Forecasting the 2024 U.S. Presidential Election*

Kamala Harris Projected to Defeat Donald Trump 48.3% to 47.1% in the Popular Vote and 270 to 268 in the Electoral College Based on Poll of Polls and Bayesian Modeling Analysis

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The U.S. Presidential election will take place on Tuesday, November 5th with Vice President Kamala Harris and former President Donald Trump in a close race for the White House. In this paper, we used the poll-of-polls method and applied a Bayesian model to estimate the winner of the popular vote and the winner of each of the seven battleground states: Arizona, Georgia, Nevada, North Carolina, Michigan, Wisconsin, and Pennsylvania, and Nebraska's second congressional disctict. Using the results of our poll-of-polls analysis, we predict that Vice President Harris will win the popular vote, 48.3% to 47.1% and the electoral college 270 to 268 by winning three of the seven battleground states, Wisconsin, Michigan, and Pennsylvania. Our analysis shows that the race is extremely tight and former President Trump winning the popular vote, electoral college, or both is well within the margin of error. Our results show a statistical tie when we account for error, bias, weaknesses, and limitations.

1 Introduction

On Tuesday November 5, 2024, Americans will head to the polls to elect their 47th president. Polling data has shown a tight race between VIce President Kamala Harris and former President Donald Trump since President Joe Biden made the historic and unprecedented decision to end his re-election campaign on July 21, 2024. President Biden immediately endorsed Vice President Harris on July 21, making her the presumptive Democratic nominee. Vice President Harris officially became the Democratic nominee on August 2, 2024 following a virtual rollcall. This paper uses presidential polling data from after President Joe Biden ended his re-election campaign and Vice President Harris became the presumptive Democratic nominee nominee

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*The code and data used to perform this presidential election forecast can be found at: https://github.com/taliafabs/USPresidentialPollingForecast2024.git.

and Bayesian analysis models to estimate the percentage of voters supporting Vice President Harris and former President Trump.

The estimands, defined by Alexander (2024) as the values we are trying to estimate, are the percentages of voters that support Vice President Harris and former President Trump at the national level, in each of the seven battleground states (Arizona, Nevada, Georgia, North Carolina, Wisconsin, Michigan, and Pennsylvania), and in Nebraska's second congressional district.

Based on the results of applying our Bayesian model, we estimate that Vice President Harris will receive 48.3% of the popular vote and win the swing states of Michigan, Wisconsin, Pennsylvania, and Nebraska CD-2, and former President Trump will receive 47.1% of the popular vote and win the swing states of Arizona, Nevada, North Carolina, and Georgia. We use a baseline of 222 electoral votes for Vice President Harris from safe and likely Democratic states that were won by both Hillary Clinton and President Biden in 2016 and 2020, and 219 electoral votes for former President Trump from safe and likely Republican states that he won in 2016 and 2020 (270 to Win 2024). U.S. elections are decided by the electoral college, not the popular vote; the candidate who wins the popular vote is not guaranteed to win the election (270 to Win 2024). We estimate that Vice President Harris will defeat former President Trump in the electoral college 270 to 268.

Political polarization in the United States is at an all-time high. Vice President Harris and former President Trump have presented staunchly different policies and visions for the future of the United States. Vice President Harris has campaigned on reproductive rights, supporting small businesses, building more affordable housing, expanding medicare coverage, and cutting taxes for the middle class. Former President Trump has campaigned on tariffs, sales taxes ending foreign aid to Ukraine, and securing the Southern border despite instructing his allies in the U.S. Senate to oppose a bipartisan border bill. He is has not yet acknowledged that he lost the 2020 election to President Joe Biden. Women make up 50% of the U.S. population, but all 46 presidents so far have been men. Only one person of color, Barack Obama, has ever been elected president.

