History, Heterogeneity, and Presidential Approval: A Modified ARCH Approach

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Abstract

Since Mueller (1973), the study of Presidential popularity routinely designates certain historical events as "rallying" events, especially the onset of foreign conflicts. Subsequent scholarship explores the effect of additional significant historical events (such as scandals or bad economic conditions) upon the President's stock of approval. This paper argues that prior research has misconceptualized "rallies," which refer to stable increases in approval of the president's performance, not just a short-lived spike. Volatility is an important but mostly neglected aspect of presidential approval. This paper shows how the systematic causes of volatility can be examined.

Volatility increases across administrations and over time, primarily as a consequence of weakening partisan attachments. Volatility decreases during elections and after honeymoons, and presidentially relevant events vary in their effects on the mean level as well as on volatility. The results have significant implications for the support of rational political actors in the legislature and for evidence of the rationality of public opinion.

Ample evidence demonstrates that approval ratings are a critical element of presidential leadership, especially in the legislature. When approval ratings are high, members of the president's party in Congress are less likely to be defeated in the midterm than when they are low. Presidents generally aim for a more ambitious agenda, and the president's legislative proposals are more successful, under conditions of high approval.[1]

What has been unexamined is the impact of volatility or stability of approval on presidential leadership. Rises and falls in mean levels of presidential approval—conventionally called rallies and busts—capture only one part of the picture. Public opinion is also labile or changeable, and the rapidity of these changes, what we deem volatility, also shifts over time and in response to events. Although the terms "rallying" and "consensus building" are *de rigeur* in speaking of the importance of events, the analysts proclaim these kinds of effects on the basis of shifts in the aggregate *mean* approval. From ordinary least squares through rarefied time-series, these are all approaches to modeling the movement in the mean. While a "rally" clearly indicates a growth in approval, the speed of the rally and its stability over time lend it a very different meaning. Volatility says nothing about the average, but it does tell us whether approval is relatively stable, providing presidents a predictable base of support, or more changeable, shifting with the tide of events.

The principal insights of this paper are that volatility in presidential approval has increased over the postwar era, that there are regularized patterns of volatility during an administration, and that some categories of events lead to higher levels of volatility in approval while others are associated with lower volatility. This paper identifies the conditions

under which presidential approval rises and falls (via its mean) *and* the volatility of approval over time expands and contracts (via its variance).

There are real political reasons that the degree of stability in approval matters along with its mean. Brace and Hinckley (1992) show how modern presidents are highly sensitive to *changes* in opinion polls. Presidents may delay certain actions because they cannot afford a drop in opinion polls, or may pursue other activities, especially foreign policy adventures, because they result in a boost in popularity. For example, George Bush received criticism for attempting to protect his 1991 Gulf War popularity surge into the 1992 election by purposely adopting a limited domestic agenda. Burbach (1995) discusses the risks presidents face when they attempt to create rallies by engaging in foreign policy adventures. A volatile public only increases these risks, because (under conditions of volatile approval) public opinion could turn away from the president as rapidly as it turned in favor.

Second, volatility itself is of intrinsic interest. As we show below, some foreign policy events induce volatility among the public at the same time they boost approval. A president may claim popular legitimacy behind his actions by pointing to high levels of public support, yet how much merit will this claim have when support rapidly withers away? Over time, more volatile and labile opinion could undermine a president's ability to employ high levels of support as a governing resource (Kernell 1997). Conversely, Bill Clinton's presidency survived in part because of the stability of public approval, even in the face of an unfolding scandal. Unlike the mean, which is a measure of the balance of support at any point, volatility is a measure of the movement of support over time.

Third, when looked at from the perspective of a rational political actor trying to decide whether to support or oppose the president, the possibility for future changes in approval introduces uncertainty. If job approval is relatively stable, Congress, the media, and the public have a consistent image of the president. Political actors can make calculations without bothering to include uncertainty. A president with a wildly variable base of support, in contrast, introduces a host of uncertainties into the political system. Should I tie my fortune to a popular president today, when he may be unpopular tomorrow?

An important component of this research project requires that we attend to events. Extensive research (e.g., Mueller 1973, Brace and Hinckley 1992, Brody 1991) shows that

significant political events have repercussions for the president's stock of popularity. Some events boost approval: when enemy troops initiate conflict with the U.S. and its allies or when the president successfully completes a major domestic or foreign policy initiative. Other events erode the president's base of support: when the administration has to escalate involvement in an unpopular foreign conflict or when current or former members of the administration fall under indictment. But nearly all of the extant research on the effect of historical events treats the effect of events as one of two crude, positive and negative, categories.[2] As a consequence, the analyst constrains the impact of events to two values. In other words, crude categorization of "positive" and "negative" events declares that warlike initiatives equate with peacemaking to boost the president's ratings, and that scandals, race riots, and strike-breaking equally undermine a president. One consequence of such crude categorization is that it misstates the importance of those events.[3] A much more important flaw is that we lose information about the relative importance of widely dissimilar events across administrations. This research shows that not all events are alike and that a much more nuanced understanding of presidential approval is easily obtained through more careful coding.

The benefit of our approach is that it allows us to understand what variables account for shifts in the presidential approval (the mean) as well as what variables account for changing magnitude of these shifts (the variance). The next section reviews the existing evidence as to why variance in approval may have increased over time.

Any Evidence of Increased Variability?

Since 1938, the Gallup Poll has asked the following question:

> "Do you approve or disapprove of the way President [name of incumbent] has handled his job as president?"

Our dependent variable is the aggregate percentage of respondents who state that they approve of the president's handling of his job, or some transformation of this variable.[4] This time series has formed the foundation for virtually every study of presidential popularity. The evidence for increased variability in these ratings is spotty and unsystematic. Edwards

and Gallup report the standard deviations in approval across presidencies and conclude that "instability has not increased steadily over time" (1990, p. 122), while Brace and Hinckley report that Bush's approval ratings, at least, were "much more erratic, showing more volatility in support" (1992, p. 144). Our own data show that the range of approval seems to have increased over time, as shown in the third column of Table 1, while the standard deviation of approval (column 4) has moved in an indeterminate pattern.

[Table 1 about here]

We argue that comparing standard deviations across administrations is the wrong way to proceed. The technique of accumulating the standard deviation of approval ratings compensates for truly unusual highs and lows, but does not control in any systematic way for similarities and differences between administrations. Compare an administration with a high frequency of events (e.g., Johnson) with those with a low frequency of events (e.g., Carter).[5] The standard deviation of the two administrations are relatively close, but the circumstances surrounding these two presidencies are radically different. Does the slightly higher standard deviation of approval under Johnson mean that the mid-60's public was more "volatile" than the late-70's public, even when fewer consequential events took place under Carter? Scholars of the presidency know that we cannot understand mean levels of presidential approval without knowing the particular circumstances of each administration, whether this includes economic performance, time in office, war casualties (Mueller 1973), media coverage of the administration (Brody 1991), or the "dramatic events of a term" (Brace and Hinckley 1992, p. 10). The same argument applies to the variance. Any scholar modeling approval—the mean *or* the variance—must take into account historical events.

[Figure 1 about here]

A cursory examination of the movement of approval, shown in Figure 1, highlights the centrality of events. The increases during Nixon's, Carter's, and Bush's terms are evident in both the table and the figure, as is the decline in variability during Reagan's and Clinton's terms of office. Yet, even this figure by itself says nothing about different levels of *variance* in approval ratings across administrations. Was popular approval during Nixon's term particularly "volatile," or are our eyes being misled by the Watergate plummet? Was Bush's approval rating really "volatile," as Brace and Hinckley claim (1992), or was there simply

a large surge and decline during and after the Gulf War conflict? No conclusive statements about variability can be made from these data, because we have no quick shorthand way to compare events across administrations. Certainly it does not make sense to compare the standard deviation during Clinton's term with the standard deviation across Nixon's term, for example, without accounting for the Vietnam War, Watergate, a booming economy, the Lewinsky scandal, and so forth. But how can we compare widely disparate administrations? We present an approach here that makes such a comparison possible, and allows us to isolate the existence, and causes, of variance in approval ratings.

