Analyzing the Relationships Between PAC Contributions, Incumbency, Political Party, and Campaign Success

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Abstract

Election finance affects all political campaigns and defines those who win political power and influence. Understanding this relationship can highlight the influence of money in politics and the ways in which it affects democracy. This project examines how reliance on different sources of funding — individuals, political parties, and political action committees (PACs) — affect the number of votes won by a political campaign. It will also study factors already known to affect election chances and how they interact with campaign success. In this project, linear regression models were used to answer the question of how sources of funding affect the percentage of votes won by a political candidate. Chi-Squared tests were used to analyze whether the categorical factors of incumbency and political party had statistically significant relationships with votes won or financial data. It was found that PAC money had a stronger relationship with votes won than individual contributions. Also, challengers are more likely to rely heavily on individual donations, while incumbents are more likely to rely on PAC money. Meanwhile, incumbents and members of the Democratic and Republican party were most likely to rely heavily on PAC funding. Policymakers who wish to combat this influence may use these results to avoid unwarranted financial influence in government.

1 Introduction

Elections define the nature of all democracies, and political campaigns spend large sums of money in the attempt to win them. In the United States, political campaigns have spent increasing amounts of money in recent years. A total of over $14 billion was spent on the 2020 U.S. elections, more than double the amount spent in 2016 [Schwartz, 2020]. In order to raise money for election campaigns, politicians accept donations, sometimes from individuals and sometimes from political action committees (PACs) and corporate donors. A PAC is a non-party group that raises and spends money for political candidates[La Raja, 2013]. Many Americans have shown concern about the increasing influence of corporations in politics [Jones, 2018], which could cause them to be wary of candidates who accept PAC and corporate donations. However, the access to funding from these wealthy donors has the potential to benefit candidates who accept it. Research has shown that money spent on advertising is effective in convincing potential voters to change their vote [Schuster, 2020]. Other research also shows that different candidates spend different amounts to get elected. For example, defeating an incumbent as a challenger is more expensive than winning an open seat [Robbins, 2018].

Different factors, such as incumbency, advertisements, and voter demographics, are known to have an effect in whether or not a candidate wins an election [Jacobson, 1978] [Schuster, 2020]. There is a gap in literature on the effects of different types of funding — for example, reliance on PAC money instead of individual donations — on the number of votes won by political campaigns. The purpose of this project is to close this gap by studying different financial properties and their effects on political campaign success, as well as how incumbency and political party affect these factors. The research questions are as follows:

1. Does the reliance on PAC or corporate donations instead of individual contributions affect the percentage of votes won by a political campaign?

2. How do factors like political party and incumbency affect the power of money in gaining votes in an election?

3. Do financial factors affecting campaign success vary across the House and the Senate?

To answer the research questions, linear regression was used to identify correlations, and Chi-Squared tests were used to find statistically significant relationships between categorical variables. I found that donations from PACs lead to higher chances of winning than donations from individuals. Additionally, challengers are more likely to rely heavily on individual donations, while incumbents are more likely to rely on PAC money. Finally, PACs tend to favor mainstream political party candidates over third-party candidates. Understanding these effects will inform decisions made by political campaigns, provide valuable insights on the priorities of the American electorate, and show where the influence of money is strongest or weakest in American democracy.

2 Literature Review

Campaign spending has risen drastically in recent years. Total 2020 election spending in America was projected to hit $10.8 billion, but reached almost $14 billion, almost double the amount spent in 2016 [Schwartz, 2020]. The scope of money's influence in politics is undeniable, and it is vital to study this topic to understand what forces are capable of determining political power.

Campaign finance affects elections in different ways. Spending on advertisements is effective in winning voter support, though not everyone is equally affected by spending. Low-information voters, economically dissatisfied voters, and members of a political party are more likely to be swayed by high candidate spending [Schuster, 2020]. However, the effectiveness of money spent also varies by candidate. As seen in Figure 1 [Robbins, 2018], in 2016, candidates running as incumbents and in open seats tended to spend more than those running as challengers. Spending also varied by political party. Figure 2 [Robbins, 2018] shows that different types of candidates tended to spend different amounts in order to get elected. For example, winning an open seat is shown to be considerably less expensive than defeating an incumbent.

