Factor Analysis of Rust Belt and Southern Senate Elections

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INTRODUCTION

Political science research has traditionally focused on Presidential and House elections. While some research has focused on Senate elections, much of it is outdated Abramowitz (1988), only analyzes one factor Swearingen (2014, 2017; Green, 1988), and none use statistical models with multivariable analyses or interaction between independent variables. This paper is intended to fill these voids, and to also take further what past research has determined for Senate elections, to account for state by state variations in the dynamics of Senate elections.

Most research on Senate elections agrees that the factors of incumbency and fundraising are the primary determinants in elections when the partisan lean is mostly equal or accounted for. However, the level of these effects and how they should be tested has been debated by many. For example, Jacobson argued that fundraising should be compared separately for challengers and incumbent candidates. Green, on the other hand, believed that it was necessary to show the importance and significant advantages that come with being an incumbent candidate by not blocking for incumbency. The factors are also heavily ingrained in each other, so while multivariate analysis would help determine the strongest factors, it is rare to find data sets that allow for interaction analysis, or even models that return significant in both factors. This is commonly seen in incumbent and fundraising models as incumbent candidates typically heavily outraise their challenger. The incumbent candidate and the candidate who raises more money typically wins with 80% or higher rates, so which factor explains the victory? These are questions that have been debated for decades, and with new factors including social media and shifting political environments show that there is still much to learn about Senate elections.

This research was conducted to analyze the factors of incumbency, fundraising, a state's partisan leaning, party control of presidency, and unemployment on Senate elections in two defined regions. It also includes multivariate analyses to determine the potential interaction effects between variables and to decide which variables have the greatest effect on these elections. For the purpose of this paper, this analysis is limited to six rustbelt states (PA, OH, IL, IN, WI, MI) and six Southern states (LA, AL, AR, MI, SC, GA). This allowed me to focus on exploring the dynamics of Senate elections. It also allowed me to explore important regional differences, specifically, the impact of party control and influence in the regions.

LITERATURE REVIEW

Previous research reveals that campaign spending and fundraising are the most common factors in determining the outcome of Senate elections. A 1978 paper by Jacobson explored the effects of campaign spending in congressional elections. Jacobson (1978) argues that money spent by challenger candidates had a larger effect on voting turnout than money spent by incumbent candidates. This information came at the start of the implementation of the Federal Elections Commission (FEC), which made analyzing fundraising and money spent much easier in more modern times. However, current researchers have not used this wealth of data to make a thorough examination into the difference between funds raised and funds spent by candidates. This research compares the effects that the two factors have on the percentage of the vote that a candidate earns and determines which factor is more effective.

Research by Abramowitz (1988) attempts to explain Senate election outcomes by incorporating variables unique to a state, a candidate, or national political conditions and finds that the most important variables were how a candidate matched a sate's partisan lean, as well as how much money the challenger raised. For open seat elections, fundraising again played a strong role in determining the election outcome. This paper attempts to analyze variables similarly across several dimensions (fundraising, incumbency, partisan lean, party control of the White House, economic factors, and multivariate analysis) to analyze and understand the complexity of Senate elections. However, in addition to analyzing individual states, I analyzed two distinct defined regions with different properties to see if there was a regional effect. This would also allow for a larger sample size, while still preventing lurking variables that would come in from using the whole country which is diverse and very different.

Building on Jacobson's findings about Senate elections in the 1970s and 1980s, Green and Krasno (1990) attempted to correct Jacobson's underestimation of the effect of campaign finances on Senate elections. They conclude that fundraising and money spent may have a larger effect than other factors. In a similar paper, Carson et al. (2007) describe the complicated factor of incumbency and how it interacts with other variables, including fundraising. This paper was instrumental in leading me to conduct interaction analysis and to attempt to determine which variables truly matter. There is an extreme overlap between incumbent candidates and those who outspend their opponents. Both of these factors lead to high win rates and large vote differences.

This paper looks to further the understanding of how these variables interact with each other. It also explains regional differences in Senate elections between the group of Southern states which are defined by a high degree or partisanship vs. Rustbelt states with significantly lower levels of partisanship. This comparison will shed light on the impact of different levels of partisanship on of the outcome of Senate elections. 90% of voters reportedly vote for their party identification (Hernnson and Curry 2011). In summation, this paper takes a statistical approach to analyzing the impact of incumbency, fundraising, partisan lean, how long a party controlled the presidency, and unemployment in two different regions of the country for Senate elections.

The hypothesis formulated prior to running the analysis was that Senate elections in the Rust Belt region would be more influenced by non-partisan factors as that region is less politically slanted than the South by a considerable margin as found by Pew Research (2018). Thus, elections would be determined more by factors including incumbency, fundraising levels, and unemployment numbers. The South was thought likely to continue to show a high incumbency effect size as the state would keep reelecting the candidates of the Republican party. The Rust Belt, as a whole, would not see this, as the region is more evenly split between Democrats and Republican voters.

