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Why Non-Competitive States are So Important for Understanding the Outcomes of Competitive Elections: The Electoral College 1868-2016

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Abstract:	Brams and Kilgour (2017) begin their recent essay on the Electoral College by pointing out the obvious, but nonetheless regularly neglected, fact that states that are non-competitive may have a decisive impact on Electoral College (EC) outcomes and shape the electoral strategies of the candidates in the competitive states, especially if there is asymmetry in the partisan balance in the non-competitive states. Their contribution is to offer combinatorics insights into the implications of such asymmetries in the form of three new indicators: Winningness, Vulnerability, and Fragility. They then explore the magnitude and effects of these three measures for the presidential elections of 2000, 2004, 2008, and 2012. The major contribution of this note is to extend their analyses of these measures to an additional 34 elections: every election in the modern two-party post-Civil War era from 1868 through 2016. We find the Winningness measure to predict very well over the entire set of 38 presidential elections. Inspired by their work, we also offer a new and simpler metric for partisan asymmetries in noncompetitive states and show how it can predict the expected closeness of EC outcomes as well or better than the more complex combinatorics measures they propose.
Response to Reviewers:	Memorandum to Editor We were very pleased with the positive response to our paper, and with the helpful suggestions of the reviewers and the editors. We have been able to respond to all of them, and in doing so we feel as if the paper is greatly improved. We first note the overall changes we have made in our manuscript, and then we discuss we discuss our response to each specific suggestion. We agree that the essay was quite dry and have added some anecdotes from the 2016 election to illustrate two observations in the paper, namely the failure of journalists to consider the importance of the non-competitive states for EC outcomes, and the focus of campaigns on the battleground states. We have also expanded the literature review, both in the text and in the concluding discussion, so that the essay builds more generally off the Electoral College literature, and more specifically on work in Public

Choice (including an additional two references that appeared in this journal).
The most important improvements we have made involve new data now reported in the Appendix and summarized briefly in the text. We have added several additional robustness checks, including an examination of what changes if we define a competitive state in terms of as +/- 1.5% vote margin, and how our ex-post measures of competitiveness compare to the Shaw and Althaus's (2017) data on ex ante battleground status for the post-WWII era that is based on observed campaigning. These additional robustness checks validate the usefulness and credibility of our non-competitive advantage measure. We are deeply indebted to the Reviewer who suggested we contact Professor Shaw, who was kind beyond all expectations in allowing us access to his data set even before he had published his own work using that data.
Below we respond to each of the reviewers concerns one by one.

Response to Reviewer #1
p. 2, line 16: there ARE m states.
- Done

p. 3, line 29: 53% is misleading; the author should say 6% greater than the other major-party candidate, because other candidates may prevent the winner from getting 53%.
- We added in text to make clear that this is the two-party vote share, and added a footnote that the margin can be no larger than 6%.

p. 3, line 39: The correlation analysis (and later the regression analysis) does not seem to add much, because virtually all the correlations are high (and the regression coefficients are in the expected direction).
- Because there are five different variables being compared, and the correlations among each pair of them are of interest (and not contained in the Brams and Kilgour analysis because of the limited number of years they had to work with) we would prefer to keep Table 1 in the paper. If the editor wished us to remove it, to save space, of course we would do so, and move it to the appendix.

p. 9, line 9: better THAN the Brams-Kilgour variables.
-Done

p. 9, line 43: What the author's measure of "non-competitive advantage," while simple, hides is whether mostly large, medium, or small states--or some combination--are the source of a candidate's strength or weakness. This might be useful information to unpack when the index fails to make a correct prediction.
- This is a very nice suggestion, but, this type of analysis fits better in a paper on campaign strategies and takes us well beyond the scope of the present note.

p. 11, line 7: Some speculation on the failure of the index in these two elections would be useful here. As we now note in the text, close elections nationally bear many resemblance to a flip of a coin, so that a candidate who does unexpectedly well in the close states can overcome his opponent's lead in non-competitive states, especially if that lead is not that large.
The on-line appendix tests robustness by changing +/-3% to +/-5%; why not go in the other direction to +/-1 1/2%, as did Brams and Kilgour.
- We have added to the appendix a section explains the results of a robustness check involving changing the competitiveness measure downward to +/- 1.5%. In doing so, we now have results for +/- 1.5%, 3%, 5%, and using Shaw and Althaus's ex ante identification of battleground states. All the models lead to essentially the same conclusions about Non-Competitive Advantage.

Response to Reviewer #2Now, I do wish that the authors were a little more skeptical (or discerning) with respect to the Brams and Kilgour theory. Most notably, their acceptance of a post-hoc definition of competitiveness is not compelling. For example, in 2008 the state of Florida was considered a pre-eminent battleground state. McCain and Obama spent millions of dollars there, and all four presidential and vice-presidential candidates made multiple stops in the Sunshine state. In the end, Obama won by over 5 points. So it wasn't competitive?
- The ex post definition of competitiveness we took from Brams and Kilgour, and it is

needed for time periods for which pre-election survey data is unavailable at the state level – i.e., for most of the period we are dealing with. We believe that we have addressed the concern about the link between ex ante and ex post measures with our robustness checks , especially that using Shaw and Althaus's ex ante campaign strategy data (see below). But we have also expanded our discussion of the point (also made by Shaw and Althaus) that closeness is not the only factor affecting campaign decisions as to where to campaign.

The authors may want to see if they can get a recent paper from Scott Althaus and Daron Shaw on the candidates' actual Electoral College strategies from 1952 through 2016. This would be a nice check on what they use here.
- We thank the reviewer very much for this suggestion. We did in fact contact Profs. Althaus and Shaw, who were kind enough to share their unpublished paper and their data with us. In Appendix C, we have reproduced the results from the main text using their ex ante measure of battleground state, which distinguishes states viewed as battlegrounds by each of the two campaigns, though there is considerably cross-party overlap. Regardless of whether we look only at the battleground states that both parties classified as battlegrounds, or include the states that either campaign so classified, or look separately by party, campaigning and post-hoc competitiveness are now (esp. post 1988) very closely linked.

The authors might also consider that underdog candidates do not simply compete in competitive states. Because they have to win 270 electoral votes, they have to compete in states where they are decidedly behind. (A and S also have an interesting take on this.)
- We agree with this point, and have now made appropriate citations to previous literature (including. Stromberg 2008, and Althaus and Shaw 2017).

