The Electoral Advantage

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A. INTRODUCTION

In the 2016 presidential election, Donald Trump, a Republican, claimed rights to the presidency by defeating the Democratic candidate, Hillary Clinton, in the electoral college. Constitutionally, this race was decided correctly, as it is the case that whoever has the most electoral votes wins. However, this election is more complex and puzzling beyond the surface. In most elections, the winner of the electoral college also wins the popular vote, the count of individual votes amongst all participating voters in that election. But Donald Trump lost the popular vote by nearly three million votes. This is not the only case where something like this has happened. In the 2000 presidential election, Al Gore won the popular vote by over five hundred thousand votes, but inevitably lost to George W. Bush, who won the electoral college. Grover Cleveland in 1888 also won the popular vote but failed to obtain enough electoral votes to win the presidency.

The electoral college is a process that consists of 538 electors, a majority of which is needed to elect the president. Each state has two Senators and a number of Representatives based on their respective population, and the total number of Senators and Representatives is equal to the number of electoral votes that a state has. The District of Columbia is allocated three electors. When an election occurs, whichever candidate wins the popular vote within a state typically claims all of that state's electors. There are some exceptions in Maine and Nebraska, where the number of electors a candidate wins is proportional with the popular vote. Electors, who sit in the electoral college and are selected based on certain criteria, then cast their vote based on how their state decided to allocate their electoral votes, although they are not constitutionally required to do so.

These occurrences, while in the minority, are important to analyze, as it raises the question of whether the electoral college is an accurate metric for determining who the United States wants to be president and representing each member of the participating voting population fairly. It also raises the question of whether the electoral college can be hacked, using various campaign strategies, to win elections, even if the candidate deploying these strategies is not the overwhelming favorite.

What I will try to answer is whether the electoral college provides an unfair advantage to candidates of one particular political party. I will first introduce the initial reasons for introducing and implementing the electoral college in our presidential elections and formulate a hypothesis to the question I am trying to answer. I will then introduce the various methods that I will use to analyze data and determine whether my hypothesis is valid or invalid. I will provide data and analyze that data in deriving interpretations and answering certain questions, and then using all of this, arrive at a conclusion.

B. LITERATURE REVIEW

According to a Time article by Akhil Reed Amar, one reason for the inception of the electoral college was a desire to balance the interests of high-population and low-population states. Amar says that this is not necessarily a valid reason, as political divide starts within regions, such as the north and the south, and the coasts and the interior. A good example of this is California and Texas, two of the largest states in the country, the former being on the coast and a predominantly liberal state and the latter being in the interior and the south and a staunch conservative state.

Another reason listed by Amar is that most early Americans across the country would lack the necessary information to intelligently pick a presidential candidate. This is not necessarily the case now since there is an incredible presence of technology in the modern United States that

allows most Americans to conduct research on presidential candidates at will. Even early on, most presidential candidates' platforms were linked to local and state populations, giving all citizens a better idea of what each candidate stood for.

With this, I think that there is sufficient evidence to believe that the reasons for implementing a system are no longer applicable to modern society, but I think it is also important to analyze instances where the system itself was hacked or taken advantage of, which is what exactly Amar does in recounting the Three-Fifths Compromise. James Madison, who promoted the idea that the states should count their slaves towards their population as three-fifths of a person each, gave the electoral college a pro-slavery tilt that elevated Thomas Jefferson, from the southern state of Virginia, to the presidency. Including Thomas Jefferson's time in the White House, 32 of the first 36 years of the Constitution, the president was a white slaveholder from Virginia, a southern state. I believe that this account alone is sufficient enough to say that an advantage can be gained from the electoral college.

C. THEORY/HYPOTHESIS

As stated previously, I will seek to answer the question of whether the electoral college provides an unfair advantage to candidates of one particular party. Although more thorough analysis of data is needed, based on the results of these outlier elections, where a candidate wins the electoral vote but not the popular vote, I hypothesize that the electoral college unfairly benefits Republican presidential candidates.

D. METHODS

In answering my posed question, I will assess the validity, or lack thereof, of maintaining the electoral college in modern presidential elections. Primarily, I will assess the reasons for having

such a system provided by the Founding Fathers and see if they are applicable to modern society, while providing data and analysis to support my conclusions on those reasons.