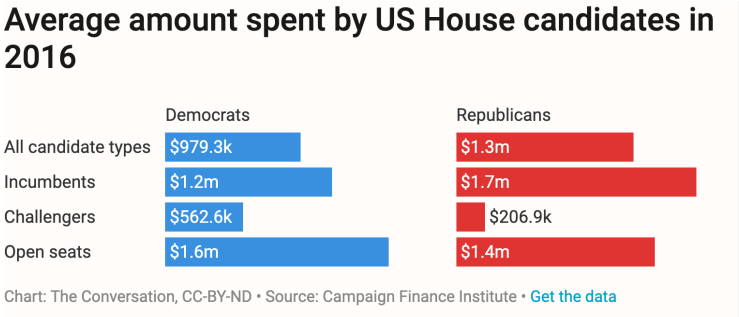

Figure 1: Among all types of candidates, there were wide differences in how much campaigns cost. Challengers tended to spend the least, while incumbents spent the most. [Robbins, 2018].

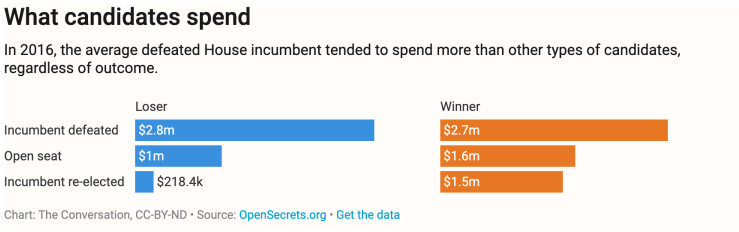

Figure 2: On average, races where the incumbent lost were the most expensive races, followed by open seats and races where the incumbent was re-elected [Robbins, 2018].

One factor that affects campaign finance is incumbency. Incumbent spending has a less statistically significant effect on election results than challenger spending [Jacobson, 1978]. There are multiple theories as to why this occurs.

Moon states that incumbents already have large support, giving them less to gain when it comes to spending on future elections [Moon, 2006]. Meanwhile, challengers start with less support and have the most to gain from spending on advertisements and canvassing. In other words, incumbent spending gains fewer votes because there are fewer votes to win for someone who has already won an election previously. However, Stratmann states that the discrepancies are also partially explained by differences in the cost of advertising across congressional districts [Stratmann, 2009]. Alternatively, Magee argues that incumbent spending is useful only to counteract high challenger spending [Magee, 2012], meaning that incumbents should spend enough to match their challengers to get the most value for their campaign expenditures. Another factor that affects the incumbent/challenger spending discrepancy is state laws that enforce spending limits. In an earlier work, Stratmann demonstrates that where campaign spending limits are in place, both challenger and incumbent spending have been shown to significantly affect in election results [Stratmann, 2006]. This study will expand on previous ones by discerning the way incumbency interacts with sources of campaign finance to affect election results.

Regardless of the effectiveness of campaign expenditures, all campaigns spend money and funding for political campaigns comes from different sources. Individuals, political parties, and corporate PACs all donate to political campaigns. PACs spend large amounts of money on consequential races. For example, in the 2020 Georgia runoff elections for Senate, PACs spent almost $460 million on the election [Norden and Weiner, 2021]. Donations from PACs continue to rise in value, because of increased partisanship leading to higher stakes in elections as well as weak federal campaign finance laws, which allow super PACs to spend unlimited amounts of money on influencing elections [La Raja, 2013].

The motivations for corporate PACs to donate to political campaigns is unclear. Theoretically, supporting a candidate who promises to pass pro-business legislation should be a good economic move, but studies show that the returns to political donations, while profitable, are minute in comparison to the value of a billion-dollar company [Fowler et al., 2017]. This analysis does not imply that there are no effects of monetary contributions, just that the effects are small or difficult to find. Regardless, corporations continue to donate large amounts of money to political campaigns, showing that wealthy donors are, to some degree, invested in the political process through monetary means. This study will further examine the influence of PACs in elections and identify how they are capable of affecting political power in America.

The rising influence of PAC money has become a topic of concern for many Americans. 77% of Americans believed their should be limits on the amount individuals and groups should be able to donate in elections, though Democrats are more likely than Republicans to believe that big donors have more political influence than individuals (Fig. 3 [Jones, 2018]).

This public concern has shown itself in the platforms of recent candidates. In the 2018 election cycle, 185 Democrats pledged not to accept corporate PAC donations, and only 397 of 3,059 non-incumbent candidates running in 2020 accepted corporate PAC donations [Godfrey, 2018]. Public opinion on corporate PACs and the sources from which candidates accept donations will continue to affect elections for years to come. This study aims to fill in a gap in academia by examining the statistical relationship between reliance on PAC money and votes won by a campaign.