I would also like to see the authors leverage their time series a little more effectively. Do relationships between winningness, vulnerability, and EC results fluctuate at all as we move across different party systems (1828-1856, 1860-1892, 18986-1928, 1932-1964, 1968-2016)? Since different party systems reflect coalitional changes in the parties' constituencies, they might influence the relative import of these different factors, or at least their distribution across states.
- We have added a plot, now labeled "Figure II", which shows a time series between percentages of competitive and uncompetitive EC votes. We tie this to some literature that says that the number of battlegrounds have decreased over time, but we concur with Shaw and Althaus's findings that any decline is slight. We have chosen not to add any other material on periodization effects, although, following the reviewer suggestion, we did some analyses directly bearing on this point. Basically, the correlations were strong throughout and we did not find realignment era distinctions that were worth discussing.

The authors' distinction between close and uncompetitive elections is interesting, and ought to be extended. Perhaps in conjunction with a by-era analysis, as described above.
- We took this point very seriously and, as noted above, thanks to the kindness of Shaw and Althous in sharing their unpublished data on campaigning in presidential elections from 1952 to the present, we were able to test the claim that competition ex post can be used as proxy for battleground states, while recognizing the point made strongly in Shaw and Althaus's unpublished working paper that closeness is not the only factor affecting campaign decisions as to where to campaign. Also as noted above, we now have a plot, labeled "Figure II", which shows a time series between percentages of competitive and uncompetitive EC votes.

There is, as mentioned earlier, an extensive literature beyond B and K. I don't know that the paper needs to slog through the dozen or so studies that might be relevant, but it is a rather skimpy set-up that could benefit from a broader review of the extant literature. (I can't believe I'm asking for more gratuitous literature review...I feel hell freezing over...)
- We appreciate the need for a slightly longer literature review, which we were happy to provide. There are now about a dozen articles not cited in the submitted version which are referenced in the current version.

	The paper is generally well-written, but the current manuscript feels a little dry. The authors might want to consider connecting it up more directly to the 2016 and (speculatively) the 2020 elections. Bring some politics into it! - We now begin the paper with a discussion of red state vs. blue state America that segues into a discussion of why presidential candidates and the media tend to focus on the so-called purple states. To enliven the paper (and make clearer its relevance to highly contested elections, such as the 2016 contest, we have added some information and anecdotes about the 2016 election.

RESEARCH NOTE

EXTENDING THE BRAMS-KILGOUR MODEL LINKING PARTISAN IMBALANCE IN NON-COMPETITIVE STATES TO OUTCOMES IN THE ELECTORAL COLLEGE USING HISTORICAL DATA FROM 1868 TO 2016*

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RESEARCH NOTE

WHY NON-COMPETITIVE STATES ARE SO IMPORTANT FOR UNDERSTANDING THE OUTCOMES OF COMPETITIVE ELECTIONS: THE ELECTORAL COLLEGE 1868-2016*

WHY NONCOMPETITIVE STATES ARE SO IMPORTANT FOR UNDERSTANDING THE OUTCOMES OF COMPETITIVE ELECTIONS: THE ELECTORAL COLLEGE 1868-2016

ABSTRACT

Brams and Kilgour (2017) begin their recent essay on the Electoral College by pointing out the obvious, but nonetheless regularly neglected, fact that states that are non-competitive may have a decisive impact on Electoral College (EC) outcomes and shape the electoral strategies of the candidates in the competitive states, especially if there is asymmetry in the partisan balance in the non-competitive states. Their contribution is to offer combinatorics insights into the implications of such asymmetries in the form of three new indicators: Winningness, Vulnerability, and Fragility. They then explore the magnitude and effects of these three measures for the presidential elections of 2000, 2004, 2008, and 2012. The major contribution of this note is to extend their analyses of these measures to an additional 34 elections: every election in the modern two-party post-Civil War era from 1868 through 2016. We find the Winningness measure to predict very well over the entire set of 38 presidential elections. Inspired by their work, we also offer a new and simpler metric for partisan asymmetries in noncompetitive states and show how it can predict the expected closeness of EC outcomes as well or better than the more complex combinatorics measures they propose.

Keywords: Electoral College; Non-Competitive States; Voting Power; Presidential Elections

The division between Red America and Blue America has become part of ordinary citizen's understanding of U.S. politics.[1] However, institutional rules such as the U.S. Electoral College structure campaigning incentives so that candidates need to allocate their limited resources and time with the goal of increasing their likelihood of gaining the needed 270 Electoral College (EC) votes. Thus, the campaigning of the candidates tends to be focused on the so-called "purple states," i.e., the competitive states where campaigning might be assumed to make a difference (Shaw 1999b; 2006; Fair 2009). For example, on the Sunday before election day, Donald Trump visited five states; Florida, North Carolina, Pennsylvania, New Hampshire, and Michigan. Four of the five states ended up the four closest states as measured by the final two-party vote margin. [2] The fifth, North Carolina, had gone to the Democratic candidate in the previous two elections but was a southern state where Republicans were quite successful in state and federal elections. Trump won North Carolina.

The focus of attention on the competitive states is enhanced by the horse-race style coverage of presidential elections by the media, who refer to such states as the "battleground" states (Lipsitz 2005). Such states are the ones most likely, over the course of a campaign, to

[1] Colored maps (chloropleths) are now an indispensable aspect of election coverage, visually emphasizing how geography matters. CNN and other broadcasters are able, with the push of a button, to display historical comparisons of voting patterns at various levels of electoral geography.

[2] On CNN, on election night in 2016, Wolf Blitzer quipped to Jake Tapper that "Jake, [this is] another presidential race where all eyes right now are on Florida", to which Tapper responded "It's one of the critical states in this race. Donald Trump himself has said he doesn't see a path to the presidency for himself without the state of Florida, the 29 electoral votes." Tapper went on to say, "the Clinton campaign knows they need Florida. They have been saying for some time they feel better about Florida than they do about states such as North Carolina, … Ohio, or Iowa."

"swing" from one candidate to the other. Often such states are taken, at least implicitly, to be the ones determinative of the presidential winner, with the largest of the battleground states in terms of EC votes seen as especially critical. In contrast, outcomes in non-competitive states, because they will come as "no surprise," tend to be treated by the media as completely uninteresting but also largely irrelevant. If indeed campaigns focus exclusively on a set of battlegrounds, other states might suffer lower citizen engagement (Gimpel et al 2007; Lipsitz and Teigen 2010), depressed voter turnout (Aldrich 1993; Duffy and Tavits 2008; Geys 2006), and worse representation (Downs 1957; Stokes 1999).

