RESEARCH NOTE

THE IMPACT OF ALTERNATIVE ELECTORAL COLLEGE RULES ON PRESIDENTIAL OUTCOMES: 1868-2016*

Jonathan R. Cervas

Bernard Grofman

Center for the Study of Democracy
School of Social Sciences
University of California, Irvine

Version 2

June 5, 2017 | 4:16 PM

*This research was supported by the Jack W. Peltason Chair, University of California, Irvine, held by the second-named author. The first-named author is a graduate student in the Department of Political Science at UCI.

ABSTRACT

Over the entire period 1868-2016, *we consider the implications for presidential outcomes of four proposed alternative versions of the Electoral College***,** *and we also examine the implications for the 2016 election of a proposal to increase the size of the U.S. House so as to increase the correspondence of EC outcomes with the popular vote (Ladewig and Jasinski, 2008). The results show that reversals from the popular vote happen under all proposed alternatives at nearly the same rate as the current Electoral College rules. Reversals are most likely to happen when the national vote is extremely close.*

"The Electoral College is a disaster for democracy"
– Donald Trump, November 6, 2012

"The Electoral College is actually genius in that it brings all states, including the smaller ones, into play."
– President Elect Donald Trump, November 15, 2016

After each presidential election, especially those where popular and Electoral College vote diverged, proposals to abolish the Electoral College (EC) are common. Yet, for many reasons, nothing happens. First, the winner of the previous election has little incentive to change the rules that elected him (see the Trump quotes above). Second, large states think that they benefit from the Electoral College because the winner-take-all rule makes their state more likely to be pivotal, while small states think they benefit from the Electoral College because of the two seat Senate "bonus".[1] Third, public opinion is closely divided (with a strong partisan split).[2] Fourth, the academic and journalistic

[1] Both sides are right. However, when we look at the likelihood that an individual voter in any given state will be pivotal (e.g., using game theoretic indices of pivotality such as the *Banzhaf index* (Banzhaf, 1965) or the *Shapley-Shubik* value (Shapley and Shubik, 1954; see also Shapley and Mann, 1962) as far back as Owen (1975) it has been recognized that these two effects -- greater large state pivotality and small state overrepresentation relative to population—tend in opposite directions, making the *a priori* "power" scores of individual votes to influence EC outcomes much more similar across states than one might think (see Gelman, Silver, and Edlin, 2012; cf. discussion in Grofman and Feld, 2005; Stromberg, 2008).

[2] In nearly every poll in the Roper Center for Public Opinion Research iPOLL data bank, the public is split about eliminating the Electoral Colleges, especially along partisan lines, albeit with majorities favoring a change to popular vote. After the bitterly fought 2000 election, 41% of Republicans would have amended the Constitution while 75% of Democratic respondents would have liked to see a change, with an overall support for change of 59% and with 3% of those polled with no opinion (Cable News Network, USA Today. Methodology: Conducted by Gallup Organization, December 15 - December 17, 2000. [USGALLUP.00DC15.R28]). After the even more bitterly fought 2016 election, Gallup asked again about the Electoral College, this time 49% choose the option to amend the Constitution (Gallup Poll 2016 [USGALLUP.120216.R01]. November 28-29, 2016). Again, there was a strong partisan split. Republican support of the current system significantly increased after the election. Gallup found that only 19% of Republican or leaning Republicans favor a system where the winner is the candidate that wins the popular vote (compared to 81% of their Democratic counterparts). In 2011, the numbers were 54% and 69%, respectably, who favored amended the Electoral College to a popular vote system. (http://www.gallup.com/poll/198917/americans-support-electoral-college-rises-sharply.aspx) Aldrich,

community is also divided, with those in opposition to change noting, *i.e.*, that proposed remedies have unknown qualities and are unlikely to cure problems such as a campaign focus on the larger states, and may bring new problems with them (e.g. party proliferation, and blackmail potential by minor parties now able to win pledged electors whose vote switches could determine a presidential election outcome) -- compare, for example, Ross (2012) and Edwards (2011).[3] Finally, after an election, attention quickly shifts to other more pressing issues.

