Effect of Endorsements and Incumbency on Win Rate in US National Elections

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Abstract

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1 Data Overview

The datasets `rep_candidates.csv` and `dem_candidates.csv` were released by opinion poll analytics and ABC News subsidiary FiveThirtyEight in 2022 to their public data Github repository[1]. The data was originally collected by FiveThirtyEight through interviews, news reports, and campaign websites, among other sources. It contains gender & race information for each of the major candidates in each gubernatorial, house, and senate election for the Republican and Democratic party primaries, respectively, for the 2022 election cycle. Louisiana is the only state not included in these datasets.

The `rep_candidates.csv` dataset contains the information of 1,599 Republican primary candidates. Of these, 1,383, or about 86.5%, are incumbents. The `dem_candidates.csv` dataset similarly contains the information for 1,077 Democratic primary candidates, of which 862 (80.8%) are incumbents. In these datasets, each row represents a single candidate's campaign, including their name, the specific location and seat they are running for, incumbency status, a selected set of partisan endorsements they were given, and the vote share and overall outcome of their primary race or runoff.

Data is also taken from the Federal Elections Commission (FEC) website in the form of `candidate_summary_2022.csv`, which contains campaign finance data for each registered candidate in the 2022 election cycle. These are the same candidates which appear in the FiveThirtyEight data, with the exception again of those in Louisiana races. Each row represents a candidate's campaign and includes financial data like total contributions, total loans, and total expenditures.

We used the FiveThirtyEight dataset for the 2022 Republican Party Primaries in our Multiple Hypothesis question regarding endorsement effect onto primary vote share. Here, we preprocessed each Endorsement column and converted them from categorical ("Yes" / "No") into binary labels 1, 0. One problem we encountered early on was determining not only the uncontested races, but how contested a race was. Unlike most general elections with two candidates each from the two major parties, primaries often have a contested field and that would result in a lower primary vote share and win chance. We dealt with this issue by grouping the dataset by the exact seat of the election to find the amount of candidates registered for the race, and using that to determine the correct expected vote share they'd have.

We used all three datasets previously mentioned in our second research question, on the causal link between Incumbency and Win Outcome. Here, in order to merge all three datasets, we reformatted each candidate's name using regex expressions. Along with that, due to the disjointed natural of the Democratic and Republican set of partisan endorsements, we represented the effect endorsements have as simply a sum of those garnered by the candidate. Through our prior work, we didn't believe this reduction would have a large difference in our causal effect, and it provides a double purpose of reducing AIC from the sheer number of columns for each endorsee down to one. Along with that, we also preprocessed the Incumbency Status column to binary labels, similar to what we did with Endorsements previously.

2 Exploratory Data Analysis

2.1 Correlation between endorsers

The heat map in Figure 1 shows the correlation between Republican endorsers. The majority of this chart is blue with lower correlation coefficient, indicating that most of the endorsements are not strongly related to one another. Additionally, this could mean that these endorsers rarely support the same candidate or none at all, leading to a small overlap with other endorsers. This independence motivates the need towards examining how each endorser individually affects primary vote share amongst each candidate. As for highly correlated endorsements, VIEW PAC and Maggie's List have a correlation of 0.70, which is the highest correlation coefficient on this map. VIEW PAC and Winning for Women
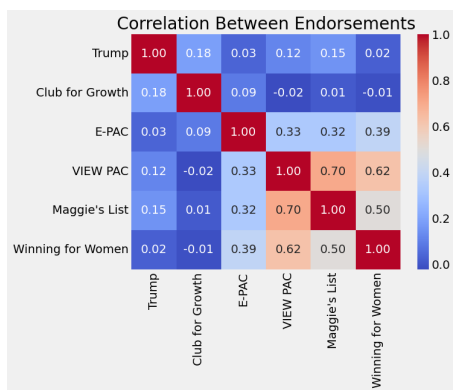
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[1]https://github.com/fivethirtyeight/data/tree/master/primary-project-2022

Figure 1. Correlation matrix between major endorsers across the 2022 Republican national primary elections.

have a similarly high correlation around 0.62. These patterns suggest that the combined effects of these endorsers could lead to a better performance for that specific candidate.
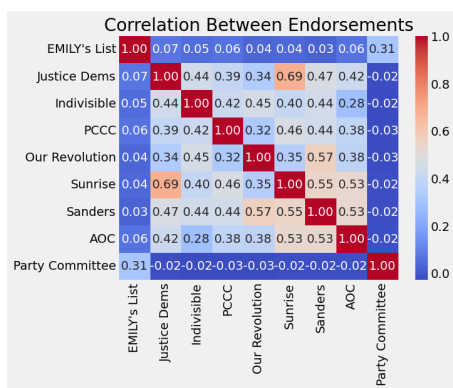

Figure 2. Correlation matrix between major endorsers across the 2022 Democratic national primary elections.

