Snazzy Stocks: The Relationship between Donation Recipient Political Performance and Stock Pricing for S&P 500 Companies

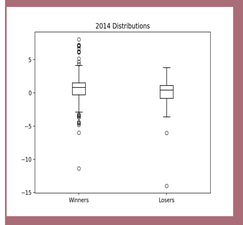
CSCI 1951A final project by Seth Barshay, Justin Cardozo, Daniel Kotroco, and Nikita Ramoji

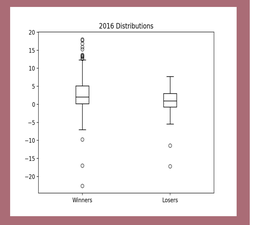
Hypothesis

We wanted to determine if there existed a relationship between the political performance of candidates that S&P 500 companies had donated to and the stock performance of a donor company the day following an election. Specifically, our null hypothesis is that the distribution will not be significantly different under a t-test, and the coefficient on the variable corresponding to whether a company donated to a winning candidate or a losing candidate will be equal to 0.

Data Collection

We primarily used Yahoo Finance to collect opening and closing stock values for S&P 500 companies during the first two days of an election in the years 2012, 2014, 2016, and 2018. We then used data collected using web scraping and OpenSecrets API to gather information about which candidates these companies donated to and how they performed in their respective elections. Additional financial data for regression controls, including the beta value and market capitalization value for each donating company, was gathered from a database maintained by the Center for Research in Security Prices.





Many of the outliers observed in the 2016 plot were from 'penny stocks,' where the valuation was less than $.10. We excluded these, since small changes in price resulted in significant percent changes.

Methodology and Results

Approach 1: Two sample t-test

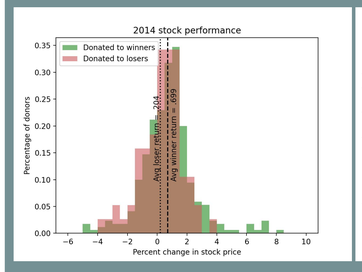
Our first intuition was to perform a t-test on two samples for each election, companies that had donated solely to winning candidates, and those that had donated solely to losing candidates, and determine if there was a significant difference between the two populations. However, it is common practice among companies that donate to elections to donate to candidates either on both sides of a race, or across multiple races, with mixes of both winners and losers. Therefore, we constructed a new set of populations based on whether they had more net donations to winning candidates, or more net donations to losing candidates. We assigned each company to one of two groups according to this equation:

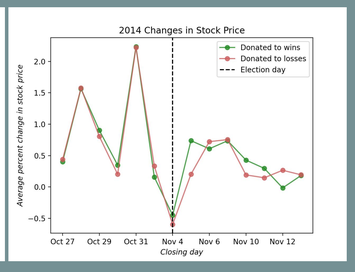
$$f(company) = 1, \text{if} \sum donations_{won} > \sum donations_{lost}, 0 \text{ otherwise}$$

This created groups of 342 winners and 72 losers in 2014, and 278 winners and 118 losers in 2016. After assigning companies to the two populations using this method, we calculated the following t-statistics.

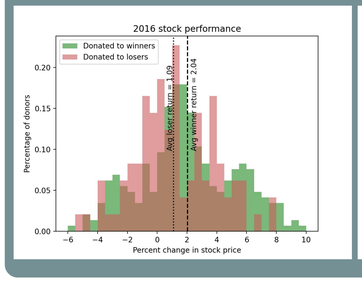
For **2014**, the **t-statistic was 2.068,** with a **p-value of .0392.**
For **2016**, the **t-statistic was 2.412,** with a **p-value of .0163.**

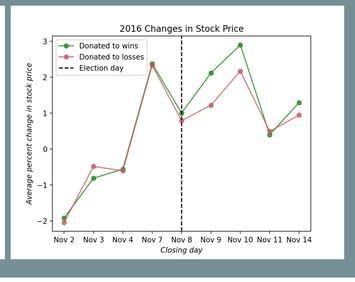
<u>These p-values suggest that the population means of the distributions of those who donate more to winners and losers are different at a statistically significant level, meaning we can reject the null hypothesis that there is no difference between stock performance of companies that donated more to winning candidates and the performance of companies that donated more to losing candidates for both 2014 and 2016.</u>





These figures illustrate the differences between the two populations, as well as how average stock performance compared between the two groups around/following election day.