The remainder of this paper is structured as follows. Section 2 contains an overview of the polling dataset from FiveThirtyEight (2024) that was used, visualizations of different variables, and summary statistics. Section 3 contains the Bayesian regression models used to predict the percentages of voters that will support Vice President Harris and former President Trump. Section 4 contains tables and visualizations that present the national popular vote and state-level results after applying the Bayesian regression model model. Section 5 contains detailed discussions about the …. Appendix A contains a thorough discussion about an idealized methodology that we would use if given a $100,000 budget to build a survey to forecast the 2024 U.S. election and our idealized survey questions. Appendix B contains a deep-dive into and evaluation of the methodologies used in the Siena College/New York Times poll. The statistical programming language (R Core Team 2023) and the `tidyverse`, `janitor`, `ggplot`,

`kableExtra`, `arrow`, `rstanarm`, and `spline` packages were used to perform this election forecast, clean the dataset, build the Bayesian regression models, create data visualizations and tables, and apply the model.

2 Data

2.1 Overview

The data was downloaded on October 29, 2024; polling data released after this date was not considered anywhere in this paper. The presidential polls dataset from FiveThirtyEight contains national polls and state-level polls for each of the 50 states and congressional districts in Maine and Nebraska (FiveThirtyEight 2024). The polls are conducted by various pollsters, including YouGov, Siena/NYT, CES/YouGov, Marquette Law School, The Washington Post, and McCourtney Institute/YouGov. We analyze national data and state-level data for the seven swing states that are expected to determine the results of this election: Michigan, Wisconsin, Pennsylvania, North Carolina, Georgia, Nevada, and Arizona.

We cleaned this dataset to only include high-quality polls at the national and state-level conducted on or after July 21, 2024, where the `population` is likely voters. We determined which polls were high-quality based on the numeric grade, and cleaned the dataset to include only polls with a numeric grade of at least 3.0. Polls with a rating (`numeric_grade`) of 3.0 are conducted by the best pollsters in the United States and score in the 99th percentile or better for accuracy and transparency (Morris 2024b). If a poll in the dataset from FiveThirtyEight (2024) includes multiple populations, the narrowest one is used (likely voters over registered voters and registered voters over all American adults) (Morris 2024a).

2.2 Measurement

During U.S. presidential and midterm election cycles, different pollsters conduct polls (surveys) to estimate support for Democratic, Republican, and third-party candidates and forecast the election results. Sampling and survey methodologies vary by pollster and we discuss the methodologies used by the Siena College/New York Times poll in Appendix B. Each poll aims to survey a population that is representative of the U.S. electorate or likely voters to predict the percentage of voters who will support each candidate and which candidate will win.

Our dataset from FiveThirtyEight (2024) is a a collection of presidential polls from different pollsters that were conducted during the 2024 presidential election cycle. Each entry represents the percentage of respondents to a unique poll supporting Vice President Harris (after July 21, 2024) or President Joe Biden (before July 21, 2024), former President Trump, and third-party candidates. Unique polls are identified by a poll id and each entry contains information about the poll, such as the pollster that conducted it, its population, sample size, and the

methodology that was used and information about its quality and accuracy, including its numeric grade, pollscore, and transparency score.

2.3 Outcome and predictor variables

We will use `end_date` (the date that a poll was completed), `state`, `pollster`, and `pollscore` to predict support for Vice President Harris and former President Trump at the national level, at the state level for each of the seven battleground states, and in Nebraska's second congressional district in Section 3. The tables and visualizations below present possible relationships between the predictor variables and support for Vice President Harris and former President Trump.

2.3.1 Variation in support for Harris and Trump by state

The percentage of voters that support Vice President Harris and former President Trump varies by state; in some states support for Vice President Harris is higher than the national average and in others, it is lower than the national average. The 2024 presidential election is expected to be decided by seven swing states: Arizona, Georgia, Nevada, North Carolina, Wisconsin, Michigan, and Pennsylvania and Nebraska's second congressional district (270 to Win 2024). Two states, Maine and Nebraska, award one electoral vote to the popular vote winner in each congressional district and an additional two electoral votes to the statewide popular vote winner (270 to Win 2024).

Table 1: Polling averages for Harris and Trump at the national level and at the state level for the states included in the polling dataset show a narrow popular vote lead for Vice President Harris and extremely close races in the 7 battleground states (Arizona, Georgia, Nevada, North Carolina, Michigan, Pennsylvania, Wisconsin as of October 29, 2024.

