.g., Box-Steffensmeier and Tomlinson 2000; Davidson, Byers, and Peel 2006; Dolado, Gonzalo, and Mayoral 2003; Gil-Alana and Henry 2003).

¹¹We also estimate the reduced form model in levels (without prewhitening), which shows that our VAR results are not dependent on our use of prewhitening. The results are largely consistent and are included in the web appendix.

¹²Statistically, the idea is to see whether all coefficients of the right-hand side variables are jointly zero. Inference proceeds via Granger causality tests, in which chi-square (large sample) or F (small sample) tests are computed on the difference between a restricted model (excluding a particular lagged value) and an unrestricted model (including this particular lagged value). A significant chi-square or F test indicates that the inclusion of the lagged term adds explanatory power in accounting for the value of the dependent variable. If a statistically significant effect is found, the lagged term is said to Granger cause the dependent variable, which is thus endogenous to the lagged term. While useful, the approach is not perfect (see Freeman, Williams, and Lin 1989; Greene 2000; Kmenta 1997). See also Granato and Smith (1994a, 1994b) for a useful discussion of strong and weak endogeneity. However, VAR does still provide additional, useful, and unique evidence on campaign dynamics.

effects on other series. Using the Akaike Information Criterion (AIC), we find that 12 lags are chosen. Substantively, the 12 lags indicate that expenditures, media coverage, and the expected vote take nearly two weeks to exert their full effects on each other. Consistent with our theoretical framework, effects are thus neither transient nor instantaneous and occur over the course of days, not months, during the campaign.¹³

We also included dummy variables for seven major campaign events in our VAR analysis. These events were the Republican and Democratic national conventions, the three presidential debates, the critical late September period when Gore's trustworthiness came into question, and the final week of the campaign during which Gore's support increased (see Johnston, Hagen, and Jamieson 2004).¹⁴

Table 1 presents the results of the multivariate VAR analysis. The first column lists the dependent variable for the equation. The second column lists the excluded series in each equation (those jointly set to zero). The third column reports the chi-square value, while the fourth reports the p-value. A small probability indicates that we can reject the null that the coefficients are jointly zero and, as a consequence, conclude that x Granger causes y .¹⁵

As Table 1 demonstrates, a standard unidirectional model of campaign effects in which influence flows from elites through the media to citizens does not accurately capture the dynamics of the 2000 campaign. We find instead that partisan elites, the media, and citizens each played critical and interdependent roles in shaping the dynamics of the 2000 presidential election. Controlling for campaign events, each of our seven series Granger caused all other series, with p values $< .001$ for each relationship. If the 2000 presidential election is representative (and we believe that it is, especially of close campaigns), presidential elections are highly interdependent affairs in which campaign dynamics and levels of voter support on election day are produced by the daily interactions of elites, the media, and citizens. Indeed,

¹³We also considered a seven- and ten-day lag. For justification of the latter, see Shaw (1999b). However, the lag length tests continued to show that 12 lags were needed.

¹⁴These event dummy variables were coded as 1 for the 12 days following the event unless a subsequent event occurred during this period, as happened for the first two presidential debates. The late September period begins on September 20, the day after *USA Today* published an article questioning Gore's statements. The twelve day periods for the event dummies were chosen to be consistent with the AIC results.

¹⁵The last row of each set of results, labeled "all", is simply a test of the null that the coefficients on all lagged values of all series are jointly zero for that dependent variable.

as we will demonstrate, had any of these actors significantly altered their behavior during the campaign, the election outcome in 2000 likely would have been quite different.¹⁶

We employ cumulative impulse response functions to examine the effects of these actors on each other during the campaign. The figures plot the cumulative effect on a response series produced by a one unit positive shock to an impulse series.¹⁷ We employ impulse response functions to examine effects on two response series: the expected vote and Gore expenditures. Examining these series is particularly helpful in identifying why Al Gore was unable to match the expectations of most election forecasters for a clear victory in 2000.