In the following section, I will also provide voting demographic data in prior elections in order to analyze the differences in the power that each vote carries amongst the different states. More specifically, I will look at voting data for the presidential election of 2016, an outlier election, and, as a control, the presidential election of 2008, where the Democratic candidate won the popular vote and electoral vote. In particular, I will figure out which party has an advantage in the presidential elections by analyzing the metric, electoral votes per individual vote, in each state and by party and then determining which party typically wins the states that have skewed numbers for electoral votes per individual vote. In other words, in states where each individual vote has more power and influence on electoral votes, the party that has the advantage in the electoral college is dominant.

E. DATA

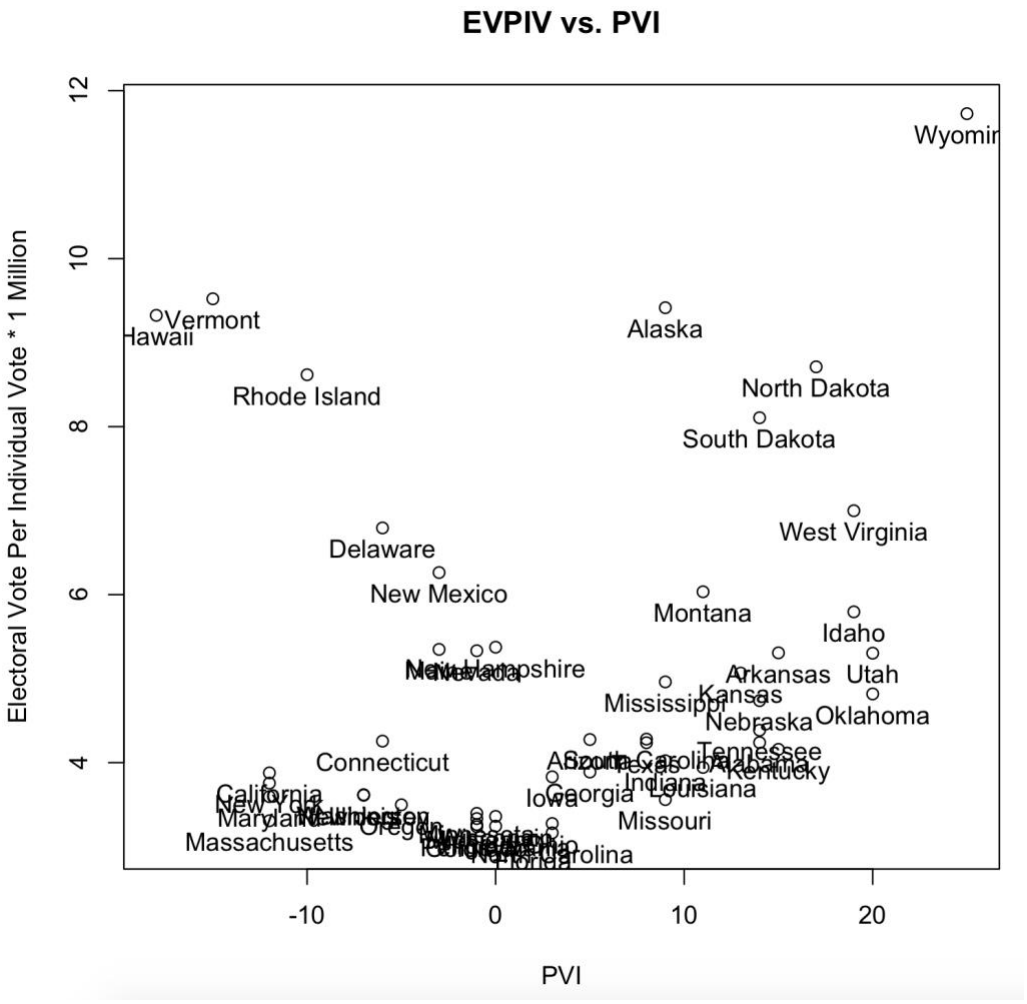
For the data, I collected a couple of metrics. For each state, I found data on the population estimates, the number of voters who participated in each election, the number of electoral votes, and the partisan voter index (PVI). Please note that because of my use of the PVI, I did not include the District of Columbia in this study. Also regarding PVI, a positive number is used to indicate a Republican state and a negative number is used to indicate a Democratic state. With this data, I calculated each states' electoral votes per individual vote metrics and multiplied each by one million for readability. I then plotted each states' electoral votes per individual vote metric against their respective PVI.