Research listed in this literature review has reached a consensus that the factors of incumbency and fundraising have been shown to have a positive correlation and effect on the outcome of House and Senate elections. However, these factors are heavily intertwined and still rely on others such as party and likability. To combat a complex problem in determining each of these complex variables' effect on winning Senate elections, statistical analysis will be run to determine the effect sizes in both single variable and multivariate analysis. There was also analysis on some independent variables' effect on the other independent variables to determine where the true answer lies.

METHOD

The original plan was to analyze all 50 states for the variables of incumbency, fundraising, partisanship, and economic factors. However, due to time constraints, the analysis was restricted to six Rustbelt and six Southern states. The Rustbelt states that were chosen (Pennsylvania, Ohio,

Wisconsin, Michigan, Illinois, Indiana) share the common denominator of a decline in manufacturing jobs from 1950-1980 and a lack of economic growth and development shown by Ohanian (2014). These states have also all consistently lost electoral college power since the 1960s due to shifting population. Finally, each of these states is characterized by a high level of their population living in rural areas, thus explaining why New York was not included by Census.gov.

The second region selected was the Deep South, for which I chose the states of Arkansas, Louisiana, Alabama, Mississippi, Georgia, and South Carolina. This region is defined by high poverty rates, low education rankings, low income levels, and high minority percentages of the states' populations as found in "Top 10 Poorest States in the U.S" (2019), InfoPlease (2017), Ziegler (2016), and Maciag (2015).

Candidate performance was measured by collecting data on the percentages of votes earned by the two major candidates who competed in the election. Using total votes would require blocking for election type due to more citizens voting in presidential elections than midterm elections. This would then reduce the sample size of each test and consequently reduce the power of the analysis. With choosing percentage of the vote a candidate earns, this issue is ignored. However, this does not account for voter turnout, as there is often a significant change in voter turnout from one election to another of the same type as reported by Fair Vote (2018).. In the end, the decision was to use percentage of the vote as the dependent variable. This also accounts for the impact of independent, third party candidates because this variable measures the main candidate's percentage of the vote earned between all candidates instead of just the two main ones.

While the FEC was created in 1974 requiring all candidates to report fundraising and funds spent to the commission, there are omissions from the records prior to 1980. Thus, the analysis starts with the 1980 election to avoid the missing data points.

Incumbency: As discussed earlier, the factor of incumbency has been heavily tracked and analyzed. However, its total effect is still unknown as the factor is complex and interacts with other factors used for the analysis of elections. The unique approach this research takes, is not only to examine the independent variables' effect on the percentage of the vote earned, but also

to analyze the independent variables' effect on the other independent variables included in the model. Some examples include how length of incumbency affects the fundraising capabilities of a candidate, or if a long-term incumbent candidate is less effected by poor economic numbers than one who is a first term incumbent. The analysis I conducted to assess the impact of the incumbency variable excluded elections involving no incumbent candidates, thus reducing the sample size for those tests. However, this was important as otherwise the data would be skewed by some candidates competing against other non-incumbent candidates. It was paramount to see the true relation between incumbent and challenger candidates.

Fundraising: Analysis of the effect of fundraising and funds spent has been done for all types of elections in the United States. This research included both forms of fundraising and funds spent and analyzed both the qualitative and quantitative forms of these factors to determine their effect on the candidate's percentage of the vote. It also was done to see if there are differences in the predictive power of these two variables. Are funds raised a better indication of election success than funds spent? Do they have similar regression equations? Fundraising numbers for previous elections were adjusted due to inflation using a CPI calculator to 2018 numbers.

Candidates who raised more money early on were often given front runner status, thus leading to them receiving even more funds and media attention. Thus, this variable is complex and not to be seen as a simple one sum against another. This variable is also heavily intertwined with the factor of incumbency, as the incumbent candidate almost always outraised and outspent the challenger.

Economic Factors: Due to time constraints, state unemployment percentages were chosen to represent economic factors in the models. Unemployment numbers, while having many forms and being a complex factor, have been used throughout political science research to attempt to determine the impact of economic conditions on elections. Unemployment was chosen over other factors including GDP, inflation, and stock market performance, as it more directly affects all citizens and is often taken as a shortcut for overall economic performance in addition to being more easily understood by the population.

The Unemployment variable was operationalized as the percentage of unemployment at the time of election. This factor was not used numerically, as candidates would be given the same value.

For example, Arkansas had 8.2% unemployment in 1980. Thus, both the Democratic incumbent and Republican challenger would be given a value of 8.2. Even giving one of the candidates a negative version of the same number would fail as a low unemployment number is great for an incumbent, but logic would dictate that to be a disadvantage for the challenger. The inverse is true for a high percentage of unemployment. Thus, simply giving one candidate a negative number and the other the positive version of the unemployment percentage failed to show anything meaningful or useful. Thus, the only way to create a usable form, was to create a categorical version of the factor. This circumnavigates the issue of the quantitative form, as there is a logical flow to the factor levels. As unemployment increases, the rating becomes worse for the incumbent candidate but better for the challenger, and vice versa. There were five ratings for a candidate to have: great, good, average, bad, and poor. "Great" unemployment ratings were given to incumbent candidates with an unemployment rating of 0-4%. "Good" was for 4-5%, 5-7% was "average", 7-8% was listed as "bad", and 8%+ was "poor". The challenger candidate was given the inverse rating. Thus, poor rating for the challenger if the incumbent was rated great, and both would be average if that rating amount was present.