However, while results in these non-competitive states may not come as surprising, they play an important role in shaping both outcomes and campaign strategies. The view that the states which are non-competitive are largely irrelevant has been strongly challenged by Brams and Kilgour (2017).[3] These authors point out that each candidate's electoral votes can be thought of as coming from two sources: non-competitive states—with outcomes effectively decided before the election—and the competitive states that support him or her on election day. But it is not simply that the EC votes received in non-competitive states are just as important in determining the presidential winner as the EC votes received in the competitive states, but also that the readily foreseeable outcomes in non-competitive states can create a "loading of the dice" in an election, by requiring the candidate with fewer expected easy victories to do remarkably well in the more

[3] We will refer to Brams and Kilgour's *Public Choice* paper by their names and with the B-K acronym interchangeably throughout this essay.

competitive states in order to win. [4] Indeed, at the extreme, we can imagine the outcomes in states essentially safe for one party might involve enough votes so as to render outcomes in the more competitive states the ones that are irrelevant. [5]

Moreover, when there is a partisan imbalance in EC vote share expected from the non-competitive states there is also a potential for choice of (slightly) different campaign strategies by the advantaged and the disadvantaged candidate (Stromberg, 2008; Shaw and Althaus, manuscript). The trailing candidate may be forced to campaign in states with a low probability of success. Another impact of the different degrees of competitiveness across states is tied to the different levels of visible campaign activity in competitive and non-competitive states. Increased exposure to a campaign can lead to a positive impact on interest and engagement of politics, and to higher turnout, with some studies finding the differences across levels of campaign exposure particularly high for low-income individuals (Gimpel, Kaufmann, and Pearson-Merkowitz 2007; Lipsitz and Teigen 2010).

Brams and Kilgour specify an indicator, *Winningness*, of the extent to which the virtually certain outcomes in non-competitive states structure the expected outcome of the overall election

[4] For example, in 2012, Brams and Kilgour point out (p. 101): "Because Barack Obama had a 233–191 electoral vote lead over Mitt Romney in the 42 noncompetitive states and the District of Columbia, he needed only 37 of the 114 electoral votes in the competitive states to win with a majority of 270 electoral votes, whereas Romney needed 79."

[5] In 1984, Ronald Reagan won 49 out of 51 states (including Washington D.C.) Norman Ornstein, writing before the election, said "Incumbent presidents don't often lose, particularly presidents presiding over 6% real growth and low or non-existent inflation" (quoted in *CQ Press*, http://library.cqpress.com/cqresearcher/document.php?id=cqresrre1984091400).

in a two-candidate contest. If we, for simplicity, posit that each of the battleground states is equally likely to go for either candidate, and there are *m* such states, then *Winningness* is the proportion of the 2^m combinations of zeroes and ones in which the candidate who is ahead in the non-competitive states is the winner (adding the seats won in competitive states found in that particular combination to the already "known" votes in the non-competitive states). The *Winningness* value for the Democratic candidate is simply one minus the *Winningness* value for the Republican candidate.

Note that the greater the advantage a given candidate has in the non-competitive states, the greater will be the expected proportion of the 2^m outcomes in which that candidate is the winner of an Electoral College majority, since the candidate ahead in seats won in non-competitive states will need fewer seats won from the competitive seats to amass a winning majority than will the other candidate. For example, in 2012, with m=8 competitive states, under the equiprobability assumption, Brams and Kilgour (2017: 101) point out that 207 (80.9%) of the 256 splits would result in a win for Obama, whereas only 49 (19.1%) would result in a win for Romney, giving Obama 4.22 times more ways of winning than Romney."

Brams and Kilgour (2017: 101-2) offer two other closely linked indicators that can be used to measure the extent to which outcomes are predictable: *Vulnerability* and *Fragility*. *Vulnerability* is defined as "the proportion of the coalitions in competitive states in which a single competitive state, by switching to the other candidate, either can cause a change in the winner or create a tie …;" while "*Fragility* is measured by the expected number of competitive states in a winning coalition that can disrupt victory in this way." Both of the latter measures are well defined only for those election years in which no candidate has a large enough EC seat share in the non-competitive seats to constitute a majority of the Electoral College. Each must be calculated separately for each party. *Winningness* is defined for all elections.

Brams and Kilgour, using a definition of *non-competitive state* as one where the winner's vote share in a two-party race is expected to be above 53% [6], calculate *Winningness, Vulnerability,* and *Fragility* for four recent elections: 2000, 2004, 2008, and 2012. We extend their analysis to include all 38 presidential elections in the modern two-party era, from 1868-2016. In the next section, we focus on the most important findings of our historical analyses for the Brams and Kilgour measures, evaluating how well each of the three measures (and all three together) allow us to predict EC winners and EC seat shares in these 38 elections.

Table AI in the on-line Appendix reports the full results of our calculations. [7] In the online Appendix, we consider how analyses would change if we changed the definition of non-competitive state. While the analyses in the Appendix show that our choice of range to define a competitive state can matter somewhat, to maximize our compatibility with Brams and Kilgour (2017), and because we think this definition is a plausible one in the context of predicting EC outcomes (see discussion below), we will use the Brams and Kilgour (2017) plus or minus three percentage point definition of competitive state in the remainder of the essay.

In the subsequent section, we offer a simple alternative measure based on the Brams and Kilgour intuition about the importance of the imbalance in partisan breakdown of EC seat shares in the non-competitive states. We show that this measure, that we label *Non-Competitive*

[6] In races with third parties, a margin of victory no greater than 6%. For the purposes of this note, we concern ourselves only with the two highest vote earners and calculate accordingly.

[7] In the process of replicating the Brams and Kilgour (2017) analyses, we found a few minor errors that we corrected; those corrections explain the differences in the numbers reported in Table AI for the elections of 2000 and 2004**,** and those reported in Brams and Kilgour Table 4.

Advantage, is as predictive of the final EC outcomes and somewhat more predictive of final EC seat percentages than any of the measures proposed by Brams and Kilgour (2017). In sum, we find both *Winningness* and *Non-Competitive Advantage* to perform very well.

