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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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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*

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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. One 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 Electoral College (EC) is often criticized because the logic of campaigning under the EC's weighted voting rule makes each party's presidential campaign focus exclusively on *battleground states*, i.e., states characterized as competitive. Such states can, over the course of a campaign, "swing" toward one candidate or 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, a large majority of states have seemingly no power to determine the president, since, for all practical purposes, the outcomes in those states cannot be changed by the presidential campaign. It is also well known that, because of the horse-race nature of election coverage, it is the potentially pivotal states that get all the attention from the media.

The view that the states which are non-competitive are therefore made irrelevant has been challenged by Brams and Kilgour (2017).[1] 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. Thus, 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 competitive states in order to win.[2] Indeed, at the extreme, we

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

[2] 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."

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. [3]

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 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 is *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 point out (2017: 101) 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."

[3] 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).

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. Also 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 is expected to be above 53%, 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. Table AI in the on-line Appendix reports the results of our calculations. [4]

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

[4] 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.

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. [5]

<<Table I about here>>

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 throughout the essay.

In the next section, we consider 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. Then we discuss the question of how well an *ex post* measure of non-competitive states relates to expectations about non-competitiveness *ex ante*. 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 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*

[5] 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).

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 performance by the *Winningness* 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%.[6]

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). [7]

<< 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

[6] 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.

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

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 four following elections, one of the two candidates had locked up enough votes in non-competitive states to win the election.[8]

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 states by pointing out that ±3% corresponds with the usual pre-election poll

8 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.

margin of error.[9] Second, they point out that, empirically, there is a very good fit between *ex ante* and *ex post* evaluations of competitive states.[10] For example, 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 *post hoc* set of competitive states, while the other two were the next closest states in terms of margin of victory. In 2012, 87% of campaign events were held in the set 8 states viewed post-hoc as competitive.[11]

We provide confirmation of the congruence between post-hoc measures of competitiveness and ex ante expectations of competitiveness for two additional recent elections, those in 2004 and in 2016.[12] In the 2016 election, the campaigns and campaign related PACs spent 82% of

[9] 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).

[10] A third 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 t has (marginally) greater predictive power than the often used ±5% definition of competitive state (see Appendix).

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

[12] 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

advertising money in the states retrospectively classified as competitive.[13] 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. A similar pattern occurs in 2004, when 85% of campaign events were held in the 12 competitive states (Shaw 2006). However, 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. [14]

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

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.

[13] 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/

[14] 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. 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.

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 as 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-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. [15] 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 II 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 shows that difference normalized by total EC seats, i.e. a column that shows *Non-Competitive Advantage*. [16]

<<Table II 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-*

[15] 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.

[16] Minor party candidacies likely to be a problem for our analyses 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.

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.[17]

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, 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 0.806, lower than that for *Non-Competitive Advantage* at 0.958. 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-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

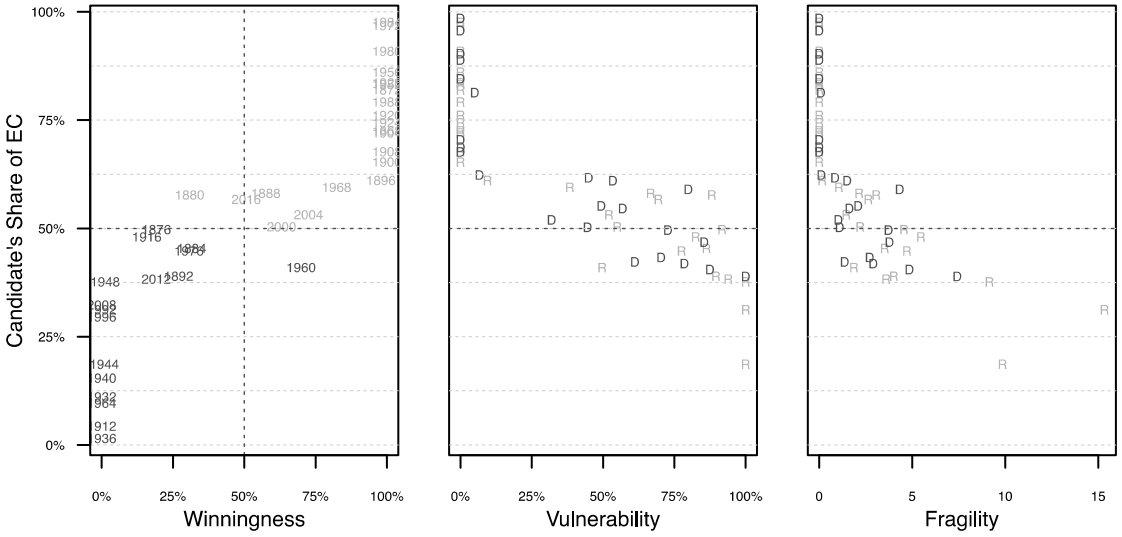
[17] See footnote 5.