Partisan Leaning: This measure assessed how effective a party is at winning elections in a given state or region. As stated earlier, the states in the Rust Belt region display about even performances of the two parties. In contrast, the South has become increasingly Republican since the 1990s. While the Rust Belt as a whole is mostly split, the states of Indiana, Pennsylvania, and Ohio have favored Republican candidates, while Illinois, Michigan, and Wisconsin have been leaning more toward Democrats This variable was measured qualitatively by assigning each candidate to their respective party, Democrat and Republican. Then, analysis was run comparing this factor with the dependent variable of percentage of vote earned.

Party controlling White House: Similar to previous research by Ansolabehere et al. (2001), this research also accounts for the potential impact of party control of the White House. Voters may have a potential bias in terms of basing their vote for a senator on their assessment of the candidate's party in the previous years. For example, going into the 1992 election, Republicans had controlled the presidency for the previous twelve years. Thus, voters may decide they want more of the same, and others may want a switch of party. With the increase of down ballot voting, this can either directly or indirectly affect a Senate candidate's chances of winning. As

with the other factors, this was measured in a qualitative and quantitative form. Again, for 1992, a democratic challenger would have a value of 12, while a Republican incumbent would have a value of -12. Races not involving an incumbent were not included as they may not be as associated with the political party.

The voting count data and fundraising and funds spent numbers were retrieved from the official government website USA.gov and the Federal election commission site. Then, by using a cpi calculator, the fundraising and funds spent amounts were adjusted up to fiscal year 2018. Unemployment numbers were taken from the Federal Reserve of Economic Data website.

Dependent Variable: The dependent variable, vote counts for each election, was taken from USA Gov. The fundraising numbers were taken from the FEC and cross checked at opensecrets.org. However, there were several omitted entries, and several that did not match. These were all from the first couple years of campaign finance law, and it is possible leeway was given to those who failed to properly submit their information or numbers. When data points did not match, the officially reported Government site's numbers were used. When no points were present, that candidate was removed from analysis for fundraising but kept for other tests involving non-related factors. The unemployment numbers were taken from the Bureau of Labor Statistics. Once all the data pertaining to the variables was recorded in excel spreadsheets, the data was transferred to Minitab.

The analyses were first performed for the Rust Belt region, and then were repeated for the Southern states. Individual states in the Rust Belt were first analyzed with Anova and regression analysis for the following tests: differences in voting levels between election types, partisan lean, qualitative and quantitative forms of analysis of the factors of incumbency, fundraising and funds spent, how long a candidate's party controlled the white house, and unemployment. This allowed for an in-depth look at the correlation and effect size between the individual factors and the dependent variable percentages of the vote earned. While achieving high p-values is seen as desirable, it is not as strong of an indicator of a factor's importance when compared to effect sizes. High p-values can be manipulated easily through increasing sample size and masking a small effect on the dependent variable. After the single variable analyses were completed, multivariate analyses were run for factors that returned statistically significant and with a sizable R-squared adjusted value when run through single variable Anova analysis. Once the

multivariate analyses were completed, the best models for that state were noted, as well as the effect size, p-value, and R-squared adjusted of each individual factor's results. Once one state was complete, another was run through this process until all six states from the region were done. Then, the Rust Belt region with all data points from the states was analyzed in a similar fashion. This shows the trend for the region as a whole, as well as increases the sample size, which increases the reliability of the tests and its results. However, seeing the differences from each individual state was important, as well as to notice outlier points that would have been increasingly difficult to find when running a combined analysis. The importance of finding outlier points is important when determining the test's results of the population. Again, the results from analyzing the Rust Belt region were recorded, and then this entire process was repeated in the South.

RESULTS

Incumbency: Incumbency in both quantitative (number of years as incumbent) and qualitative (simple incumbent/non-incumbent) forms, was the strongest performing variable for both regions. As can be seen in table 1 and Table 2 on the next page, each state returned a statistically significant effect between the factor of incumbency in both quantitative and qualitative forms. In the Rust Belt region, incumbents won 80.44% of elections they partook in. They outperformed challenger candidates by an average margin of 15.52%. The qualitative form showed an R-squared adjusted of 47.04%, and a p-value of 0.000. The quantitative form, while weaker with a R-squared adjusted of 41.9%, and a p-value of 0.000, still shows a strong relationship between the factor of length of incumbency and percentage of the vote a candidate earned. Third term senators attempting to earn reelection to a fourth term performed worse than the mean incumbent candidate. They won reelection in seven of eleven attempts, and only earned 54.62% of the vote on average. This could be due to being part of a smaller sample, a coincidence, or that the candidates faced stronger opponents. It is also possible that voters are more likely to desire political change after an incumbent has been in office for long periods of time. However, incumbent candidates with fewer years of experience performed around the mean level with an 86.21% for first term incumbents, and an 81.25%-win rate for second term incumbent

candidates. The six candidates having four or more terms of experience, won every election by significant margins.

TABLE 1: The impact of incumbency on Senate elections in six rust belt states.

