

# Presidents and Polarization of the American Electorate

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## Abstract

Scholars widely understand that the U.S. electorate has become increasingly polarized since the 1980s. However, little rigorous statistical work evaluates the role of the American president in this process. A potential reason for the lack of rigorous statistical work could be measurement limitations. Previous work has also not separated out how presidents affect fellow and opposing partisans in the ongoing process. New measures of electoral polarization are presented and evaluated for presidential effects using Box-Tiao multiple impact assessment methods. The statistical results show that post-1980 presidents have been central to electoral polarization generally and to polarization of both the president's fellow and opposing partisans specifically.

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Scholars widely understand that party polarization in the U.S. electorate has increased since the 1980s. However, little rigorous statistical work evaluates the role of the American president in this process. When presidents have been considered, the methods used have been largely anecdotal or considering only a few presidents. A potential reason for the lack of rigorous statistical work could be measurement limitations. Previous work has also not separated out how presidents affect fellow and opposing partisans in the ongoing process. This study focuses on presidents, especially those starting with Reagan, as major actors driving increased electoral polarization.

Why should presidents be important to this process? Presidents are partisans, rather than centrists in their manner of political representation (Wood 2009). Elections also tend to increase electoral polarization as partisans develop likes and dislikes for presidential candidates even before they enter office. After presidents enter office, they pursue partisan agendas that exacerbate partisan conflict. They use their extensive agenda setting, legislative, and executive powers to intensify partisan politics. As partisan warfare involving the president occurs in Washington, they become focal points of media and public attention. Partisans in the electorate increasingly align their political beliefs either with the president or the president's opposition. The result is increased electoral polarization.

Of course, anecdotal evidence of these effects abounds. For example, consider President Reagan's effort to rein in New Deal and Great Society programs over Democratic objections in the 1980s, President Clinton's standoff with the Gingrich Republicans over taxation and the federal budget in the 1990s, President George W. Bush's fights with Democrats over tax cuts for the wealthy and the invasion of Iraq in the 2000s, and President Obama's battles with the Boehner/McConnell Republicans over economic stimulus, raising the federal debt ceiling, and the Affordable Care Act after 2009. Of course, the 2016 election of Donald Trump, and his subsequent use of partisan executive orders, nominations, and legislative proposals show clearly the degree to which presidents can encourage electoral polarization. Partisan confrontations involving the American president are highly visible, and harden partisan attitudes in the electorate. As a result, partisans in the electorate increasingly align with the president's views or those of the president's opposition, resulting in greater electoral polarization.

The next section reviews the scholarly literature that forms the backdrop for this research. A graphical analysis of partisan polarization in presidential approval ratings is presented to show that electoral polarization increased sharply after the Reagan presidency. Then, a graphical analysis of partisan affect (i.e., warm/cold feelings) toward presidential candidates during the election season is used to demonstrate that partisans have reacted in an increasingly emotional way toward presidential candidates since the 1980s. Subsequent sections turn to measuring electoral polarization and partisan electoral polarization along liberal-conservative lines. Box-Tiao (1975) multiple impact assessment methods are then applied to evaluate presidential effects on increased electoral polarization generally, and for Democratic and Republican partisans specifically.

## **Past Literature on Electoral Polarization**

### **Work on Electoral Polarization Generally**

There is a large and established scholarly literature on the politics of electoral polarization in the United States. Review articles by Layman et al. (2006), Hetherington (2009), Levendusky (2013), and Jacobson (2013) provide nice summaries. Major themes of this literature concern the Southern realignment (Black and Black 2002; Hood et al. 1999; Jacobson 2000; Polsby 2005; Roberts and Smith 2003; Rohde 1991; Theriault 2004; Weisberg 2002), the increasing heterogeneity of partisan constituencies (Abramowitz and Saunders 1998; Bishop 2009; Brewer et al. 2002; Carson et al. 2004; Fiorina et al. 2011; Gimpel 1999; Gimpel and Schuknecht 2001, 2003; Jacobson 2013; Levendusky 2009; McCarty et al. 1997, 2008; Oppenheimer 2005; Stonecash et al. 2003; Stonecash and Mariani 2000; Theriault 2004), differences between congressional electorates (Abramowitz and Saunders 2002; Fleischer and Bond 2004; Jacobson 2000, 2005, 2013; Pomper and Weiner 2002; Weisberg 2002), and the potential effects of redistricting (Carson et al. 2004; Mann 2006; McCarty et al. 2009).

Another strand of this literature concerns the extent to which mass polarization has been elite-driven. Fiorina et al. (2011, 29) suggest that the electorate is not actually polarized, but only appears more polarized because the choices offered by elites are more extreme. Similarly, Levendusky (2009, 3) argues that the electorate has not become more polarized, but better sorted. Carmines and Stimson (1989), focusing largely on Congress and the issue of race, developed a theory of issue evolution whereby change was initiated by political elites. Zaller (1992, 100-113), focusing on the mass media and political awareness, posited that when elites send polarizing messages, the most politically aware liberals and conservatives become increasingly polarized (see also Adams 1997; Brody 1991; Hetherington 2001; Layman 2001; Layman and Carsey 2002; Sniderman 2000; Sniderman and Bullock 2004).

### **Presidents and Electoral Polarization**

As scholars of the American presidency, what stands out about previous literature is that the president is only an occasional focus, and then usually only anecdotally. To be sure the literature mentions the importance of various presidents to party sorting and ideological realignment (e.g., Lyndon Johnson - Civil Rights and the Southern realignment, Nixon - the Southern strategy, Reagan - more of the same plus appeal to White evangelicals and attacks on social programs, Clinton - further battles with Gingrich over taxes and social programs, George W. Bush - taxes and the Iraq War, and Obama - taxes and Obamacare, etc.). However, neither the presidency literature, nor the broader American politics literature has conducted a rigorous statistical analysis of how presidents have affected electoral polarization over an extended period of time.