Theory leads us to expect at least four reasons for different levels of stability in opinion about the president at different times. First, we draw upon the debate between "on-line" versus "memory-based" models of opinion formation and the survey response. In brief, the on-line approach (Hastie and Park 1986; Lodge and Stroh 1993) hypothesizes that individuals maintain a running tally (such as a summary judgement of presidential performance) while forgetting individual events. The memory-based model (e.g., Zaller and Feldman 1992), in contrast, conjectures that individuals carry in their head a set of "considerations" regarding an attitude object such as the president. When subjected to the stimulus of the survey interview, the respondent samples from that pool of considerations to formulate a response.

What does this matter for presidential approval? There is some difficulty in abstracting from an individual-level model to an aggregate. Still, we can generate a plausible set of hypotheses based on these contending theories. Presidencies are, at their outset, blank slates, or at least slates only lightly chalked upon during the campaign. All presidents benefit from a honeymoon period at the outset of the administration, where in- and out-partisans alike share good feelings. This is a period of relatively high approval and, according to both models of the survey response, also ought to be a period of relatively high volatility in approval, since citizens have neither sufficient experiences to derive a stable tally nor have accumulated a large number of considerations. However, the two models diverge in their predictions of volatility over time. Under the on-line approach, volatility should decline, as the individual citizen's opinion is based on a longer set of experiences. The memory-based respondent, on the other hand, is far more likely to judge the president's performance

based on recent events, and thus volatility in approval is just as likely to increase as it is to decrease.

Second, deliberation reduces variance. There is one obvious occasion when Americans are called to deliberate upon the performance of the president: election years. We know from prior research that pre-election polls are wildly variable but decline in variance as the election comes closer. One interpretation of the reduction in variance is that the public is coming to a stable judgment about the candidates' probable performance (Gelman and King 1993). Reelections are slightly different, in that there is a specific reference point in the form of the incumbent president However, reelections trigger partisan reactions to the incumbent president as well. The result should be that elections, particularly those involving lame duck presidents, will reduce variance in approval.

Third, events initiated by the president's administration should increase or decrease variance, depending on the nature of information the event provides to in- and out-partisans. Zaller's (1992) argument about differential information flows in the public contends that out-partisans are much more willing to accept negative information about the president than would in-partisans. (Equivalently, out-partisans resist information favorable to the president.) Different events should be expected to reduce volatility, whether because everyone agrees that the administration has failed (after revelations of scandal) or succeeded (after pronouncements of significant foreign or domestic policy accomplishments). Thus, we expect that positive events will reduce volatility, since they are looked upon favorably by both in- and out-partisans, while negative events will increase volatility. In-partisans are able to counter-argue while the out-partisans willingly adopt the new information. But it is also possible that particularly strong negative signals, such as administration scandals, overcome hurdles to persuasion among in-partisans, implying a reduction in volatility.

In a related way, attacks by foreign states on the U.S. and its allies represent a different form of information, one which is rarely of an obvious partisan nature. We expect that the variance in approval over these time periods should decline precipitously when the U.S. is attacked by another country. When the U.S. initiates conflict, however, domestic opposition is much more likely, especially in a "pretty prudent" post Vietnam public (Jentleson, 1992). Thus, we expect positive events, scandals, and foreign attacks on the U.S. will lead to a

decline in the volatility of approval, while other negative events and U.S. initiated foreign conflict lead to an increase.

Fourth, we anticipate a linear increase in volatility during the postwar era as a consequence of declining partisan ties. Partisan affiliation and partisan attachments provide an inertial base in evaluations of the president. Voters who are of the same party as the president are more likely to resist negative information about him, and therefore less likely to incorporate such information into their approval of the president (Gronke 1999, Zaller 1992). Voters who are of the opposite party would be more likely to incorporate negative information, but less likely to incorporate positive information. Independent voters should be the most receptive to new information of either valence. These four hypotheses comprise the central goals of this research. Each implicates, to some degree, changes in the volatility of presidential approval.

In the next section of the paper, we illustrate a methodological technique, a modified autoregressive conditional heteroskedasticity (ARCH) model, which allows us to capture over-time variability in a time series. The approach is then tailored to test our hypotheses about changes and trends in volatility, and has widespread application to models where over-time variance is a dependent variable of interest.

Models of Heteroskedastic Variance in Time Series

The likelihood functions for time-series models differ from cross-sectional models in that one cannot simply represent the overall likelihood as the product of the individual densities. Each observation is conditional on previous observations, and the likelihood must reflect this. The most general formulation of the likelihood for some random variable Y_t represents each observation as conditional on all prior observations:

$$\begin{aligned} \mathcal{L}(Y) &= f(y_t|\theta, y_{t-1}, y_{t-2}, \ldots, y_0) \\ &\quad \times f(y_{t-1}|\theta, y_{t-2}, y_{t-3}, \ldots, y_0) \times \ldots \times f(y_0|\theta) \end{aligned} \tag{1}$$

(where $f()$ is the density function, and θ is a vector of parameters for that function). Such a model cannot be estimated, so we conventionally make an assumption that only k periods

back affect values of y_t:

$$\begin{aligned}\mathcal{L}(Y) &= f(y_t|\theta, y_{t-1}, y_{t-2}, \ldots, y_{t-k+1}) \\ &\quad \times f(y_{t-1}|\theta, y_{t-2}, y_{t-3}, \ldots, y_{t-k}) \times \ldots \times f(y_0|\theta) \end{aligned} \tag{2}$$

These very general equations lead to two further comments. First, because the normal density function is one of few functions where the conditional distribution is of the same form, we opt for normal densities. Second, the parameter vector θ is composed of a mean μ and variance σ^2. Rewriting (2):

$$\begin{aligned}\mathcal{L}(Y) &= f_{\text{normal}}(y_t|\mu, \sigma^2, y_{t-1}, y_{t-2}, \ldots, y_{t-k+1}) \\ &\quad \times f_{\text{normal}}(y_{t-1}|\mu, \sigma^2, y_{t-2}, y_{t-3}, \ldots, y_{t-k}) \times \ldots \times f_{\text{normal}}(y_0|\mu, \sigma^2) \end{aligned} \tag{3}$$

Typically, the analyst chooses an appropriate function to reparameterize μ in terms of the substantive explanatory variables, while leaving σ^2 as a constant:

$$\mu = f(X, \beta) \tag{4}$$

What has been long neglected in studies of presidential approval is the opportunity to reparameterize σ^2 and to identify independent variables that help explain changes in the variance. This is methodological exercise accomplishes a substantive goal: it allows us to test hypotheses about changes in public response to events and the long–term impact of the decline of parties for the presidential ability to act.

There are, roughly speaking, two classes of models of heteroskedasticity in time-series. One approach (multiplicative heteroskedasticity) treats variance as a function of some set of explanatory variables, but is not conditional on variance in prior periods (Greene 1993, p. 405–407; Harvey 1990). An alternative approach (autoregressive conditional heteroskedasticity or ARCH) treats variance as conditional on variance in previous periods, yet typically omits explanatory variables (Greene 1993, p. 438-442; Harvey 1990). The contrast between multiplicative heteroskedasticity and ARCH is straightforward. The multiplicative heteroskedasticity model represents variance as a function of some set of exogenous variables Z (which may or may not include the X variables in the function for the mean):

$$\sigma_t = g(Z, \gamma). \tag{5}$$

Typical functional forms for $g()$ include exponentiation and squaring, since $g()$ must be positive.

The ARCH approach represents variance as a function of the square of the residuals in the previous period (ϵ_{t-1}^2):

$$\sigma_t = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 \tag{6}$$

In other words, variance at any time is conditional on the noise in the fit of the model in the previous period.[6]

A relatively simple test for the presence of ARCH processes strongly resembles standard Lagrange multiplier tests for the presence of AR(1) disturbances (the full derivation can be found in Harvey (1990)):

$$\text{LM}^* = T \times rsq_1^2 \sim \chi^2(1 \text{ d.f.}) \tag{7}$$

where T is the sample size and rsq_1 is the first-order autocorrelation of the square of the residuals. Applying this test to the presidential popularity series yields a χ^2 (1 d.f.) of 11.03, which is significant beyond $p < .01$, leading us to reject the null hypothesis of no ARCH(1) effects.