Similarly, Figure 2 displays a heat map of the correlation between Democratic endorsers. We generally see much higher correlation coefficients than Republican heatmap, most notably Sunrise and Justice Dem's (0.69), Sunrise and Sanders (0.55), Our Revolution and Sanders (0.57), AOC and Sunrise (0.53), and AOC and Sanders (0.53). In contrast to the Republican heatmap, there appears to be a lot more overlap between endorsements of Democratic candidates. We also noticed that Party Committee and Emily's List have very small correlation with other endorsers except each other. These trends suggest that deeper exploration into the combined effect could reveal more about the relationships between primary outcomes and endorsements than the simpler vote share by endorsement chart did. It motivates questioning whether certain endorsers or certain combinations of endorsers have more overall power to influence voters and increase primary vote share in a given candidate.

2.2 Endorsements and Win Rate

Figures 3 & 4 visualize the win rates based on endorsements across Democratic and Republican candidates, respectively. The height of each bar is proportional to the win rate, with green bars representing endorsements and the red bar representing non-endorsements. For example, the green bar for Trump is significantly taller than the orange bar, showing that candidates endorsed by Trump had a higher win rate than those who were not.
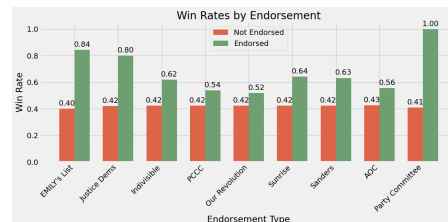

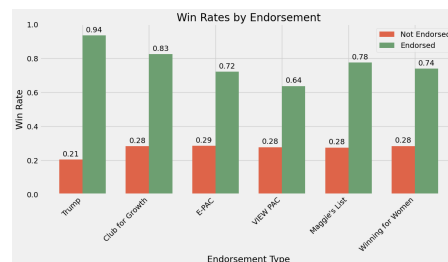**Figure 3.** Win rates based on endorsements by various Democratic endorsers.

Figure 4. Win rates based on endorsements by various Republican endorsers.

The win rates for candidates who were not endorsed by any of the listed endorsers are relatively consistent across all Republican endorsers with a win rate average of about 27%. Comparatively, the win rates of the Democrats' endorsed candidates are higher and the win rates for the not endorsed candidates are consistently around 0.4-0.43%. Notably, the Democratic party committee win rate is exactly 100%, surpassing even that of former President Trump.

This outcome is unexpected and reveals a strong—perhaps causal—relationship between winning and endorsement from the Democratic party committee. High win rates for endorsed candidates suggest a possible influence of that endorsement on voter behavior, therefore further exploration into the role these endorsements play in candidate's performance in the polls. By identifying patterns in the win rates, these visualizations motivate questions about the relationship between endorsements and electoral success.
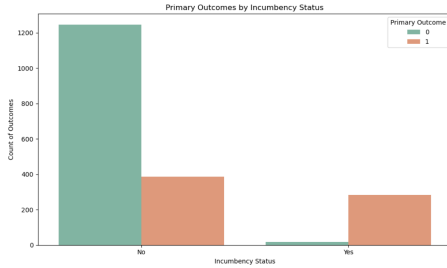
Figure 5. Primary outcomes based on candidate incumbency.
1: Won. 0: Lost

2.3 Primary Outcomes by Incumbency Status

Figure 5 illustrates the outcomes of primary races grouped by
incumbency status. In this visualization, a primary outcome
of 0 indicates that the candidate lost, whereas a primary out-
come of 1 signifies that the candidate won, including cases
where they advanced through a runoff. The graph reveals
a significant disparity in success rates between incumbents
and non-incumbents, highlighting the advantages of incum-
bency in political races.

The majority of candidates in the dataset were not incum-
bents, many of whom were likely running for office for the
first time. Non-incumbents have a relatively low win rate of
23.71%, which can be attributed to the competitive nature
of these races, as multiple non-incumbent candidates often
compete for the same position, but only one can win.

In contrast, incumbents demonstrate a much higher win
rate of 94.02%. This significant win rate difference can be ex-
plained by the incumbency advantage. Incumbency provides
candidates with benefits that include name recognition and
access to existing donor networks, which enables stronger
campaign financing.