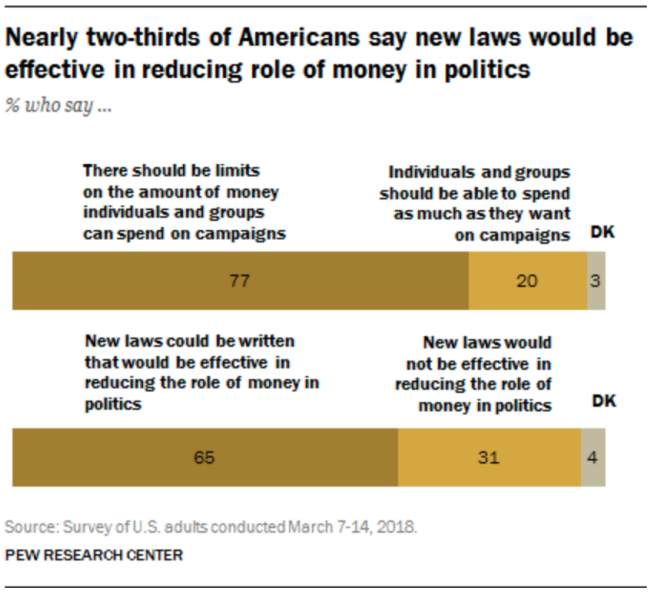

Figure 3: A poll from Pew showed that most Americans believe that there should be limits on the amount of money donors can spend on elections, and that new laws would be effective in enforcing this idea [Jones, 2018].

Different factors related to finance affect the results of elections. This paper will address a gap in literature about the effect of the origin of donations (corporate or PAC versus individual donors) on a candidates' winning chances. It will also analyze incumbency and political party as factors that affect elections in order to gain a deeper understanding of the effects of campaign finance and how it affects the United States' political climate.

3 Research Questions

My study examines the following research questions:

1. Does the reliance on PAC or corporate donations instead of individual contributions affect the percentage of votes won by a political campaign?
2. How do factors like political party and incumbency affect the power of money in gaining votes in an election?
3. Do financial factors affecting campaign success vary across the House and the Senate?

4 Methodology

4.1 Datasets

This project used two datasets to answer the research questions. The first dataset is from the Federal Election Commission (FEC), which regulates po-

litical campaign finances in the United States. It was collected by the federal government to ensure compliance with election finance laws and is available for public use. The bulk data for all candidates contains donations by individuals, political parties, other committees; total expenditures; loans taken and repaid; and several other variables for all Congressional and presidential races. It starts at at 2018 and dates back to 1980. For the purpose of this project, only Congressional race data was used.

The MIT Election Data and Science Lab (MEDSL) is a collection of datasets on election results in House, Senate, presidential, and state-level races. For the purpose of this project, data pertaining to the House and Senate were used. The data was collected by professors in MIT and is publicly available. It contains vote counts, party affiliations, and other data regarding election results. The data covers the elections from 1976-2020. Because this dataset only contained data for general elections and not primaries, only general elections are analyzed in this paper.

4.2 Data Cleaning

The two datasets were combined with Python's pandas library in order to perform the analysis in this project. The overlap between them was data from general elections for Senators and Representatives from 1980 to 2018. One challenge faced was that names were recorded differently in each dataset. For example, "John M. Doe" in the MEDSL dataset would be written as "Doe, John M." in the FEC dataset. Other discrepancies included the use of initials or nicknames rather than full names. In order to overcome this, Google Sheets functionality was used to split the name column of each dataset into a suffix, last name, and first name column. Middle names and initials were included in the first name column. The features used to combine the two datasets were last name of the candidate, year, political party, state, and, in the case of House elections, the district. These columns were chosen because they are standard and constant between the two datasets. If any rows were still unable to be combined, they were dropped from the dataset. From the House dataset, 13,821 rows were dropped, and the final dataset size was 15,815 rows. From the Senate dataset, 1,970 rows were dropped, and 1,659 rows remained in the dataset. Finally, the column "vote_percent" was calculated by dividing the column "candidatevotes" by "totalvotes." This process was done twice, once for the House and once for the Senate. Both datasets are analyzed in this project.

4.3 Data Analysis

Ordinary least squares linear regression models were trained on the House and Senate data in order to identify the relationships between financial features in the dataset and the percentage of votes received by the campaigns. The coefficients generated by the linear regression models provide valuable insight into the effect each variable has on the "vote_percent" column.

While most of this project, including the running of the models themselves, was conducted in Python, R was used in order to choose the features with the strongest correlation to the chosen label. The programming language R offers increased functionality for choosing variables with best subsets regression, which

runs through every subset of features and returns the models with the best R-squared metrics. R also detects collinearity among variables, which can skew a model and make it difficult to discern which feature causes the change in the label. These helpful tools make the process of building an effective linear regression model more efficient and accurate than guessing and checking to find the best features. Accuracy graphs for the top three models for each the House and Senate datasets can be found in the appendix.