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.

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 the basic B-K intuition: Campaigns have clear incentives to concentrate resources in the most competitive states, but non-competitive states play a foundational role in setting up the contest and, as we have shown, the more potential paths to victory the greater the expected seat share, and 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.

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: 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

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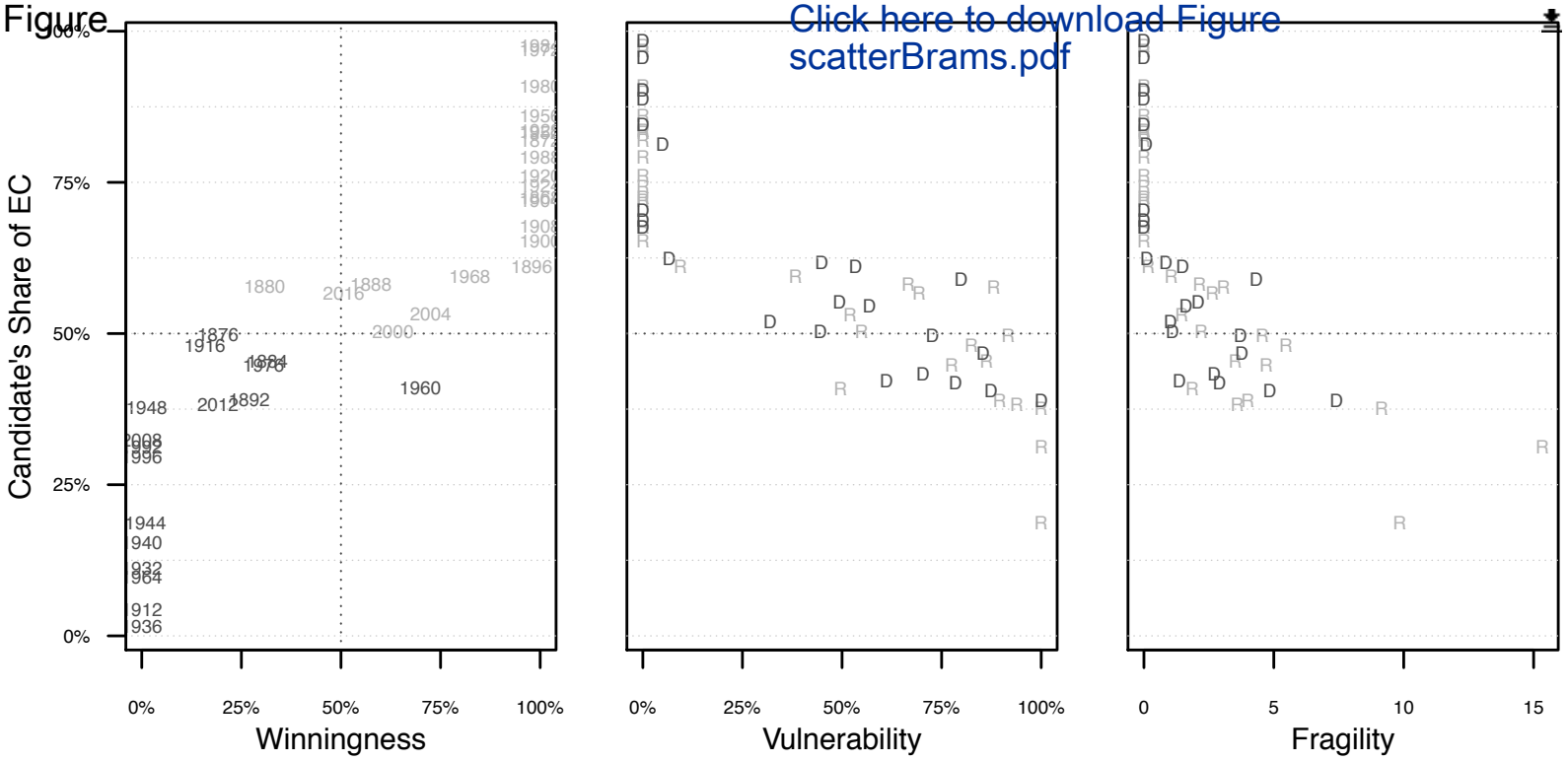