With this, it underlines the importance of our question
of whether incumbent status causes a candidate to win a
political race. We will explore the causal relationship of this,
but the graph clearly demonstrates a disparity in success
rates between incumbents and non-incumbents.

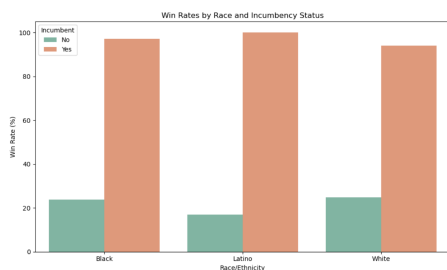## 2.4 Demographic Information by Incumbency Status

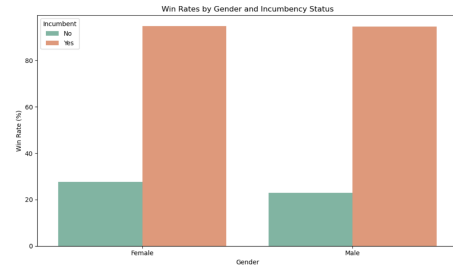**Figure 6.** Win rates by selected races of candidates.
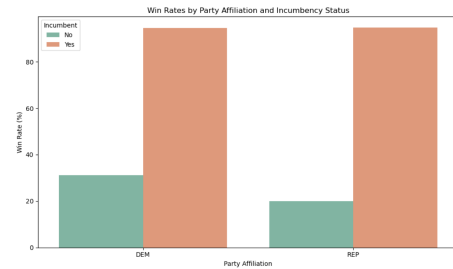

Figure 7. Win rates by gender.

Figure 8. Win rates by candidate party affiliation.

Figures 6, 7, and 8 all represent win rates by race, gender,
and party affiliation grouped by incumbency status, show-
ing that all of the categories exhibit a clear advantage for
incumbents.

In Figure 6, the three most common races among the candi-
dates—White, Black, and Latino—are filtered for analysis. All
of these races show a high win rate for incumbents at around
95%, while non-incumbents have a much lower win rate, av-
eraging around 20%. Figure 7 reveals similar trends to Figure
6, with incumbents across both gender categories showing
high win rates, while non-incumbents exhibit significantly
lower win rates. As for Figure 8, a high win rate is seen for in-
cumbents, and a slightly higher win rate for non-incumbents
compared to Figure 6 and 7 for their non-incumbents with
an average of about 25%.

3 Research Questions

3.1 Multiple Hypotheses

The first selected research question pertains to increase in
vote share as the result of an endorsement by various people
and organizations on candidates' primary vote share in the
2022 Republican Party primary elections.

Let $\mathbb{E}[C]$ denote the average vote share for the set of all
candidates C in primary races of the 2022 Republican Party
elections, and let End_x denote the average vote share for the
set of candidates endorsed by an individual or group x. We
can use this to define our hypotheses[2] below.

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[2]TRUMP is abbreviated for Donald Trump, WIN is abbreviated for Winning
for Women, MAGGIE is abbreviated for Maggie's List, VIEW is abbreviated

$$H_0 : \forall x End_x - \mathbb{E}[C] = 0$$
$$H_1 : End_{\text{TRUMP}} - \mathbb{E}[C] > 0$$
$$H_2 : End_{\text{WINNING}} - \mathbb{E}[C] > 0$$
$$H_3 : End_{\text{MAGGIE}} - \mathbb{E}[C] > 0$$
$$H_4 : End_{\text{VIEW}} - \mathbb{E}[C] > 0$$
$$H_5 : End_{\text{EPAC}} - \mathbb{E}[C] > 0$$
$$H_6 : End_{\text{CLUB}} - \mathbb{E}[C] > 0$$

3.2 Causal Inference

The second research question is "Does candidate incumbency cause a candidate to win a political race?". Causal methods such as ordinary least squares regression (OLS), Logistic Regression, and propensity matching can be used to isolate the direct effects of incumbency on political race outcome while accounting for potential confounding factors such as campaign contributions, endorsements or party affiliation. For example, an incumbent running for office might be seen as less risky in a competitive district compared to other candidates in the primary, potentially leading to a disproportionate number of donations and endorsements for them over other incumbent challengers in the primary. Furthermore, total contribution and number of endorsements may cause a candidate to be more successful than others in the primary election cycle, putting them ahead of other candidates.