While most of the current attention on Electoral College reform has been centered on the state compact to bind electors to vote for the national popular vote winner,[4] many other proposals for changing the EC have been proposed. In addition to the notion of a binding state compact, the most common proposals are to replace the present EC either with an election based on winning the national vote (though usually with a runoff rule if the plurality victory margin is not that large), or with a scheme that makes the EC allocation to the candidates in each state more proportional to each candidate's share of the statewide vote. Here we consider the consequences for election outcomes of four of the variants that have attracted the most traction, with particular attention to their implications for the 2016 election.[5]

The first of these sets an electoral college vote share equal to the size of the state's delegation in the U.S. House divided by the total number of seats in the House, i.e., an

Reifler and Munger (2014) have modeled the circumstances where we might expect changes in preferences about the desirability of the Electoral College.

[3] See also Grofman and Feld (2005).

[4] S.J. Res 28 1979; National Popular Vote Bill --enacted in 11 states.

[5] For a discussion of the downside of EC reform see e.g., Dewitt and Schwartz (2016). For issues of problematicity of the meaning of "popular vote" see Gaines (2001).

electoral college with the two seat Senate bonus removed.[6] The second sets the electoral college vote share as identical to the state's share of the national population, with fractional allocations to allow for (nearly) perfect proportionality, i.e., an electoral college that corrects for both House malapportionment and malapportionment due to the two seat Senate bonus. The third proposal is to create an electoral college that allocates its votes in a proportional way to the state's share of the present EC, rather than in terms of winner take all,[7] using the same proportional representation rule (the Hill method) as is presently used for apportioning seats to the states in the U.S. House of Representations.[8] We will refer to the first of these as a *U.S. House delegation* EC vote, the second as a *state-population proportional* vote, and last as an *EC proportional vote allocation*.[9] The fourth change to the present EC rules we discuss in this section is one in which EC votes are allocated, as they presently are in the states of Maine and Nebraska, by giving one seat for each House district won and possibly also a two-seat bonus for the candidate who wins the popular vote in the state.

In addition, in the subsequent section, we consider a fifth type of change, one based on the suggestion in Ladewig and Jasinski (2008) that the House size be decennially

[6] For the purposes of this calculation, Washington D.C. will still be counted for one EC vote in periods after 1960 despite not having a voting member of the House of Representatives. As per the twenty-third amendment, adopted in 1961, D.C. is allocated 3 Electoral College votes regardless of its population.

[7] Note that the first of these alternative electoral college vote allocation mechanisms do not affect the winner take all way in which electoral college votes from any state are allocated to candidates, while the other two measures do. What changes in the latter two approaches is that states assign a proportional number of seats based on population or EC seat shares.

[8] https://www.census.gov/library/publications/2000/dec/what-you-should-know.html

[9] Because seats to the U.S. House have been reallocated after each decennial census roughly on the basis of population, with the possible exception of 1920, we would expect that there should be little difference between the *state-population-weighted* EC vote, and the *U.S. House delegation*-weighted EC vote.

increased to reflect the cube root of U.S. population. Here the idea is that increasing the size of the House should increase the weight of the House seats in determining EC allocations, and thus increase the proportionality of EC outcomes, and thus make the EC vote look more like the popular vote.

PROPORTIONAL VERSUS WINNER-TAKE ALL EC RULES

We show in Table 1 four times series that provide information about the first three of the EC modifications we wish to consider: the first two columns are the proportion of the actual National Popular vote and the share of the actual EC seats won by the Democratic candidate, the third the *U.S. House delegation-weighted proportion*, the fourth the *population-weighted EC*, and the fifth the *proportional representation assigned EC share*. The differences between the Actual EC Outcome and the US House Weighed Outcome is the amount of partisan bias that enters from the two-seat bonus (column six of Table 1). Of course, we recognize that when we change the EC rules we also change the strategic incentives as to where to invest campaign resources, and such changes will almost certainly be reflected in differences in turnout, and potentially in difference in outcomes. Thus, we must interpret the results shown in Table 1 below as *ceteris paribus* ones.

<<Table 1 about here>>

There are number of interesting results shown in Table 1. First, when we take partisan effects into account, malapportionment effects, and especially the effects of the two-state bonus, are not that large. For example, in 2016, Donald Trump would have been

elected even had there been no two seat Senate bonus. As can be derived from the differences between column 1 and column 2 of Table 1, in only two elections in American history has the two-seat bonus feature of the Electoral College been decisive in reversing an election result. The first time this happened was in 1916 when it benefited the Democratic candidate, then again in 2000 when it benefited the Republican candidate. However, we would also observe that the over last seven elections the two-seat bonus has consistently favored the Republican candidate, even though it has not impacted on election outcome.

