

Final Report: Election Prediction

Alexander Bendeck, Lynn Fan, Cathy Lee, Alice Liao, Justina Zou

28 October 2020

Introduction

The United States is getting closer to the 2020 presidential and Congressional elections on November 3, 2020. All 435 seats in the United States House of Representatives, 35 of the 100 seats in the United States Senate, and the office of President of the United States are up for election (Wikipedia, 2020). With the current polarizing political landscape, the election outcomes are significant to determine the next stage of this country. Polarization also makes election prediction both less and more difficult. It is less difficult because election results are less subject to election or candidate-specific factors, and it is more difficult as elections become increasingly close and fierce competitions, especially for presidential elections (Gelman, 2020). Therefore, we believe 2020 is a particularly challenging yet interesting year for statisticians to predict election outcomes and compare results with other predictions and the actual outcome to reflect on methodologies and unaccounted predictors. These election predictions not only inform the public about campaign trends and political sentiments but also help political strategists make decisions on allocating campaign resources for different candidates (Linzer et al.). American political pundits have been spending countless hours obtaining and analyzing relevant data to predict the election outcomes, and historical models and predictions and pre-election polls are two of the most important sources of information (Linzer et al.). In this report, similarly, we will also be using both literature review and polls for 2020 to build our prediction models.

We plan to build prediction models for the 2020 U.S. presidential election and the Senate election nationwide. Also, among all states, we decide to further predict the U.S. House election outcome for North Carolina, as it has been a swing state in presidential and Congressional elections for decades. Since 1996, the Republican statewide vote share in Congressional elections has varied “from a low of 45% in 2008 to a high of 55% in 2014” (Perrin et al.). To summarize, this report aims to use statistical models to predict (1) the outcome of the presidential election, (2) whether the US Senate remains in Republican control, (3) the electoral college vote, (4) the outcomes of all NC Congressional elections (the 13 federal Representatives to Congress), and (5) the outcome of the NC Senate election, including characterization of uncertainty in predictions.

Data Description

Senate poll/House poll: from <https://data.fivethirtyeight.com/> States_cov_matrix: from the Economist paper
Economist prediction polls: from the Economist paper (pres) partisan lean (prior for pres): from 538
Abramowitz data: from the Economist paper (pres)

Map For Democrat Vote Share Among States of Interest

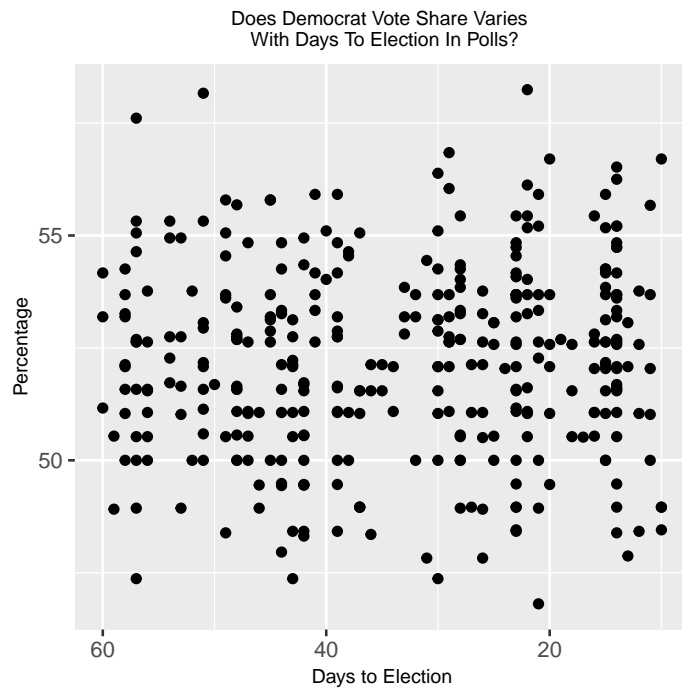
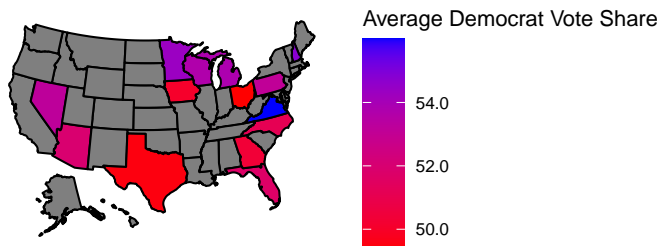