Incumbent adv	Incumbent win percentage	Percent Difference	P-value	R^2 adj
IL***	62.50%	14.25%	0.011	33.21%
WI	75.00%	10.63%	0.001	35.25%
IN	80.00%	25.29%	0.001	45.80%
PA	83.33%	9.82%	0.002	33.18%
OH	90.90%	16.11%	0.000	56.62%
MI	90.90%	15.56%	0.000	75.47%
RB compiled	**80.44%**	**15.52%**	**0.000**	**47.04%**

The effect of incumbency was very similar in the Southern Region. Qualitative analysis revealed an 84.38%-win rate, with incumbent candidates earning an average of 25.78% more of the vote than a challenging candidate. While the average margin of victory is significantly higher, the win rate, a p-value and R^-squared shows a similar effect size to what the Rust Belt region has.

TABLE 2: Shows the impact of the incumbent variable in the Southern Region.

Incumbent adv	Incumbent win percentage	Percent Difference	P-value	R^2 adj
Mississippi	100%	38.29%	0.000	67.30%
Louisiana	88.89%	27.05%	0.005	36.08%
Arkansas	72.73%	22.04%	0.013	23.68%
Alabama (non normal)	81.82%	26.70%	0.004	---
Georgia	60%	18.23%	0.032	18.75%
South Carolina	100%	22.16%	0.000	74.88%
South Compiled	**84.38%**	**25.78%**	**0.000**	**42.33%**

The quantitative analysis shown in table 2 was also similar to the Rust Belt region. With a p-value of 0.000, and an R-squared of 42.6%, this analysis was similar to the pattern found in the Rust Belt region. The individual analyses of each factor level of incumbency was more consistent in terms of margin of victory and win rates in the South region than the Rust Belt. There were more elections involving higher factor levels (older incumbents) to explain this difference.

Partisan Lean: The Rust Belt region has been consistently moderate as a region since 1980, but includes states that lean toward a political party.

TABLE 3: Shows the Partisan variable effect for the Rust Belt for the full-time length.

Party	Wins	percent difference	P-value	R^2 adj
OH	8D 6R	R 0.88%	0.842	0.00%
PA	3D 11R	R 5.92%	0.040	11.98%
IN	3D 11R	R 15.76%	0.008	21.31%
WI	10D 4R	D 9.71%	0.001	34.08%
MI	12D 1R	D 13.73%	0.000	63.98%
IL	11D 2R	D 17.56%	0.000	58.14%
Total	47D 35R	(adj) D 3.07%	0.086	1.22%

Overall, Democrats have outperformed Republicans in the Rust Belt region by winning 57.32% of elections and by outperforming Republicans by 3.07% in the region when adjusted for population sizes. This is extremely low when compared to other regions (Political Partisanship 2010) and with an R-squared value of only 1.22%, this factor shows no importance to defining electoral outcomes in the region. As shown in Table 3, individual states have moderate sized leanings. The difference between the rust belt and the South, as well as many other regions is that, even though the Rust Belt has been defined by manufacturing job loss among other variables, both parties have found success, though they have done so in separate parts of that region.

TABLE 4: Shows the Partisan variable's effect since 1994 for the Rust Belt region.

party since 1994	Wins	percent difference	P-value	R^2 adj
OH	3D 6R	R 10.22%	0.011	30.04%

				R-sq. adj
PA	3D 6R	R 1.17%	0.717	0.00%
IN	3D 6R	R 14.43%	0.106	0.00%
WI	7D 2R	D 11.2%	0.003	38.75%
MI	8D 1R	D 13.2%	0.000	55.77%
IL	6D 2R	D 17.67%	0.001	52.31%
Total	30D 23R	D 2.43%	0.333	0.00%

Also, unlike the South, the Rust Belt has maintained their bi-partisan distribution of senators as similar effect sizes and win rates are shown in Table 4 above when the analysis is run from 1994 and on.

TABLE 5: Showing the Partisan effect in the Southern Region since 1980.

Party (since 1980)	wins	percent difference	p-value	R-sq. adj
Mississippi	12R 1D	R 31.57%	0.000	48.43%
Louisiana	4R 9D	D 14.1%	0.049	11.64%
Arkansas	4R 9D	D 16.78%	0.028	15.13%
Alabama	9R 4D	R 14.89%	0.033	14.10%
Georgia	9R 4D	D 5.78%	0.403	2.93%
South Carolina	9R 4D	R 8.21%	0.083	8.34%
Total	47R 31D	R 2.99%	0.302	0.05%

The six Southern states have fared similarly to the Rust Belt region when analyzed from 1980. Individual states may have partisan lean, but the region as a whole has been almost equally divided, with Republicans earning 2.99% more of the vote on average than their Democratic rivals. Republicans won 60.26% of these elections. However, a resounding change is made if the start date for the analysis is changed to 1994 or more recent years.

TABLE 6: Showing the Partisan effect in the Southern Region since 1980.