The directed acyclic graph (DAG) in Figure 9 depicts the variables and their relationship to one another in this instance.
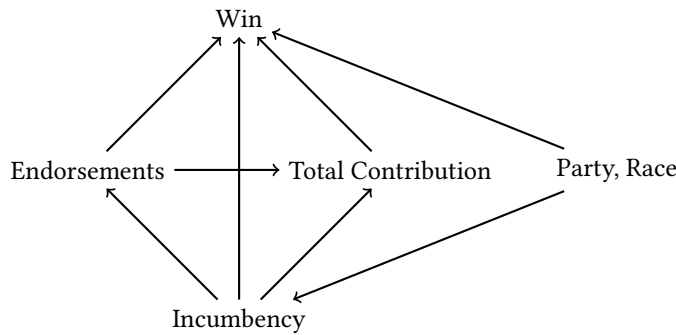

Figure 9. Causal inference DAG

Logistic Regression and Propensity Scores are used to determine the treatment effect of incumbent status on political race outcome (win/lose).

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for VIEW PAC, EPAC is abbreviated for E-PAC, and CLUB is abbreviated for Club for Growth.

4 Prior Work

In our exploration of what factors affect a candidate's primary vote share, we looked at two prior studies to guide which direction to take. Dominguez [4] determines that, broadly speaking, partisan endorsements have an effect on a candidate's primary vote share, controlling for financial contributions and a candidate quality scale. This lined up exactly with what we wanted to focus on, but its methodology left several questions that we wanted to provide clarity on. The Dominguez paper used a dataset of only 32 primary races in the 2002 House elections, determined by open seats and survey responses. With a much smaller sample size of candidates and a much different political environment twenty years ago, our study will be broader and more robust towards application in future races.

Likewise, DeLuca [3] provides an interesting observation into how local newspaper endorsements can be used to determine differences in candidate quality using a large election dataset. While our datasets involve national endorsements instead of local newspapers and DeLuca focuses upon general elections and not primaries, it still was an important resource in fine-tuning our research questions and determining our exact methodologies. Along with furthering our understanding in why endorsements is a good direction to take, it helped us realize that for our research question about incumbency, endorsements garnered by a candidate can have a large enough effect to actually be a confounding variable in a candidate's chances of winning a primary, and we adapted our Causal DAG to take that into account.

5 Inference & Decisions

5.1 Multiple Hypotheses

5.1.1 Methodology. Each hypothesis is tested through multiple rounds of A/B testing, where each rounds compares H_0 with an alternative (e.g. endorsement for a given candidate). We then determine p-values that quantify the extremity in the difference between the effects on primary vote share for endorsed candidates and non-endorsed candidates for a particular endorser.

This is accomplished by generated an empirical null distribution of differences, simulating 25,000 datasets with randomly shuffled endorsements, and taking the observed difference in means between groups in the binary labels. This sampling preserves the original proportion of endorsement and non-endorsements, thereby remaining unbiased. We then compare this null distribution with the actual the observed difference in means of the original unshuffled set to finally determine the statistical significance of the endorsement on a candidate's vote share in a primary race. We chose A/B testing in our methodology as we saw that it was much easier to simply compare the null to each endorsement rather than dealing with potential aggregate effects with multiple

endorsements for a single candidate and having to isolate those results to compare between endorsements directly.

We computed the statistical power specifically with respect to the 'Winning for Women' endorsement, as we were worried about the significance of our results due to its smaller sample size. We used a significance level of $\alpha = 0.05$ and utilized the noncentral t-distribution, which is linked to the Student t-test used in comparing two sample means, to determine that we get a power of 0.988 for 'Winning for Women'. This vastly exceeds the conventional standard of 0.8 and therefore means that our sample sizes for all our populations is large enough to potentially have a statistically significant conclusion to our hypotheses.

5.1.2 Multiple Hypothesis Test Corrections. The Bonferroni Correction and the Benjamini-Yekutieli procedure are used to control error rates. p-values are computed for the average difference in means between the binary Republican endorser column and the numerical primary percentage column, similar to vote share.

5.1.3 Results. The results for each of the p-value tests are provided below in Table 1.

Endorser	p-value
Donald Trump	0.000
Club for Growth	0.000
E-PAC	0.014
VIEW PAC	0.000
Maggie's List	0.000
Winning for Women	0.000

Table 1. p-values for endorsement vote share differences.

The Bonferroni Correction (BC) controls the Family-Wise Error Rate (FWER) by selecting a threshold a which is inversely proportional to the number of hypotheses being tested [1]. For six hypothesis tests with an original $\alpha = 0.05$, this threshold becomes $\alpha_{BC} = \frac{0.05}{6} \approx 0.0083$. This correction ensures that the probability of any false positives remains below the original α.