Consider first the effects of the campaigns and media coverage on the expected vote. Figure 3 presents cumulative impulse response functions of the effects of Gore expenditures, Bush expenditures, positive Gore coverage, and negative Gore coverage on the expected vote for Gore (the impulse series is listed in the title of each panel). Ninety-five percent confidence intervals are plotted around each impulse response function.¹⁸

¹⁶The reciprocal influences occur also in disaggregated analyses with separate expected vote series for battleground and nonbattleground states (using CNN's definition of battleground states in 2000 at <http://www.cnn.com/interactive/allpolitics/0010/battleground.states/battlegroundstates.html>). In both the national and two disaggregated analyses, all series Granger caused all other series. The standard deviation for the overall expected vote series is 0.05, and for the battleground and nonbattleground series it is 0.06, so there was little difference in how noisy the expected vote series were.

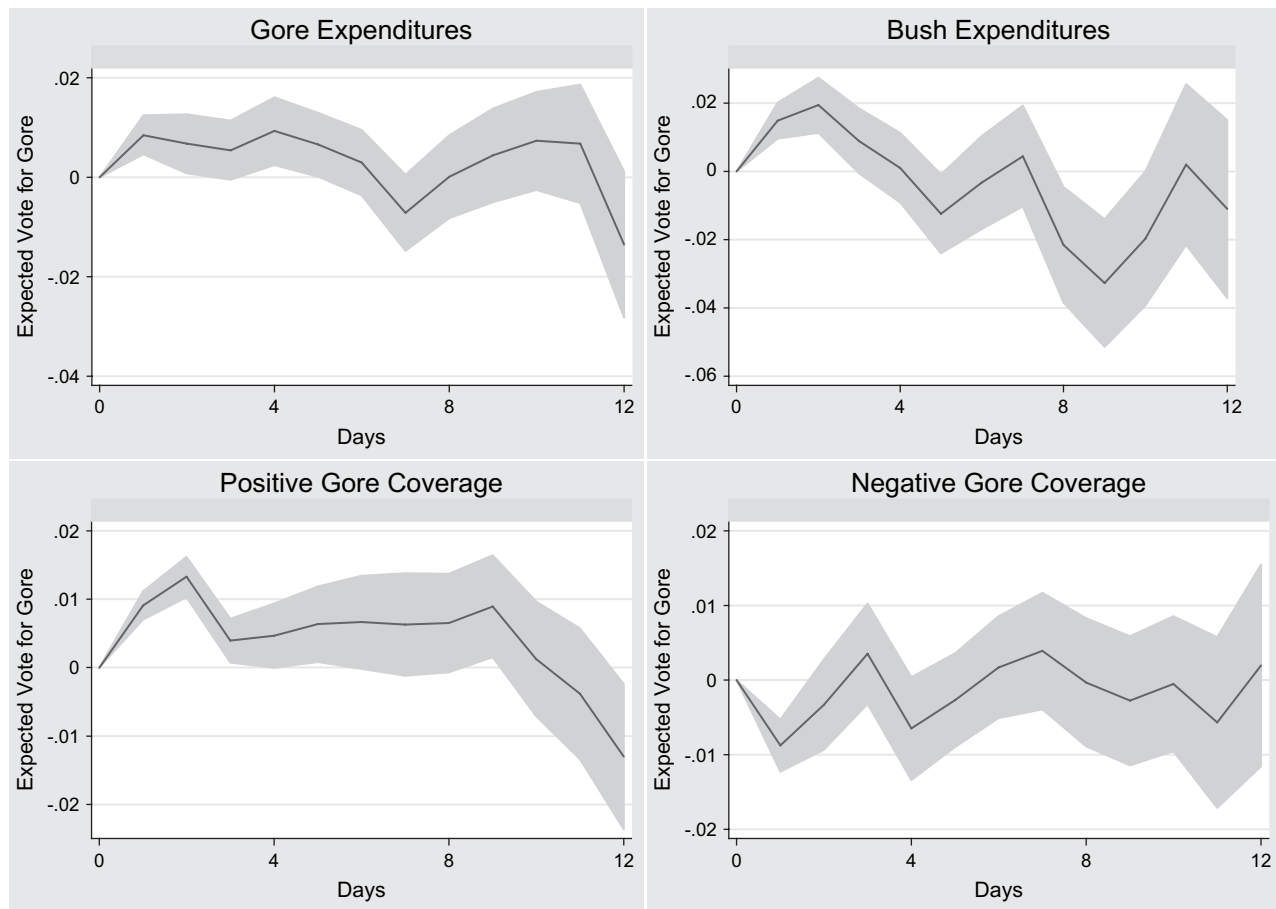
¹⁷The causal chain of the variables is an important consideration in plotting an impulse response function. The causal chain is captured by the ordering of the variables in the analysis, as only antecedent variables are allowed to exert immediate effects on the subsequent variables in the chain (Freeman, Williams, and Lin 1989, 846–47). The causal chain used is, from first to last: expected vote, Bush expenditures, Gore expenditures, negative Gore coverage, negative Bush coverage, positive Bush coverage, and positive Gore coverage. Our theory leads us to expect that there are no unmoved movers in campaigns. However, we place the expected vote first in this interpretation part of our analysis to explore the possibility that voter preferences exerted contemporaneous effects on elite and media series, in contrast to standard top-down models of campaign effects. Our remaining ordering reflects expectations from previous research (Johnston, Hagen, and Jamieson 2004) that Bush expenditures and negative Gore media coverage exerted particularly large effects on other series in 2000.