Figure 1: Presidential Election Data Visualization

Map For Democrat Vote Share Among States of Interest

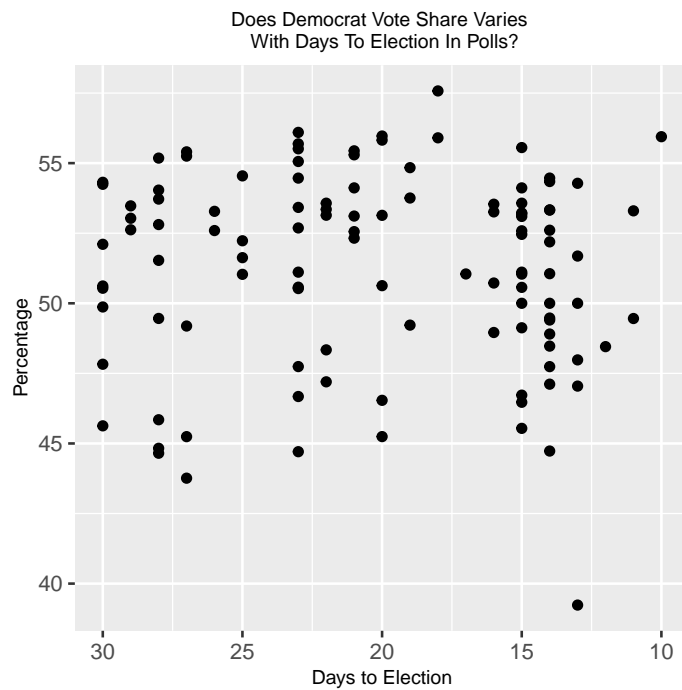
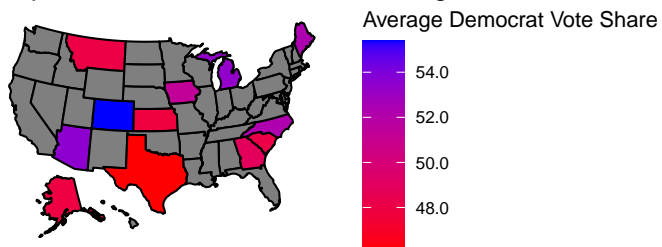


Figure 2: U.S. Senate Election Data Visualization

Exploratory Data Analysis

Method

Results

Model Validation and Sensitivity Checks

Diagnostics

Appendix

References

1. Linzer, D. A. (2013). Dynamic Bayesian Forecasting of Presidential Elections in the States. *Journal of the American Statistical Association*, 108(501), 124-134. doi:10.1080/01621459.2012.737735
2. Hansford, T. G., & Gomez, B. T. (2010). Estimating the Electoral Effects of Voter Turnout. *American Political Science Review*, 104(2), 268-288. doi:10.1017/s0003055410000109
3. 2020 Election. (2020, October 20). Retrieved October 20, 2020, from <https://fivethirtyeight.com/politics/elections/>
4. Park, D. K., Gelman, A., & Bafumi, J. (2006). State-Level Opinions from National Surveys: Public Opinion in State Politics, 209-228. doi:10.2307/j.ctvr33bdg.17
5. Mahler, V. A., Jesuit, D. K., & Paradowski, P. R. (2013). Electoral Turnout and State Redistribution. *Political Research Quarterly*, 67(2), 361-373. doi:10.1177/1065912913509306
6. Uhlaner, C. J., & Scola, B. (2015). Collective Representation as a Mobilizer. *State Politics & Policy Quarterly*, 16(2), 227-263. doi:10.1177/1532440015603576
7. Godbout, J. (2012). Turnout and presidential coattails in congressional elections. *Public Choice*, 157(1-2), 333-356. doi:10.1007/s11127-012-9947-7
8. Kim, S. S., Alvarez, R. M., & Ramirez, C. M. (2020). Who Voted in 2016? Using Fuzzy Forests to Understand Voter Turnout. doi:10.33774/apsa-2020-xzx29
9. Weinschenk, A. C. (2019) That's Why the Lady Lost to the Trump: Demographics and the 2016 Presidential Election, *Journal of Political Marketing*, 18:1-2, 69-91, DOI: 10.1080/15377857.2018.1478657
10. Charles, K. K., & Stephens, M. (2011). Employment, Wages and Voter Turnout. doi:10.3386/w17270
11. Hills, M. (2020, September 25). US election 2020: A really simple guide. Retrieved October 20, 2020, from <https://www.bbc.com/news/election-us-2020-53785985>
12. Railey, K. (2016). Federal Judges Let Stand North Carolina's New Congressional Map. *The Hotline*. https://link.gale.com/apps/doc/A498010836/ITOF?u=duke_perkins&sid=ITOF&xid=119d6ad9
13. Perrin, A. J., & Ifatunji, M. A. (2020). Race, Immigration, and Support for Donald Trump: Evidence From the 2018 North Carolina Election. *Sociological Forum*, 35(S1), 941-953. doi:10.1111/socf.12600