As innovative and useful as the ARCH approach can be, in the present context it yields little of direct use. We gain more efficient estimates of the parameters on μ, to be sure, but a standard ARCH approach doesn't provide information about what causes σ^2 to vary. Since we are interested in testing a hypothetical relationship between events, partisan strength, and variance in approval ratings, we need a different functional form, one which allows us to explain changes in σ^2.

There is no reason that multiplicative heteroskedasticity and ARCH methods cannot be combined. In fact, there are a number of examples of the use of exogenous or predetermined variables in ARCH models in the econometrics literature.[7] The autoregressive nature of the time series is retained, but we add a series of explanatory variables. The parameterization for the variance thus becomes:

$$\sigma_t = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + Z\gamma \tag{8}$$

where α_0 and α_1 represent the ARCH parameters, Z is a matrix of explanatory variables, and $Z\gamma$ represents the impact of other explanatory variables on σ. In order to retain a notation familiar to political scientists, we refer to this combined specification as ARCH-MH, although it receives no special designation by econometricians.

Modeling the Mean Level of Approval

We estimate two versions of the ARCH-MH model. The first version utilizes the traditional event series. The second employs a more detailed coding scheme for events. In addition, in order to establish a basis for comparison with the established EDL model, we estimate both events models without the ARCH component. These results are reported in Appendix B.

The format of the exponentially distributed lag is straightforward. Let λ represent the exponential decay and X represent a matrix of independent variables (lagged or contemporaneous):

$$\text{Approval}_t = \beta_0(1-\lambda) + \beta' X + \lambda \text{Approval}_{t-1} + \epsilon_t - \theta\epsilon_{t-1} \tag{9}$$

The significant difference between the EDL model and a standard Koyck transformation is the implicit MA(1) error process ($\epsilon_t - \theta\epsilon_{t-1}$).

The dependent variable is the mean level of presidential approval, taken from the Gallup series, and converted to monthly data.[8] Our primary interest is in the model for the variance. Thus, while we need to rely upon a well specified model of the mean, we will not spend a great deal of space justifying our selection of a particular specification.[9] There are four principal independent variables in the model: the change in unemployment (monthly first difference), rate of increase in the Consumer Price Index (CPI), a dummy for Watergate, and the number of American troops killed in Vietnam (during Johnson's administration). In order to account for the delay before such information would be incorporated into approval ratings, all these independent variables are lagged one month.[10]

We add one of two sets of dummy variables to represent significant historical events in the model of the mean. The first set is taken from Brace and Hinckley (1991) and extended by us to 1999. One dummy denotes events favorable to the president, the other dummy denotes events which are unfavorable to the president.[11] We do not lag the event

variables, because we believe that the transmission of information about these events should have a rapid impact, unlike the effect of more complex information such as the change in unemployment or the level of inflation.

Second, we considered an improved event series. The conventional coding scheme developed incrementally, from Mueller's (1972) observation that presidential approval increases during "rally" events, to Kernell's (1978) fuller identification and analysis of rally events, to Brace and Hinckley's (1991) attempt to provide a relatively comprehensive list of "positive" and "negative" events. As Brody and Shapiro note, however, even supposed "rally" events (foreign policy adventures) differ dramatically in their impact on presidential approval (Brody 1991). By only selecting "rally" events, one precludes the ability to understand declines in presidential approval. Categorizing events solely into "positive" and "negative" is better, but still might obscure important differences among events.

A more informative approach is taken by Marra, Ostrom, and Simon (1990), where one includes separate dummy variables denoting different kinds of events.[12] There are, broadly speaking, two areas of presidential activity, domestic and foreign, and two kinds of effects on approval, approval enhancing and approval diminishing, areas that reflect longstanding traditions of presidential policymaking (e.g. the "two presidencies"). Since presidents are held particularly responsible for economic performance, we code economic news separately from other domestic policy events, and otherwise expect that positive economic news and domestic policy accomplishments will enhance a president's level of support, while poor economic news and policy failures will erode presidential support.

The other "presidency" is the foreign policy presidency. Foreign policy events, however, are not uniformly positive. Some, such as the Tet offensive or the U.S. downing of Libyan fighters, were associated with a decline in approval, while others, such as the Cuban missile crisis or the Vietnam peace agreement, show the commonly expected pattern, a short term boost for the president (Brody, 1991, Table 3.1). We distinguish between peace-making initiatives and those that involve the use of troops, and between conflicts begun by the U.S. and those started by enemy nations. It is entirely plausible — indeed, we will demonstrate as much — that the effect of enemy attacks is especially strong in boosting presidential approval, whereas conflicts initiated by the U.S. might find doubters among the respondents

as to the wisdom of the policy.

Finally, presidents are judged on personal characteristics: competence, integrity, empathy, and leadership (Aldrich, Gronke, and Grynaviski 1999; Funk 1999; Hinckley, 1990). While few events can be said to reflect directly on presidential character, the public responds to events that seem to bear on presidential fitness, character, and ability to lead. Thus, we anticipate a rally when the president's health is threatened and after an assassination attempt; and expect a decline in approval during administration scandals. Because of the extraordinary set of events surrounding Watergate, we include a separate dummy variable for time points comprising this scandal.[13]

These expectations are reflected in the coding of events shown in the table below.[14] We expect that two of these should have negative signs in the model for the mean: adverse economic events and administration scandals. We expect that four of these should have positive effects upon the mean: domestic and foreign policy accomplishments, and U.S.- and enemy-initiated foreign conflicts. We are agnostic as to the effect of escalation.

[Table 2 about here]

Modeling Volatility in Presidential Approval

Our primary interest is in the set of explanatory variables for the variance portion of the model. Here, we need to think of sets of variables which will not lead to uniform shifts up or down in approval, but may lead to increases or decreases in the volatility of approval over time. Above, we identified four categories of hypotheses that we see as pertinent towards understanding variance in presidential approval. Each has a corresponding set of independent variables, which are listed here.

First, we suggested that two prominent theories of the survey response provided conflicting predictions about volatility over time. According to the on-line model, volatility should decrease over an administration, where under a memory-based approach, volatility should show no predictable pattern. We test between these two competing predictions by examining the coefficient on the *percentage of the term completed* in the variance portion of the model.[15]

Second, we expect that elections, as moments of deliberation, should decrease variance

in approval. Hence, we include a dummy variable, *election years,* and expect that the underlying variance in election years should be considerably more narrow than it is in non-election years. Since we expect that the effect should be slightly less pronounced during *reelection years,* we also include an appropriate dummy measure.

Due to the differential effect of the events of an administration upon in- and out-partisans, we include one of two sets of dummy event codes into the variance portion of the equation, thus controlling for the unique history of each administration. This allows us to test whether particular kinds of events are more likely to lead to higher levels of volatility while others lead to lower levels. One set of events is Brace and Hinckley's (1992) positive and negative event codes; the other is our more elaborated set of events specific to different categories.

Finally, we hypothesize that declining partisan ties in the postwar era may have undercut the president's ability to maintain a stable level of support, thereby leading to an increase in variance. As a surrogate for strength of partisan attachment, we include the *percentage of independent identifiers*, as measured monthly by the Gallup survey.[16] If our expectation holds, our measure for declining partisan attachment should be positively signed in the variance model.

Results

Table 3 displays the autoregressive conditional heteroskedastic exponentially distributed lag (ARCH-MH) estimates for the Gallup approval series from 1953 – 1998 under two specifications. The first column contains the estimates from a model using Brace and Hinckley's version of events and the second column contains the estimates from a model using our elaborated coding scheme for events.[17] In this results section, we turn first to the model for the mean, with a focus on the event categories, and then to the model for the variance, the core innovation in this paper.