Second, while proportionality variants of EC allocations clearly can dramatically change the magnitude of seats outcomes relative to votes outcomes, it is only in the period from 1880 to 1900 that we see repeated evidence of changes in the presidential winner based on choice of a proportional as opposed to a winner-take-all rule, though of course, we also see this in 2000 and 2016.

Third, if we look to see when we get reversals under the various electoral college variants, we see the popular vote winner is nearly always the same as the other variants. 2016 is a notable exception to this, with the *House delegation-weighted* reverse of the Electoral College winner. As it turns out, the reversals that have happened have all benefited the Republican Party. But glancing through Table 1's first two columns will reveal several instances where *reversal* almost happened and, in these instances, the Democratic candidate would have been benefited, e.g., 1960.

AN EC BASED ON HOUSE DISTRICTS

Some have suggested the desirability of replacing the present EC rules with one based specifically on House seats (Hirsch, 2008). For Republicans, the desirability of change to a district based election systems stems from having majorities in the House of Representatives, combined with their disproportionate unified control of state legislatures that suggests an ability to expand their present advantage through further partisan gerrymandering in the next redistricting round. However, it is useful to view the impact of such a change in rules in historical perspective.

We have already looked at what would have happened, *ceteris paribus*, had the EC not had a two state Senate bonus, and at what would have happened, *ceteris paribus,* had votes been proportionally allocated by state rather than being awarded on a winner-take-all basis. We show in Table 2 a comparison of actual EC votes with what would happened, *ceteris paribus*, under House district based rules with and without a two-seat bonus for the statewide popular vote winner. For this series, we only include elections between 1956 and 2016.[10] To construct this analysis, we used of presidential results aggregated to congressional districts. If a candidate receives a majority of the two-party vote in that House district, we say that they win that elector. The table indicates the percent of the two-party electors the Democratic candidate wins. In the first set of results, shown in column 3, the majority winner of the state gets an additional two electors. It is, however, worth repeating that the effects of the various rules we consider are *ceteris paribus* ones.

[10] No official source maintains records for Congressional District level presidential returns, leaving it to interested parties to piece together data to obtain these results. The source of this data in our analysis come from Professor Brunell (University of Texas, Dallas) for the period from 1956-2008 and the internet site DailyKos.com for 2012 and 2016. Any errors in the data remain the responsibility of the present authors.

As President-elect Trump was aware, if you change the rules, you change the campaign strategies of the candidates.[11]

<<Table 2 about here>>

What we see in Table 2 is that in recent elections, apart from 2016, there is a significant benefit to the Republican Party in shifting to one of the House-based electoral college rules shown in that table in terms of EC seat share. In 2016, although Democrats would have fared better under an election using House districts with a two-seat bonus than under the actual EC rule, Donald Trump would still have won. Looking to reversals, we see that replacing the present rule with one allocating electors based on the results of Congressional Districts can change outcomes. In 1960, 1976, and 2012[12], for example, the outcomes would have been reversed (all three times benefiting the Republican candidate) if we allocated based on the results *within* Congressional Districts plus the plurality state winner getting two bonus seats. In 1976, however, not giving the two-seat bonus to the state plurality winner reverses yet again back to the actual winner, Jimmy Carter (i.e., benefits the Democratic candidate).

[11] In the same tweet in which President Trump said that the Electoral College was "genius", he also claimed that he would have won the popular vote if, rather than the present EC system, who won the popular vote decided who got elected president. Under that rule for deciding outcomes he said he would have campaigned in populous states that were being conceded to the Democrats under the present winner-take-all feature of the Electoral College.

[12] There is an especially large difference when allocating by Congressional District in 2012, due in no small part by the aggressive House gerrymandering that took place in the census before the election, mostly to the benefit of Republicans. (McGann et al 2016). Once incumbents are in place, who's election is in part or largely due to gerrymandering, since benefit from incumbency advantage reduces the vote shares of challengers, *ceteris paribus*, apparent partisan bias in subsequent elections may appear lower (Theodore Arrington, personal communication, February, 2017).