Of course, many presidency scholars understand at the intuitive level that presidents are important. After all, presidents are the most visible manifestations of their parties in the American system - far more visible to the typical voter than the party contingents in the Congress. As partisans, they engage in highly visible battles over policy with the opposing party in Washington. Presidency scholars have extensively documented these battles between presidents and Congress. For example, Fleisher and Bond (2000) show that congressional support for presidential initiatives became more predictably partisan since the 1980s. Edwards and Barrett (2000) show that presidential initiatives are less likely to get on the legislative agenda or become law when the opposition party controls one or both chambers of Congress. Similarly, Sinclair (2000) observes that relations between Congress and the presidency have become more hostile since the 1980s, with increasing use of legislative tools such as the filibuster and committee prerogatives to block presidential initiatives. Binder (2003, 50-53) focuses on the president's role in producing legislative gridlock in a polarized era, emphasizing the president's ability to block legislation through the veto. Theriault (2013) evaluates institutional warfare between the Gingrich senators and presidents from Clinton through Obama.

A few scholars have focused on presidential effects on partisan attitudes. For example, Jacobson (2009) studied presidential approval during the George W. Bush presidency to show that partisan attitudes changed during this period, and affected the

Republican party's electoral fortunes. More generally, Jacobson (2011) studied the George W. Bush presidency to show that he was a divider, not a uniter. Cohen (2010) argued that with increasing polarization presidents switched from trying to appeal to the mass electorate to appealing to partisan constituents, because it is easier to get support from people already in the president's party than trying to bring in new voters. Finally, Jacobson (2012) studied the three most recent presidents to show "presidents move people to update their attitudes toward and beliefs about the president's party."

Previous studies of presidential effects on electoral polarization have focused on one or a few recent presidents. The likely reason is that there have been measurement limitations in studying the entire range of modern presidents. A major purpose of this work is to present a measurement method for electoral polarization that encompasses many presidencies over a long period of time.

### **Polarization in Presidential Approval Ratings**

This section reports well-known indirect evidence for how different presidents have affected electoral polarization through time. While not a measure of polarization, the gap in partisan evaluations of the president's job performance is an indicator of polarization. To what extent do Republicans and Democrats in the electorate evaluate presidents through different lenses? Have partisan evaluations of presidential job performance changed sharply through time in a manner consistent with presidential polarization of the electorate?

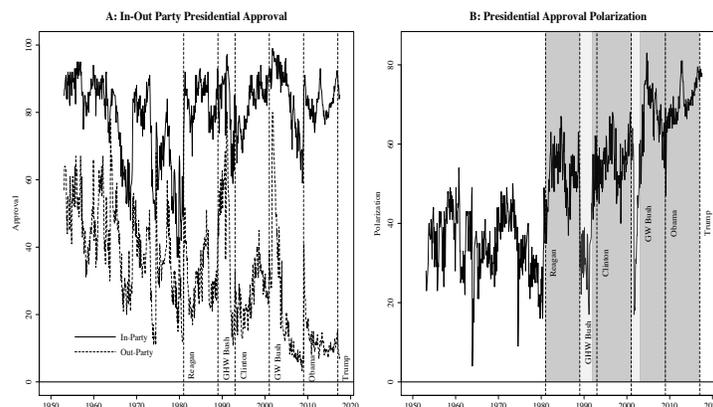
Public approval of the president's job performance is measured as the percentage of survey respondents approving of presidential job performance in periodic Gallup surveys. The Gallup survey organization regularly asks the question "Do you approve or disapprove of the way [president's name] is handling his job as president?"<sup>1</sup> The approval measures are broken down by partisanship. The two groups of interest are labeled In-Party and Out-Party, respectively. In-Party approval is defined as the approval rating percentage of respondents reporting shared partisanship with the president. Out-Party approval is defined as the approval rating percentage of respondents reporting opposing partisanship with the president.

Figure 1A graphs presidential approval through time broken down by these two groups. Visual examination of this graph shows that In-Party and Out-Party evaluators have always differed sharply in their feelings toward the president. Clearly, In-Party evaluators have been most approving. Out-Party evaluators have grown significantly less approving through time. In other words, partisans increasingly looked at the president through different lenses.

Further, as presidents became more partisan after 1980, the separation between In-Party and Out-Party evaluators became much larger. This change is revealed clearly by taking the absolute difference between In-Party and Out-Party evaluations of the

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<sup>1</sup>The data are available at <http://www.gallup.com/poll/124922/presidential-approval-center.aspx> (accessed July 4, 2017).



**Figure 1: Partisan presidential approval and Presidential Approval Polarization, 1953-2017.** Source: <http://www.gallup.com/poll/124922/presidential-approval-center.aspx>. The vertical dashed lines mark the start and end of each post-Reagan presidency. The shaded areas mark periods of high polarization. The lightly shaded areas mark pre-1992-election-year of the George H. W. Bush administration and the period from September 11 through the Iraq invasion.

president as reported in Figure 1B. The shaded areas in Figure 1B highlight sharp increases in Presidential Approval Polarization. The lightly shaded areas mark the George H.W. Bush administration before the 1992 election season, and the period from September 11, 2001 to the Iraq invasion of March 2003. Both periods corresponded with lower In-Party/Out-Party Presidential Approval Polarization.

Before 1981, Figure 1B shows that In-Party and Out-Party evaluators differed in their approval of the president by an average 35 percent. However, the difference was only about 20 percent by 1980, and had declined steadily from the early 1970s. However, the Reagan presidency corresponded with a sharp increase in Presidential Approval Polarization so that In-Party and Out-Party respondents were widely separated in their approval of the president by 50.1 percent. The George H.W. Bush administration corresponded with an immediate drop in Presidential Approval Polarization to near pre-Reagan levels. This lower level of Presidential Approval Polarization lasted until the 1992 election year, when George H.W. Bush was perceived more negatively by Republicans, and even more negatively by Democrats, perhaps because of an economic recession and his broken “no new taxes” pledge.

Presidential Approval Polarization moved sharply higher during the entire Clinton administration and into the early George W. Bush administration, averaging about 55.8 percent. However, September 11 brought a sharp drop in Presidential Approval Polarization as both Democrats and Republicans rallied around the president for the next eighteen months. However, this rally effect ended abruptly after the Iraq invasion in March of 2003. Partisans were bitterly divided over the invasion and the president’s rationale for

committing American troops. For the remainder of the George W. Bush administration, Presidential Approval Polarization moved higher again, averaging 68.7 percent. During the Obama administration Presidential Approval Polarization increased again, but only slightly, averaging 70.6 percent. What little data is available for the Trump administration suggests another increase. Between February and July of 2017, Presidential Approval Polarization among the electorate averaged 78.4 percent.