Results for Model of the Mean

Most of the coefficients in the reported model for the mean confirm the standing literature. There is considerable inertia to the president's approval. The estimate for λ (which serves

as the coefficient on the lagged approval variable) is quite high (.92). In other words, over 90% of the president's approval in the previous month carries through to the subsequent month. Inflation has a statistically significant, although substantively small, effect on the president's approval rating: an increase in the CPI of 10% would account for only a one-and-a-half point drop in the president's average approval. The estimate of the effect of change in unemployment is substantively much larger—a movement of 10% in unemployment is associated with a 13% lower approval rating, *ceteris paribus*. The other large effect on the president's approval was the number of deaths in Vietnam: every additional thousand deaths leads to nearly a two point drop in approval.

[Table 3 about here]

Adding events to the model of the mean yields substantial improvement in fit over Beck's specification; the difference in log-likelihood is significant at the $p < .001$ level (a χ^2 of 45.6). All else being held equal, a positive event is associated with an 2.33 point improvement in the president's approval rating, whereas a negative event leads to a 1.59 decline in approval. By these estimates, positive events boost a president by fifty percent more than negative events undercut the president's approval. (The overall goodness of fit of the two models is beyond $p < .001$. Note that the two goodness of fit measures are not comparable, because the more elaborate events model is not nested within the simpler model.)

The advantage of the more elaborate coding of events is readily apparent: not all "positive" or "negative" events accomplish as much for the president's approval rating. News of administration scandals undermine presidential popularity to a significant degree, a finding in line with conventional accounts. We note that the presence of the Watergate dummy variable removes the effect of the extraordinary sequence of scandalous events during Nixon's administration (when there were over fifteen events coded as administration scandals from February 1973 through Nixon's resignation in August 1974). Even after controlling for the unusual scandals of Watergate, scandals drag down the president's approval. This result reinforces the claim of Ostrom and Simon (1985) that scandals (in their case undifferentiated from Watergate) are the single most damaging category of events for a president.

Presidents receive greater credit for domestic accomplishments than foreign accomplishments, running somewhat against the received wisdom that presidents should focus on

foreign policy since that is where they receive the most credit (although see Burbach 1995). A domestic policy accomplishment, on average, produces a 2.7 point gain in the president's approval rating (compared to 1.8 for foreign accomplishments). Ostrom and Simon (1985) found that domestic policy initiatives (distinguished from completion of policy goals) were potentially a debit to the president (although that effect was not significant). Our results demonstrate that when presidents complete their policy goals, they reap significant popular rewards.

We differentiated between US-initiated and enemy-initiated foreign conflicts because we expected that it was possible that the events would not be symmetric. As Brody and Shapiro (Brody 1991, Ch. 3) and Jentleson (1992) note, public opinion about foreign policy events differs in meaningful ways. The storied "rally-around-the-flag" would be more likely in the presence of a foreign threat, but less likely when the U.S. entwines the military in an unprovoked engagement. Our suspicions were supported by the data: an enemy-initiated conflict was the most substantively significant category of events, accounting for over three and a half point increase in presidential approval (well in excess of the expected effect of a generic "positive" event). US-initiated conflicts returned 1.7 additional points on the approval ratings, but these were not statistically significant. Likewise, escalation of continuing U.S. military involvement undercut presidential approval, but not by much, and not to a significant degree.

Another perspective on these results is this: peacemaking does not pay the same dividends, in terms of domestic support, as does warmaking (as long we you are not viewed as the aggressor). A president gains most when an enemy initiates conflict, more than twice the gain from a peaceful foreign policy accomplishment. The president gains more as commander-in-chief than he does as chief statesman.

Results for the Model of the Variance

The ultimate payoff from the variance portion of the model should be substantive: what do we learn about presidential approval by directly modeling the variance? First, we found good evidence to support the hypothesis about the impact of declining partisan ties. Increases in the percent of independent identifiers are associated with increasing volatility, although

the coefficient reaches statistical significance only in the first model. More importantly, the increase in independent identification over the post-war period leads directly to a linear increase in volatility. When we regress predicted variance against a simple time counter, the slope is .001239 (t=9.76). The addition of a simple time counter had no additional explanatory power ($\chi_2 = .007$, 1 d.f.). The average level of variance in approval during the first 10 years of our data is 1.51, compared to 2.11 for the last 10 years of data. This increase is almost completely explained by changes in partisan attachments.

These results are reinforced by a graphical display of volatility ($\hat{\sigma}$), shown in Figure 2. There is no pattern evident during administrations, other than a regular honeymoon pattern of initially high volatility (from 3-5, depending on the administration) which quickly declines and a seeming increase during each administration, and over the full period. As already shown, however, the linear trend is primarily as a product of the linear increase in independent identification during this era. The bottom panel of Figure 2 makes this abundantly clear. Here we plot $\hat{\sigma}$ as a product *only* of α_0, α_1, and independent identification. The slope is positive, statistically significant, and larger than the slope for the top graph. ($b = .001255, t = 8.5$).

[Figure 2 about here]

Furthermore, compare the predicted level of volatility to the level of variance attributable to sampling error for the Gallup series during most of this period, about 3%. In other words, for most of the series, the variance (at the one standard deviation level) is already larger than the sampling error (at the two standard deviation level). Were one to increase the variance to a comparable two standard deviation (95% confidence level), it is quite apparent that sampling error accounts for only a small proportion of the underlying variance in approval.

Second, we learn that the "memory" of the system is relatively small. Somewhere between 2-8% of a shock carries over into the next time period. The α_1 coefficient (on the lagged square of the residuals) is positive and statistically significant, but substantively small.

Third, our hypothesis about election years is confirmed. Election years tighten the variance significantly (the coefficient estimate is statistically significant at $p < .01$), indicating that, during these years, the population changes their evaluations of the president

less frequently. This effect is slightly smaller in reelection years ($-.72 + .02$), but this is not surprising. Reelections activate all manner of partisan attitudes, requiring judgment of the president's performance. Those years which are both election years and are *not* re-elections are years in which the "lame-duck" president is completing the last months of his administrations.

Fourth, we found no evidence that public attitudes about the president will be less volatile over time simply as a function of greater experience with the president as an object of public attention. This supports the memory-based model of attitudes over the on-line model, but only weakly.

What of the effect of events on variance? The importance of discriminating among events is made clear when one compares columns one and three in Table 3. When we estimate our model using the positive/negative coding scheme (column one), we find no statistically discernible impact of events on variance. The estimates from the first model (employing positive/negative coding) do provide one insight: positive events, which boost the mean level of approval, also increase the variance (by a predicted .34 points); whereas negative events, which eat away at approval, decrease variance by .54 points. Although statistically insignificant, the coefficient estimates indicate that positive and negative events have very different impacts on the variance of presidential approval as well as on the level of presidential approval. Does our coding scheme provide additional insights?

We believe that it does. One noticeable difference is that the second model produces statistically discernible coefficients on some events. We are much more interested, however, in the distinctive patterns among events. Our results show that public approval of the president becomes less volatile during *domestic* events. Each of the following variance coefficients is negative (i.e. associated with a *decline* in variance): scandals, adverse economic events, and domestic accomplishments (the one non-domestic category is "foreign accomplishments"). The effect of domestic accomplishments on stabilizing public opinion seems especially strong, outweighing even that which builds during an election year. Foreign events, in contrast, cause volatility; U.S. led escalation in an ongoing conflict, U.S. initiated conflicts, and enemy initiated conflicts (contrary to our expectations) all have a positive impact in the variance side of the model. Again somewhat contrary to claims that

presidents should focus on foreign policy, the largest reductions in volatility are associated with domestic events (domestic accomplishments and adverse economic events), followed closely, and not surprisingly, by enemy attacks on the U.S.

With the exception of foreign accomplishments, these results can be grouped into two general categories: war and peace. Wars, as shown in the model of the mean, produce a generalized boost for the president, but at the same time produce increased variance in public approval. It is hard to characterize the event as a "rally" if it does not also imply a reduction in the volatility of the series.[18] Events unrelated to war (all of them domestic affairs) have a mix of effects on the mean level of approval, depending on whether they are good (accomplishments) or bad (scandals, adverse economic events), yet on average are associated with a reduction in variance.