Once the best subsets were identified, the subsets of features were put into linear regression models in Python, at which point the mean squared error of the train and test datasets were calculated and used to evaluate the models. Models that showed promising accuracy were saved, and their results are analyzed in this project.

Next, in order to test the effects of categorical variables like political party and incumbency, this project used Chi-Squared tests, along with post-hoc tests where appropriate. The Chi-Squared test takes in a dataset and outputs a p-value for the chance that the correlation among given variables is by chance. Should the p-value be lower than 0.05, or 5%, a post-hoc test is conducted in order to find out which variables are related.

5 Results

The three linear regression models with the lowest mean squared errors for each of the House and Senate datasets are visualized as tables here.

The House models' coefficients follow a pattern. Each model has exactly two variables, and all of the models include the percentage of contributions from PACs. For the second variable, a non-percentage financial variable is used.

Variable	**Coefficient**
Total Receipts	9.211e-08
Percentage of Contributions from PACs	0.0096

Table 1: These are coefficients and variables used in the first linear regression model created using House data.

Table 1, which displays the first model for the House data, has a coefficient of 0.0096 for the percentage of contributions by PACs. What this means is that for a 1% increase in the percentage of contributions by PACs a campaign accepts, there is a 0.96% increase in the percentage of votes received by a campaign. Total receipts has a smaller effect on the dependent variable, as the coefficient is smaller.

Variable	**Coefficient**
Total Individual Contributions	1.553e-07
Percentage of Contributions from PACs	0.0100

Table 2: These are the coefficients and variables used in the second linear regression model trained on House data. In comparison to the previous model, the coefficients have risen slightly, and the variable total receipts has been replaced by total individual contributions.

Table 2 is a depiction of the second model found to be effective at predicting the percentage of votes of a House campaign. It shows a similar pattern to Table 1. The coefficients for percentage of contributions by PACs are nearly equal, as well as the coefficients for total receipts and total individual contributions.

Variable	**Coefficient**
Total Contributions	1.111e-07
Percentage of Contributions from PACs	0.0094

Table 3: This table depicts the third model trained on House data. Total contributions is a new variable introduced in this model, and the coefficients remain similar to those of the previous two models.

The last model for the House data (see table 3) also follows the same patterns as the previous two. So far, it is clear that the percentage of contributions by PACs plays a role in House election results, but a dollar amount of contributions or receipts is also valuable information for predicting election results.

Variable	**Coefficient**
Starting Cash	2.089e-08
Total Disbursements	2.256e-09
Total Individual Contributions	-3.228e-07
Total PAC Contributions	-1.425e-07
Total Contributions	3.167e-07
Percentage of Contributions from Individuals	0.0032

Table 4: This is the first model created using the Senate data. There are clear differences from tables 1-3. Overall, the results of Senate races are clearly determined by different factors than those of House races.

Table 4 is the first linear regression model for the Senate data. There are more variables involved in this model than the ones for House. Interestingly, the coefficients for both total individual contributions and total PAC contributions are negative, denoting that a decrease in either of these variables would increase the percentage of the votes won. Meanwhile, the coefficient for percentage of contributions from individuals is positive. Starting cash is a variable that had not been seen in the House models, and it seems to play a considerable role in determining Senate election results. It is present in all three Senate models.

Variable	**Coefficient**
Starting Cash	8.707e-09
Contributions by Candidate	9.611e-09
Total Individual Contributions	5.112e-09
Total PAC Contributions	1.438e-07
Percentage of Contributions from PACs	0.0079

Table 5: The second model for Senate data follows similar patterns to the first, with a few differences.

Table 5 depicts the second linear regression model for the Senate data. Total disbursements and total contributions are no longer used as variables. Also,

the percentage of contributions by individuals is replaced by the percentage of contributions from PACs, though with a higher coefficient. Contributions by candidate also play a larger role in this model, meaning that Senate campaigns are more likely to depend on a candidate's monetary donations to their own campaign.

Variable	**Coefficient**
Starting Cash	1.657e-08
Contributions by Candidate	1.005e-08
Debts Owed	1.516e-08
Total Individual Contributions	1.042e-08
Percentage of Contributions from Political Party	0.0019
Percentage of Contributions from PACs	0.111

Table 6: The final model trained on Senate data is similar to the previous two, following the same basic patterns..

The third Senate model, depicted by table 6, is similar to the previous one. Some differences include the higher coefficient for percentage of contributions by PACs and the inclusion of percentage of contributions form political party, albeit with a relatively low coefficient. Debts owed is also a variable unique to this model, and its coefficient is similar to the other non-percentage features used by the model. For the most part, similar patterns are followed among the Senate models, though they all show differences from the House models.