WINNINGNESS, VULNERABILITY, AND *FRAGILITY: 1868-2016*

Over this entire period, as commonsense would predict, when *Winningness* is high, *Vulnerability* and *Fragility* are both low (with correlations ranging from -0.88 to -0.98), while the correlations between the latter two variables are highly positive (ranging from 0.80 to 0.91). See Table I. The Pearson correlations reported in Table I involving *Vulnerability* and *Fragility* are only for the elections where outcomes can be effected by what happens in the competitive states. [8]

<<Table I about here>>

While the various measures proposed by Brams and Kilgour (2017) are of theoretical interest, in and of themselves, we are most interested in how these measures allow us to address the bias imposed on likely Electoral College outcomes of having a substantial proportion of seat outcomes already known in advance in a fashion that favors one political party. Brams and Kilgour note (2017: 111) that the sign on the *Winningness* advantage correctly predicts the winners in all four of the presidential contests they study. When we replicate that analysis for all 38 elections, we find that this holds for all but two elections: 1880 and 1960. This is a very good predictive

[8] In Table Ia, *Vulnerability* and *Fragility* are defined in all elections that are competitive (17/38), and because the sample is split for Republicans and Democrats, for years in which that candidate had a *Winningness* of 1 (*Vulnerability* and *Fragility* are always zero in these cases).

performance by the *Winningnes*s variable. Even if we consider just the 17 elections where the winner was determined by the competitive states, this is a success rate of 88%.[9]

A more difficult test for the predictive usefulness of *Winningness* and the other two variables is to ask how well they, singly or collectively, predict final EC seat share outcomes. Figure I plots *Winningness*, *Vulnerability*, and *Fragility* against EC final seat share. These three variables are, in fact, highly correlated with EC outcomes, with the correlation for *Winningness* at 0.90, that for Republican (Democratic) *Fragility* at -0.76 (-0.67), while that Republican (Democratic) *Vulnerability* is -0.66 (-0.81). [10]

<< Figure I about here>>

We also see from the first plot in Figure I that in most years, *Winningness* is such that the outcome is expected to be determined solely by what happens in the non-competitive states, i.e., a *Winningness* values of zero or one. In the four elections analyzed in Brams and Kilgour (2017), only one, 2008, fell into this category. Had Brams and Kilgour extended their data back somewhat further in time to 1980, however, they would have found that in that election and in each of the

[9] While these two elections were very close in two-party vote margin, and thus might be regarded as hard to predict, they were less so electorally. In 1960, John F. Kennedy won the EC vote by 9.1% and in 1880, James Garfield won by 7.5%. In neither election were third party candidacies consequential in affecting relative two party shares.

[10] Because of the frequent occurrence of values of 0 or 1, a perfect linear fit is impossible.

four following elections, one of the two candidates had locked up enough votes in non-competitive states to win the election.[11]

We have done regression analyses with all three Brams-Kilgour measures as independent variables and EC Democratic share as the dependent variable, but we do not report results for these regressions since, as expected, the very high correlations among the three variables meant that adding *Vulnerability* and/or *Fragility* to *Winningness* did not increase the adjusted R^2, and only one of the three variables was statistically significant in any of the models. Also, when we include *Vulnerability*, and *Fragility*, we require separate equations for each party, and we lose cases. For the 38-election time-period, we find that the best fitting model in terms of adjusted R^2 is the simple bivariate regression where we use *Winningness* alone to predict the EC outcome, with an adjusted R^2 value of 0.81 (see Table AII).

ACCURACY OF EX POST CLASSIFICATION OF STATES AS NON-COMPETITIVE

B-K first justify the use of the ex-post criterion by which they classify competitive and non-competitive by pointing out that, empirically, there is a very good fit between ex ante and ex post evaluations of competitive states. Pre-election polls do a good job of predicting final outcomes to within a small margin of error (Soumbatiants et al. 2006) – though of course, that margin of error may be enough to generate an erroneous prediction. Still, highly uncompetitive states are unlikely to change partisan direction over the course of a single election. B-K point out

[11] In 1992, Bill Clinton was just 7 shy of having enough seats in non-competitive states, and could have lost the election in only 5 of the over 130,000 different combinations of electoral outcomes among the competitive states, i.e., *Winningness* > 0.99.

that the ±3% value they use to define a competitive state corresponds with the usual pre-election poll margin of error. When a state polls outside this three-percentage point margin, it is generally seen as not winnable by the trailing candidate, although more errors in prediction do occur than would be suggested by the 95% confidence limits (Gelman and King 1993; Shirani-Mehr et al., forthcoming). [12] Collectively, moreover, a high number of competitive states may result in an unexpected outcome if those states go disproportionately for one candidate. Thus, close elections nationally bear many resemblance to a flip of a coin,

However, campaigning choices are only "imperfectly correlated" with the degree to which a state is competitive (Shaw and Althaus, manuscript). We would not, in general, expect the campaign spending or campaign appearances to be only in competitive states, since candidates also spend some money and make some appearances for reasons not directly related to boosting their own campaign chances, e.g., to help down-ticket candidates or to build for the future. [13] Also, some major media markets cover more than one state. And the differential cost of campaigning may increase the desirability of campaigning in some small states where

[12] Another reason for choosing the ±3% value is a pragmatic one that we found only after we had done robustness checks; over both recent elections and the longer historical data: ±3% value has (marginally) greater predictive power than the often used ±5% definition of competitive state (see Appendix).

[13] Bartels (1985) has pointed out that campaigns have what he calls both "instrumental" and "ornamental" reasons for staging campaign events. Attending an event in a swing state, where a candidate's presence could increase turnout is instrumental, while visiting a state to satisfy state parties might be ornamental. Hillary Clinton spent over $600,000 in Arizona, perhaps trying to influence lower ticket races by increasing mobilization efforts. Ultimately, Arizona, a state that has had a strong Republican tradition, became competitive in 2016.

advertising costs are relatively inexpensive (Shaw 1999; Shaw and Althaus, manuscript). Finally, there is uncertainty about time trends, and the need to have alternative routes to victory.

While Shaw and Althaus (manuscript), who have collected the most complete data on campaign appearances and campaign expenditures by both parties for most of the post-WWII era, show that there is high agreement between the candidates of the two major parties as to which are the states in which to invest campaign resources, we would not expect a perfect symmetry, and we do not find a perfect symmetry in their data. In addition to reasons not directly connected with the presidential election contest, a leading presidential candidate and a trailing candidate face somewhat different strategic tasks. Sometimes a trailing candidate must opt for campaigning in a state expected to be won by the opponent, since doing so may open the only possible path to victory and/or may tempt an opponent to divert resources to protect a "base" state that could be better spent elsewhere.[14] As Shaw and Althaus (manuscript) put it: "campaigns often hone in on less competitive states when their overall position is weak."

Nonetheless, as both Grofman and Feld (2005) and Stromberg (2008) argue, we would expect to see that competitiveness, along with the size of the EC vote in the state, would be key

[14] Stromberg (2008) suggests a hockey metaphor; as a game winds down, a trailing team looking to increase the probability of tying the game pulls their goalie to provide more offensive potential, taking the risk of giving up another goal. A leading team would instead probably act to protect their lead, replacing offensive players with defensively skilled players.

determinants of campaigning.[15] Similarly, Shaw and Althaus (manuscript) posit that "campaign resources will be disproportionately, but not exclusively, concentrated in battleground states."