For the 2016 presidential election, where Donald Trump won the electoral vote but lost the popular vote by nearly three million votes, the data is as follows:

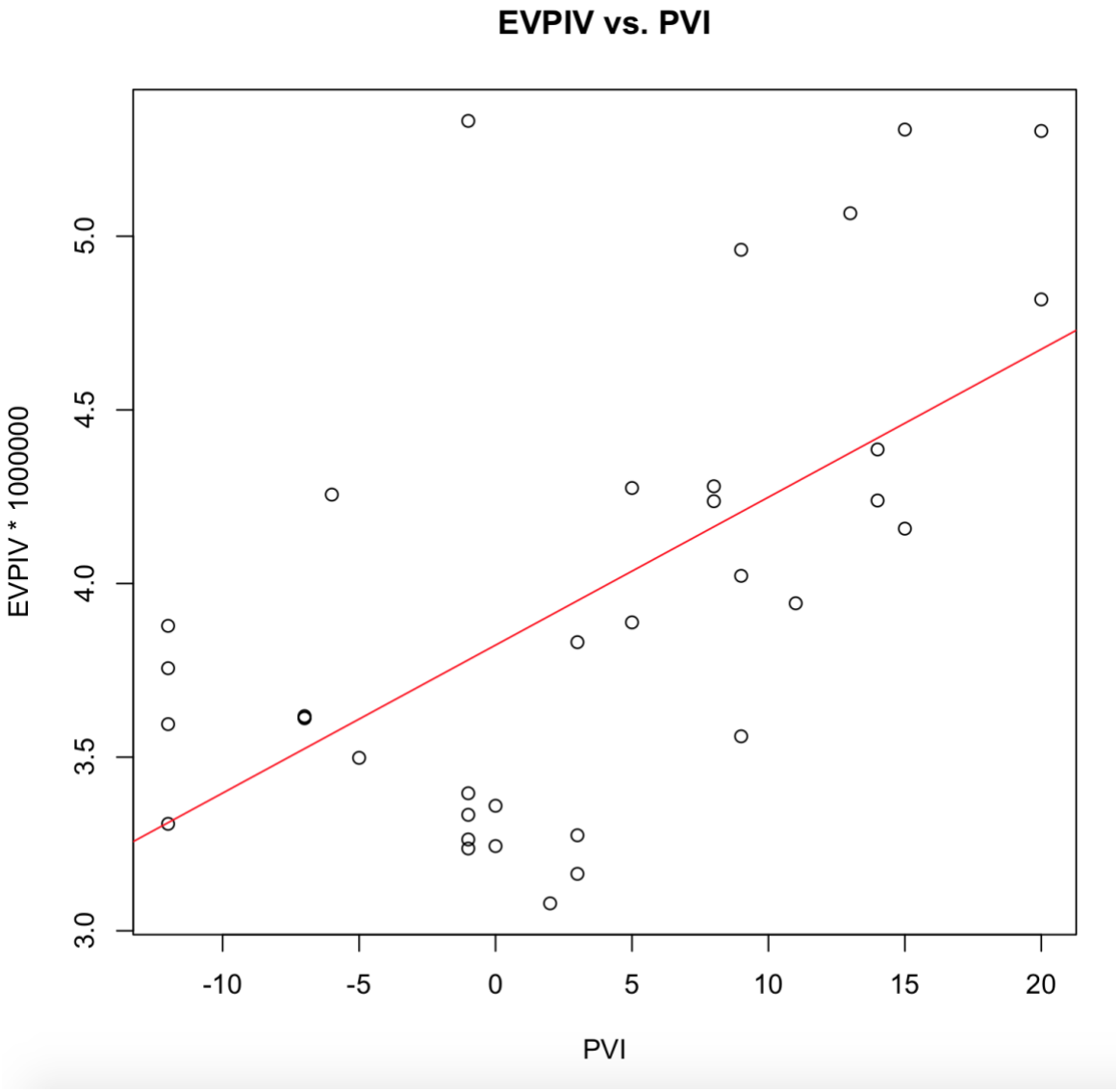
State	Population	# of Total Votes	Electoral Votes	(Electoral Votes / Individual Vote) * 1000000	Partisan Voter Index
Alabama	4,860,545	2123372	9	4.239	14
Alaska	741,522	318608	3	9.416	9
Arizona	6,908,642	2573165	11	4.275	5
Arkansas	2,988,231	1130635	6	5.307	15
California	39,296,476	14181595	55	3.878	-12
Colorado	5,530,105	2780247	9	3.237	-1
Connecticut	3,587,685	1644920	7	4.256	-6
Delaware	952,698	441590	3	6.794	-6
Florida	20,656,589	9420039	29	3.079	2
Georgia	10,313,620	4114732	16	3.888	5
Hawaii	1,428,683	428937	4	9.325	-18
Idaho	1,680,026	690255	4	5.795	19
Illinois	12,835,726	5536424	20	3.612	-7
Indiana	6,634,007	2734958	11	4.022	9
Iowa	3,130,869	1566031	6	3.831	3
Kansas	2,907,731	1184402	6	5.066	13
Kentucky	4,436,113	1924149	8	4.158	15
Louisiana	4,686,157	2029032	8	3.943	11
Maine	1,330,232	747927	4	5.348	-3
Maryland	6,024,752	2781446	10	3.595	-12
Massachusetts	6,823,721	3325046	11	3.308	-12
Michigan	9,933,445	4799284	16	3.334	-1
Minnesota	5,525,050	2944813	10	3.396	-1
Mississippi	2,985,415	1209357	6	4.961	9
Missouri	6,091,176	2808605	10	3.560	9
Montana	1,038,656	497147	3	6.034	11
Nebraska	1,907,603	844227	4	4.738	14
Nevada	2,939,254	1125385	6	5.332	-1
New Hampshire	1,335,015	744296	4	5.374	0
New Jersey	8,978,416	3874046	14	3.614	-7
New Mexico	2,085,432	798319	5	6.263	-3
New York	19,836,286	7721453	29	3.756	-12
North Carolina	10,156,689	4741564	15	3.164	3
North Dakota	755,548	344360	3	8.712	17