APPENDIX (FOR ON-LINE DISSEMINATION):

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

A. DATA AND ANALYSES REFERRED TO IN TEXT

Table A1: Extending Brams and Kilgour's Three Measures of Setup Power

	Winningness		Vulnerability		Fragility		Actual EC Outcomes
	Democratic	Republican	Democratic	Republican	Democratic	Republican	Republican EC Share
1868	1	0	0		0		0.725
1872	1	0	0		0		0.82
1876	0.191	0.809	0.917	0.446	4.554	1.097	0.497
1880	0.308	0.692	0.881	0.611	3.061	1.365	0.577
1884	0.315	0.685	0.862	0.569	3.519	1.62	0.454
1888	0.575	0.425	0.667	0.785	2.144	2.905	0.581
1892	0.27	0.73	0.895	0.534	4.005	1.499	0.39
1896	0.979	0.021	0.095	1	0.159	7.419	0.611
1900	1	0	0		0		0.653
1904	1	0	0		0		0.721
1908	1	0	0		0		0.677
1912	0	1		0		0	0.043
1916	0.158	0.842	0.824	0.319	5.464	1.028	0.48
1920	1	0	0		0		0.761
1924	1	0	0		0		0.744
1928	1	0	0		0		0.836
1932	0	1		0		0	0.111
1936	0	1		0		0	0.015
1940	0	1		0		0	0.154
1944	0.009	0.991	1	0.05	9.85	0.093	0.186
1948	0.012	0.988	1	0.067	9.146	0.115	0.377
1952	1	0	0		0		0.832
1956	1	0	0		0		0.861
1960	0.699	0.301	0.496	0.799	1.861	4.325	0.41
1964	0	1		0		0	0.097
1968	0.824	0.176	0.383	0.874	1.053	4.848	0.595
1972	1	0	0		0		0.968
1976	0.306	0.694	0.775	0.494	4.714	2.092	0.448
1980	1	0	0		0		0.909
1984	1	0	0		0		0.976
1988	1	0	0		0		0.792
1992	0.00004	1	1	0.001	15.333	0.001	0.312
1996	0	1		0		0	0.296
2000	0.631	0.369	0.549	0.727	2.198	3.724	0.504
2004	0.725	0.275	0.52	0.854	1.45	3.773	0.532
2008	0	1		0		0	0.323
2012	0.191	0.809	0.939	0.449	3.592	0.85	0.383
2016	0.507	0.493	0.694	0.703	2.638	2.711	0.567

Table AII: Regressions with *Non-Competitive Advantage* and with *Winningness* to Predict Final Republican EC seat share

	Model 1	**Model 2**	**Model 3 [Restricted]**
Non-Competitive Advantage	0.530*** (0.018)		
Winningness		0.553*** (0.044)	0.273*** (0.067)
Constant	0.502*** (0.009)	0.230*** (0.031)	0.357*** (0.033
N	38	38	15
Adj. R-squared	0.958	0.806	0.495
***p < .01; **p < .05; *p < .1 Standard Errors in Parenthesis			
Note: All Regressions calculated using plus or minus 3% as the definition of competitive state. Model 3 includes only elections where Winningness is greater than 0 and less and 1.			