The results of the Chi-Squared and following post-hoc tests (see tables 7-18) reveal further insight about the data.

	Challenger	Incumbent	Open Seat
0-20%	5.210253e-204	1.0	7.047322e-22
20-40%	0.0	1.0	1.143993e-02
40-60%	1.0	1.0	7.842204e-80
60-80%	1.0	0.0	1.0
80-100%	1.0	1.161178e-178	1.0

Table 7: Percentage of the Vote vs. Incumbency Status, House of Representatives. Statistically significant p-values are highlighted in grey.

Table 7 shows that challengers tend to get between 0-20% and 20-40% of the vote in House elections, while incumbents tend to get between 60-100% of the vote. Open seats are more competitive, with candidates tending to get either 0-20% or 40-60% of the vote.

Table 8 examines the relationship between incumbency and the percentage of contributions a campaign receives from individuals. Challengers running for the House most commonly received 80-100% of their donations from individuals, while incumbents and open seat candidates received 0-20%. The dashes in the table indicate that for that cell, there was no corresponding data in the dataset. For example, in none of the races studied in this project did a challenger receive between 20% and 40% of the vote.

Table 9 shows that challengers running for the House tend to receive less than 80% of their contributions from PACs, while incumbents receive over 80%.

	Challenger	Incumbent	Open Seat
0-20%	1.0	5.878573e-19	0.002228
20-40%	—	—	—
40-60%	—	—	—
60-80%	7.444817e-01	1.926025e-01	0.649341
80-100%	2.035579e-31	1.0	0.997624

Table 8: Incumbency vs. Percentage of Contributions from Individuals, House of Representatives. Statistically significant p-values are highlighted in grey. Dashes indicate no data available for that relationship.

	Challenger	Incumbent	Open Seat
0-20%	2.176149e-192	1.0	0.575082
20-40%	9.174850e-13	1.0	0.783789
40-60%	3.426952e-11	1.0	0.494669
60-80%	5.490859e-10	9.999999e-01	0.739605
80-100%	1.0	1.501163e-188	0.338238

Table 9: Incumbency vs. Percentage of Contributions from PACs, House of Representatives. Statistically significant p-values are highlighted in grey.

There is no clear relationship between an election being an open seat and the percentage of contributions from PACs received.

	Democrat	Independent	Libertarian	Other	Republican
0-20%	1.0	0.0	0.0	0.0	1.0
20-40%	4.799678e-06	1.0	1.0	1.0	2.838523e-04
40-60%	9.395025e-02	1.0	1.0	1.0	1.187607e-15
60-80%	2.384691e-05	1.0	1.0	1.0	1.713351e-06
80-100%	2.192842e-40	0.999993	0.999999	1.0	1.0

Table 10: Percentage of the Vote vs. Party, House of Representatives. Statistically significant p-values are highlighted in grey.

Table 10 displays the results of a post-hoc test comparing political party and the percentage of votes won in House races. Third parties tend to win a smaller percentage of the vote than candidates from the Democratic or Republican parties.

Table 11 shows that Independents and Libertarians tend to get over 80% of their contributions from individuals, while Democrats tend to get less than 20%. There is no statistically significant relationship shown between Republicans and members of other third parties and their reliance on individual contributions.

Table 12 depicts another post-hoc test based on political party in the House data. It shows that Democrats and Republicans tend to rely most heavily on PAC contributions to their campaigns.

Table 13 is the first one depicting a post-hoc test on Senate data. It shows that in Senate races, incumbents win the most votes, followed by those running

	Democrat	Independent	Libertarian	Other	Republican
0-20%	0.000672	0.999390	0.999856	0.994472	0.741733
20-40%	—	—	—	—	—
40-60%	—	—	—	—	—
60-80%	0.071381	0.567005	0.575025	0.595517	0.903123
80-100%	0.999484	0.000600	0.000141	0.005376	0.236170

Table 11: Party vs. Percentage of Contributions from Individuals, House of Representatives. Statistically significant p-values are highlighted in grey. Dashes indicate no data available for that relationship.

	Democrat	Independent	Libertarian	Other	Republican
0-20%	1.0	6.105841e-85	5.246704e-101	5.438767e-137	0.998062
20-40%	9.949547e-01	8.324690e-01	3.440475e-03	4.539473e-01	0.019867
40-60%	9.965899e-01	7.692626e-01	7.954755e-01	2.140992e-03	0.015666
60-80%	9.956788e-01	7.750553e-01	8.015216e-01	5.514334e-01	0.001040
80-100%	1.154312e-60	1.0	1.0	1.0	0.038157

Table 12: Party vs. Percentage of Contributions from PACs, House of Representatives. Statistically significant p-values are highlighted in grey.