Generally, Figure 1B shows what many scholars of the presidency and American politics already believe. Electoral polarization increased sharply starting with the Reagan administration. New presidents including Clinton, George W. Bush, Obama, and Trump corresponded with increased electoral polarization. While this indirect evidence is suggestive of how presidents polarized the American electorate after 1980, a more direct approach is to actually measure electoral polarization along liberal-conservative lines, and evaluate statistically how presidents affected changes in that polarization.

### **Polarization During Presidential Election Campaigns**

However, before turning to measurement and statistical analysis of presidential effects on electoral polarization, it is instructive to observe what happened to partisan attitudes during election seasons. The 1980 presidential election marked the start of ideological warfare over whether government should be a protector of citizens or focused more on limited government and promoting particular cultural values. Did the electorate become increasingly polarized in its reaction to presidential candidates during election seasons? How have feelings toward the opposing party's candidate changed over time?

These questions can be answered using the ANES feeling thermometer questions on Republican and Democratic affect toward the presidential nominees. The feeling thermometer question reads

“I'd like to get your feelings toward some of our political leaders and other people who are in the news these days. I'll read the name of a person and I'd like you to rate that person using something we call the feeling thermometer. Ratings between 50 and 100 degrees mean that you feel favorably and warm toward the person; ratings between 0 and 50 degrees mean that you don't feel favorably toward the person and that you don't care too much for that person. You would rate the person at the 50-degree mark if you don't feel particularly warm or cold toward the person.” (ANES 2015, VCF0201)

The persons focused on in this analysis are the presidential nominees for the Republican and Democratic parties.

Figure 2 graphs the ANES feeling thermometers (VCF0424, VCF0426) for Republican and Democratic presidential nominees for each election from 1968 through 2016, broken down by the self-reported party identification of the respondents. Democratic and Republican respondents are plotted with solid and dashed lines, respectively. Observing Figure 2A, Republicans' liking for Republican presidential candidates has always been positive. Warmth toward their own candidates ranged between 67 and 82 on the

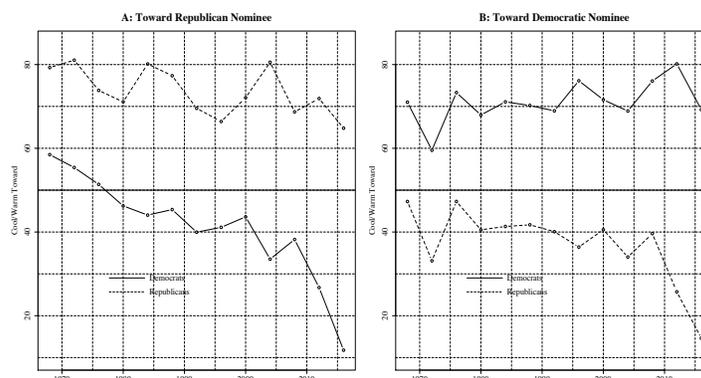


Figure 2: Partisan affect toward Republican and Democratic presidential nominees, 1968 - 2016. Source: American National Election Study Cumulative File, 1948-2012, VCF0424, VCF0426

100-point scale for every presidential election until 2016, when Donald Trump scored only about 60. In contrast, Democrats' liking for Republican presidential candidates has been declining since 1968. Before 1980, however, Democrats did not dislike Republican presidential candidates; rather they rated them above 50 for the 1968, 1972, and 1976 elections. After 1980, however, Democrats increasingly disliked Republican presidential candidates, with very sharp downward breaks in 2004, 2012, and 2016. The Democratic warmth score for George W. Bush, Mitt Romney, and Donald Trump, respectively, were only 33, 27, and 11 on the 100-point scale. Clearly, Democrats have increasingly disliked Republican presidential candidates.

Focusing on Figure 2B, Democrats have always felt warm toward their own presidential candidates, just as have Republicans. They rated them between 68 and 80 on the 100-point scale for every presidential election except 1972, when George McGovern scored only a 60. In contrast, Republicans' warmth toward Democratic presidential candidates has always been negative. They only modestly disliked the Democratic candidates in 1968 and 1976, but Republican warmth also declined steadily after 1980. The drop was especially precipitous in 2012 and 2016 when the warmth score for Obama and Hillary Clinton, respectively, were only 26 and 14 on the 100-point scale. Clearly, Republicans have also increasingly disliked Democratic presidential candidates.

Thus, electoral polarization over presidential nominees since 1980 has consistently appeared even before the winning presidential candidate takes office. Campaigns are polarizing processes and divide the electorate. These divisions continue as the candidates assume office and pursue the partisan agendas promised during presidential election campaigns.

## Measuring Electoral Polarization

As noted earlier, past research on how presidents have affected polarization in the electorate has focused largely on one or a few recent presidents. However, rigorous statistical analysis requires a polarization measure encompassing many presidents over a long period. In developing such a measure, the polarization concept must be carefully defined.

### Defining Polarization Generally

Polarization can take any of three forms, based on the divergence, dispersion, and distribution of potentially polarized entities (e.g., electorates, partisans, Congress, etc.). Wood with Jordan (2017, 237-242) illustrates and discusses these forms of polarization graphically, showing that serious measurement errors can occur by considering only a single polarization type. However, the three forms have a common feature that enables measuring polarization in a metric that reflects all three forms. For each polarization form, the probability masses in the overlapping parts of the distributions become smaller with increasing polarization. Making use of this fact, polarization is defined in this study as one minus the probability masses in the overlap between Democratic and Republican partisan distributions at each point in time. More formally, polarization at time  $t$  is defined as follows.

$$Polarization_t = 1 - \left( \int_{I_t}^1 Left_t dx + \int_0^{I_t} Right_t dx \right) \quad (1)$$

where  $I_t$  is the point of intersection of the two distributions at time  $t$ ,  $Left_t$  is the left party distribution at time  $t$ ,  $Right_t$  is the right party distribution at time  $t$ , and  $x$  is the left-right continuum ranging from zero to one.