B. How Analyses Would Change if We Changed the Definition of Non-Competitive State

Brams and Kilgour (2017: 110-111) discuss their choice of the domain of competitiveness as plus or minus three percentage points of two-party vote. One justification is that this range is close to the usual margin of error in state polls. A second justification for this choice of range is a pragmatic one: there are computability issues in that, when we expand the range of competition, we have many more combinations to analyze. But there is also a good theoretical reason to favor this choice: for this range, the assumption they use that all states in this range had an *a priori* equal probability of being won by either party seems plausible. Nonetheless, it is useful to consider the robustness of their measures to alternative specifications of the range used to define a competitive seat. In Table BI, for the four elections they consider, and for 2016, we show the comparisons between the values they derive for a plus or minus three percentage point definition and the more conventional plus or minus five percentage point definition of a competitive state.

<< Table BI about here >>

Changing the states that are considered non-competitive changes the number of seats from the competitive states a party needs to win the election. In the parlance of voting power literature, we might say such changes in the definition of competitive state changes the "effective" *quota*, i.e., the number of competitive EC seats a candidate needs to win above and beyond expected wins in "safe" seats (Banzhaf 1968). However, increasing the number of states defined as competitive does not give rise to an expectation of a monotonic change in the three B-K variables. It is possible that the set of new states are more (less) vulnerable or more (less) fragile than those previously included. Also, if a large state is just outside the competitive range

under the narrow definition, but is now competitive under the less restrictive definition, it could increase the number of coalitions that are wins for the disfavored party, but not change anything for the leading party's candidate.

From Table BI, we see that in some cases the changes in other variables are small, even though the number of competitive states may have changed considerably, while in other cases the differences when we change the definition of competitive state are quite large.

For example, in 2016, when we switch from a plus or minus 3 percentage point definition of competitive to a plus or minus 5 percentage point definition of competitive, the election previously characterized as very close now is seen as less close. Using Brams and Kilgour's definition of competitive, Donald Trump had a one seat EC lead in non-competitive states, and by virtue of winning the majority of the competitive EC seats, won the election. Using the more traditional plus or minus 5% definition of a competitive seat, Clinton would have had a 50 EC seat starting advantage, having 182 safe EC seats to Trump's 132. Shifting the definition of competitive state, *Winningness* would now have predicted a Clinton victory and, given the size of the *Winningness* score (0.77), she would be predicted to win by a large margin.[1]

Even though the number of competitive states increases by just three in 2016, as judged by *Winningness*, the Republican candidate goes from a slight favorite to a big underdog! In the states that finished with the winning candidate garnering less than 53% of the vote, if results were determined simply by flipping a fair coin, Trump would have been expected to have won 3% more of the feasible coalitions than Clinton. In contrast, if we shift our definition of

[1] Hillary Clinton won the popular vote by over 3 million votes, but still lost the Electoral College.

competitive state to plus or minus five percentage points, Clinton would have instead been expected to won 3.3 times more coalitions under the same equiprobability assumption.

A similar dramatic shift in estimated win probabilities occurs in 2000. Bush had a slight advantage in competitive states using the B-K definition of competitive state, but he had many fewer outlets to victory under the broader plus or minus five percent definition.

2004 and 2012 offer a different kind of result. Although the number of states counted as competitive drastically increases in both years when we change the definition of a non-competitive state, changes in results are minimal. The Republican candidates in each of these elections gain a slightly higher percentage of winning coalitions, while in both cases decreasing their *vulnerability* and *fragility* among those coalitions.

Finally, let us turn to 2008. Whereas Obama had enough EC seats in the non-competitive states in 2008 using the plus or minus 3% definition,[2] he was twelve seats shy of victory using the less restrictive plus or minus 5% definition. While Obama remained the favorite even when we expand the definition of competitive states, under the former definition, Obama's *quota* is effectively zero in the competitive states, while under the latter definition it becomes twelve.[3] Nonetheless, in 2008, Obama remains far enough ahead in non-competitive states that McCain would be predicted to have had virtually no chance of victory.[4]

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[2] Few would, at the time, have believed that the outcome was certain. McCain did not; he raised and spent over $300 million dollars in his quest for the presidency, though considerably outspent by Obama. McCain raised $368 million to Obama's $730 million, http://www.opensecrets.org/pres08/

[3] Since we decreased the number of non-competitive states in 2008 by changing the definition, we have also increased the number of competitive ones, from 102 to 159.