AN EC BASED ON AN EXPANDED HOUSE

Now we turn to the fifth variation on the present Electoral College rules that we consider. Ladewig and Jasinski (2008), drawing on ideas in Taagepera (1972), have proposed that the House size should be decennially adjusted to equal the cube root of U.S. population.[13] The cube root of the US population in 2010 was $\sqrt[3]{309{,}785{,}186} = 676$. Using this House size, a congressional seat's average size would be just 458,262 people. [14] As it turns out, this would have insured that, had Congressional size been increased in 2010 according to this formula, even the smallest state would have received at least one congressional seat *based solely on the state population*. How would Electoral College malapportionment and outcome effects change if we increased the size of the House to make the allocation rule in that body more nearly proportional to the population of the state by using the cube root of population to determine House size?

One way in which House size could matter is when a reversal actually happened, so the popular vote winner has lost the election. Under this circumstance, as the House size grows to approximate the population size, eventually the popular vote winner will also win the Electoral College. Recalculating the 2016 election for a House size of 676 (but now excluding the two bonus seats for each senator) yields Donald Trump 380 out of the 676 electors. Again, as with the current Electoral College and the version that simply omitted the bonus Senate based electors, Trump would still have won the White House if

[13] Taagepera (1972) argued that, for optimal communication purposes between representatives and those they represent, an assembly size should be the cube root of the polity's population.

[14]In addition to the work of Ladewig and Jasinski (2008), the effects on presidential outcomes under the EC of increasing/varying the size of the House have been studied by other authors (e.g., Neubauer and Zeitlin, 2003; Barthélémy, Martin and Piggins, 2014; Miller, 2014). Here we limit ourselves to consideration of results in 2016 under the cube-root proposal.

the House size were 676. In this EC rule, he wins by 84 electors. Although this is a larger number of seats, the EC is also larger. This margin increases to 12.4% of all electors in this system, compared to 6.8% in the current system. Trump won the plurality in the majority of states, so the same Trump victory occurs if we add in the two seat "federal bonus". In 2016, for House size to matter may require a House size so huge as to be unrealistic: the effects of increasing House size do not affect the outcome in 2016 for any House size under at least 800 (data omitted for space reasons).[15]

DISCUSSION

Using election results from the period 1868 to 2016, we have constructed four counterfactual variants on the Electoral College for the purpose of comparing the actual EC results with those from various proposed reforms. The results of these counterfactuals vary in their impacts; typically, the effect on reversal is small, using the popular vote as the *ceteris paribus* outcome of the aggregate national vote. That is, in most elections, the assorted reforms provide for winners consistent with the popular vote. In only three elections since the beginning of the 20th century have there been a reversal under any of the variants, with 1916 and 2016 reversing with the *U.S. House delegation* EC vote outcome, and in 2000 and 2016 the actual EC outcome being reversals from the popular vote.[16] The frequent reversals in the 19th century is primarily a feature of the closeness of the popular vote, with the largest victory garnering only 53.2% of the two-party vote**.**

[15] In 2000, in contrast, an increase in the size of the House could have mattered in that, in most House sizes starting above 493, including all of them above 655, the popular vote winner, Gore, would also have won the Electoral College (Neubauer and Zeitlin 2003).

[16] The 2016 U.S. House delegation outcome reversal is a result of distributional bias.

Presidential elections have seen four reversals in the modern political party era of American history. Proposals to modify the Electoral College include eliminating the Senate bonus, which is said to give small states and out-weighted advantage. This proposal would still have produced three reversals. The two proposals that would allow for a more proportional distribution of electors also both produce three reversals.

We also looked at the potential consequences of an alternative arrangement for selecting a president by allocating electors based on the Maine/Nebraska system, where the winner of each US House district gets one elector, and the plurality winner of the state getting a bonus two. This analysis only covers the period 1956 to the present, but it is clear that reversals are much more common under this system. Moreover, given current partisan political gerrymandering of US House districts, this supposed reform permits a new type of bias to enter into the selection of the President.