Intuitively, this polarization measure captures the summed probabilities of partisans lying in the non-overlapping part of the two distributions. The measure always lies between zero and one. This sum becomes larger the closer partisans are to the respective poles. When there is total overlap between the two distributions, then the summed subtrahend in Equation 1 converges to one, resulting in polarization of zero. When there is no overlap between the two distributions, then the summed subtrahend converges to zero, resulting in polarization of one. Using this approach, polarization is measured annually from 1947 through 2017 for the American electorate.

### Empirical Data for Measuring U.S. Electoral Polarization

Previous studies of electoral polarization in the U.S. have relied almost exclusively on data from the American National Election Studies (ANES) and General Social Surveys (GSS). However, surveys from these organizations were intermittent. The ANES conducted surveys biannually from 1972 through 2004, but missed 2006 and 2010. The GSS conducted annual surveys for 1974 through 1978, then in 1980, 1982 through 1991, 1993 through 1994, and then biannually from 1996 through 2008. Further, both datasets are limited historically.

The ANES did not ask an ideology question until 1972. The GSS did not ask both ideology and party identification questions until 1974. Therefore, these surveys do not provide the historical coverage that would enable observing the dynamics of changing electoral polarization over an extended period.

Measuring electoral polarization requires a common data source administered regularly over a long time span. With this goal in mind, the online Roper iPoll database was queried for mass surveys asking respondents about both their liberal-conservative ideology and party identification. Using this query, the individual level data were retrieved from 119 surveys with 129 ideology questions administered between 1947 and 2016. Wood with Jordan (2017, Appendix A) contains the rationale for selecting the particular surveys, an explanation of coding, as well a discussion of methods to validate the measure.

Each survey sample was divided into Republicans, Democrats, and Independents. In every instance, partisans “strong, regular, or weak” were coded with their party, working from the findings that even “weak” partisans are often much more consistent than their self-prescribed label indicates (Keith et al. 1992). Using these separate distributions, the mean, standard deviation, and skewness of the Democrat and Republican distributions were calculated for each survey sample over time. Then, the survey-level parameters were smoothed into annual time series using WCALC implemented through R (Stimson 1998, 2015).

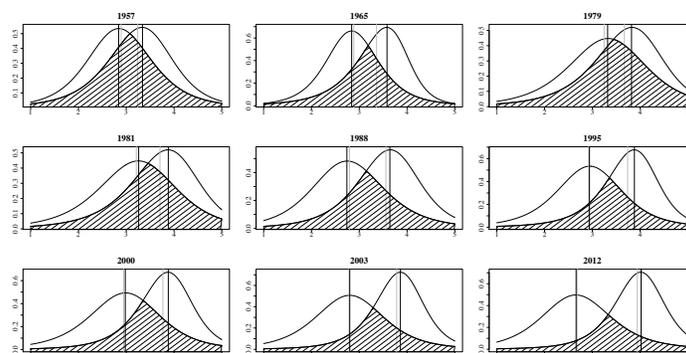
Using these normalized moments, left-right probabilities were generated for the two partisan electorates using the skew-t probability distribution (Azzalini and Capitano 2003).<sup>2</sup> Using these distributions, the probability masses in the non-overlapping parts of the two distributions were calculated as defined in Equation 1. Intuitively, the measure of electoral polarization represents the probability masses in the uncompromising part of the partisan distributions. Separate Democratic and Republican partisan polarizations were also calculated from the two components of Equation 1.

Figure 3 graphs historical distributions of partisan liberalism and conservatism for Republicans (on the right) and Democrats (on the left) for selected years. Of particular interest are the divergence in means (distance between the gray lines for each year’s two distributions), dispersions (the standard deviations for each distribution), skewness (the distance between the gray and black lines for each year’s separate distributions), and overlap of the distributions (the hatched areas).

In 1957, Figure 3 shows that divergence polarization was at a minimum. The Democrat mean was slightly left of center on the scale of liberalism/conservatism. Republicans were slightly to the right on the scale of liberalism/conservatism, and not all that different from Democrats. By 1979 Democrats had moved significantly to the right, but so had the Republicans. By 1988, Democrats had moved back toward the left, but Republicans had moved to the right. By 2016 Democrats were more liberal than in 1957, though most of that change occurred after 2003. In contrast, Republicans moved steadily

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<sup>2</sup>The skew-t distribution is given by  $t = \frac{2}{\omega} t(z; v) T(\alpha z \sqrt{\frac{v+1}{v+z^2}}; v+1)$ ,  $z = \frac{x-\psi}{\omega}$ , where  $t(\cdot, v)$  and  $T(\cdot, \tau)$  denote the density and distribution function, respectively, for Student’s t distribution with  $\tau$  degrees of freedom. Here  $\psi$  is the location parameter that determines the mean,  $\omega$  is the scale parameter that determines the dispersion, and  $\alpha$  is the shape parameter that determines the skew.

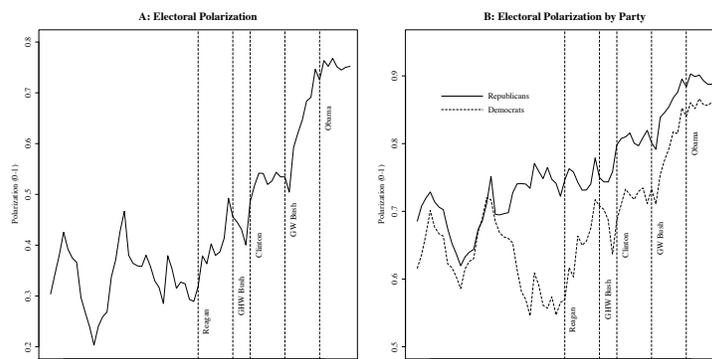


**Figure 3: Historical empirical distributions of partisan ideology in the electorate.** Note: The plots are generated using the skew-t distribution using the observed means, standard deviations, and skewness statistics for each year. The vertical black lines are modes. The vertical gray lines are means. The left curve is Democrats and the right curve is Republicans. The hatched areas are the basis of the polarization measure in Equation 1.

to the right after the 1990s, and by 2016 were further to the right than at any point in modern history.