	Challenger	Incumbent	Open Seat
0-20%	5.703369e-35	1.0	0.006916
20-40%	2.346133e-44	1.0	0.843305
40-60%	1.0	8.305358e-07	0.000011
60-80%	1.0	1.557746e-72	1.0
80-100%	9.992395e-01	2.280904e-07	0.989697

Table 13: Percentage of the Vote vs. Incumbency Status, Senate. Statistically significant p-values are highlighted in grey.

for open seats, and finally, challengers. This trend carries on from the previous test of the same relationship in the House data.

	Democrat	Libertarian	Other	Republican
0-20%	1.0	1.079106e-121	5.397004e-146	1.0
20-40%	2.095674e-03	9.999999e-01	1.0	7.442486e-04
40-60%	6.318636e-09	1.0	1.0	2.195601e-08
60-80%	3.575396e-03	9.999996e-01	1.0	2.036804e-03
80-100%	3.113551e-01	8.864025e-01	9.066733e-01	1.917644e-01

Table 14: Percentage of the Vote vs. Party, Senate. Statistically significant p-values are highlighted in grey. Dashes indicate no data available for that relationship.

Table 14 shows that Democrats and Republicans win more often than mem-

bers of third parties in Senate races, similarly to the trend shown in the House dataset. There is no data for Independent candidates because they did not appear in the Senate dataset.

	Challenger	Incumbent	Open Seat
0-20%	0.999988	0.003581	0.047553
20-40%	—	—	—
40-60%	—	—	—
60-80%	—	—	—
80-100%	0.000012	0.996419	0.952447

Table 15: Incumbency vs. Percentage of Contributions from Individuals, Senate. Statistically significant p-values are highlighted in grey. Dashes indicate no data available for that relationship.

Table 15 shows that challengers tend to get over 80% of their campaign contributions from individuals. An unexpected observation is that there were no candidates who had 20-80% of their contributions from individuals.

	Challenger	Incumbent	Open Seat
0-20%	8.378608e-24	1.0	0.672099
20-40%	1.955613e-01	5.967494e-01	0.755328
40-60%	3.595485e-04	9.958532e-01	0.775265
60-80%	1.594076e-03	9.192936e-01	0.957328
80-100%	1.0	2.027914e-23	0.134872

Table 16: Incumbency vs. Percentage of Contributions from PACs, Senate. Statistically significant p-values are highlighted in grey.

Table 16 shows that incumbents tend to rely more heavily on PAC contributions. Challengers accept varying amounts of PAC donations, and there is no clear relationship between candidates running for open seats and the percentage of contributions from PACs accepted.

	Democrat	Independent	Libertarian	Other	Republican
0-20%	0.808408	—	0.639874	0.970914	0.020043
20-40%	—	—	—	—	—
40-60%	—	—	—	—	—
60-80%	—	—	—	—	—
80-100%	0.191592	—	0.360126	0.029086	0.979957

Table 17: Party vs. Percentage of Contributions from Individuals, Senate. Statistically significant p-values were not found in this test. Dashes indicate no data available for that relationship.

Table 17 has no statistically significant relationships. No independent candidates were in the dataset, and no candidates in Senate races accepted between 20-80% of contributions from individuals.

	Democrat	Libertarian	Other	Republican
0-20%	1.0	2.592994e-41	1.278464e-67	1.0
20-40%	3.281017e-01	2.217903e-01	7.926305e-01	6.461350e-01
40-60%	4.815632e-01	8.303274e-01	1.502052e-03	8.797610e-01
60-80%	1.269713e-01	0.899446e-01	3.885196e-01	8.157019e-01
80-100%	6.145517e-12	1.0	1.0	7.626940e-18

Table 18: Party vs. Percentage of Contributions from PACs, Senate. Statistically significant p-values are highlighted in grey.

Finally, table 18 shows that Democrats and Republicans running for the Senate are more likely than Libertarians and other third parties to receive over 80% of their contributions from PACs. Again, no Independents were in the Senate dataset.

These results will be further interpreted in the discussion section.

6 Discussion

Total PAC contributions or the percentage of contributions from PACs appear in every linear model. Where total individual contributions or the percentage of contributions from PACs also appear in the linear models, the coefficient is always smaller than the PAC variable. This means that if a campaign receives 1% more of its contributions from PACs, it will see a greater increase in votes than the if it had received the same amount from individuals. While success in Senate races relies on a more diverse set of variables, this relationship is constant across both the House and the Senate. All in all, these results show that PACs have a strong monetary influence on election results in both the House and the Senate. This should be a cause of concern for policymakers and activists who wish to remove PAC contributions' influence in politics.