Ohio	11,622,554	5496487	18	3.275	3
Oklahoma	3,921,207	1452992	7	4.818	20
Oregon	4,085,989	2001336	7	3.498	-5
Pennsylvania	12,787,085	6165478	20	3.244	0
Rhode Island	1,057,566	464144	4	8.618	-10
South Carolina	4,959,822	2103027	9	4.280	8
South Dakota	861,542	370093	3	8.106	14
Tennessee	6,649,404	2508027	11	4.386	14
Texas	27,904,862	8969226	38	4.237	8
Utah	3,044,321	1131430	6	5.303	20
Vermont	623,354	315067	3	9.522	-15
Virginia	8,414,380	3984631	13	3.263	-1
Washington	7,280,934	3317019	12	3.618	-7
West Virginia	1,828,637	714423	5	6.999	19
Wisconsin	5,772,917	2976150	10	3.360	0
Wyoming	584,910	255849	3	11.726	25

The plot for this election is provided below:



Upon cursory analysis of the above plot, I removed the outlier states that had populations or voting participation of under one million and reconstructed the plot and best fit linear regression line below (correlation coefficient reported to be approximately 0.6):

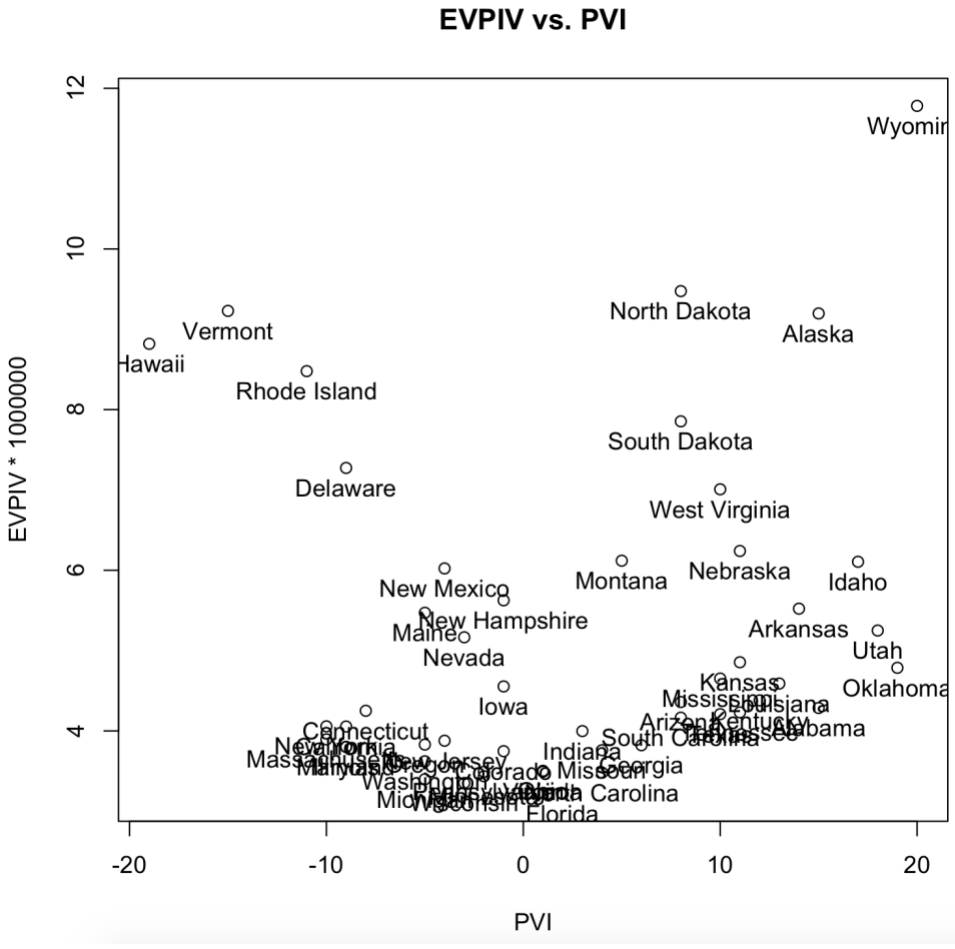


For the 2012 presidential election, where Barack Obama, a Democrat, won both votes, the data is as follows:

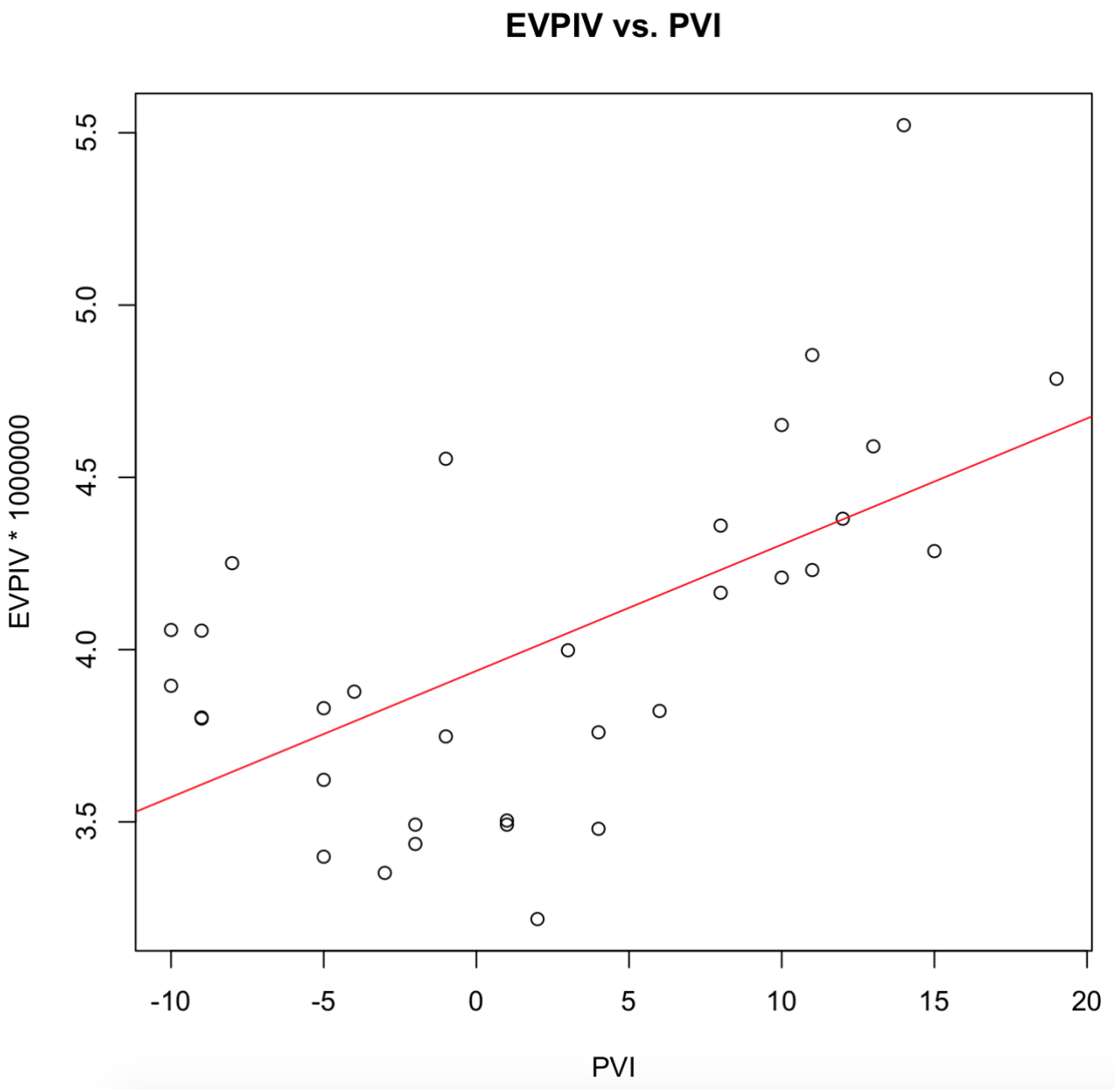
State	Population	# of Total Votes	Electoral Votes	(Electoral Votes / Individual Vote) * 1000000	Partisan Voter Index
Alabama	4,718,206	2099819	9	4.286	15
Alaska	687,455	326197	3	9.197	15
Arizona	6,280,362	2293475	10	4.360	8
Arkansas	2,874,554	1086617	6	5.522	14
California	36,604,337	13561900	55	4.055	-9
Colorado	4,889,730	2401462	9	3.748	-1
Connecticut	3,545,579	1646797	7	4.251	-8
Delaware	883,874	412412	3	7.274	-9
Florida	18,527,305	8390744	27	3.218	2
Georgia	9,504,843	3924486	15	3.822	6
Hawaii	1,332,213	453568	4	8.819	-19
Idaho	1,534,320	655122	4	6.106	17
Illinois	12,747,038	5522371	21	3.803	-9
Indiana	6,424,806	2751054	11	3.998	3
Iowa	3,016,734	1537123	7	4.554	-1
Kansas	2,808,076	1235872	6	4.855	11
Kentucky	4,289,878	1826620	8	4.380	12
Louisiana	4,435,586	1960761	9	4.590	13
Maine	1,330,509	731163	4	5.471	-5
Maryland	5,684,965	2631596	10	3.800	-9
Massachusetts	6,468,967	3080985	12	3.895	-10
Michigan	9,946,889	5001766	17	3.399	-5
Minnesota	5,247,018	2910369	10	3.436	-2