The changing dispersion of the distributions is also interesting. The Democrat distributions remained similarly dispersed from 1957 through 2016. However, the Republican distributions grew increasingly concentrated around their means. This implies that Republicans in the electorate grew more homogeneous than Democrats through time. The skewness of the progression from 1957 through 2016 is also revealing. Note that skewness of a distribution implies that the mean (grey vertical line) is different from the mode (black vertical line). The distance between the means and modes in each graph captures the relative skewness of the distributions. In 1957 the distributions for the two parties were largely symmetrical, with Democrats exhibiting slightly positive skew and Republicans exhibiting slightly negative skew. The Democrat distribution remained consistently symmetrical between 1957 and 2016. However, the Republican distribution became increasingly skewed to reach a peak of skewness in 2016.

The story told by the progression shown in Figure 3 is one of asymmetric electoral polarization. Republicans grew increasingly attracted to their right pole through time, while Democrats were only slightly polarized until after 2003. Since 1957 and especially after 1979, Republicans moved toward the right pole with declining dispersion. By 2016, the Republican mean was farther to the right than at any other point in modern history, and the Republican mode was even farther to the right. Republicans became far more attracted to their respective pole and mean than Democrats. Thus, the electorates of both political parties have contributed to modern polarization, but asymmetrically by Republicans.



**Figure 4: Electoral polarization and partisan polarization, 1947 - 2016.** Note: The dashed vertical lines mark the start of each presidency starting with Reagan.

As noted above and as shown in the Wood with Jordan (2017, 237-242), measures of polarization based solely on the divergence, dispersion, or skewness of distributions can yield different (and potentially erroneous) conclusions about polarization. However, all three types of polarization affect the overlap between the distributions (hatched areas in Figure 3), providing a natural measure as defined in Equation 1. Note that the overlap was greatest in 1957, but grew increasingly smaller through 2016. The overlap between Republican and Democrat distributions forms the basis for the measure of polarization used in this study. The measure contains the probability masses outside the hatched areas of each distribution for each year from 1947 through 2016.

Figure 4 reports the general time series measure of partisan electoral polarization used in this study, as well as separate measures of Democratic and Republican electoral polarization from 1947 through 2016. Note that this graph tracks the areas outside the hatched parts of each distribution for each year through time. The dashed vertical lines mark the start of each presidential administration from Reagan through Obama.

Visual examination of Figures 4A and B provides new information that might be surprising to some scholars. Reasonably consistent with expectations, Figure 4A shows that electoral polarization started increasing sharply with the Reagan administration, declined somewhat during the George H.W. Bush administration, increased sharply again during the Clinton administration, increased even more sharply during the George W. Bush administration, and then leveled off at a peak during the Obama administration. The upward trend during the George W. Bush administration did not begin until 2003, likely suppressed by September 11, and sparked again by the start of the Iraq invasion. What is surprising about Figure 4A is that electoral polarization did not increase

during the Obama administration, but remained near the peak of the previous Bush presidency. Obama was no more polarizing than George W. Bush.

Also somewhat surprising, Figure 4B shows that the partisan basis of increased electoral polarization during the Reagan administration was due to change among Democrats. Democrats in the electorate reacted strongly to Reagan's more ideological agenda. Republicans have always been more polarized than Democrats since the 1960s, and perhaps from the beginning of the time series. However, Republican polarization remained relatively stable during Reagan, and did not begin increasing until the 1990s. Of course, anecdotal accounts have often claimed that Republicans began polarizing in the late-1970s or 1980s. Given these data, this belief appears erroneous. Further, the rate of polarization among Democrats from 1981 through 2009 was significantly faster than among Republicans. During the Clinton administration, both Democratic and Republican electoral polarization increased in step fashion, and trended upward even more sharply during the George W. Bush administration. Again, note that the trend during the George W. Bush administration did not start until after 2003, likely due the start of the Iraq invasion. During the Obama administration electoral polarization was relatively stable for both Democratic and Republican partisans near its peak.

## Time Series Analysis

The earlier data reported in Figures 1 and 2 suggest that presidents after 1980 were more polarizing of the electorate than earlier presidents. Figure 1 shows this most clearly through the sharp breaks associated with the shaded areas in Figure 1B. To evaluate this proposition more rigorously, the time series shown in Figure 4 were evaluated using Box-Tiao (Box et al. 2016; Box and Tiao 1975) multiple impact assessment methods, positing interventions for all post-1980 presidents.

The impact assessment research design is a very powerful and causal approach. According to Campbell and Stanley (1963, 37-42) and Shadish et al. (2001, chapter 6), the only threat to research design validity for the impact assessment approach is that some other event occurred at precisely the same time  $t$  as the hypothesized impact to cause the change. Given their argument, one is led to question what other events might have occurred at precisely the same time as the start of presidential administrations to produce increased electoral polarization.

Past theory and research has posited changes in the electorate as responsible for electoral polarization, but these changes have occurred more gradually through time and are not timed with the start of presidential administrations. Other theory and research has posited that changes in Congress have produced greater electoral polarization. However, with the possible exception of 1980, no initial presidential election year from 1980 through 2012 produced dramatic changes in Congress. The 1994 congressional elections may have contributed to increasing electoral polarization, but cannot explain changing polarization synchronized to multiple post-1980 presidencies.

With multiple hypothesized impacts, the impact assessment design is an even more powerful design. With multiple impacts  $I_{kt}$ ,  $k$  events would need to occur at precisely the

same time as the hypothesized impacts for the statistical results to be spurious. It is difficult to imagine what competing events could have occurred simultaneously. Further, including an appropriate ARIMA noise model for statistical control reduces the probability even further that hypothesized changes are due to random chance. Thus, the results reported below can be considered causal.