Party (since 1994)	wins	percent difference	p-value	R-sq. adj
Mississippi	9R 0D	R 34.35%	0.000	72.73%
Louisiana	4R 4D	D 2.02%	0.648	0.00%
Arkansas	4R 4D	D 5.6%	0.520	0.00%
Alabama	8R 0D	R 33.8%	0.000	61.48%
Georgia	7R 1D	R 9.31%	0.000	62.84%
South Carolina	7R 1D	R 13.93%	0.000	56.25%
Total	39R 10D	R 15.04%	0.000	25.14%

As shown above in Table 6, Republicans have dominated this region of the South, holding a 15.04% advantage, and only having a slight disadvantage in Louisiana and Alabama. To show the dominance by Republicans even further, those are the only states in the region that do not return statistically significant results. All four of the states in which Republicans have outperformed their counterparts are statistically significant and have R-squared values of over 55%. To analyze from an even more recent era, a Republican has not lost an election in this region since 2008. So, while both regions are similar in group and individual state analysis from 1980 and on, the South has undergone a partisan transformation into a bastion of Republican dominance. The Rust Belt, however, has remained a neutral region regardless of time period.

Fundraising and funds spent: The fundraising factor consistently outperformed the funds spent variant in terms of R^sq values by an average of 8.32% in the Rust Belt states. The Rust Belt region had statistically equal fundraising in midterm and presidential elections, as well as a quadratic model defining the relationship between fundraising amounts and percentage of the vote earned. Essentially, this means that, while candidates would receive more votes when gaining or spending more funds, they would see diminished returns and eventually lose votes if the amount of fundraising or funds spent became too high. This was seen in several states where candidates with the highest levels of fundraising often underperformed compared to candidates who raised a high amount of money, but less than those who over raised. The R-squared adjusted

values are all similar to their respective state's incumbent R-squared values, further testing has shown an incredible overlap between fundraising and if a candidate is an incumbent. This shows that the factor of incumbency is a great predeterminant of whether a candidate will receive a significant amount of fundraising. This raises the likely point that it is more desirable or beneficial to be an incumbent candidate, as it will likely also lead to that candidate outraising their opponent.

TABLE 7: How strong the Fundraising Variable was in the Rust Belt Region.

Fundraising	p-value	R^2 adj
IL	0.002	35.50%
WI	0.010	30.30%
IN	0.000	53.10%
PA	0.010	26.90%
OH	0.045	15.70%
MI	0.002	37.70%

Table 8 below shows that the Southern region was very similar to the Rust Belt states in terms of R-squared values. Most states had statistically equal levels of fundraising and again a quadratic relationship between fundraising and percentage of the vote earned. However, there were more differences and minor issues in this region including the fact that Arkansas did not have equal fundraising levels for election type, and that the state of Alabama was not found to have normal data. This is likely due to the small sample size, but can be explained as the distribution of electoral success for the factor of fundraising not to be normally distributed. This could mean that the data points are skewed, or simply do not have most data points falling near the population means voting percentage. Georgia did not have a statistically significant relationship between this factor and the independent variable, again with a smaller sample size due to missing fundraising numbers, this is not surprising to see in a state. Only a couple elections where the candidate that fundraises less and wins by a decent to significant margin would prohibit the results from showing a significant p-value. However, as the region as a whole still performs

similarly to the Rust Belt, so this is a non-issue. The fundraising effect sizes were higher and more consistent than funds spent as with the Rust Belt region.

TABLE 8: How strong the Fundraising Variable was in the Southern Region.
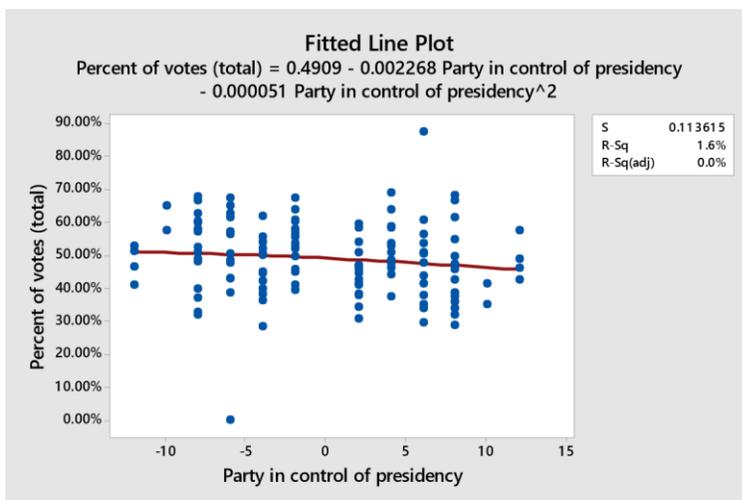
fundraising	p-value	R^2 adj
Mississippi	0.000	52.90%
Louisiana	0.005	34.50%
Arkansas	0.007	29.80%
Alabama	0.003	37.60%
Georgia	0.35	0.80%
South Carolina	0.002	38.30%

Party in control of white house prior to election: This factor failed to reveal any significant effect on how candidates earn votes, suggesting that voters' choices are not determined by a candidate's party ability to control the White House in the years prior to the election. In the Rust Belt region, only Illinois and Michigan returned statistically significant results, and even those states had significantly lower R-squared values compared to other factors. Furthermore, the regional analysis revealed a lack of any correlation, as evidenced by Plot 1 below. This is proof that the variable in quantitative form has no use when explaining or predicting how candidates win Senate elections.