14. Redistricting in North Carolina. (2020). Retrieved October 21, 2020, from https://ballotpedia.org/Redistricting_in_North_Carolina
15. Â§ 132-1. Public Records. https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/BySection/Chapter_132/GS_132-1.pdf
16. Â§ 163-82.10. Official record of voter registration. https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/BySection/Chapter_163/GS_163-82.10.pdf
17. FairVote.org. (n.d.). Voter Turnout. Retrieved October 22, 2020, from https://www.fairvote.org/voter_turnout
18. McDonald, M. P. (2020). Voter Turnout Demographics. Retrieved October 23, 2020, from <http://www.electproject.org/home/voter-turnout/demographics>
19. Y. Ghitza, A. Gelman's (2013). Deep interactions with MRP: Election Turnout and Voting Patterns Among Small Electoral Subgroups. *American Journal of Political Science* 57 762– 776.
20. Walker, H.L., Herron, M.C. & Smith, D.A. Early Voting Changes and Voter Turnout: North Carolina in the 2016 General Election. *Polit Behav* 41, 841–869 (2019). <https://doi-org.proxy.lib.duke.edu/10.1007/s11109-018-9473-5>
21. Pew Research Center (2020). Men and women in the U.S. continue to differ in voter turnout rate, party identification. <https://www.pewresearch.org/fact-tank/2020/08/18/men-and-women-in-the-u-s-continue-to-differ-in-voter-turnout-rate-party-identification/>
22. Pew Research Center (2016). Party affiliation among voters: 1992-2016. <https://www.pewresearch.org/politics/2016/09/13/2-party-affiliation-among-voters-1992-2016/>
23. J. Misra (2019). Voter Turnout Rates Among All Voting Age and Major Racial and Ethnic Groups Were Higher Than in 2014. <https://www.pewresearch.org/fact-tank/2020/08/18/men-and-women-in-the-u-s-continue-to-differ-in-voter-turnout-rate-party-identification/>
24. Killian, L. (2012). Five Myths About Independent Voters. Retrieved October 22, 2020, from https://www.washingtonpost.com/opinions/five-myths-about-independent-voters/2012/05/17/gIQAZmGyWU_story.html
25. Igielnik, R. (2020). Men and Women in the U.S. Continue to Differ in Voter Turnout Rate. Retrieved October 22, 2020, from <https://www.pewresearch.org/fact-tank/2020/08/18/men-and-women-in-the-u-s-continue-to-differ-in-voter-turnout-rate-party-identification/>
26. Akee, R. (2019). Voting and Income. Retrieved October 22, 2020, from <https://econofact.org/voting-and-income>
27. Wikipedia. 2020 United States elections. (2020, October 27). Retrieved October 31, 2020, from https://en.wikipedia.org/wiki/2020_United_States_elections
28. Gelman, A., & Heidemanns, M. (2020). President-Forecasting the US 2020 elections. Retrieved November 01, 2020, from <https://projects.economist.com/us-2020-forecast/president>
29. Gelman, A., Hullman, J., Wlezien, C., & George, E. M. (2020). Information, incentives, and goals in election forecasts. *Judgment and Decision Making*, 15(5), 863-880.