State	Harris %	Trump %
Popular Vote	50.5	48.0
Arizona	47.0	51.0
Georgia	46.0	51.0
Nevada	51.0	47.0
Pennsylvania	49.0	49.0
Michigan	51.0	46.0
Wisconsin	50.0	47.0
North Carolina	48.0	50.0
Florida	46.0	52.0
Minnesota	53.0	43.0
Missouri	41.0	54.0

Table 1: Polling averages for Harris and Trump at the national level and at the state level for the states included in the polling dataset show a narrow popular vote lead for Vice President Harris and extremely close races in the 7 battleground states (Arizona, Georgia, Nevada, North Carolina, Michigan, Pennsylvania, Wisconsin as of October 29, 2024.

State	Harris %	Trump %
Montana	39.5	56.5
Nebraska	39.5	54.0
Nebraska CD-2	53.5	41.5
New Hampshire	52.0	45.0
Ohio	45.0	52.0
Texas	41.0	51.5
Virginia	52.0	44.0

Based on our presidential polling data from FiveThirtyEight (2024) Vice President Harris leads former President Trump in the popular vote 50.5% to 48.0%. The margins in the seven battleground states are tight, with Vice President Harris leading in Nevada, Michigan, Wisconsin, and Nebraska's second congressional district and former President Trump leading in Arizona, Georgia, North Carolina. The two candidates are tied in Pennsylvania. The data set also includes state-level polls from likely Democratic states (Minnesota, New Hampshire, Virginia) and likely Republican states (Florida, Missouri, Montana, Nebraska, Ohio, Texas) that are not expected to determine the winner of the election (270 to Win 2024). Support percentages for Harris and Trump are closer, but still have some variation among the seven battleground states. Harris' support in five of the seven battleground states is lower than her national support, while Trump's support in four of the seven battleground states is higher than his national support.

Since President Biden ended his re-election campaign and Vice President Harris became the Democratic Presidential nominee, the polls have shown a close race between Vice President Harris and former President Trump. Polling averages for the six months leading up to election day, including from before President Biden withdrew on July 21, 2024 can be found in Appendix C.2. Figure 1 shows national polling averages for Harris and Trump since July 21 and Figure 2 shows state-level polling averages fo Harris and Trump in the seven battleground states and Nebraska's second congresional district.