PLOT 1: Shows the fitted line for the quantitative form of party in control of the presidency and the percentage of the vote the candidate earns for the Rust Belt region.

Fitted Line Plot
Percent of votes (total) = 0.4874 - 0.009424 Party in control of presidency
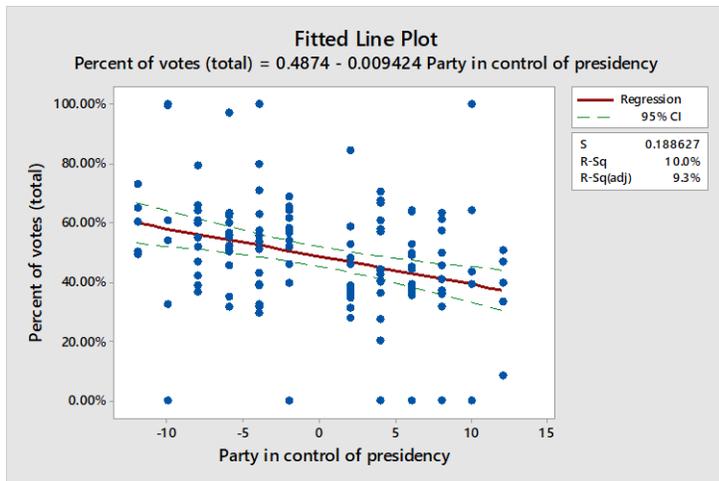
The Southern region fared slightly better, with a statistically significant result in the quantitative (amount of years) form in Alabama and both forms of analysis in Arkansas and Georgia (Simple yes or no check). However, as seen in plot 2 below, while the regional analysis revealed that there was a statistically significant relationship. Analyzing the regression line shows that it would be of no use for actual prediction. Too many points at each factor level of incumbency fall into winning and losing percentages of the vote earned. This creates a false sense of usability or importance, as the trend line fails to account for the


Fitted Line Plot
Percent of votes (total) = 0.4909 - 0.002268 Party in control of presidency
- 0.000051 Party in control of presidency^2

significant spread of data points at each factor level.

PLOT 2: Shows the fitted line for the quantitative form of party in control of the presidency and the percentage of the vote the candidate earns for the Southern region.

Unemployment: The factor analysis of unemployment failed to reject the null hypothesis that economic factors have no impact on Senate election outcomes. This is contrary to most major political science research on economic factors, as most have found it to be an essential variable when determining how elections are won. Every individual state analysis had at least one of three issues.

PLOT 3: Michigan percentage of the vote per unemployment rating.

First, as illustrated by the case of the state of Michigan in plot 3, there was no statistical difference between any factor level suggesting that unemployment levels in a state do not affect Senate elections.
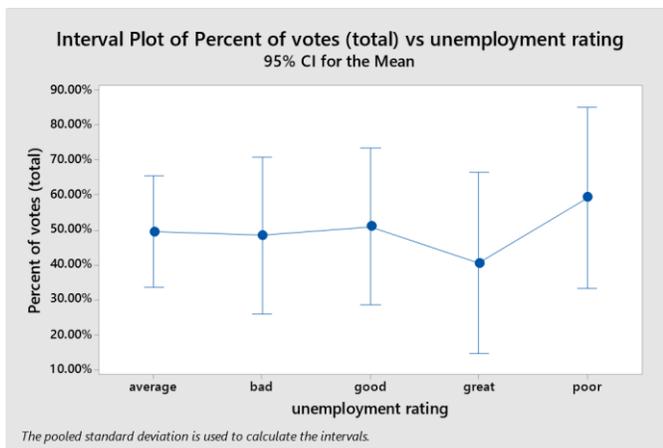

PLOT 4: Unemployment plot for IL.

Second, including IL here, several states did not have elections for each factor level, thus preventing complete analysis for differing unemployment levels.
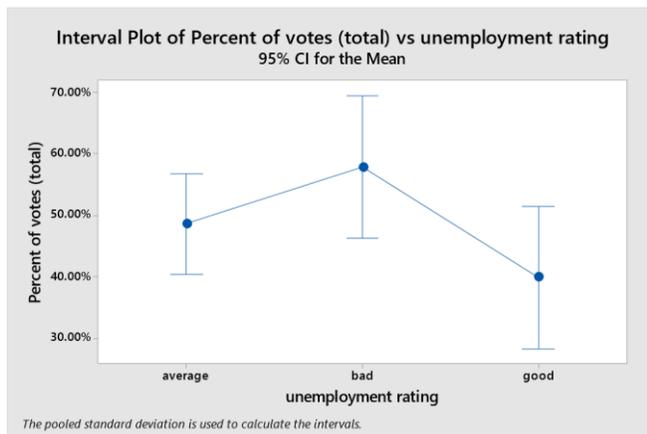
Plot 5: LA Unemployment Levels