These results are not inconsistent with the results using Brace and Hinckley's codes, when one realizes that the bulk of "positive" events are foreign affairs, "rally" events, whereas the bulk of "negative" events consist of scandals and bad economic news. Still, the two point coding disguises an important difference in public reactions to foreign and domestic affairs, a distinction which has characterized public opinion research for decades (see Holsti 1992 for a review). Our research supports the claim that public opinion on foreign policy can be just as influential as on domestic issues – as long as we pay close attention to different kinds of foreign policy events (Aldrich, et al. 1989). Furthermore, the distinction that we make among foreign policy events confirms the findings of Page and Shapiro (1992, p. 281): "the American public makes many clear and reasonable distinctions among *alternative* [foreign] policies" (emphasis added). Equally, these results confirm an argument of Brace and Hinckley (1992, p. 107-114) that the public reacts in very different ways to presidential use of force, depending on the perception of U.S. interests. These important differences—between public opinion on domestic and foreign policy and among kinds of foreign policy actions—are fundamental to our understanding of presidential approval.

Finally, there is only weak support for the theoretical expectation of positive signs on the effects of mixed partisan events and negative signs on the partisan-neutral events. Only two events achieve statistical significance here: domestic accomplishments and adverse economic events. At a stretch one might regard these events as those which exceed hurdles

to persuasion in a partisan environment, but there is no support for such a claim in the literature. Failure to confirm the effects of mixed partisan events with aggregate data does not mandate rejection of the hypothesis, but does argue for tests at a less aggregated level such as the pooled cross-sections.

The graphical display (Figure 2) further illustrates the combined impact of events, economics, and elections. One can readily see the estimated periods of low volatility during election years. Every election year with the exception of 1968 and 1972 is marked by an unusually low estimated variance in approval. The former was an exceptionally eventful year, with not only significant events in Vietnam and at home, but also the Soviet invasion of Czechoslovakia. The latter involved both an announcement of a peace accord, and an escalation of bombing in Cambodia. There are multiple sharp spikes in estimated variance, due to a mix of both positive and negative events. The turbulence of Watergate is obvious, as was also the low volatility concerning Nixon's performance just prior to his resignation in August 1974.

Increased media scrutiny, an accelerated frequency of events, and increasing distrust of principal federal institutions could all lead to a general increase in the variance of the public's approval of the president. The causes of this general increase (outside of those already controlled for) argue for a promising research program. The result for independent identification alone is significant in that it suggests current presidents must deal with a more fickle public than those of the immediate postwar period, and will consequently increase the chances that an aggressive presidential agenda will be met with unanticipated opposition.

Conclusion

Our approach to understanding volatility yields significant new insights into the dynamics of presidential approval. Public volatility moves in sensible patterns, rising to unusual spikes on occasion, but also settling into periods of relative quiescence in others. By directly modeling volatility, we can account for the effect of significant events as well as secular trends when comparing the underlying distributions of approval across presidencies.[19]

Substantively, we found that volatility increased over the forty years of the presidential approval series. This finding puts our work in concurrence with Edwards and Gallup (1990),

but on much stronger methodological foundations since we control for the different events. Furthermore, the increase in variance is clearly a function, at least in part, of a strong secular trend toward independent partisan identification. Once party is controlled for, we find that volatility follows no discernible pattern over the course of each administration. The underlying variance declines during election years, but especially during those years when a lame-duck is in office.

We find that history matters, and significant events can wildly disrupt the steady patterns of increasing variance on the whole, punctuated by lower periods during elections. With respect to the president's average level of approval, we find that historical events can be more important than economic conditions. Specifically, the president gains most by his role as commander-in-chief, in that his approval ratings climb more when the U.S. becomes involved in a foreign conflict. This is especially so when an enemy nation initiates the conflict (where the effect is twice the boost that the president receives when the U.S. initiates conflict).

Domestic politics matter, too. Scandals are the worst of the seven categories of historical events to befall a president. A president also gains significantly by finalizing domestic policy, to a point larger than any event save enemy-initiated conflicts.

These results have a variety of implications for strategic political actors and for the rationality of the American public. Consider the effect of steadily increasing variance in approval upon the president's support in the legislature. We know that strategic political actors consider the president's level of popular support when deciding whether to support the president's program (e.g., Rivers and Rose 1985, Ostrom and Simon 1985). One implication of our work arises if strategic actors conduct a kind of hypothesis test on the president's approval levels. As the variance in presidential approval increases, this means that the strategic actor should begin to discount modest approval levels. Consider two presidents with approval levels at 60 percent, but one near the start of his administration (with low variance following the honeymoon), and the second further along in the administration and some events causing an increase in variance. The strategic actor should consider that the approval levels for the former need not slip very much in the short run, but that approval levels for the latter might slip significantly below 50 percent. In other words, it is not just

the president's declining level of approval, but volatility in approval which undermines the president's program.

There are also speculative implications to be drawn from our work with respect to the general rationality of the public. The alleged indifference of the American public to foreign affairs (Almond 1950) obviously does not hold with respect to three of the significant categories of events. Foreign conflicts, whether U.S.- or enemy-initiated, and foreign policy accomplishments have significant effects upon the president's approval ratings. Not only does public attention to these events tend to boost the president's base of support, it does so to a degree greater than most of the domestic events we study. Recent scholarship supports the argument that there are significant aspects of foreign policy events that affect attitudes towards political figures (e.g., Aldrich, Sullivan, and Borgida 1989), and in attitudes towards policy choices (e.g., Page and Shapiro 1992; Holsti 1992). Our work not only adds to these more general findings, but provisionally demonstrates that these events need not be "rallying" in the sense that they produce stable opinions.

Lastly, the systematic pattern of declining variance in approval during election years deserves interpretation. Plainly, the greatest declines in variance in approval happen when the president is of limited relevance as a political actor: during the election year of the lame duck president's final year in office. At this time, one may reasonably expect that much of the partisan bickering over the actor would turn towards evaluation of the current political candidates. It is perfectly reasonable to expect that attitudes toward the lame duck president would stabilize as political attention drifts elsewhere.

Presidential approval has held the interest of political observers for almost fifty years. The typical conception of approval, which focuses on shifts in the mean, is incomplete. No one would argue that a statistical distribution can be described solely by its central tendency; nor should our exploration of the patterns and causes of presidential approval look only at the mean. As important in many circumstances is the frequency and sharpness of shifts in public sentiment—volatility. In this paper, we derive an estimator for variance in a time series that can be easily incorporated into existing models of approval, and can be readily adapted to test hypotheses about the causes of changing volatility. We test three such hypotheses here: whether volatility displays trends over time and through administrations

(it does, with an important caveat); whether there is a differential impact of events, some causing public agreement and others disagreement (there are); and whether changes in the partisan makeup of the population has led to increasingly volatile approval (it has). Whether due to changes in the nature of political information, changes in the occupants of the Oval Office, or simply a consequence of the tumult of the past forty years, presidents have had to contend with an increasingly fickle public.

Appendix A: Coding of Events

For reasons outlined in the text, we developed our own coding scheme for events, and estimated a second set of models employing dummy variables denoting these codes. Instead of two categories, we used the following seven categories. We did not code for positive economic events, protests, or the health of the president since there were few or no instances of each of these three categories in our dataset.

- *Adverse Economic Event*: An event which can reasonably be expected to have nationally adverse economic consequences (e.g., a strike or other form of labor unrest, initiation of wage-price controls).

- *Administration Scandal*: Congressional hearings, indictments, or unusually prominent media stories of scandals involving the president's administration.

- *Domestic Policy Accomplishment*: Successful completion of a major domestic policy objective (including significant space missions).

- *Foreign Policy Accomplishment*: Successful completion of a major domestic policy initiative (e.g., announcement of an armistice or peace accord).

- *US-initiated Foreign Conflict*: The first major engagement of U.S. military units abroad, where the engagement is initiated by the U.S. (e.g., Eisenhower sending Marines to Lebanon, air strike on Libya under Reagan).

- *Enemy-initiated Foreign Conflict*: An attack by an enemy of the U.S. on U.S. officials or its allies (e.g., Soviet invasion of Afghanistan, Iran hostage seizure).