In Appendix C, we provide an additional robustness check on our use of an ex post measure of political competitiveness by using Shaw and Althaus's (manuscript) classifications of battleground/target states. We find that their *ex ante* measure and our *ex post* competitiveness measure are highly correlated when we include battleground targets from either campaign or from only those in which the campaigns agree about the battleground status of the state.

In 2012, B-K note that 99.6% of advertising money was spent in the ten states identified as battlegrounds by FairVote.org. Of those ten states, eight are included in the *ex post* set of competitive states, while the other two were the next closest states in terms of margin of victory. Similarly, in 2012, 87% of campaign events were held in the set 8 states viewed post-hoc as competitive.[16] We can provide confirmation of the congruence between post-hoc measures of competitiveness and ex ante expectations of competitiveness for two additional recent elections,

[15] This conclusion differs from that of early political science literature on campaign strategies which claimed that the most populous states would receive the bulk of campaign activities. For example, Brams and Davis (1974) offered a model that predicted campaign allocations proportional to the electoral votes of each state raised to the power (3/2). For an early critique of the view that campaigning would necessarily focus on the most populous states see Colantoni, Levesque, and Ordeshook (1975). See also Wright (2009), Miller (2012).

[16] Data aggregated from FairVote.org, with original data from CNN: http://www.fairvote.org/presidential_tracker_2012#2012_campaign_events

those in 2004 and in 2016.[17] In the 2016 election, the campaigns and campaign related PACs spent 82% of advertising money in the states retrospectively classified as competitive.[18] Moreover, the only competitive state not targeted by either campaign was Minnesota, a state that holds the longest win streak for Democratic candidates. Similarly, if we look at candidate rallies or events where the presidential or vice-presidential candidate was present in 2016, the major party candidates held 79% of all events in the 13 states which post-hoc we are labeling competitive.

Some studies have claimed that the number of battleground states has narrowed (Gimpel et al 2007), but what is arguably the most comprehensive study to date, looking from 1952 onward, finds little change in the number of battleground states over time (Shaw and Althaus, manuscript). We can contribute to this debate by examining the change in the number of competitive states over a much longer time period.

We show in Figure II the percentage of competitive states as we have measured that concept, with a running average also shown by plotting a locally-weighted polynomial regression.

[17] Older elections also largely conform to these expectations. Detailed campaign activities for the 1976 election are available because they were submitted into evidence for the hearing before the Subcommittee on the Constitution of the Committee on the Judiciary (S.J. Res. 28, 1979) on a bill that would abolish the Electoral College and establish a direct popular vote. The data were first used by Bartels (1985). That election shows a similar pattern of campaign activities focused on the competitive states, though there were many more (25) competitive states in 1976 than in the two most recent elections of 2012 and 2016. In 1976, 78% of all campaign events were held in the 25 battleground states, and 78% of all campaign television and radio ads were held there.

[18] Data compiled from AdAge.com, based on state specific ad buys between October 21, 2016 and election day. http://adage.com/article/campaign-trail/states-where-trump-clinton-spending-most-on-advertising/306377/

What we see is that the post 1952 data is compatible with the Shaw and Althaus's (forthcoming) assertion that there has been little change in the number of battleground states in recent presidential elections, though there is some evidence for a slight downturn in our data. However, when we look at the longer time series, what we observe is that we now have relatively few competitive states as compared to the period1868-1900, and the percentage of competitive states is more stable (lower standard deviation) than it was before 1988.

<< Figure II about here>>

Shaw and Althaus (forthcoming) also expect the ability of campaigns to more optimally use their resources should increase over time with more sophisticated survey and targeting tools. We relatedly expect that higher levels of polarization allow for more accurate predictions of which states are likely to be competitive and which not. We can examine this question by comparing the Shaw and Althaus measure of what states were viewed as battleground states as judged by the behavior of each campaign and our post-hoc measure of competitiveness. We show the average level of competitiveness in their battleground states in Table II.

<< Table II about here >>

What we see from Table II is that, since 1988, the states which Shaw and Althaus (manuscript) find to be battleground states as judged by campaigning, also are consistently highly competitive. However, this consistency is not true in the period from 1952 to 1984, although low ex post competitiveness in battleground states is found in three of these presidential election years.

Thus, at least for the recent period, the only period for which we have relevant campaign data, using post-hoc measures of competiveness as a proxy for campaign strategies is reasonable.[19]

USING PARTISAN IMBALANCE IN NON-COMPETITIVE STATES TO PREDICT EC OUTCOMES

We, like Brams and Kilgour (2017), believe that outcomes in non-competitive states are critical in understanding final Electoral College winners. In this section, we capitalize on that insight by offering a simple measure that we show jointly performs as well or better than the Brams-Kilgour variables in predicting final EC outcomes.

To present our measure, some notation is useful. We may again partition the states into the set of competitive states, C_j, and the set of non-competitive states, NC_i, where *i* indicates the election year. The EC seats in a competitive state are labeled as $s(C_j)$ and the EC seats in a non-competitive state are labeled as $s(NC_j)$. We have $s(EC) = s(C_j) + s(NC_j)$. The noncompetitive states won by Democrats we label NC_D, and the non-competitive states won by Democrats we label NC_R. The seats in the non-competitive states won by the Democrats are thus labeled $s(NC_D)$ and the seats in the non-competitive states won by Republicans are thus labeled $s(NC_R)$.

We will be interested, on the one hand, on the partisan balance of seats in the non-competitive states and, on the other hand, on the share of the states that fall into the non-

[19] In 1964, the Goldwater campaign treated 23 states as battlegrounds (Shaw and Althaus, manuscript). The Goldwater campaign focused on the South, seeking to mirror the Dixiecrat revolt and pry southern states from the hands of the Democratic party which, except for the Dixiecrat revolt of 1948, had been winning them by large margins. Goldwater's campaign went poorly except in the deep South, winning only a handful of states. All but one of the states he won were states his campaign treated as battleground. The one exception was a very narrow win.

competitive category. We define our variable of interest as the difference between the two-candidate's non-competitive electoral totals, divided by the total number of EC seats

$$\textit{Non-Competitive Advantage} = [s(NC_D) - s(NC_R)]/s(EC)$$

This measure is standardized, thus allowing us to compare its effects across elections. When one party has a big advantage in non-competitive electoral votes, they will be more likely to win the election. Bram's and Kilgour reflect this intuition by examining coalitions among competitive states, and determining outcomes under the explicit assumptions that the competitive state outcomes occur independently of one another and with an equal probability of victory for the two parties in each. [20] We do not require either of these strong assumptions. But exactly the same intuition drives our model as that in the work of Brams and Kilgour, namely that the candidate that has a bigger advantage in electors from the non-competitive states will have more options in terms of possible wins in competitive states leading to Electoral College victory.