¹⁸In calculating the error bands, we constrain all coefficients not significantly different from zero to zero (e.g., Fielding, Lee, and Shields 2004). A well-known drawback of VAR is the amount of degrees of freedom used, particularly due to lag length (e.g., Runkle 1987; Sims 1987; Watson 1987). Alternative solutions to this problem include Bayesian VAR, constraints on lag distributions, or structural VAR. All of these approaches reduce the number of parameters to be estimated and increase the precision of the impulse response functions.

TABLE 1 Granger Causality Tests for VAR Model of Presidential Campaign

Equation	Excluded	χ^2	p-value
Expected Vote	Logged Bush Expenditures	96.062	.000
	Logged Gore Expenditures	231.703	.000
	Positive Bush Media Coverage	77.759	.000
	Positive Gore Media Coverage	208.839	.000
	Negative Bush Media Coverage	119.436	.000
	Negative Gore Media Coverage	128.444	.000
	All	667.325	.000
Logged Bush Expenditures	Expected Vote	67.727	.000
	Logged Gore Expenditures	69.846	.000
	Positive Bush Media Coverage	112.499	.000
	Positive Gore Media Coverage	116.091	.000
	Negative Bush Media Coverage	176.939	.000
	Negative Gore Media Coverage	143.394	.000
	All	712.795	.000
Logged Gore Expenditures	Expected Vote	310.143	.000
	Logged Bush Expenditures	239.901	.000
	Positive Bush Media Coverage	112.187	.000
	Positive Gore Media Coverage	174.970	.000
	Negative Bush Media Coverage	255.668	.000
	Negative Gore Media Coverage	103.552	.000
	All	1680.145	.000
Positive Bush Media Coverage	Expected Vote	145.333	.000
	Logged Bush Expenditures	249.837	.000
	Logged Gore Expenditures	193.391	.000
	Positive Gore Media Coverage	79.954	.000
	Negative Bush Media Coverage	154.817	.000
	Negative Gore Media Coverage	115.830	.000
	All	1143.720	.000
Positive Gore Media Coverage	Expected Vote	153.374	.000
	Logged Bush Expenditures	193.118	.000
	Logged Gore Expenditures	100.688	.000
	Positive Bush Media Coverage	149.007	.000
	Negative Bush Media Coverage	169.173	.000
	Negative Gore Media Coverage	161.091	.000
	All	765.377	.000
Negative Bush Media Coverage	Expected Vote	157.508	.000
	Logged Bush Expenditures	149.935	.000
	Logged Gore Expenditures	127.149	.000
	Positive Bush Media Coverage	183.598	.000
	Positive Gore Media Coverage	86.919	.000
	Negative Gore Media Coverage	105.020	.000
	All	1318.779	.000
Negative Gore Media Coverage	Expected Vote	66.683	.000
	Logged Bush Expenditures	65.605	.000
	Logged Gore Expenditures	67.357	.000
	Positive Bush Media Coverage	60.469	.000
	Positive Gore Media Coverage	103.174	.000
	Negative Bush Media Coverage	83.012	.000
	All	693.383	.000