- *Escalation of Foreign Conflict*: Subsequent expansion of U.S. military involvement in an on-going foreign conflict.

[Table 4 about here]

Appendix B: EDL Estimates

[Table 5 about here]

Appendix C: Comparative ARCH-MH Estimates

[Table 6 about here]

Notes

[1]These claims are well established in the literature on presidential approval and presidential leadership. The citations are too numerous to include here. Four recent volumes are Brody (1991), Brace and Hinckley (1992), Kernell (1997), and King and Ragsdale (1988). For evidence on the "boldness" of the agenda, defined as breadth of legislative proposals, frequency of vetoes, and use of military force, see Simon and Ostrom (1989).

[2]Notable exceptions are Burbach (1995), who categorizes foreign policy events into five separate categories and who allows the size of a rally to vary with elite support and media coverage; and Marra, Ostrom, and Simon (1990), who categorized domestic and foreign policy events and presidential travel and speeches into a comprehensive list of "determinants of presidential approval." (Marra, et al., pg. 596).

[3]If events differ in the magnitude of their effect, an overly coarse categorization will underestimate the impact of some events and overestimate the impact of others.

[4]Approval ratings were collected from the *Gallup Monthly*. When approval ratings were collected less than monthly, the data were interpolated to monthly by linear averaging. When approval ratings were collected more than once a month, we chose the first observation collected in a month.

[5]The event series for these presidencies are reported in the Appendix, as well as some of the works cited in the bibliography.

[6]ARCH models have become popular in a variety of economic and finance applications, including capital and stock markets, and models of inflation, finance, and marketing (for a review, see Bollerslev et al. 1994). Most applications involve dependent variables, such as exchange rates, where actors have had to make some forecast based on incomplete or uncertain information. Econometric models attempt to account for changing variance in these forecasts using the ARCH framework. If we conceptualize the approval rating as the "current value" the public places on the president's job performance, then the two applications are similar.

[7]The possibility for including exogenous variables is mentioned as a possibility by Engle and Bollerslev, 1986. A useful review of the literature is available in the Bollerslev et.al. (1994) review from the *Handbook of Econometrics*; see also Engle, Ito and Lin (1990) and

Engle, Ng, and Rothschild (1990) for some notable empirical applications.

[8]We did not have access to a complete set of the Gallup polls, as did Burbach (1995), and Ostrom and colleagues (Marra et al., 1990; Simon and Ostrom, 1989; Ostrom and Simon, 1989). By selecting only the first poll in a month, we may underestimate the impact of any particular event on approval, but will not erroneously identify an impact where one does not exist (Ostrom and Simon, 1989, p. 369).

[9]We drew upon Beck's (1989, 1991) model for the mean. Our results are reasonably stable across model specifications. In Appendix C, we report the model just including ARCH, with ARCH and reelection variables, and finally with ARCH and only variables from our analysis that pass conventional statistical significance levels. As shown in the table, the significant variables remain significant and of approximately the same magnitude no matter what the specification of the model for the variance. In addition, the model of the variance is largely insensitive to the selection of either the Brace and Hinckley event codes or to our more elaborated set of codes.

[10]Unemployment data were provided to us by Neal Beck. CPI data were collected from the "CPI Web Site" (http://stats.bls.gov/cpihome.htm) at the U.S. Department of Labor.

[11]The full list of events can be found in Appendix II of Brace and Hinckley (1991). When two positive or negative events occurred in the same month, we coded this as a single event (i.e. coded as "1" for that month). For the one month where a positive and negative event occurred (April 1952), we coded a "0" for both dummy variables. We coded additional events from 1988–1998 (the necessary reference guides for 1999 were not yet available at the time of this writing), following the coding rules outlined by Brace and Hinckley. See Appendix A for more details. Full coding sheets are available from the authors.

[12]In a series of papers, Ostrom and colleagues have developed an extensive categorization of presidential "drama," from a twelve category listing of relevant outcomes, some of which were included in a final equation as a function of other, more distal variables; to others using the more conventional dummy variable approach (Ostrom and Simon, 1985); to the most recent eighteen category treatment of "presidential drama" (events, foreign travel, and speeches), depending on the primacy of the event and the domestic or foreign nature of the event (see Marra, Ostrom, and Simon 1990, pg. 599–606; Ostrom and Simon 1989;

Ostrom and Simon 1986). While we developed our seven point scale independently, later comments alerted us to the similarity of the approaches. In particular, our distinction between domestic and foreign policy events corresponds to the Marra, et al. distinction between president as foreign policy leader and as economic and domestic policy manager. Other distinctions that we make, such as U.S. vs. foreign initiated foreign conflict, are tailored more toward measuring changes in variance rather than the mean. Since the general categories are quite similar, and the results for the model of the mean replicate many others, we feel confident in continuing with our categorization.

[13]We feel that it would be misleading to give this scandal the same weight as other, more frequent, but considerably more minor events (e.g. Sherman Adams's or Donald Regan's resignation). This will certainly depress the size of the scandal variable.

[14]As previously noted, a full listing of events and a more extensive description of the coding rules appears in Appendix A.

[15]This term has an initial value of zero and a maximum value of 1.0, corresponding to 96 months in office. Note that this implies a maximum value of .5 for a one-term president.

[16]Our thanks to Jim Stimson for providing us the data on independent identifiers through 1993; the data since 1994 were coded by the authors.

[17]The ARCH-MH estimates in the model of the mean (the top panel of Table 3) are extremely close to Beck's original estimates (for a direct comparison, see Appendix B for the Beck model estimated with these data).

[18]Our results regarding foreign policy events dovetail with Burbach (1995). Burbach models variability among events and discovered (as we did) important differences in the size of rallies, depending on the kind of foreign adventure. The results just summarized, however, show that foreign policy events *uniformly* increase variance, regardless of whether they lead to large or small rallies or declines in approval ratings.

[19]For another political science application of ARCH modeling, see Maestas and Preuhs, 2000.

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Table 1: Variations in Approval Ratings Across Administrations

President	High Point	Low Point	Difference	SD	N of Obs.
Eisenhower	79	48	28	7.25	96
Kennedy	79	56	23	6.98	35
Johnson	80	35	45	13.29	61
Nixon	67	23	44	12.41	68
Ford	55	37	28	4.75	28
Carter	72	28	44	12.51	48
Reagan	68	35	33	7.68	96
Bush	83	32	51	14.39	48
Clinton	69	39	30	7.03	89

Data collected by authors from Gallup Organization web site.

Table 2: Presidentially Relevant Events and Volatile Approval

Type of Event	Approval Enhancing	Approval Diminishing
Domestic	Positive Economic News	Negative Economic News
	Policy Accomplishment	Policy Failure
Foreign	Foreign Attacks	U.S. Attacks
	Policy Accomplishment	Policy Failure
Personal	Health	Administration Scandal
	Assassination Attempt	

Table 3: Presidential Approval as Function of Economy and Events, 1953–93, ARCH-MH Estimates