Third, analysis for some states displayed conflicting results that did not square with the conventional logic. Including Louisiana here, several states had candidates with a poor economic performance measure, performing better than candidates who received an average, good, and great score. These issues
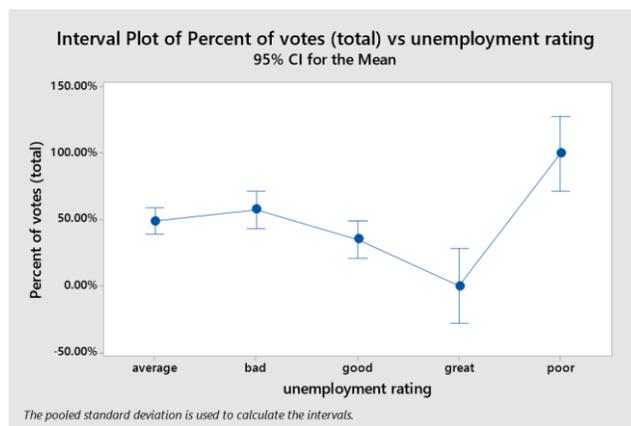
were unsurmountable and led to this variable being deemed either non-important or impossible to track or evaluate meaningfully, as seen in PLOT 5 here, displaying the unemployment levels for LA.

Multivariable Analysis: As shown in the bivariate analyses and individual factor analyses, the factors of incumbency and fundraising performed the strongest. These results are in line with the multivariable analyses, which also showed those two factors to be the strongest. The Rust Belt region was unique in that it had a model that was deemed acceptable to test interactive effects. This was as the multivariate model for the Rust Belt containing the fundraising adjusted variable and the incumbency variable had both factors return statistically significant. Other models in both the Rust Belt and in the South did not accomplish this. This is likely to be the case because the factors of fundraising and incumbency were less correlated in the Rust Belt states than in the South, as well as being slightly stronger in this region. The model testing the quantitative forms of fundraising and incumbency, and their interaction term showed the following success.

This model (shown below in table 8) was extremely strong, boasting an R-squared adjusted value of 50.69%, and a R-squared predicted value of 48.32. This R-squared predicted value is much higher than any other multivariable analysis in either region. This was also the only test in either region to have both terms return statistically significant. Generally, one of the two factors overpowered the other and the test was run solely through the statistically significant one.

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Analysis of Variance

Source                      DF  Adj SS    Adj MS  F-Value  P-Value
  fundraising adj            1  0.1952  0.195181    30.84    0.000
  Incumbency                 1  0.4916  0.491586    77.66    0.000
  fundraising adj*Incumbency 1  0.1557  0.155737    24.60    0.000
Error                      121  0.7659  0.006330
Total                      124  1.5917


Model Summary

        S   R-sq  R-sq(adj)  R-sq(pred)
0.0795600  51.88%    50.69%      48.32%
```

TABLE 8: Analysis model for the Rust Belt containing the variables of fundraising adjusted, incumbency, and the interaction variable.

```
Analysis of Variance

Source            DF   Adj SS    Adj MS  F-Value  P-Value
  fundraising adj  1  0.00031  0.00031     0.01    0.908
  Incumbent?       1  1.49523  1.49523    64.61    0.000
Error            122  2.82318  0.02314
  Lack-of-Fit    113  2.54790  0.02255     0.74    0.784
  Pure Error       9  0.27527  0.03059
Total            124  4.84485