FIGURE 3 Impulse Response Functions for Effects on Expected Vote



A common view is that Bush ran a more effective campaign than did Gore (e.g., Johnston, Hagen, and Jamieson 2004). We find some support for this from the impulse response functions, in which Bush expenditures have a larger effect on the expected vote than do Gore expenditures. A one unit increase in Gore expenditures produces a marginal positive increase in Gore support, particularly in the two days following the expenditure increase. This effect, however, evaporates by the fifth day after the expenditure increase. In contrast, a one unit increase in Bush expenditures has a longer and larger cumulative effect in reducing support for Gore. By eight days after the Bush expenditure increase, the decline in Gore's support is larger than any increase from Gore expenditures. At day 12, Gore's support is still lower (including the 95% confidence intervals) than at the time of the Bush expenditure increase.

How did media coverage shape the 2000 campaign? Earlier we found no evidence of bias in the *New York Times*' coverage. The lack of systematic bias, however, does not reduce the importance of media effects during the campaign. As Table 1 shows,

both positive and negative media coverage had impacts on voter preferences above and beyond the effects of campaign expenditures and campaign events. These independent media effects run counter to the indexing hypothesis' conception of the media as a simple reflection of elite discourse.

We can use the estimated VAR model to explore counterfactuals, such as what would have happened if media coverage of Gore had become more positive during the final week of the campaign. An increase in positive Gore media coverage during this period may have staved off the recount in Florida, depending on when in the week the surge occurred. Figure 3 indicates that Gore would have benefitted from this coverage if it had occurred in the final 48 hours of the campaign. After this point, however, the positive effect on Gore's support dissipates, indicating that Gore would not have benefitted had the more positive coverage occurred earlier in the week before the election.

Figure 3 also speaks to the effects of positive and negative media coverage in 2000. We find little support for the contention that Gore was undone by negative coverage. A one unit increase in negative Gore coverage

produces only a single day drop in Gore’s support and no lasting effect. The negative Gore media series, of course, picks up any effects of negative coverage beyond our event dummies, and it may well be that these dummy variables (particularly the late September and first two debate dummies) capture some of the effects of negative events on Gore’s support. Still, our analysis finds that the effects of any additional negative coverage beyond the events of the campaign were marginal, consistent with our finding of no systematic bias in media coverage. In fact, controlling for campaign events, positive coverage had a slightly larger effect on Gore’s support than did negative coverage.