Based on my results, PACs tend to donate more money to candidates who are incumbents, Democrats, and Republicans. These candidates are also more likely to win a higher percentage of the vote in elections. This reveals a pattern in PAC influence. The fact that PACs tend to donate to certain types of candidates can also be used as an indicator of where PAC influence in strongest and where individual contributions are most likely to be overshadowed. For those wishing to reform campaign finance and better understand its effects on elected representatives, this information is invaluable to discerning where PAC influence is strongest.

A limitation of this study is that much of the data was unusable because of discrepancies in the candidates' names. Future work can more rigorously clean the data to produce more accurate and insightful results. Furthermore, other researchers may benefit from analyzing data from presidential or local elections to see how the power of PAC money varies across these variables. The information in this study can be built on by both researchers and policymakers to discern where PAC influence is strongest in elections and how best to combat it.

7 Conclusion

In this work, linear regression models were trained to predict the percentage of the vote received by a campaign based on financial features. Afterwards, Chi-Squared and post-hoc tests were used to determine whether incumbency and political party had relationships with percentage of votes won or the source of funding received by the campaign. This study filled a gap in literature on the effects of different types of funding — for example, reliance on PAC money instead of individual donations — on the number of votes won by political campaigns. It was found that PAC contributions are more significant in increasing the percentage of votes won by a campaign. Also, PACs tend to donate more money to incumbents, Democrats, and Republicans, rather than challengers and third-party candidates. The results of this study should be a cause of concern for those wishing to remove PAC influence from politics. However, researchers and activists can also use this study to discern where PAC influence is strongest and form better methods to combat it.

References

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8 Appendix

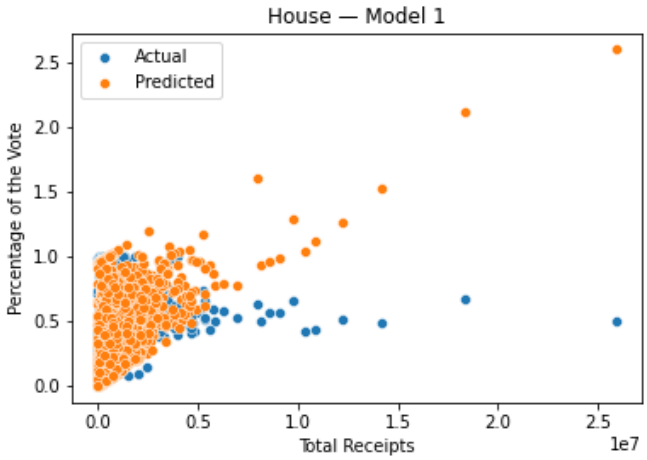

Figure 4: The first House model's predictions on the test set. Outliers are more common as total receipts rise, since the campaign cannot win more than 100% of the vote, but the model assumes that the percentage continues to increase. The mean squared error for this graph is 0.07472623877939234.

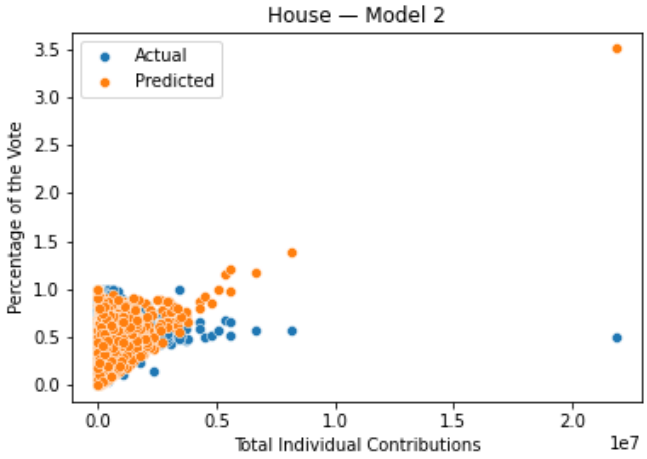

Figure 5: The second House model's predictions on the test set. Outliers are more common as the total individual contributions rise, since the campaign cannot win more than 100% of the vote, but the model assumes that the percentage continues to increase. The mean squared error for this graph is 0.07304371872678579.