Model Summary

        S   R-sq  R-sq(adj)  R-sq(pred)
0.152121  41.73%    40.77%      38.43%
```

TABLE 9: Analysis model for the South

The South failed to show the same level of interaction and significance even with the strong factors of fundraising and incumbency in table 9 above. Both the analyses below, involving one categorical and one numerical independent factor failed to have both return statistically significant. Thus, this prevented the need to check for interaction analysis.

Other factors, not having as large an effect on the dependent variable, made multivariable analysis involving them in vain. The factors of fundraising and incumbency overpowered the others to make the test essentially a single variable analysis, as the R-squared values were similar to those statistically significant factors.

Fundraising Levels by Candidate Type: Incumbent candidates raised significantly higher amounts of money in both regions, suggesting that incumbency matters more for determining the outcome of the elections than other variables. This is shown in plot 6 and 7, found on the next page. It could also be critical to determining that incumbency status determines the level of fundraising that a candidate receives. Basic logic would reveal that incumbency would have to occur before a candidate started to receive the extra fundraising. Incumbency status comes with a huge advantage in terms of fundraising. Incumbents have name recognition and are able to use their incumbency status to spread information about how their actions have benefitted their state. They will also have had better opportunities to directly speak to lobbyists and those looking to spend money on candidates and have a track record to show them what they are capable of.

Further, they are likely to receive more media attention, which in turn facilitates fundraising. If the fundraising levels are what cause a candidate to earn more votes, then they do so by being an incumbent candidate and raising millions of more dollars. Incumbent candidates likely have an inherent advantage in being a known product and having a record. Citizens of their state hold higher opinions of their representatives, and corporations favor candidates that they know they can trust. Adding to the idea that incumbents also raise money, the idea of fundraising could be heavily skewed into incumbency, further driving that factor's advantage and large effect in determining Senate elections.

PLOT 6 and 7: RB/South fundraising by Incumbents vs Challenger.
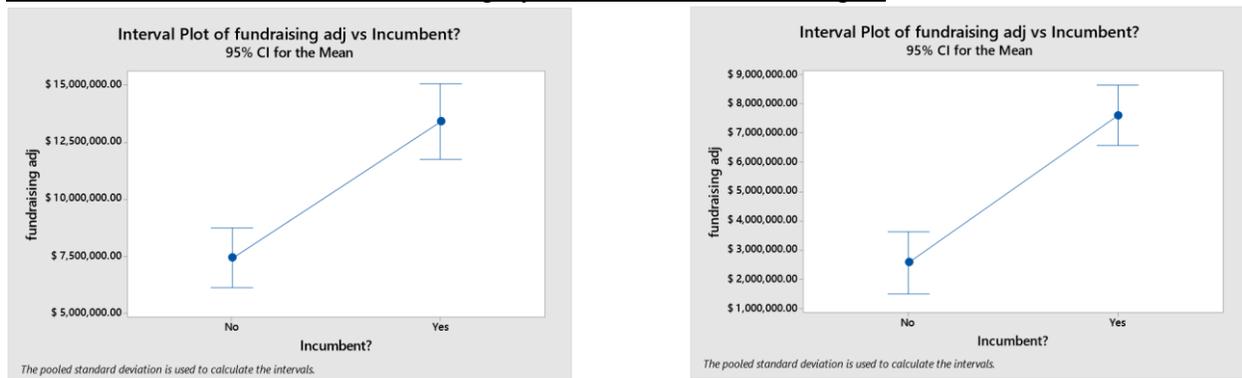
CONCLUSION/FUTHER RESEARCH:

The data analyzed strongly suggest that fundraising and incumbency are the best predictors of the outcomes of Senate elections. This was predictable based on the literature review and is a consensus held in the political science community. The models including the factors of fundraising and incumbency were much stronger than other models, and it was the only model where both factors were significant. Thus, This allowed for a statistical model including an interactive term. Both factors depend on each other, as most incumbents also heavily outspend their opponents. This leads us to believe that these are the factors that should be emphasized in further research, and that the other factors, including economic factors, seem to impact the elections and the populations perception less. It is possible that citizens view economic issues more as an issue of the whole government issue rather than an issue of their senators. This would explain why senators have higher favorability ratings from citizens in their own states while having abysmal approval ratings on the national level. Further in-depth research for the interaction phenomenon would be vital to understanding the relationship between fundraising and incumbency.

While the region as a whole was not partisan, the individual states did show moderate levels of partisan advantage. However, with the region split, yet sharing many of the same demographics and economic hardships with manufacturing and general job loss, either side could build a regional "wall" and secure many Senate seats by shifting their message. This is the region that is most available in this regard, as the region shares the same issues that neither side has gone

about properly addressing. This is shown in presidential elections, as the side that wins most of these rust belt states tends to win the election. Political parties should start researching and building coalitions from this region for further political success.

The impact of other variables, especially party control of the White House and the unemployment model were weak and not shown to be useful for research or political purposes. These factors pale in importance to the aforementioned three and should not be included in predicting or even explaining Senate elections. Given that previous research has shown that economic factors play a significant role in the outcomes of elections, the low predictive value of the unemployment variable was surprising. However, the poor performance of this variable might also be attributed to the way that economic performance was operationalized in terms of unemployment. Future research should consider other ways of measuring this variable to arrive at more conclusive evidence about the impact of this variable.

The South was mostly similar to the Rust Belt region in terms of the most important three factors for determining Senate election outcomes. However, partisan lean was a much better predictor in the individual states as well as in the region as a whole. This is unsurprising, as the factor has been deemed critical in all aspects of politics for decades. In addition, the partisan advantage has been growing exponentially since 1980 where the region was mostly even to heavily Republican advantage in 1994, to finally complete domination by the Republican party since 2004 and on. While fundraising and incumbency were the next and last two successful factors in explaining Senate elections, they were not as strong as in the Rust Belt region. They both failed to return statistically significant in multivariate analysis, preventing the use of an interaction term in the model. Again, most other factors failed, especially the party control of the presidency and unemployment. I would again recommend further research on the economic factors, even if the South has been shown to care more for cultural or social issues, including abortion rights and gun laws.

Another area to further expand research into would be when incumbent candidates retire. This inflates their win rates because, instead of running in elections that they might lose to a strong challenging candidate, they could just retire or run for another position to avoid a loss. Analysis of this action and of challenger strength would be interesting for further understanding how the complicated factor of incumbency is to be understood.

Lastly, while it was shown that incumbents raised an average of double what their challengers did, there are two areas concerning the relationship between fundraising and incumbency. First, political campaigns have been raising significantly more money recently compared to the 1980s – 2000 period. This could have skewed the results, but the qualitative form of fundraising in which a simple outraised factor returned similar results to the quantitative form. Further time analysis could reveal if the factor is having a diminished effect as the numbers increase. This was shown in the models with the quadratic form, but time analysis would show a more in depth answer as to how this variable has adjusted over time. Second, there is still further untangling of the relationship between incumbency and fundraising, why PACs or lobbyists aren't sending more money towards opposition candidates, or when a senator is unfavorable. Again, the rate in which senators "retire" should be analyzed but here with an emphasis on money raised during non-race years.

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