We also considered the implications of a proposal by Ladewig and Jasinski (2008) to increase the size of the House (and thus of the Electoral College) by picking a House size that was proportional to the cube root of population. Here we found that the election results in 2016 would have been unchanged, and only in 2000 would this proposal lead to a different electoral outcome.[17]

Given the amount of attention reformers give to amending the electoral rules, there is a strikingly limited effect of such changes on outcomes with only the proposal to shift to House district based allocations likely to have major impact – and that impact a pernicious one.

[17] There might have been an effect in 1876 but that is hard to assess. Differences between a cube-root based EC and the current EC are generally less than 1% and average just 0.3%.

Remarkably, too, under all the reforms that we considered, reversals from the national popular vote outcomes are still nearly as prevalent as they are in the current system.[18]

[18] The alternative systems we analyzed are counterfactuals based on an assumption of *ceteris paribus*, and any reasonable expectation would be that, to paraphrase Donald Trump, campaigns would create strategies to maximize their potential victories under the rules. Future work might identify these alternative rules and seek to re-estimate outcomes based on the differing incentives to campaigning imposed by each. But such a task, even if it is possible, is well beyond the scope of the present research note.

REFERENCES

Aldrich, John, Jason Reifler, and Michael C. Munger. 2014. "Sophisticated and Myopic? Citizen Preferences for Electoral College Reform. Public Choice 58:541–558.

Banzhaf, J. F. III. 1965. "Weighted Voting Doesn't Work: A Mathematical Analysis." Rutgers Law Review, 19: 317–343.

Barthélémy, F., Martin, M., Piggins, A., 2014. "The Architecture of the Electoral College, House Size Effects, and the Referendum Paradox." Electoral Studies 33: 111-118.

DeWitt, Darin and Thomas Schwartz. 2016. "A Calamitous Compact." PS: Political Science & Politics 49(4): 791-796/

Edwards, George C. III. 2011. Why the Electoral College Is Bad for America, 2nd Edition. Yale University Press.

Gaines, Brian J. 2001. "Popular Myths about Popular Vote-Electoral College Splits." PS: Political Science and Politics 34(1): 70-75.

Gelman, Andrew, Nate Silver, and Aaron Edlin. 2012. "What is the Probability that Your Vote will Make a Difference?" Economic Inquiry 50(2): 321-326.

Grofman, Bernard and Scott L. Feld. 2005. "Thinking About the Political Impacts of the Electoral College. Public Choice, 123:1-18.

Hirsch, Sam. 2008."Awarding Presidential Electors by Congressional District: Wrong for California, Wrong for the Nation." 106 Mich. Law Review. http://www.michiganlawreview.org/firstimpressions/vol106/hirsch.pdf.

Ladewig, Jeffrey W. and Matthew P. Jasinski. 2008. "On the Causes and Consequences of and Remedies for Interstate Malapportionment of the U.S. House of Representatives. Perspectives on Politics 6:1: 89-107.

Miller, Nicholas R. 2014. "The House Size Effect and the Referendum Paradox in U.S. Presidential Elections." Electoral Studies 35: 265–271.

Neubauer, M.G and J. Zeitlin. 2003. "Outcomes of Presidential Elections and the House Size." PS 36 (4): 721–725.

Owen, G. (1975). "Evaluation of a Presidential Election Game." American Political

Science Review 69, 947–953.

Ross, Tara. 2012. Enlightened Democracy: The Case for the Electoral College, 2nd Edition. World Ahead Publishing.

Shapley, Lloyd S. and Martin Shubik,. (1954). "A Method for Evaluating the Distribution of Power in a Committee System". American Political Science Review. 48(3): 787–792.

Shapley, Lloyd S., and Irwin Mann, 1962. "Values of Large Games, VI: Evaluating the Electoral College Exactly." RM-3158-PR. The RAND Corporation, May.

Strömberg, David. 2008. "How the Electoral College Influences Campaigns and Policy: The Probability of Being Florida." American Economic Review. 98(3):769–807.

Taagepera, Rein. 1972. "The size of national assemblies." Social Science Research 1(4): 385-401.