Variable	BH Event	Std Err		New Event	Std Err	
Mean Model						
Constant	4.6605	0.8689	**	4.5920	0.8853	**
Inflation_{t-1}	−0.1464	0.0446	**	−0.1385	0.0463	**
$\text{Unemployment}_{t-1}$	−2.0808	0.7565	**	−2.1800	0.7612	**
Watergate_{t-1}	−1.5423	0.7998	*	−1.2317	0.8593	
Vietnam_{t-1}	−1.3505	0.5609	**	−1.4153	0.5614	**
Positive Event_t	2.3313	0.5988	**			
Negative Event_t	−1.5911	0.4705	**			
$\text{Adverse Economic Event}_t$				−1.7363	1.0431	*
$\text{Administration Scandal}_t$				−2.1730	0.8229	**
$\text{Domestic Accomplishment}_t$				2.6691	1.3373	*
$\text{Foreign Accomplishment}_t$				1.7964	0.9844	*
Escalation_t				−0.6169	1.7915	
$\text{US} - \text{initiated Foreign Conflict}_t$				1.7352	1.1727	
$\text{Enemy} - \text{initated Foreign Conflict}_t$				3.5955	1.1488	**
$\text{Approval}_{t-1}(\lambda)$	0.9246	0.0134	**	0.9253	0.0137	**
Moving Average (θ)	0.0890	0.3139		−0.2407	0.0591	**
Variance Model						
α_0	−0.2584	0.0597	**	2.3993	1.1788	*
α_1	0.0841	0.0159	**	0.0263	0.0081	**
$\text{Re} - \text{election Year}_t$	0.0240	0.0070	**	−0.0057	0.9331	
Election Year_t	−0.7249	0.2934	**	−0.6388	0.2896	**
Positive Event_t	0.3428	0.4704				
Negative Event_t	−0.5421	0.3745				
$\text{Adverse Economic Event}_t$				−1.2218	0.6436	*
$\text{Administration Scandal}_t$				−0.2457	0.6400	
$\text{Domestic Accomplishment}_t$				−1.8475	1.0753	*
$\text{Foreign Accomplishment}_t$				−0.4269	0.7671	
Escalation_t				0.0424	1.3801	
$\text{US} - \text{initiated Foreign Conflict}_t$				0.2057	1.0444	
$\text{Enemy} - \text{initated Foreign Conflict}_t$				1.2101	0.8900	
$\text{Percent Term Completed}_t$	−0.0886	0.4621		−0.2950	0.6748	
$\%\ \text{Independents}_t$	0.0631	0.0308	**	0.0451	0.0348	
$-2 \times (\log \mathcal{L}_0 - \log \mathcal{L})$	70.6			72.8		

Dependent variable is the percentage of respondents approving of the president's performance, T=567. $* = p < .05$; $** = p < .01$. Intervention dummy variables (set to 1 for first month of a new Presidential administration) included in estimation, but suppressed from output. Fit is assessed relative to a model with only the constant terms, the intervention dummies, and the lagged dependent variable.

Table 4: Coding of Events

3/53	Soviets fire on U.S. bomber	EN	P	8/69	Successful moon launch	DP	P
8/53	Korean armistice announced	FP	P	12/69	Huge anti-war rally	PR	N
10/53	Eisenhower invokes Taft-Hartley	NE	N	6/70	Cambodia invasion	ES	N
7/55	Soveits shoot down U.S. spy plane	EN	P	6/70	Kent State shooting	PR	N
10/55	Eisenhower has heart attack	H	P	2/71	Laos invasion	ES	N
6/56	Eisehower has major surgery	H	P	4/71	Antiwar demonstrations	PR	N
10/57	Eisenhower orders army to Little Rock	PR	N	9/71	Nixon imposes wage-price controls	NE	N
10/57	Sputnik launched	O	N	2/72	Vietnam peace proposal announced	FP	P
6/58	Sherman Adams scandal breaks	AS	N	4/72	Increase in war and bombing	ES	N
7/58	Eisenhower sends marines to Lebanon	US	P	1/73	Vietnam peace accord	FP	P
7/59	Steel strike	NE	N	2/73	Watergate burglars convicted	AS	N
11/59	Eisenhower invokes Taft-Hartley	NE	N	3/73	McCord letter Sirica	AS	N
5/60	U-2 incident	US	P	5/73	Ervin Committee begins	AS	N
5/61	Bay of Pigs invasion	US	P	6/73	Price freeze announced	NE	N
8/61	Berlin Wall crisis	EN	P	7/73	Dean testifies	AS	N
11/61	Second Berlin Wall crisis	3-?	P	8/73	Agnew investigation revealed	AS	N
3/62	First American orbits the Earth	DP	P	9/73	Ehrlichman, Liddy, and others indicted	AS	N
5/62	Steel crisis	NE	N	10/73	Saturday night massacre	AS	N
10/62	Integration crisis in Mississippi	R	N	11/73	Gap in tape revealed	AS	N
11/62	Cuban Missile Crisis	EN	P	11/73	Six Watergate figures sentenced	AS	N
5/63	Integration crisis in Alabama	PR	N	4/74	House judiciary hearings begin	AS	N
5/65	Dominican Republic crisis	ES	P	4/74	Nixon ordered to pay back taxes	AS	N
8/65	Vietnam draft doubled	ES	N	5/74	Judiciary hearings continue	AS	N
4/66	Vietnam protests	PR	N	8/74	U.S. v. Nixon announced (8/30)	AS	N
8/66	Race riots in Chicago	PR	N	8/74	Articles of Impeachment voted	AS	N
9/66	Race violence in Atlanta	PR	N	8/74	Tapes incriminate Nixon	AS	N
8/67	Race riots	PR	N	10/74	Ford pardons Nixon	O	N
11/67	Vietnam protest	PR	N	5/75	Cambodia falls	EN	N
2/68	Tet offensive	EN	N	6/75	Mayaguez incident	EN	P
4/68	Johnson announces end to bombing	FP	P	9/78	Camp David Accords signed	FP	P
5/68	Campus protests	PR	N	12/79	Hostages first seized in Iran	EN	P
9/68	Soviets move into Czechoslovakia	EN	P	1/80	Soviets invade Afghanistan	EN	P
11/68	Johnson halts bombing in Vietnam	FP	P	2/80	Inflation sets new record high	NE	N
12/68	Lowest unemployment in fifteen years	PE	P	4/80	Helicopter rescue plan fails	US	N
4/69	Campus protests about Vietnam	PR	N	5/80	Race rioting	PR	N

Table 4: (con't)

3/81	Assassination attempt on Reagan	H	P	12/89	US invades Panama	US	P
8/83	Soviets attack Korean airliner	EN	P	4/90	Poindexter convicted	AS	N
10/83	Grenada invasion	US	P	8/90	Iraq invades Kuwait, US	EN	P
3/84	Record deficit balance of payments	NE	N	11/90	Treaty on nuke weapons in Europe	FP	P
4/84	Bombing of Nicaraguan harbors	US	N	1/91	Desert Storm	US	P
1/85	Cabinet shakeup	O	N	3/91	No fly zone in Iraq, shoot down plane	US	P
4/85	Bitburg controversy	O	N	7/91	START treaty signed	FP	P
7/85	Hostage incident(06/14-06/30)	EN	P	9/91	Unilateral reduction in tactical nukes	FP	P
8/85	Reagan surgery (7/13)	H	P	10/91	Thomas hearings, Hill revelations		N
1/86	Space shuttle explodes	O	P	11/91	Wofford beats Thornburgh for PA Senate	O	N
4/86	Libyan hostilities	EN	P	4/92	LA Riots	PR	N
5/86	Air strike on Libya	US	P	1/93	START II signed	DP	P
11/86	First Iran-Contra revelation	AS	N	1/93	US attack on Iraqi missle/radar stations	US	P
12/86	Reagan claims Iran-Contra ignorance	AS	N	2/93	Trade Center Bombing	PR	P
3/87	Tower Committee report	AS	N	4/93	Waco siege and fire	PR	?
3/87	Donald Reagan resigns	AS	N	5/93	Travelgate	AS	N
5/87	Iran-Contra hearings	AS	N	6/94	US attacks Somali warlord	US	P
5/87	Persian Gulf attack on U.S.	EN	P	4/95	Oklahoma City bombing	PR	N
6/87	Iran-Contra hearings continue	AS	N	6/95	O'Grady shot down in Bosnia	EN	P
6/87	U.S. escorts Kuwaiti tankers	US	P	11/95	Government shutdown, 770,000 sent home	NE	N
7/87	Iran-Contra hearings continue	AS	N	12/95	Government shutdown continues	NE	N
10/87	Stock market plunges	NE	N	6/00	Filegate, confidential FBI files	AS	N
11/87	Iran-Contra report by Congress	AS	N	7/96	Olympic Park Bombing	PR	N
12/87	U.S.-U.S.S.R. treaty signed	FP	P	9/96	US attacks Iraq	US	P
1/88	Meese investigation	AS	N	10/97	Asian crisis, Dow drops 554 points	NE	N
4/88	Justice Department investigated	AS	N	7/98	Secret service testify, Lewinsky case	AS	N
4/88	Marines enter Panama	US	P	8/98	US embassies in Africa bombed	EN	P
5/88	Senate ratifies INF treaty	FP	P	8/98	Lewinsky case, Clinton admits relationship	AS	N
3/89	Senate rejects Tower nomination	O	N	9/98	Starr presents Impeachment case to House	AS	N
5/89	North convicted by Federal Jury	AS	N	10/98	House votes for impeachment hearing	AS	N
10/89	Dow Jones drops 190, 2nd lgst in history	NE	N	12/98	House votes to impeach	AS	N
12/89	Bush announces end of Cold War	FP	P	12/98	US air strike against Iraq	US	P