Mississippi	2,947,806	1289865	6	4.652	10
Missouri	5,923,916	2925205	11	3.760	4
Montana	976,415	490302	3	6.119	5
Nebraska	1,796,378	801281	5	6.240	11
Nevada	2,653,630	967848	5	5.166	-3
New Hampshire	1,315,906	710970	4	5.626	-1
New Jersey	8,711,090	3868237	15	3.878	-4
New Mexico	2,010,662	830158	5	6.023	-4
New York	19,212,436	7640931	31	4.057	-10
North Carolina	9,309,449	4310789	15	3.480	4
North Dakota	657,569	316621	3	9.475	8
Ohio	11,515,391	5708350	20	3.504	1
Oklahoma	3,668,976	1462661	7	4.786	19

Oregon	3,768,748	1827864	7	3.830	-5
Pennsylvania	12,612,285	6013272	21	3.492	-2
Rhode Island	1,055,003	471766	4	8.479	-11
South Carolina	4,528,996	1920969	8	4.165	8
South Dakota	799,124	381975	3	7.854	8
Tennessee	6,247,411	2599749	11	4.231	11
Texas	24,309,039	8077795	34	4.209	10
Utah	2,663,029	952370	5	5.250	18
Vermont	624,151	325046	3	9.229	-15
Virginia	7,833,496	3723260	13	3.492	1
Washington	6,562,231	3036878	11	3.622	-5
West Virginia	1,840,310	713451	5	7.008	10
Wisconsin	5,640,996	2983417	10	3.352	-3
Wyoming	546,043	254658	3	11.781	20