The Benjamini-Yekutieli (BY) procedure controls the False Discovery Rate (FDR), which is the expected proportion of false positives among all rejected hypotheses, for set of not necessarily independent multiple hypotheses [2]. This procedure was used in place of the Benjamini-Hochberg (BH) procedure to control the FDR due to the dependency nature of endorsements. For instance, endorsements by one endorser may influence another endorser to endorse similar or opposing candidates. The BY compares each p-value to the comparison value below.

$$\mathrm{Pr}_{(k)} = \frac{k}{m \cdot \sum_{i=1}^{1} \frac{1}{i}} \cdot \alpha$$

The BY Procedure has greater power than the Bonferroni Correction and adjusts p-values based on their rank, allowing more discoveries while controlling the proportion of errors.

Under the naive threshold $\alpha = 0.05$, we reject the null for all 6 hypothesis. However, when controlling for error rates with Benjamini–Yekutieli and Bonferroni Correction, we fail to reject H_6. As a result, there is no difference between the mean vote share for candidates endorsed by E-PAC and the expected vote share.

5.2 Causal Inference

5.2.1 Methodology. We aimed to determine the treatment effect of incumbent status on political race outcome, where the treatment group is incumbents (1) and control is non-incumbents (0), units are the candidates, and the outcome is winning (1) or losing (0).

Since we are using observational data and binary outcomes, we decided to use a logistic regression model and propensity score to control for observed confounders for our causal inference.

Structural racism and taste-based discrimination persists in the US today, and impacts winning outcomes and incumbency. After all, to be an incumbent, they must have won the previous election, and a politician's racial identity influences all, current or prior, election results. Party affiliations can also influence voter behavior, and also impact who wins and becomes an incumbent. This is a reasonable assumption especially with the increasingly polarized American political system. To adjust for these observed confounders, we included it in the regression model as part of the features to regress on.

Additionally, selection into incumbent status is not random, so the people who are incumbents (treatment group) may be fundamentally different from the non-incumbents (control group). Therefore, we used propensity scores to calculate our average treatment effect estimator to adjust for selection bias in observational studies

We also noted other variables that are potential colliders. Endorsements can increase visibility and credibility of candidates, just like incumbent status does. Additionally, incumbents typically receive more endorsements and funding due to their connections and track record in office. Likewise, people and organizations are more likely to support candidates they are familiar with, hence incumbency can also influence race outcomes through its impact on total contributions. These variables should not be conditioned on to get the total effect of incumbency.

5.2.2 Results. The estimated treatment effect of incumbent status using logistic regression with the inverse propensity weighted estimator is 0.7018. The value indicates a positive causal effect of the treatment group. On average, the treatment group's outcome, where 1 is winning the race and 0 is losing, is 0.7018 higher than the control group.

Given the magnitude of the causal estimate after adjusting for confounders, colliders, and selection bias, we are confident that there is a causal relationship between Incumbent status and Primary Outcomes.

Though we can conclude there is a large causal effect of incumbent status, additional data such as media coverage, Twitter or Reddit sentiment, and surveys and polls may offer more insight about the public image of the candidate. This can improve causal inference models because it can offer insight on the similarities and differences in the perceived character, quality, or skill of the candidates in the treatment versus control group.

6   Conclusion & Discussion

A limitation of the results are its potential generalizability to elections beyond 2022 or for more local elections. Due to the rapidly-changing landscape of US national politics, endorsements in a time where a party is more centered around particular national figures may be more effective than when a party is not as coordinated behind the same figures. Similarly, in municipal and county elections where turnover of a particular politician may be more common, the effect of incumbency may become less significant.

In national US elections, understanding which endorsers wield the most influence, whether incumbency status causes one to win, and whether contribution amounts significantly impact race outcomes can shape a candidate's campaign strategy. Candidates might prioritize targeting specific actors or emphasizing certain policy issues to secure endorsements and financial support. This knowledge can also enhance voters' awareness of their agency in a political race. If certain endorsers or incumbent status are shown to have a disproportionate impact on win rates, it may diminish voters' perceived influence or rookie politicians' aspirations. Conversely, evidence of the significant role of contributions might motivate voters to support candidates, even through small financial contributions.

References

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[4] Casey B. K. Dominguez. 2011. Does the Party Matter? Endorsements in Congressional Primaries. *Political Research Quarterly* 64, 3 (2011), 534–544. http://www.jstor.org/stable/23056373