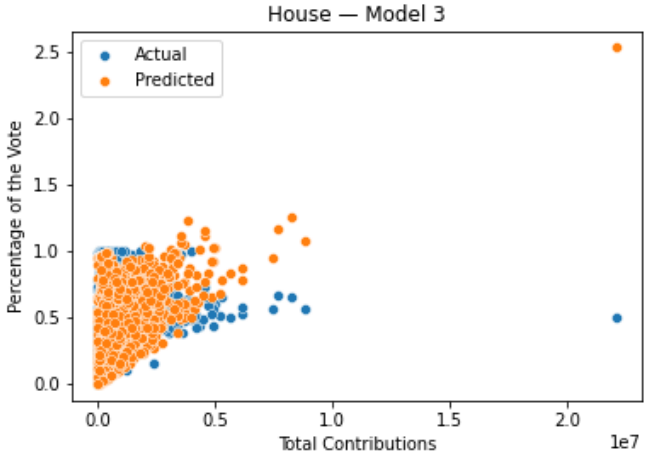

Figure 6: The third House model's predictions on the test set. Outliers are more common as total contributions rise, since the campaign cannot win more than 100% of the vote, but the model assumes that the percentage continues to increase. The mean squared error for this graph is 0.07162701852570975.

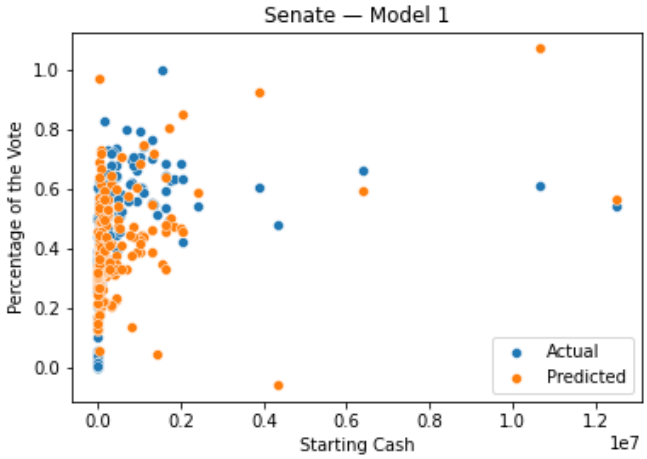

Figure 7: The first Senate mode's predictions on the test setl. Outliers are more common as starting cash rises, since the campaign cannot win more than 100% of the vote, but the model assumes that the percentage continues to increase. The mean squared error for this graph is 0.05768321583421723.

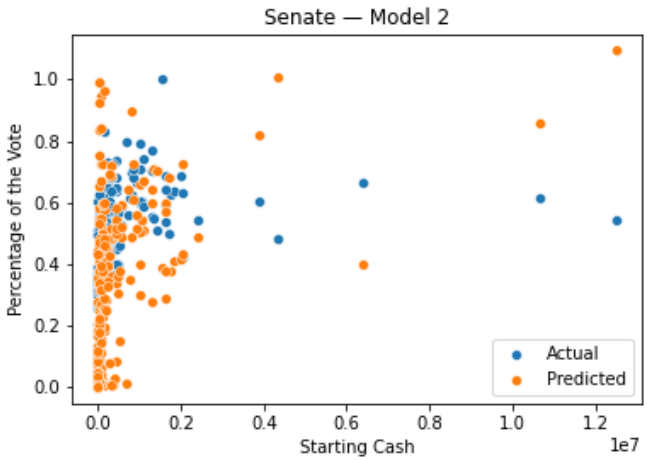

Figure 8: The second Senate model's predictions on the test set. Outliers are more common as starting cash rises, since the campaign cannot win more than 100% of the vote, but the model assumes that the percentage continues to increase. The mean squared error for this graph is 0.04754185704213631.

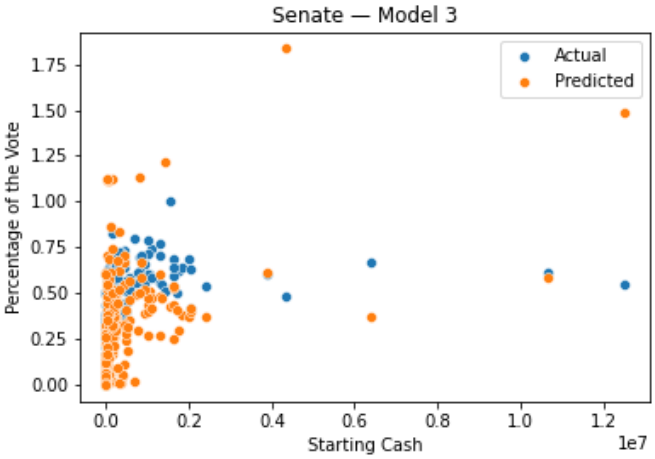

Figure 9: The third Senate model's predictions on the test set. Outliers are more common as starting cash rises, since the campaign cannot win more than 100% of the vote, but the model assumes that the percentage continues to increase. The mean squared error for this graph is 0.07089288308631163.