Following the Brace-Hinckley classification scheme, BH events were coded as follows: P = Positive-predicted; and N = negative-predicted. BG events follow the following reclassification: AS=Administration Scandal; US=US-initated foreign conflict; EN=Enemy-initated foreign conflict; ES=Escalation of foreign conflict; H=Health risk to President; NE=Nationally adverse economic events; PE=Nationally positive economic event; DP=Domestic policy accomplishment; FP=Foreign policy accomplishment; PR=Protests; O=Other. Events from 3/1949 – 5/1988 were adapted from Brace and Hinckley (1992). Events from 6/1988 - 11/1992 were coded by the authors. We followed the same coding rules emplyed by Brace and Hinckley. However, because one of their sources for historical events was published in 1983, we substituted George Gallup (various years).

Table 5: Presidential Approval as Function of Economy and Events, 1953–93, EDL Estimates

Variable	BH Event	Std Err	New Event	Std Err
Mean Model				
Constant	5.2303	0.9567	5.1258	0.9678
Inflation_{t-1}	−0.1509	0.0431	−0.1490	0.0434
$\text{Unemployment}_{t-1}$	−1.3402	0.7996	−1.3755	0.8034
Watergate_{t-1}	−1.9704	0.9225	−1.6605	0.9760
Vietnam_{t-1}	−1.6678	0.6622	−1.7969	0.6705
Positive Event_t	2.8261	0.5738		
Negative Event_t	−1.4128	0.5363		
$\text{Adverse Economic Event}_t$			−1.5151	1.2461
$\text{Administration Scandal}_t$			−1.9247	0.7862
$\text{Domestic Accomplishment}_t$			2.6102	2.3576
$\text{Foreign Accomplishment}_t$			1.6495	1.1366
Escalation_t			−0.9950	1.8005
$\text{US} - \text{initiated Foreign Conflict}_t$			2.4391	1.0914
$\text{Enemy} - \text{initated Foreign Conflict}_t$			3.7121	0.9223
$\text{Approval}_{t-1}(\lambda)$	0.9140	0.0151	0.9158	0.0153
Moving Average (θ)	−0.2123	0.0505	−0.2090	0.0505
σ^2	4.0709	0.1209	4.0786	0.1211

Dependent variable is the percentage of respondents approving of the president's performance. N=567. Intervention dummy variables (set to 1 for first month of a new Presidential administration) included in estimation, but suppressed from output.

Table 6: Presidential Approval as Function of Economy and Events, 1953–93, ARCH-MH Estimates

	Minimum	(SE)	Election	(SE)	Only Sig't	(SE)
Mean Model Constant	4.5007	0.8905	4.8685	1.0465	4.7231	0.7637
Inflation_{t-1}	−0.1357	0.0455	−0.1493	0.0512	−0.1268	0.0490
$\text{Unemployment}_{t-1}$	−2.0026	0.7855	−0.4878	0.8917	−0.1415	0.8925
Watergate_{t-1}	−1.5583	0.8141	−1.5382	0.8850	−1.5137	0.6562
Vietnam_{t-1}	−1.3574	0.6019	−1.5355	0.5625	−1.4050	0.4898
Positive Event_t	2.4934	0.5683	3.3876	0.6466		
Negative Event_t	−1.6368	0.5171	−0.9940	0.5515		
$\text{Adverse Economic Event}_t$				3.3035	−1.6945	1.7990
$\text{Domestic Accomplishment}_t$				3.4260	4.5318	1.1329
$\text{US} - \text{initiated Foreign Conflict}_t$				3.4179	2.2394	0.9624
$\text{Enemy} - \text{initated Foreign Conflict}_t$				4.4837	3.8259	0.8884
$\text{Approval}_{t-1}(\lambda)$	0.9261	0.0139	0.9204	0.4875	0.9215	0.0122
Moving Average (θ)	−0.2441	0.0611	−0.1587	0.4327	−0.1535	0.0615
Variance Model						
α_0	3.6549	0.1420	3.5958	0.5715	3.5054	0.2265
α_1	0.0245	0.0071	0.0263	0.0076	0.0292	0.0083
$\text{Re} - \text{election Year}_t$			0.5894	0.4875	0.7423	0.4347
Election Year_t			−1.2870	0.4327	−1.5081	0.3596
$\text{Percent Term Completed}_t$			0.4716	0.5715	1.0916	0.4905
$\text{Administration Scandal}_t$					−0.8902	0.2386
$\text{Domestic Accomplishment}_t$					−2.2618	0.8209

Dependent variable is the percentage of respondents approving of the president's performance. T=567. Intervention dummy variables (set to 1 for first month of a new Presidential administration) included in estimation, but suppressed from output.

Figure 1: Presidential Approval, Gallup Series, 1953–2000

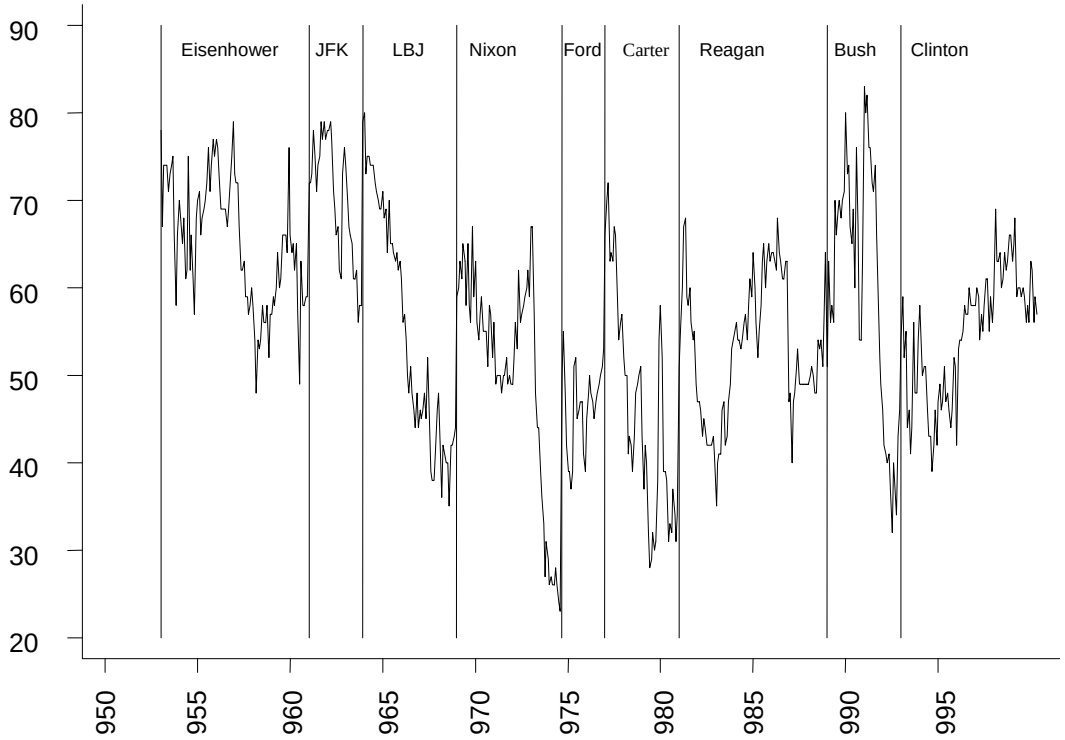

Figure 2: Predicted Variance in Presidential Approval, Gallup Series, 1953–98 (complete forecast and party only)