Table 1: Electoral Contest Seat Shares using Alternative EC Voting Rules

Year	Popular Vote	Actual Outcome	House Delegation-Weighted	State Population-Weighted	Proportional Representation	Two-Seat Bonus
1868	47.3%	27.5	28.4	47	46	-0.9
1872	44.1%	18	18.5	43.7	42.3	-0.5
1876	51.5%	**49.9**	51.2	51.4	51.2	-1.3
1880	49.9%	42.3	40.3	**50.9**	**50.4**	2
1884	50.3%	54.6	55.1	51.3	50.6	-0.5
1888	50.4%	**41.9**	**40.6**	52.2	52.4	1.3
1892	51.7%	61	63.2	52.1	52.3	-2.2
1896	47.8%	38.9	36.4	**50.4**	**50.3**	2.5
1900	46.8%	34.7	33.9	**50**	**50.3**	0.8
1904	40%	27.9	28.2	45.5	44.1	-0.3
1908	45.5%	32.3	31.7	49.5	49.5	0.6
1912	64.3%	95.7	96.1	67.5	70.4	-0.4
1916	51.6%	52	**49.7**	56.2	57.3	2.3
1920	36.1%	23.9	24.1	41	39.2	-0.2
1924	34.8%	25.6	25.7	40.6	38.8	-0.1
1928	41.2%	16.4	16.3	44	42.7	0.1
1932	59.1%	88.9	89.2	63.2	65.3	-0.3
1936	62.5%	98.5	99.1	66	68	-0.6
1940	55%	84.6	85.7	59.2	60.6	-1.1
1944	53.8%	81.4	82.8	57.5	58.9	-1.4
1948	52.4%	62.3	61.8	54	55.4	0.5
1952	44.5%	16.8	16.3	45.4	43.9	0.5
1956	42.2%	13.9	13.8	43.5	42.2	0.1
1960	50.1%	59	61.6	50.3	51	-2.6
1964	61.3%	90.3	90.8	59.6	61.5	-0.5
1968	49.6%	40.5	42.2	49.3	49.4	-1.7
1972	38.2%	3.2	3	37.4	35.1	0.2
1976	51.1%	55.2	57.1	51.1	50.9	-1.9
1980	44.7%	9.1	8	44.7	43.3	1.1
1984	40.8%	2.4	2.1	40.5	38.7	0.3
1988	46.1%	20.8	20.6	46	45.2	0.2
1992	53.5%	68.8	69.7	53.2	53.5	-0.9
1996	54.7%	70.4	72.2	54.5	54.6	-1.8
2000	50.3%	**49.6**	51.6	50	50.2	-2
2004	48.8%	46.8	48.6	48.4	48	-1.8
2008	53.7%	67.7	70.2	53.5	53.7	-2.5
2012	52%	61.7	63.8	51.5	50.9	-2.1
2016	51.1%	**43.3**	**43.8**	50.6	50.2	-0.5

NOTE: Popular vote values are given as the Democratic candidate's percent of total Electoral College two-party vote. Reversals from the National Popular Vote are in Bold.

Table 2: Electoral College Outcomes Under Congressional District Allocations: 1956-2016

Year	Actual Popular Vote	Actual EC	Two-Seat Bonus	Benefits	Congressional Only	Benefits
1956	42.2%	13.9%	22.7%	~ D	24.1%	~ D
1960	50.1%	59.0%	**47.5%**	~ R	**47.4%**	~ R
1964	61.3%	90.3%	85.7%	~ R	85.1%	~ R
1968	49.6%	40.5%	41.6%	~ D	43.6%	~ D
1972	38.2%	3.2%	11.9%	~ D	13.8%	~ D
1976	51.1%	55.2%	**49.9%**	~ R	50.6%	~ R
1980	44.7%	9.1%	26.6%	~ D	29.6%	~ D
1984	40.8%	2.4%	12.8%	~ D	14.9%	~ D
1988	46.1%	20.8%	29.9%	~ D	31.9%	~ D
1992	53.5%	68.8%	60.0%	~ R	58.9%	~ R
1996	54.7%	70.4%	64.1%	~ R	64.4%	~ R
2000	50.3%	**49.6%**	**45.0%**	~ R	**45.4%**	~ R
2004	48.8%	46.8%	41.1%	~ R	41.5%	~ R
2008	53.7%	67.7%	55.9%	~ R	55.7%	~ R
2012	52.0%	61.7%	**48.9%**	~ R	**47.9%**	~ R
2016	51.1%	**43.3%**	**46.1%**	~ D	**47.2%**	~ D

NOTE: Bolded entries represent reversals