The multiple impact assessment analyses first involved constructing best fitting ARIMA models for the electoral polarization time series shown in Figures 4A and 4B. Using the ARIMA model as a statistical control, step intervention variables starting at the first year for each post-1980 president were entered into the analysis. The time series were all non-stationary I(1) processes, and were made stationary through first differencing.<sup>3</sup> Since the impacts may each result in non-linear change, all were specified uniformly as first order transfer functions. The final specification for the multiple impact assessment models is given as follows.

$$\Delta EP_t = \alpha + \frac{\omega_0, R}{1 - \delta_{1, R}} R_t + \frac{\omega_0, GHWB}{1 - \delta_{1, GHWB}} GHWB_t + \frac{\omega_0, C}{1 - \delta_{1, C}} C_t + \frac{\omega_0, GWB}{1 - \delta_{1, GWB}} GWB_{t-2} + \frac{\omega_0, O}{1 - \delta_{1, O}} O_t + \epsilon_t$$

where  $\Delta EP_t$  is change in electoral polarization or partisan electoral polarization at time  $t$ ;  $\alpha$  is a constant capturing the pre-intervention level after first differencing;  $R_t, GHWB_t, C_t, GWB_t$  and  $O_t$  are step functions for the Reagan, George H.W. Bush, Clinton, George W. Bush, and Obama presidencies; the  $\omega_0$  parameter for each presidency capture first year changes; and the  $\delta_1$  are rates of non-linear increase in electoral polarization from the start of each presidency. The step function for the George W. Bush presidency is lagged two periods to account for the delaying effect of September 11th and the start of the Iraq invasion in 2003.

## Presidential Effects on Electoral Polarization

### Multiple Impact Assessment of Electoral Polarization Generally

If presidents made a systematic difference to increasing electoral polarization after 1981, then a transfer function analysis should show statistically significant increases with each post-1980 presidential administration, with possible non-linear responses for each presidency. Table 1 reports the Box-Tiao (1975) first order multiple impact assessment coefficients for electoral polarization generally as reported in Figure 4A. The results

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<sup>3</sup>Stationarity and nonstationarity were evaluated using a battery of tests, including correlograms, Sims Bayesian Unit Root Tests (1988), KPSS tests (Kwiatowski et al. 1992), and the generalized least squares Dickey-Fuller and Point Optimal efficient unit root tests developed by Elliott, Rothenberg, and Stock (1996) and Elliott (1999). Note that these latter tests have significantly better power relative to the older Dickey-Fuller (1979) tests, aligning precisely with the Gaussian power envelope (see Elliott, Rothenberg, and Stock 1996, 823).

Table 1: Autoregressive Integrated Moving Average Box-Tiao Transfer Function Analysis of Post-1980 Presidential Effects on Electoral Polarization

President	Coefficient	Electoral Polarization
Reagan	$\omega_0$	0.03 (0.08)
	$\delta_1$	0.99 (0.00)
GHW Bush	$\omega_0$	-0.05 (0.01)
	$\delta_1$	0.98 (0.00)
Clinton	$\omega_0$	0.10 (0.00)
	$\delta_1$	0.58 (0.00)
GW Bush	$\omega_0$	0.08 (0.00)
	$\delta_1$	0.78 (0.00)
Obama	$\omega_0$	-0.04 (0.12)
	$\delta_1$	-0.67 (0.04)
Constant	$\alpha$	0.00 (-0.07)

The coefficients are first-order transfer function estimates for each president.

The numbers in parentheses are one-tailed  $p$  values for the transfer function coefficients.

Residuals are white noise with  $Q_{15} = 20.55$  and  $p = .15$ .

confirm an increase in electoral polarization in response to three of the five post-1980 presidencies (Reagan, Clinton, and George W. Bush).<sup>4</sup> The other two presidencies (George H.W. Bush and Obama) did not significantly increase electoral polarization. Electoral polarization actually declined significantly during the George H.W. Bush administration, and did not change significantly during the Obama administration. To assess model fit, Figure 5 plots actual electoral polarization from Figure 4A and the model predictions calculated from the coefficients in Table 1. Observing Table 1 and Figure 5, the transfer function estimates for Reagan predict a first period increase in electoral polarization of  $\omega_0 = 0.03$  from 1980 to 1981 on the 0-1 scale, and a total increase of

<sup>4</sup>As a robustness check, following Bai and Perron (2002) the number and location of structural breaks in electoral polarization were evaluated using dynamic breakpoint analysis. The Bai and Perron procedure identified three breakpoints for the entire series at 1981, 1993, and 2003. As noted above, the George W. Bush breakpoint was quite likely delayed by September 11th but initiated again by the 2003 Iraq invasion. The Bai and Perron lower 95% boundary on the third breakpoint was 2001. Caporale and Grier (2005, 84) advise, "Check to see if the political dummy variables fall within the confidence intervals for the empirically optimal breaks. If so, declare victory as the political variables are closely associated with major shifts in the series."

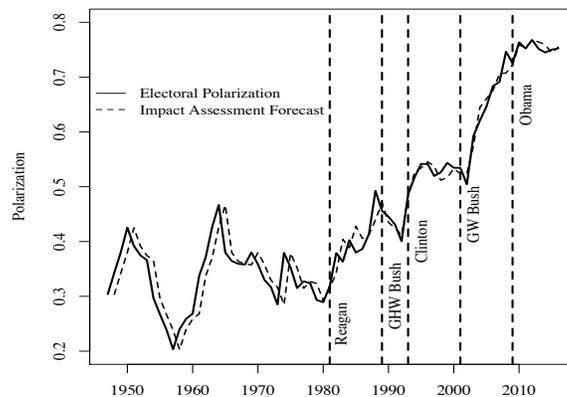


Figure 5: Electoral polarization and impact assessment predictions.

about 0.148 units over eight years. Compare this number with the actual increase in Figure 5, which is about 0.204. Thus, Figure 5 shows that Reagan produced a sharp increase in electoral polarization that lasted through 1988.

The coefficients for the George H.W. Bush administration suggest a drop in electoral polarization during his four-year presidency. The first period change coefficient  $\omega_0 = -0.05$  for GHW Bush is statistically significant. The coefficients combined would have basically reversed the electoral polarization of the Reagan presidency. However, the GHW Bush presidency lasted only four years. Thus, the actual decline shown in Figure 5 was only  $-0.09$ . Hence, George H.W. Bush was less polarizing of the electorate than Reagan, but did not come close to returning polarization to pre-Reagan levels.