[4] McCain wins 22 of the coalitions out of 32,768 using ±5%, definition of a competitive state -- a percentage low enough to round to zero.

What seems to us to be most important is that, in both 2000 and 2016, years in which the popular vote and the Electoral College diverge, when we change the definition of competitive state to plus or minus five percentage points, the candidate with the higher *Winningness* is no longer the winning candidate. This reduced predictive power for the plus or minus five percentage point definition provides us with further justification for the choice made in the text to retain the B-K plus or minus three percentage point definition of what constitutes a competitive state.

We could also look at how a change in the definition of competitive state will change the various regression results mentioned in the text, but the results are not especially interesting. The changes are minor and parallel the insights we gain from analyzing results in Table A1, namely that going from a plus or minus 3 percentage point definition of competitive seat to a plus or minus 5 percentage point definition of competitive seat reduces the predictive accuracy of *Winningness*. See Table B2.

<< Table B2 about here >>

We should also note that this shift in the definition of what constitute a competitive state also reduces the predictive power of the *Non-competitive advantage* variable, but not substantially.[5] Moreover, it does not affect the relative predictive power of *Winningness* and

[5] For example, using the plus or minus five percent definition of competitive, the *Non-Competitive Advantage* bivariate regression has an R^2 of 0.92, as compared to 0.96 for the B-K definition.

Non-competitive advantage; the latter still does better at predicting seat share, while both apparently do equally well at predicting EC outcomes treated dichotomously. [6]

[6] Using the plus or minus five percent classification of competitive state, *Non-Competitive Advantage* accurately predicts 33/38 elections (the errors are the 1880 and 1960 elections --ones that are also mispredicted when using the ±3% competitive definition -- and the 1888, 1960, and 2016 elections); while *Winningness* incorrectly predicts between 4 and 6 elections using the plus or minus five percent classification. The reason for the "uncertainty" about the predictive power of the *Winningness* variable is that due to computational difficulties in calculating results across 2^k coalitions when k is large, we were unable to provide *Winningness* calculations for the plus or minus five percentage point definition of competitive seats for two years: 1960 (a year that *Non-Competitive Advantage* incorrectly predicts) and for 1976.

Table BI: Comparisons of Results for the Winningness, Vulnerability, and Fragility Variables for the Republicans for a Plus or Minus Three Percentage Point and a Plus or Minus Five Percentage Point Definition of Competitive State: 2000-2016

Year	Competitive States (ECvotes)		Winningness (Ratio)		Vulnerability (Ratio)		Fragility (Ratio)	
	±3	±5	±3	±5	±3	±5	±3	±5
2000	16 (178)	21 (221)	1.71	0.50	0.76	1.47	0.59	2.00
2004	12 (142)	20 (209)	2.64	2.9	0.61	0.55	0.38	0.35
2008	7 (102)	15 (159)	0	0		125.92		1187.27
2012	8 (114)	15 (193)	0.24	0.35	2.09	1.85	4.22	2.83
2016	12 (163)	16 (224)	1.03	0.31	0.99	1.89	0.97	3.22

NOTE: All ratios are REP over DEM, therefore when the ratio is 1, both candidates have the same number of winning coalitions among the competitive states.

Table B2: Regression Tables using the ± 5% Definition of Competitive

	Full Model		**Restricted Model**	
Non-Competitive Advantage	0.568*** (0.026)		0.696*** (0.067)	
Winningness		0.551*** (0.046)		0.432*** (0.055)
Constant	0.522*** (0.011)	0.255*** (0.031)	0.530*** (0.016)	0.333*** (0.032)
Restricted Model	NO	NO	YES	YES
N	38	36	24	22
Adjusted R^2	0.929	0.801	0.821	0.742
NOTE: Restricted models only include elections where at least one competitive state could change the result.				