Table III shows *ex post* values for the Democratic and Republican EC seat shares in the non-competitive states in the first two columns, and it also shows the final EC seat outcome both as a number and as a percentage. In addition, we provide a column that has the *difference* between the Democratic and Republican EC seats in the noncompetitive states, and a further column that

[20] We regard both of these assumptions as quite reasonable ones to make for purposes of model tractability, but we might expect that they would be falsified if there are electoral tides that sweep in a particular direction and thus create interdependencies in vote outcomes in the competitive states.

shows that difference normalized by total EC seats, i.e. a column that shows *Non-Competitive Advantage*. [21]

<<Table III about here>>

We first test the predictive usefulness of our *Non-Competitive Advantage* variable by looking to see how often the party with the advantage in the non-competitive states wins the EC vote. As does the *Winningness* measure, in all four of the elections from 2000 through 2012, *Non-Competitive Advantage* correctly predicts the presidential outcome. Indeed, we find that in all but 2 of the 38 elections (1880 and 1960) the party with a *Non-Competitive Advantage* goes on to win the election, the same strong predictive accuracy as the *Winningness* measures. Interestingly, the two election errors are the same two elections that *Winningness* fails to predict. The failure of the models to correctly classify states is directly tied to two empirical realities of elections; closely competitive elections (and reversals, where one candidate wins the popular vote and the other wins the Electoral College) are, by definition, more difficult to predict, and candidates who over perform their rivals in battlegrounds can overcome non-competitive *disadvantages.* 1880 appears to be the former, while 1960 appears to be the later.

Next, we regress Republican EC seat share on the *Non-Competitive Advantage* variable. Here we find (see Table AII) a very strong and significant relationship between the two measures,

[21] Minor party candidacies are likely to be a problem for our analyses only in situations where they receive Electoral College votes. This has not been the case in recent elections, as no minor party candidate has won a state since George Wallace in 1968. In their assessment of minor party impact, Pattie and Johnson (2014) do not find substantial effects, and they also note that such effects have often been split in their partisan impact. To provide a consistent coding across all elections in our data set we ignore minor party votes and treat contests as between the two major party candidates in terms of two party vote share.

and the simple regression between them yields an adjusted R^2 of 0.96. We can compare this regression with one that models the same dependent variable with *Winningness* as the predictive variable. As noted earlier, the adjusted R^2 of the *Winningness* model is 0.81, lower than that for *Non-Competitive Advantage* at 0.96. While the very simple *Non-Competitive Advantage* variable does better in predicting final seat shares than any (or all) of the three variables from Brams and Kilgour (2017), *Winningness* and *Non-Competitive Advantage* do equally was well at predicting the directionality of EC outcomes.

DISCUSSION

Brams and Kilgour (2017) begin by suggesting that the set-up power of non-competitive states dictate the terms under which a presidential election is contested. We agree. While competitive states receive the bulk of campaign activities like television and radio advertising, campaign field offices, and visits from the candidates and their surrogates, the media "horse-race" coverage about 'swing states' and 'battleground states' takes attention away from the extent to which safe seats matter for election outcomes. Partisan balance in non-competitive states matters since the candidate who enjoys a *Non-Competitive Advantage* has many additional pathways to the presidency, and thus one candidate can begin the presidential contest severely handicapped.

Our results complement a broader literature on the Electoral College, which has both empirical, theoretical, and normative components. Normatively, there is an ongoing debate between those that see popular vote decisions as the only legitimate way to elect a president, and those who view the Electoral College as a result of a political bargain reflecting federalist efforts to balance popular votes and states as the bases of representation (Hirsch, 2008; Edwards, 2011; Ross, 2012). This debate is tied to proposals about alternative ways to elect the U.S. president. Such proposals tend to surface after each presidential election, especially those (like 2000 and

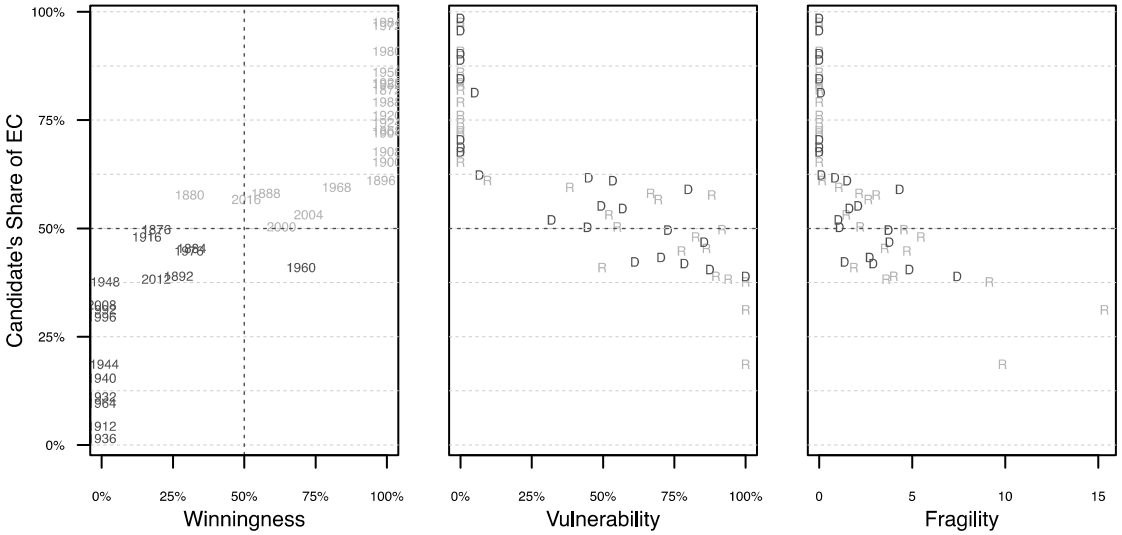
2016) where there is a divergence between the popular vote and the EC vote. Theoretically, there is a debate about the degree to which the weighted voting rule used in the Electoral College disproportionately empowers citizens of small states as opposed to large states. This debate is most commonly couched in terms of game theoretic indices of power such as the *Banzhaf Index* or the *Shapley-Shubik* value (see e.g., Owen, 1975; Duffy and Matros, 2015). Empirically there is a debate about such issues as the degree of partisan bias imposed by EC apportionment (Grofman, Brunell, and Campagna, 1997; Johnston, Rossiter and Pattie, 2004; Pattie and Johnston, 2014; cf. Ladewig and Jasinski, 2008), and the nature of optimal campaigning under the Electoral College (see esp. Shaw, 2006; Stromberg, 2008).