Electoral polarization resumed its sharp climb during the Clinton administration. The model predicted first year change from 1992 to 1993 in electoral polarization was  $\omega_0 = 0.10$  on the 0-1 scale. The total change in electoral polarization during the eight years of the Clinton presidency was predicted from the model to be 0.122 on the 0-1 scale. Comparing this prediction with the plot in Figure 4A, the model is again quite close to the actual increased electoral polarization during the Clinton administration of 0.135. Unlike Reagan, however, the Clinton presidency produced a step-like change, rather than a gradual trend.

The George W. Bush administration saw an even sharper increase in electoral polarization, but only after the March 2003 invasion of Iraq. The estimated change from 2002 to 2003 was  $\omega_0 = 0.08$  on the 0-1 scale. The model prediction suggests a total increase in electoral polarization coinciding with the George W. Bush administration of about

0.176 on the 0-1 scale. Compare this model prediction with the actual increase shown in Figure 5, which is 0.243. Clearly, the George W. Bush presidency was highly polarizing of the electorate, particularly after 2003 and the Iraq invasion.

Finally, the model coefficients for the Obama administration are non-significant. This non-significance implies no increase (or decrease) in electoral polarization after 2009. This result is again confirmed visually in Figure 5. During the first four years of the Obama presidency, electoral polarization leveled off. While no increase occurred during Obama's first term, there was also no drop from the previous high level. Hence, Obama was at least as polarizing of the electorate as George W. Bush, and significantly more polarizing than earlier presidents.

Overall, the multiple impact assessment model reported in Table 1 fits the data nicely as shown in Figure 5. All post-1980 presidencies were polarizing of the electorate. Sharp increases in electoral polarization occurred during the Reagan, Clinton, and George W. Bush presidencies. The George H.W. Bush administration significantly reduced electoral polarization, but not to pre-Reagan levels. The Obama presidency produced no decrease in electoral polarization. Therefore, post-1980 presidents were all highly polarizing of the electorate.

### **Multiple Impact Assessments of Polarization Among Fellow and Opposing Partisans**

This section evaluates how post-1980 presidents affected polarization of their fellow and opposing partisans in the electorate. Table 2 reports Box-Tiao (1975) multiple impact assessments evaluating the effects of post-1980 presidents on the two time series in Figure 4B. Again, to better enable assessing model fit, Figure 6 plots actual partisan electoral polarization from Figure 4B and the model predictions calculated from the coefficients reported in Table 2. For Republicans, the model shows that Clinton and George W. Bush were especially important to increasing electoral polarization. For Democrats, Reagan, Clinton, and George W. Bush were important to increasing electoral polarization.<sup>5</sup>

Observing Table 2, the transfer function results for Reagan on Republican partisans in the third column show an increase in electoral polarization of  $\omega_0 = 0.02$  from 1980 to 1981 on the 0-1 scale. However, the non-significant  $\delta_0$  parameter suggests no subsequent dynamics. Figure 6A shows that the initial change among Republicans in the electorate was transitory. The model predicted total change in Republican electoral polarization was 0.00, while the actual change shown in Figure 6A was 0.056. In other words, Reagan was not polarizing of his fellow Republicans in the electorate.

The results for Reagan on Democratic partisans in the electorate in the fourth column of Table 2 tell a different story. There was an initial increase in electoral polarization

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<sup>5</sup>As above, a robustness check was done for the number and location of political interventions using the method developed by Bai and Perron (2002). The dynamic structural breakpoint analysis showed breaks for Republicans in 1993 and 2002 and breaks for Democrats in 1981, 1993, and 2003. The upper confidence boundary for Republicans in 2002 contained 2003. Therefore, according to Caporale and Grier (2005, 84), "the political variables are closely associated with major shifts in the time series."

Table 2: Autoregressive Integrated Moving Average Box-Tiao Transfer Function Analyses of Post-1980 Presidential Effects on Partisan Electoral Polarization

President	Coefficient	Republican	Democrat
		Electoral Polarization	Electoral Polarization
Reagan	$\omega_0$	0.02 (0.09)	0.02 (0.05)
	$\delta_1$	0.28 (0.34)	0.99 (0.00)
GHW Bush	$\omega_0$	-0.03 (0.05)	-0.04 (0.02)
	$\delta_1$	0.18 (0.38)	0.99 (0.00)
Clinton	$\omega_0$	0.04 (0.02)	0.06 (0.00)
	$\delta_1$	0.21 (0.32)	0.74 (0.00)
GW Bush	$\omega_0$	0.05 (0.01)	0.05 (0.01)
	$\delta_1$	0.26 (0.23)	0.85 (0.00)
Obama	$\omega_0$	-0.02 (0.17)	-0.02 (0.15)
	$\delta_1$	-0.65 (0.10)	-0.71 (0.05)
Constant	$\alpha$	0.00 (0.69)	-0.00 (0.19)

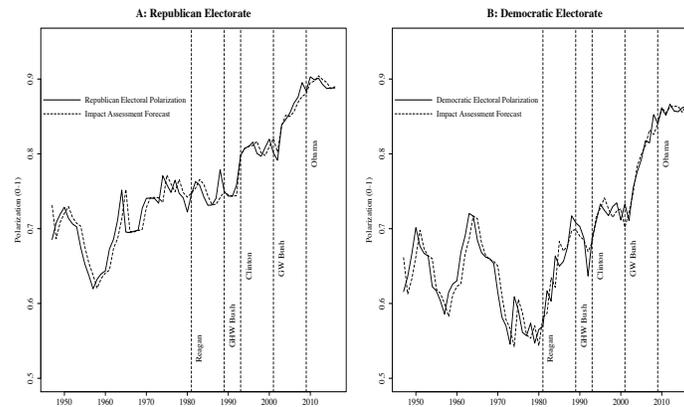
The coefficients are first-order transfer function estimates for each president.

The numbers in parentheses are one-tailed  $p$  values for the transfer function coefficients.

Residuals from the Republican model are white noise with  $Q_{17} = 19.29$  and  $p = 0.31$ .