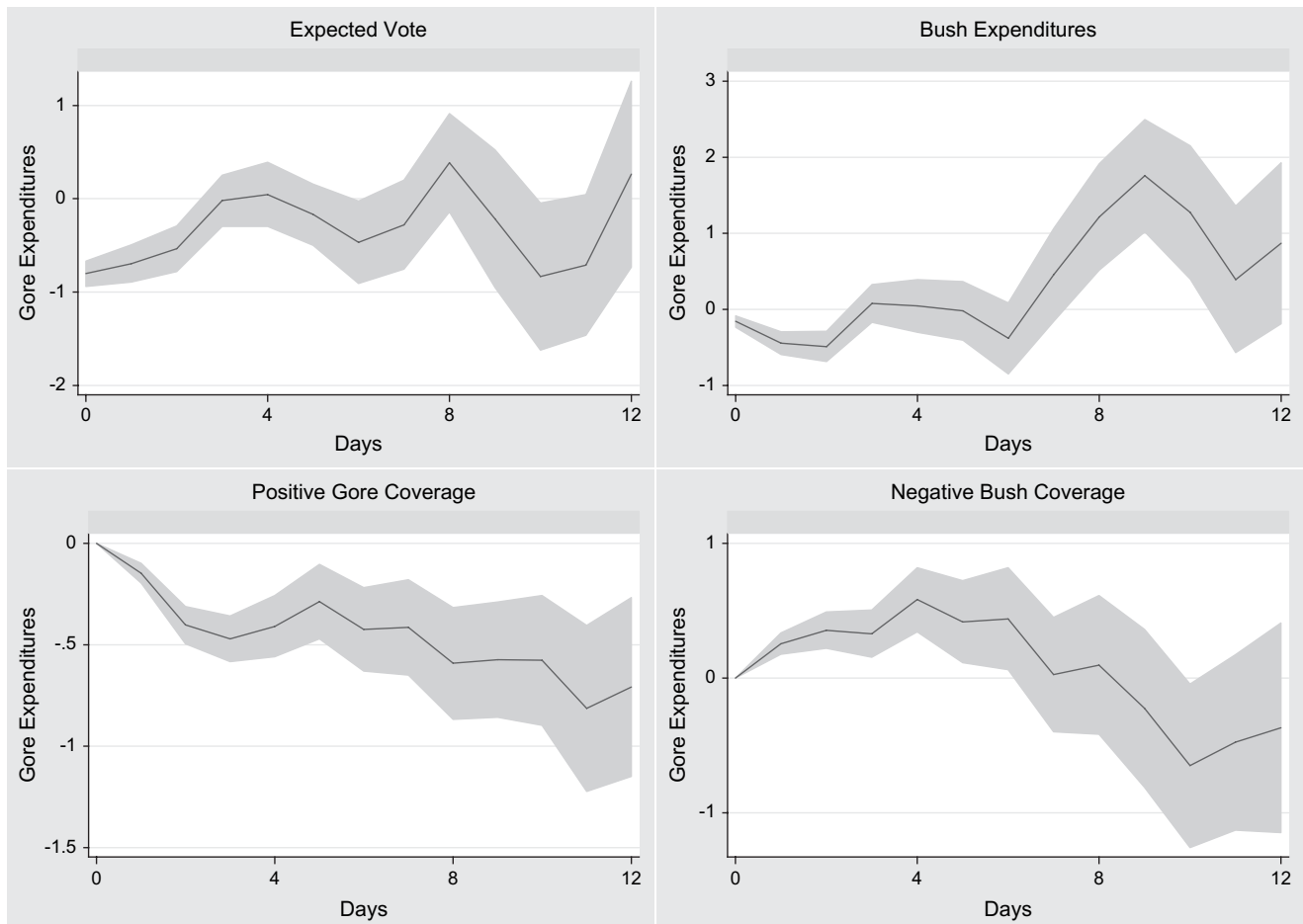
Thus far we have examined top-down campaign influence from elites and the media to citizens. At this point, the standard analysis of campaign effects ends, without exploring reciprocal flows of influence from citizens and the media to partisan elites. Our theoretical framework, in contrast, predicts these reciprocal flows and our Granger causality analysis confirms them. We can employ impulse response functions to examine these flows of influence further,

and in the process explore whether different campaign decisions by the Gore campaign could have produced a different outcome in the 2000 election.

Figure 4 presents cumulative impulse response functions to examine the effects of the expected vote, Bush expenditures, positive Gore media coverage, and negative Bush media coverage on the Gore campaign’s expenditures decisions. The first panel of Figure 4 demonstrates the importance of disentangling the endogeneity between campaign expenditures and the expected vote in studies of campaign effects. The Gore campaign’s expenditures decisions were not exogenous to the expected vote, as the Gore campaign appears to have sought to build on increases in Gore’s support by boosting its expenditures in response. A one unit positive shock in the expected vote for Gore is predicted to have produced a cumulative increase in Gore expenditures for most of the next eight days of the campaign.