Vice President Harris surpassed former President Trump in popular vote polls shortly after becoming the presumptive Democratic nominee in late July, but her lead narrowed in mid-August and the polls have been neck-and-neck since late August.
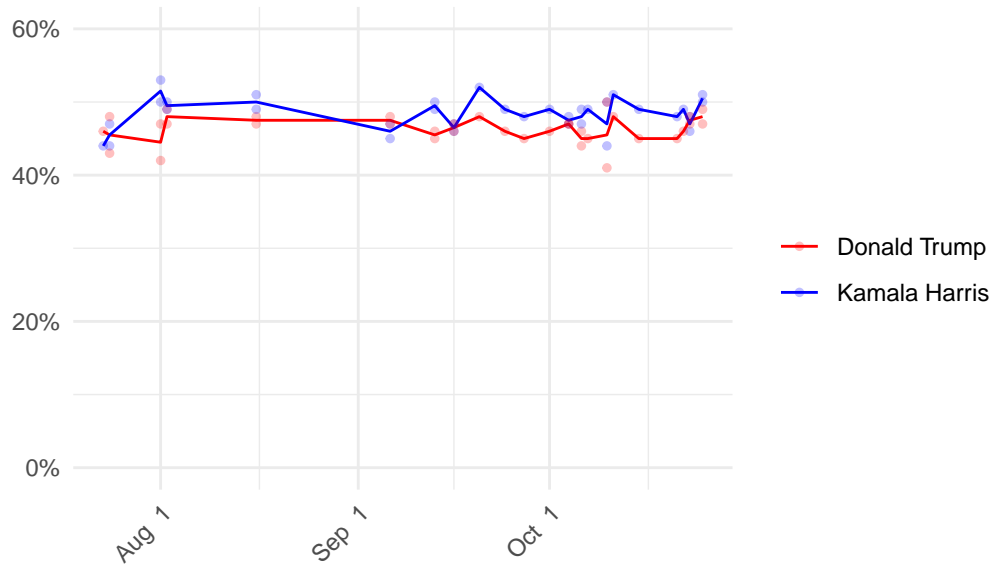
Figure 1: Harris leads Trump in national popular vote polling. The lines are moving poll averages and the points are individual high-quality polls. Color shading of points indicates which candidate won the poll.
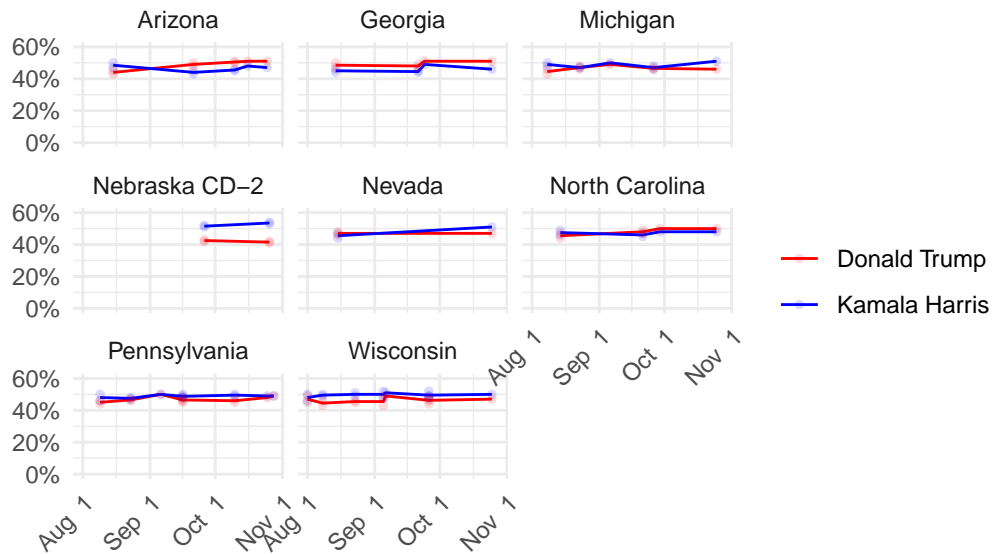

Figure 2: Harris and Trump have been in a dead heat in swing state polls since July 2024. The lines are moving poll averages for each candidate in the seven battleground states. The points are individual state-level polls. The color of each point indicates which candidate lead in the poll.

2.3.2 Variation in support for Harris and Trump by pollster and pollscore
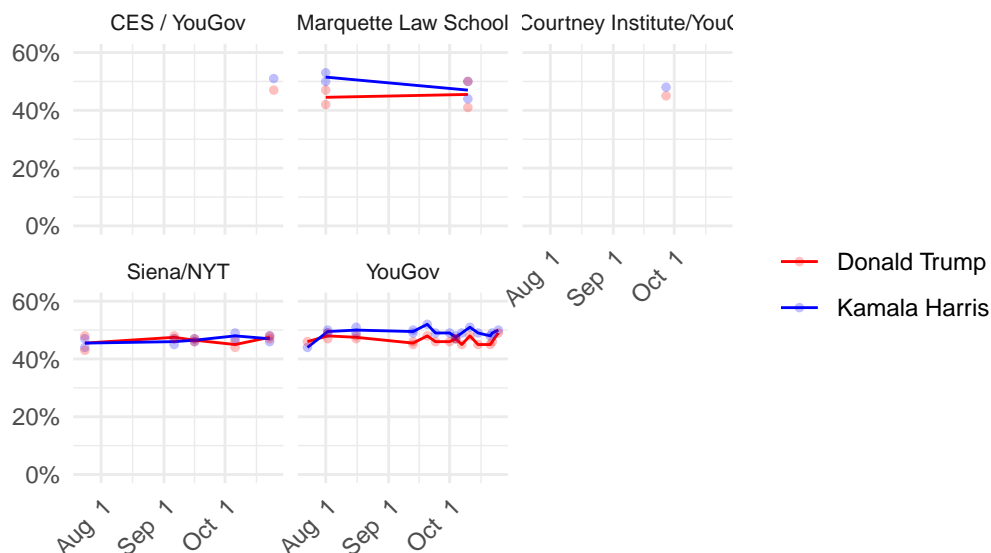
Talk more about it.