Additional EDA

Map For The Number of Filtered Polls Among States

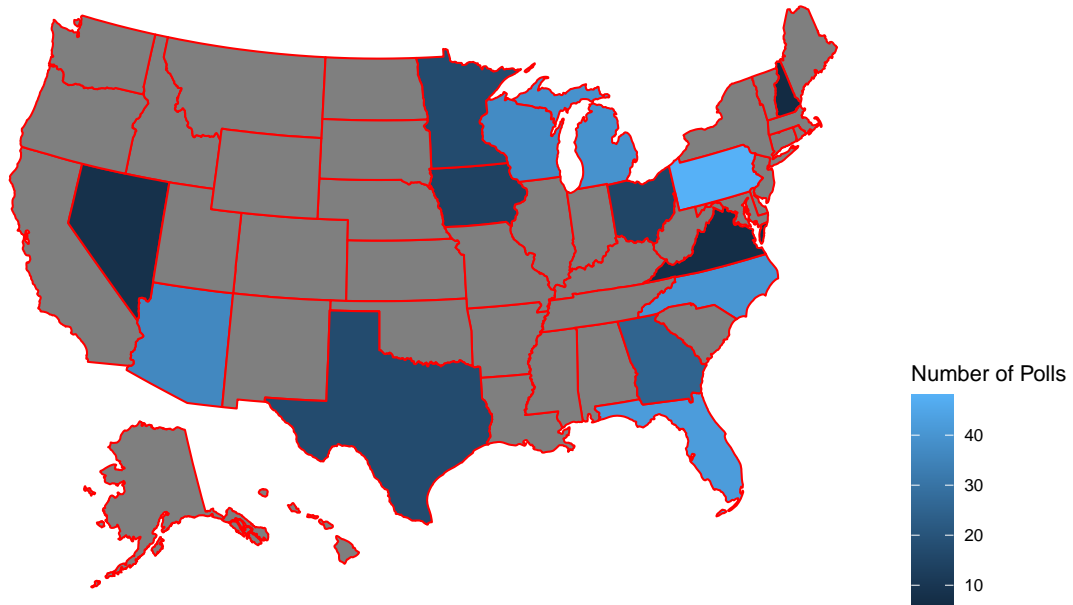


Figure 3: Additional Presidential Election Data Visualization

Map For The Number of Filtered Polls Among States

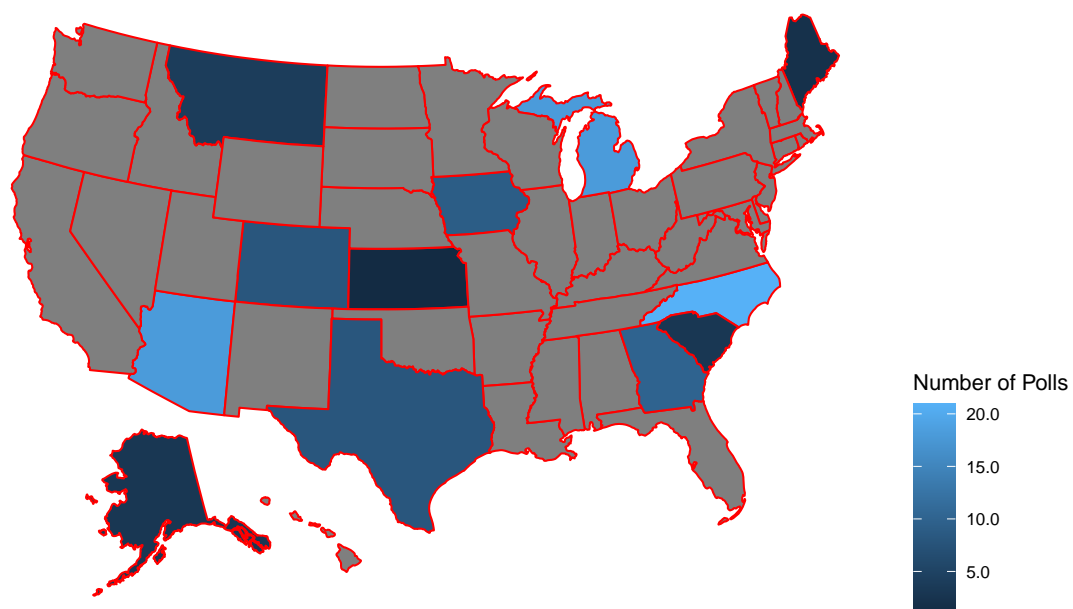


Figure 4: Additional Senate Election Data Visualization