Approach 2: Multivariate Regression

Following the results of our t-test, we ran a multivariate regression in order to better understand the magnitude and significance of the relationship between political performance and stock performance. Our regression was run on each political donation made by S&P 500 corporations in the 2012, 2014, and 2016 election cycles for house, senate, and presidential races. The dependent variable is the percent change in stock price of the company at the time of the election. Initially, our independent variables were whether the candidate donated to won or lost, and the amount of donation. We then included as controls qualitative data about the candidates including their political party and whether the type of race they were in, the "beta coefficient" of the company (a measure of how volatile the stock is relative to the market).
Below is a summary of relevant results from the regression:

Variable	Coefficient	P> |t|
const	1.7779	0.000
candidate_won	0.1679	0.000
is_democrat	-0.1567	0.000
is_president	-0.2495	0.000
is_senate	-0.1122	0.000
is_2012	-4.4623	0.000

Variable	Coefficient	P> |t|
is_2014	-2.0263	0.000
prev_pct_chg	-0.0676	0.000
market_cap	-0.0008	0.000
donation_amt	-6.576e-5	0.950
betav	0.8556	0.000

As shown above, the regression suggests that whether or not a candidate wins does seem to have a relationship with a donating company's performance, as indicated by that independent variable's positive coefficient and a p-value of this coefficient that indicates statistical significance, The adjusted r-squared of the regression is .261; it makes sense that the value is this low considering how volatile and unpredictable stock prices are; we were able to raise this value by including the additional control variables, but a lot more data would likely need to be included to get a high r-squared.

Follow Up: Interaction of Party and Result of Race

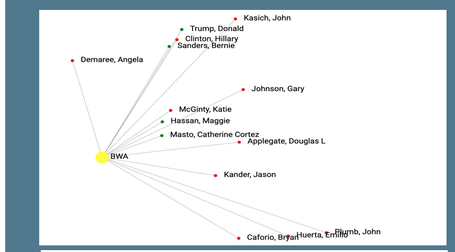
While it is indicated by the first regression that there is a statistically significant correlation between a company donating to a winning candidate and its stock performance, we were interested in further looking at the interaction between whether a candidate wins and the political party of the candidate, to see if the relationship still held for both parties, and if there was a difference in the magnitude of the correlation depending on the candidate's party.
Below is a summary of this follow-up regression.

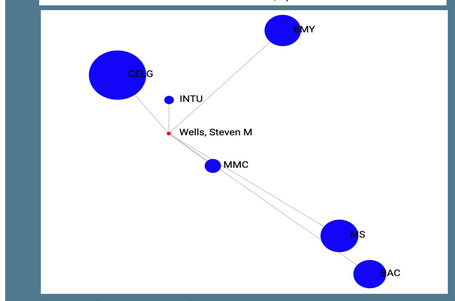
Variable	Coefficient	P> |t|
const	1.6807	0.000
candidate_won	0.2387	0.000
dem_won (interaction)	-0.0968	0.000
is_president	-0.2131	0.001
is_senate	-0.1136	0.000
is_2012	-4.4604	0.000

Variable	Coefficient	P> |t|
is_2014	-2.0187	0.000
prev_pct_chg	-0.0687	0.000
market_cap	-0.0008	0.000
donation_amt	-0.0002	0.877
betav	0.8556	0.000

This suggests that the above relationship holds for both republican and democratic candidates. It is interesting to note that the republican coefficient is slightly higher, which could suggest that there is a stronger positive relationship between the stock performance of companies who donate to republicans and whether the republican wins. However, it is important to note that a majority of these companies have donated to both democrats and republicans.

Capstone Visualization





View interactive version at nikitaramoji.com/capstone

Future Work

A lot of donations occur through the use of political action committees, or by donations made by law firms on behalf of their clients. In order to gain a more accurate understanding of the investment companies had made, we would need to extract this information.
Additionally, it would be interesting to isolate elections that had unexpected results, because many of these races may have already been "priced in" by the market; this could be achieved by scraping polling data ahead of each race.

Conclusion

The regressions conducted and the t-test indicate that there is some relationship between the political performance of candidates and the stock prices of companies that donate. However, a low r-squared value on the regression suggests that we likely need to gather more data to further substantiate the claim.

Acknowledgements

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