The plot for this election is provided below:



Similarly, upon cursory analysis of this plot for the 2008 presidential elections, I decided to remove states with populations or voting participation of under one million people from the dataset and construct a new plot with a best fit linear regression line, provided below (correlation coefficient was again reported to be approximately 0.6):



F. ANALYSIS AND INTERPRETATION OF RESULTS

Upon initial analysis of the data for the 2016 presidential election, there is no clear correlation between PVI and electoral vote per individual vote metrics. What is interesting about this data is that most of the outliers, like Vermont, Alaska, Delaware, North Dakota, South Dakota, and Wyoming, have populations of under one million people. In addition, other outliers, like Idaho, Maine, Montana, Nebraska, Rhode Island, and West Virginia, had less than one million people from their state vote in the 2016 presidential election. I took these outlier states out of the data set and reconstructed the plot and added a best fit linear regression line, which showed a weak (but much stronger than before), positive, linear relationship between PVI and a higher electoral vote per individual vote metric. In other words, as PVI in the state becomes more Republican, the higher the state's electoral vote per individual vote metric. The correlation coefficient of this relationship was reported to be approximately 0.6, the highest possible correlation coefficient being 1.0.

Again, upon initial analysis of the data for the 2008 presidential election, there is no clear correlation between PVI and electoral vote per individual vote metrics. But following the additional steps that I took with the 2016 presidential election, I received similar data. The plot excluding states with populations or voting participation of under one million people indicated that there was a weak (but much stronger than before), positive, linear relationship between PVI and a higher electoral vote per individual vote metric, reinforcing the initial analysis of the 2016 presidential election. The correlation coefficient of this relationship was again reported to be approximately 0.6.

The scope of this analysis is limited in that only two elections were selected for analysis, and there are only so many elections to analyze. A more thorough analysis would include tests on all presidential elections, and an analysis on electoral vote per individual vote metrics would be

conducted to see how those metrics change across states over time. This more detailed analysis would encounter several issues. For example, PVI is a metric that was only very recently introduced and used in data analysis on elections. Data for votes cast in every state for some of the earliest elections may not be readily available or accessible either. Because of these issues and because the greater implication is whether the electoral college is applicable and fair in modern society, a more detailed analysis would conduct this test among all modern elections to see if there are consistent trends in the analyzed metrics.

G. CONCLUSIONS

Overall, there is strong evidence, based on the data provided, to suggest that Republican presidential candidates have an advantage in the electoral college. Via a basic review of the initial reasons for the inception of the electoral college, it was found that many of the reasons are no longer necessarily valid in modern society and that there are instances in United States history where the electoral college was essentially hacked, providing an advantage to a specific party.

In terms of modern elections, both elections, where the victor lost the popular vote but won the electoral vote, were won by Republicans, and based on this, my hypothesis was that Republicans have an advantage because of the electoral college. The data I provided and the analysis done on the data do not contradict this. In 2016, Donald Trump would have lost the presidential election by nearly three million votes if presidential elections were decided by the popular vote. Instead, he benefited from the electoral college, where there was a positive correlation between a state leaning more Republican and a higher electoral vote per individual vote metric. The same thing can be seen in the 2008 election, where Barack Obama, a Democrat won both the electoral college and the popular vote. States learning more Republican had higher electoral vote per individual vote metrics, and the Republican presidential candidate, despite

losing, had a significant advantage. In 2008, it is feasible to say that one vote for Barack Obama had less weight and less value than one vote for John McCain, the Republican presidential candidate.

I recognize that the correlation coefficient identified for both elections, was only approximately 0.6, but it is clear to see that there is a positive correlation to suggest that Republican states carry more weight in elections and electoral votes and that Republican presidential candidates, as a result, gain an advantage. I also recognize that more should be done before arriving at a definitive conclusion. However, the electoral college has great implications on our democracy in ensuring all votes are heard for deciding who will assume arguably the most important position in our democracy after every election. The electoral college has been the system in deciding elections since the drafting of the Constitution, but like most things, the United States government must adapt to a changing and evolving landscape to ensure that every voice and vote is heard. My analysis has revealed significant issues in the system, and a more thorough analysis will confirm these issues and will hopefully incite change to our archaic and ineffective presidential election system.

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