We have extended B-K's analyses of *Winningness*, *Vulnerability* and *Fragility* beyond the four recent elections they analyze, to include not just 2016, but all elections between 1868 and 2016. Thus, we have added 34 elections to the analyses. We also added a new and simpler variable based on the logic of the B-K argument, namely, *Non-Competitive Advantage*, defined as the difference in safe EC seats between the parties, normalized by total EC seats. We find that the candidate that holds the edge in *Winningness* and *Non-Competitive Advantage* have gone on to win in all but 2 of the 38 elections since 1868. In the mispredicted elections, the partisan advantage in non-competitive seats was very slim. When we move from attempting to predict a dichotomous outcome variable to seeking to predict final EC vote shares, we found that both *Winningness* and our new *Non-Competitive Advantage* variable are highly predictive of EC seat shares, but now the predictive edge is with the simpler variable **(**R^2 of 0.96 vs. one of 0.81).

In *toto*, we take these results to be highly supportive of recent Public Choice and economics scholarship on optimal campaigning. In particular, campaigns have clear incentives to concentrate resources in the most competitive states rather than simply the most populous ones, and recent

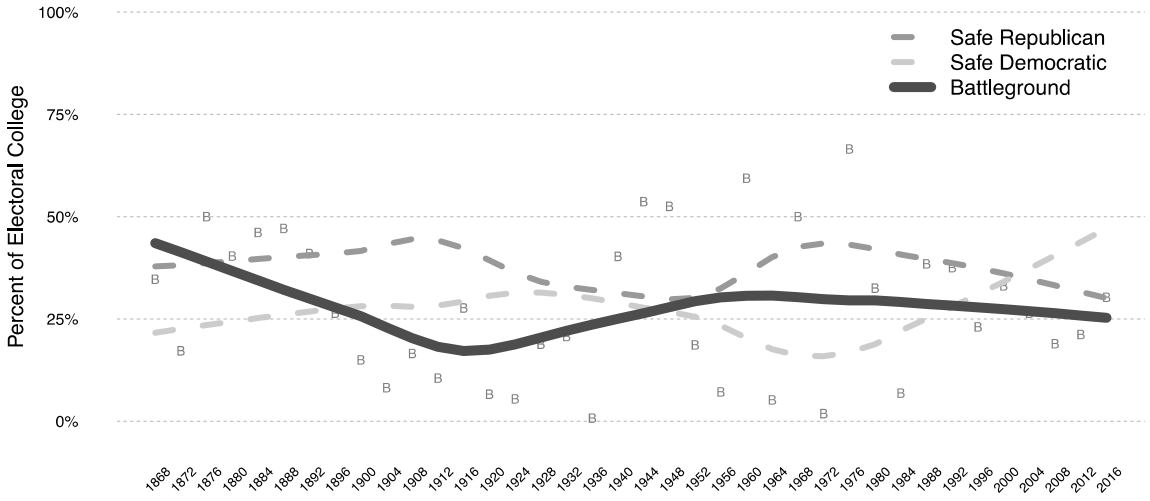
campaigns (since the 1980s) show a closer correspondence between post-election closeness of result and expenditure of campaign resources. However, we have shown that we have relatively few competitive states in more recent elections compared to those prior to the 20th century. More specifically, our results support with a much more extensive data set the key intuition in Brams and Kilgour that non-competitive states play a foundational role in shaping the presidential context. As with Brams and Kilgour's *Winningness*, our measure shows that the more potential paths to victory leads to a greater expected seat share. Moreover, the candidate who has the edge in the Non-Competitive EC seats is almost always elected President.

Figure I: Comparing *Winningness*, *Vulnerability*, and *Fragility* to EC Outcomes



NOTE: Candidate's Share of EC is from the Republican perspective in plot one. The Candidate's Share of the EC is labeled "D" for the Democratic candidate, and "R" for the Republican candidate in the *Vulnerability* and *Fragility* plots.

Figure II. Percent of Competitive States Over Time: 1868-2016



NOTE: Smoothed lines are locally-weighted polynomial regressions with smoothness set at f=0.5. These lines are intended to show over time patterns among noisy data.

Table I

a. Correlations among the *Winningness*, *Vulnerability*, and *Fragility* variables for the Republican and Democratic Parties and with Republican EC seat share: 1868-2016

Democratic Party Correlations				
	Winningness	**Vulnerability**	**Fragility**	**EC Outcome (DEM)**
Winningness	1	-0.957	-0.981	0.901
Vulnerability	-0.957	1	0.910	-0.855
Fragility	-0.981	0.910	1	-0.718
EC Outcome	0.901	-0.855	-0.718	1
Republican Party Correlations				
	Winningness	**Vulnerability**	**Fragility**	**EC Outcome (REP)**
Winningness	1	-0.978	-0.876	0.901
Vulnerability	-0.978	1	0.804	-0.883
Fragility	-0.876	0.804	1	-0.774
EC Outcome	0.901	-0.883	-0.774	1

NOTE: *Winningness* defined for all elections. *Vulnerability* and *Fragility* only defined for 24/38 elections for the Democratic candidate, and for 31/38 for the Republican candidate.

Table I (cont.)

b. Correlations among the *Winningness*, *Vulnerability*, and *Fragility* [Restricted Models]: 1868-2016

Democratic Party Correlations [Restricted Model]				
	Winningness	**Vulnerability**	**Fragility**	**EC Outcome (DEM)**
Winningness	1	-0.947	-0.973	0.726
Vulnerability	-0.947	1	0.886	-0.807
Fragility	-0.973	0.886	1	-0.667
EC Outcome	0.726	-0.807	-0.667	1

Republican Party Correlations [Restricted Model]				
	Winningness	**Vulnerability**	**Fragility**	**EC Outcome (REP)**
Winningness	1	-0.964	-0.810	0.726
Vulnerability	-0.964	1	0.705	-0.658
Fragility	-0.810	0.705	1	-0.759
EC Outcome	0.726	-0.658	-0.759	1

NOTE: Restricted values are defined only on the elections in which *Winningness* is neither 0 or 1 (17 of 38). *Vulnerability* and *Fragility* took value 0 in Table Ia when *Winningness* is 1 since the candidate who wins all the coalitions cannot be vulnerable or have fragile coalitions. Here, only elections which were decided by competitive states are used to calculate the Pearson Pairwise Correlations.