A static analysis of the relationship between expenditures and voter support would identify the positive relationship between Gore expenditures and

FIGURE 4 Impulse Response Functions for Effects on Gore Expenditures



voter support without the ability to identify which flow of influence had the greater effect on the campaign. In contrast, our VAR analysis finds that the expected vote had a larger and more sustained positive effect on Gore expenditures than the reverse. Voters, as a consequence, played a much greater role in shaping the 2000 election than simply going to the voting booth on election day.

The Gore campaign's expenditures were also responsive to the Bush campaign's expenditures decisions (the second panel in Figure 4). Here, we find evidence of a tactical error that may have affected the election's outcome in the Gore campaign's delayed response to Bush expenditures. The immediate effect of a one unit increase in Bush expenditures is a two-day *decrease* in Gore expenditures. It is not until eight days after the initial shock to Bush expenditures that the Gore campaign's expenditures exhibit a significant increase. Although Gore expenditures were more ineffectual with voters than were Bush expenditures, this delayed response by the Gore campaign may have made a difference at the margins in voter support (this delayed responsiveness may also explain why the Bush campaign's expenditures were more effective with voters).

The Gore campaign's expenditures decisions were also influenced by the media's coverage of the campaign. Interestingly, we find that the Gore campaign did not use its resources to build upon positive media coverage. The campaign instead reduced its expenditures as the media's coverage of Gore turned more favorable. This may reflect a tactical decision by the Gore campaign to rely on positive free media when it was available. Importantly, this was not a decision matched by the Bush campaign, which instead sought to reinforce positive media coverage of Bush by increasing its campaign expenditures.

This asymmetry in responses to positive news coverage is, we believe, evidence of an effective decision by the Bush campaign and an ineffective decision by the Gore campaign. The Bush campaign's reinforcement of positive media coverage with increased expenditures played a significant role, we expect, in producing the large effects of Bush expenditures on voter support. Similar reinforcement of positive media coverage by the Gore campaign would have been a worthwhile investment at the margins in such a close contest. Rather than reinforcing positive media coverage of its own candidate, the Gore campaign instead sought to reinforce negative coverage of Bush through increased expenditures (see the fourth panel in Figure 4). This, however, was a flawed strategy because negative coverage of Bush did not have a large depressing effect on Bush's support in the campaign.

Conclusion

Our analysis carries both theoretical implications for our understanding of campaigns and more specific implications regarding the 2000 campaign. On the former, our study demonstrates the importance of modeling reciprocal influences between partisan elites, the media, and citizens. The standard top-down model of campaign effects presents only part of the story of campaign influence. Our results demonstrate, on the contrary, that partisan elites, the media, and citizens are able to respond effectively within days to each other's actions, and influence each other's behavior as a consequence. As a result, each plays a critical and interdependent role in shaping campaign dynamics and election outcomes.

Normatively, this interdependence reinforces the importance of campaigns as democratic instruments. Candidates are not alone in the driver's seat; on the contrary, citizens are able to ensure elite responsiveness by shifting their preferences over the course of the campaign. As a consequence, citizens play a much larger role in campaigns than merely casting ballots on election day. For their part, the media do not merely mirror elite discourse. Their independent effects on candidates and citizens afford the possibility that they may serve as an independent fourth estate during campaigns. The responsiveness of expenditures to opposition expenditures also carries implications for electoral reforms such as public financing that are designed to level the playing field. Our finding of expenditure responsiveness in financially balanced, publicly financed presidential campaigns argues that public financing of campaigns at other levels may also promote competitive responsiveness in those contests.

Campaigns matter as a consequence of the reciprocal influences of the three sets of actors. Election results are not foreordained. Had any of the three actors significantly altered their behavior in 2000, the outcome in such a close contest likely would have been quite different. Here we focus on the Gore campaign, which has received considerable and, we argue, merited criticism. Gore's expenditures in 2000 proved less effective than Bush's expenditures in part because of the Gore campaign's delayed responsiveness to the Bush campaign and its unwillingness to reinforce positive media coverage of Gore through campaign expenditures. Had the Gore campaign not made these two decisions, we believe that the closest presidential election in decades may well have had a different outcome.

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