Residuals from the Democrat model are white noise with  $Q_{17} = 12.33$  and  $p = 0.78$ .

among Democrats of  $\omega_0 = 0.02$  from 1980 to 1981 on the 0-1 scale. However, between 1981 and 1988 Democratic electoral polarization trended sharply upward. The model forecast shows a total change in Democrat electoral polarization between 1981 and 1988 of 0.154 on the 0-1 scale. Compare this prediction with the actual change in Democratic electoral polarization in Figure 6B of 0.153. More visually, Figure 6B shows a sharp increase in Democratic electoral polarization during this period. Hence, Reagan was far more polarizing of opposing Democratic partisans than of fellow Republican partisans. The coefficients for the George H.W. Bush administration in Table 2 show a significant first period decline in Republican electoral polarization of  $\omega_0 = -0.03$ . However, there was again no subsequent dynamics among Republicans, as shown by the non-significant  $\delta_1$  parameter in column 3. In contrast, Democrats found GHW Bush to be significantly less polarizing than Reagan. The first period decline in polarization among Democrats was  $\omega_0 = -0.04$ , with significant subsequent dynamics.



**Figure 6: Partisan electoral polarization and impact assessment predictions, 1947–2016.**  
 Note: The dashed vertical lines mark the start of each presidency starting with Reagan.

The model predictions imply a total predicted decline in polarization under GHW Bush of -0.03, while the actual decline in Democratic polarization shown in Figure 6B was -0.081. Hence, the decline in polarization during the George H.W. Bush administration shown in Table 2 and Figure 6 was concentrated among Democrats. He was not polarizing of fellow Republican partisans, and reduced polarization significantly among opposing Democratic partisans.

The coefficients for Clinton in Table 2 and model predictions in Figure 6 show that he was polarizing of both Republican and Democratic partisans in the electorate. The significant first period effect for Clinton on Republicans was  $\omega_0 = 0.04$  on the 0-1 scale. However, there were no subsequent dynamics as shown by the non-significant  $\delta_1$  parameter for Republicans. The model predictions show that a step increase in polarization occurred among Republicans associated with the Clinton intervention of about 0.066 units, while the actual step increase shown in Figure 6A was about 0.06 units. The significant first period effect for Clinton on Democrats was  $\omega_0 = 0.06$ , with highly significant subsequent dynamics. The model predicted total effect for Clinton on Democrats was 0.057, while the actual change in polarization among Democrats from Clinton shown in Figure 6B was 0.08. Clearly, Clinton was a polarizing president for both the Republican and Democratic electorates.

The coefficients for George W. Bush in Table 2 and model predictions in Figure 6 show that he was also polarizing of both Republican and Democratic partisans in the electorate. The significant first period effects for GW Bush for Republicans and Democrats respectively are both  $\omega_0 = 0.05$ . Again, it should be noted that polarization for the GW Bush presidency was delayed until 2003, the start of the Iraq war. Nevertheless, both Republicans and Democrats in the electorate subsequently became far more polarized, perhaps due to the highly partisan battles over taxation and the invasion of

Iraq. The model forecasts an increase in polarization between 2001 and 2008 for Republicans of 0.067 on the 0-1 scale; the estimated increase for Democrats was 0.10. Compare these model predictions with the actual increases in Republican and Democratic electoral polarization of 0.076 and 0.142. Obviously, George W. Bush was the most polarizing of post-1980 presidents for both Republicans and Democrats.

Finally, consider the transfer function results for Obama reported in Table 2 and Figure 6. The first period effects for Republicans and Democrats in Table 2 are both non-significant at conventional levels. Consistently, Figures 6A and 6B show little change in partisan electoral polarization between 2009 and 2016. The model forecasts a non-significant change of -0.01 for Republicans and 0.03 for Democrats. Compare these predictions with the actual change in electoral polarization for Republicans and Democrats of -0.01 and 0.00, respectively. Thus, Obama did not increase electoral polarization, as had earlier post-1980 presidents. However, he did not diminish it either. The electorate remained about as polarized as it was during the George W. Bush presidency.

## Implications for Studying Electoral Polarization

Many scholars of the presidency and American politics believe intuitively that presidents have been important to electoral polarization, especially those since Ronald Reagan. Partisan presidential approval ratings have been increasingly divergent for Republicans and Democrats since 1980. Further, the literature often alludes anecdotally to the importance of various presidents to party sorting and ideological realignment. However, neither the presidency literature, nor the broader literature on electoral polarization has conducted a rigorous statistical test of presidential effects.

The core result of this study, that presidents are polarizing figures, is probably not surprising to presidency or American politics scholars. However, Figure 4 and the statistical analyses in Tables 1 and 2 do reveal some unexpected results. One matter concerns Obama's effect on electoral polarization. Our guess is that some scholars would believe that Obama significantly increased electoral polarization. However, the statistical analysis shows that he did not. Rather, electoral polarization leveled off from already high levels under George W. Bush. Obama was no more polarizing than Bush.

Other surprising aspects concern the separate analyses of how presidents affected their fellow and opposing partisans. 1) Reagan did not polarize his fellow Republicans; only opposing Democrats. 2) The rate of polarization from 1981 and 2009 among Democrats was significantly faster than among Republicans. 3) Republicans have always been more polarized than Democrats since the 1960s, and perhaps from the beginning. 4) Republicans in the electorate did not start polarizing further until the 1990s, not in the 1970s or 1980s, as some have suggested.

More generally, this study provides definitive statistical evidence that presidents are important in polarizing the electorate. The synchronous changes revealed here are timed with multiple presidencies. Presidents Reagan, Clinton, and George W. Bush were all highly polarizing figures who sparked shifts in electoral polarization generally, as well as among Republican and Democratic partisans specifically. Although the statistical

analysis reported here does not encompass the Trump presidency, the early anecdotal evidence suggests that he too is a highly polarizing figure. Indeed, electoral polarization from the Trump election and presidency may well exceed that of earlier presidents. While presidents George H.W. Bush and Obama did not spark similar increases, they also did not significantly reduce the electoral polarization associated with previous presidents. Thus, future theory and research on electoral polarization should more strongly consider the role of presidents.

This study is limited in that it does not evaluate a complete causal chain whereby presidents are polarizing of the electorate. Do specific presidential behaviors and policy stances affect electoral polarization? How, if at all, does media coverage of battles between the president and partisans in Congress affect ideologies in the electorate? Evaluating these questions requires different data than used in this analysis. Future research should assemble such data and develop the causal chain of presidential influence on electoral polarization more fully.