TABLE II. Average Victory Margins in Battleground States as Defined by Shaw and Althaus

	Base Democratic		Battleground		Base Republican	
Year	Democratic	Republican	Democratic	Republican	Democratic	Republican
1952	11.9%	12.6%	12.9%	12.3%	27.9%	28.0%
1956	15.3%	19.1%	16.9%	14.6%	27.1%	24.3%
1960	12.0%	11.0%	6.7%	4.4%	8.7%	10.4%
1964	33.3%	35.7%	26.8%	27.8%	19.3%	12.4%
1968	15.7%	19.2%	6.9%	6.5%	16.2%	14.5%
1972	19.8%	20.5%	19.5%	26.5%	36.7%	33.0%
1976	13.2%	18.9%	3.5%	5.7%	12.8%	11.5%
1980	8.5%	9.6%	14.7%	10.6%	40.3%	31.0%
1984	17.3%	14.7%	17.8%	16.8%	30.9%	27.9%
1988	15.6%	14.3%	5.2%	7.0%	17.0%	17.8%
1992	21.7%	22.3%	7.0%	5.9%	9.6%	11.3%
1996	24.0%	25.0%	7.9%	7.8%	11.2%	11.8%
2000	26.3%	26.0%	4.9%	5.8%	23.5%	25.8%
2004	18.6%	19.5%	3.0%	4.2%	21.2%	22.2%
2008	28.4%	28.4%	8.4%	7.7%	18.1%	17.2%
2012	25.4%	26.3%	5.4%	5.7%	21.4%	21.4%
2016	19.1%	24.1%	2.9%	3.6%	24.7%	25.4%

NOTE: Classifications and data courtesy of Daron Shaw via personal communication. Numbers represent the unweighted means by classification. Each party has its own strategy, so averages were taken for each party's strategy separately. Same conclusions hold if all targets are included as battlegrounds, or only those where there is concurrence.

Table III: Electoral College Data for Calculation of *Non-Competitive Advantage*, 1868-2016

Year	Non-Competitive EC Seats		Electoral College Outcomes				Differences	
			Seats		Percent			
	Rep	Dem	Rep	Dem	Rep	Dem	Seats	Percent
1868	153	37	211	80	0.725	0.275	116	0.399
1872	269	34	300	66	0.82	0.18	235	0.642
1876	64	119	182	184	0.497	0.503	-55	-0.15
1880	95	125	213	156	0.577	0.423	-30	-0.081
1884	93	123	182	219	0.454	0.546	-30	-0.075
1888	112	100	233	168	0.581	0.419	12	0.03
1892	112	150	173	271	0.39	0.61	-38	-0.086
1896	203	126	273	174	0.611	0.389	77	0.172
1900	258	122	292	155	0.653	0.347	136	0.304
1904	317	120	343	133	0.721	0.279	197	0.414
1908	283	120	327	156	0.677	0.323	163	0.337
1912	8	467	23	508	0.043	0.957	-459	-0.864
1916	171	213	255	276	0.48	0.52	-42	-0.079
1920	382	114	404	127	0.761	0.239	268	0.505
1924	366	136	395	136	0.744	0.256	230	0.433
1928	379	52	444	87	0.836	0.164	327	0.616
1932	8	413	59	472	0.111	0.889	-405	-0.763
1936	8	519	8	523	0.015	0.985	-511	-0.962
1940	27	290	82	449	0.154	0.846	-263	-0.495
1944	31	215	99	432	0.186	0.814	-184	-0.347
1948	37	215	200	331	0.377	0.623	-178	-0.335
1952	379	53	442	89	0.832	0.168	326	0.614
1956	446	47	457	74	0.861	0.139	399	0.751
1960	132	86	220	317	0.41	0.59	46	0.086
1964	47	463	52	486	0.097	0.903	-416	-0.773
1968	175	94	320	218	0.595	0.405	81	0.151
1972	511	17	521	17	0.968	0.032	494	0.918
1976	66	114	241	297	0.448	0.552	-48	-0.089
1980	344	19	489	49	0.909	0.091	325	0.604
1984	498	3	525	13	0.976	0.024	495	0.92
1988	289	42	426	112	0.792	0.208	247	0.459
1992	73	263	168	370	0.312	0.688	-190	-0.353
1996	66	348	159	379	0.296	0.704	-282	-0.524
2000	189	171	271	267	0.504	0.496	18	0.033
2004	213	183	286	252	0.532	0.468	30	0.056
2008	145	291	174	364	0.323	0.677	-146	-0.271
2012	191	233	206	332	0.383	0.617	-42	-0.078
2016	188	187	305	233	0.567	0.433	1	0.002

NOTE: Competitive states are determined by the winning party garnering no more than 53% of the two-party vote.

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Figure 1

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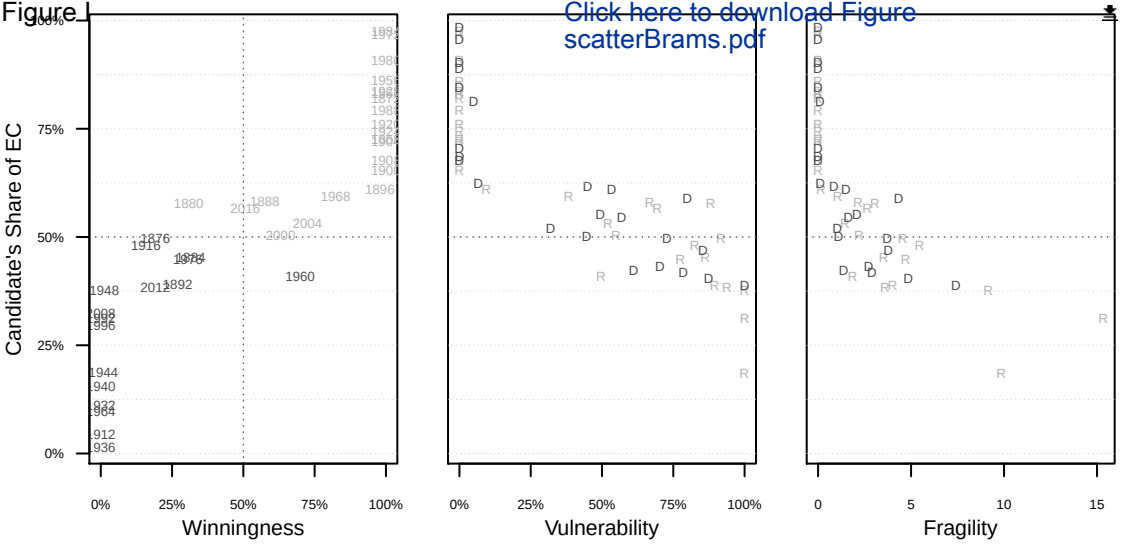

Figure II

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