Figure 3: Harris and Trump polling averages vary by pollster. The lines are moving poll averages for each candidate in the seven battleground states. The points are individual polls. The color of each point indicates which candidate lead in the poll.

Table 2 shows the different pollscores that appear in our dataset and how often they appear.

Table 2: Only high-quality datasets with a numeric grade of at least 3.0 were included, so the polls included all have good pollscores. Negative/lower pollscores are better.

Pollscore	Number of Polls
-1.5	112
-1.2	8
-1.1	114

Table 3: All the pollsters included in our analysis dataset have a numeric grade of 3, but Siena/NYT has the best pollscore at -1.5.

Pollster	Pollscore	Numeric Grade
CES / YouGov	-1.1	3
Marquette Law School	-1.1	3
McCourtney Institute/YouGov	-1.1	3

Table 3: All the pollsters included in our analysis dataset have a numeric grade of 3, but Siena/NYT has the best pollscore at -1.5.

Pollster	Pollscore	Numeric Grade
YouGov	-1.1	3
The Washington Post	-1.2	3
Siena/NYT	-1.5	3

3 Model

The goal of our modeling strategy is to use a Bayesian model to investigate the relationship between the percentage of voters in a poll who support Vice President Harris or Former President Trump and the date the poll was conducted, the state (or if it was a national poll), the pollster who conducted the poll, and the pollscore it received. Model details and diagnostics are presented in Appendix D. We use two Bayesian regression models, one each to model the percentage of voters supporting Vice President Harris, *pct_harris* and the percentage of voters supporting former President Trump, *pct_trump*.

The models to predict *pct_harris* and *pct_trump* both use the following predictors:

- `end_date_num`: the number of days since July 21, 2024, when President Biden ended his re-election campaign and endorsed Vice President Harris. This is the spline term; it uses an spline with 5 degrees of freedom to model changes in *pct_harris* (in the Harris model) and *pct_trump* (in the Trump model) over time.

- `state`: accounts for the change in *pct_harris* and *pct_trump* at the state-level for a particular state or at the national level.

- `pollster`: accounts for the differences in *pct_harris* and *pct_trump* among different pollsters.

- `pollscore:`adjusts for the pollscore rating, which is the Predictive Optimization of Latent skill Level in Surveys, Considering Overall Record, Empirically, calculated by averaging the predictive error and predictive bias of a poll (Morris 2024a).

3.1 Model set-up

Define pct_harris_i as the percentage of voters supporting Vice President Harris and pct_trump_i as the percentage of voters supporting former President Trump in the poll with unique `poll_id`=i.

Harris model:

$$pct\_harris_i = \beta_0 + \beta_1 \cdot ns(end\_date\_num_i, df = 5) + \beta_2 \cdot state_i + \beta_3 \cdot pollster_i + \beta_4 pollscore_i$$

$$\beta_0 \sim \text{Normal}(50, 10)$$
$$\beta_1 \sim \text{Normal}(0, 5)$$
$$\beta_2 \sim \text{Normal}(0, 5)$$
$$\beta_3 \sim \text{Normal}(0, 5)$$
$$\beta_4 \sim \text{Normal}(0, 5)$$

Trump model:

$$pct\_trump_i = \beta_0 + \beta_1 \cdot ns(end\_date\_num_i, df = 5) + \beta_2 \cdot state_i + \beta_3 \cdot pollster_i + \beta_4 pollscore_i$$

$$\beta_0 \sim \text{Normal}(50, 10)$$
$$\beta_1 \sim \text{Normal}(0, 5)$$
$$\beta_2 \sim \text{Normal}(0, 5)$$
$$\beta_3 \sim \text{Normal}(0, 5)$$
$$\beta_4 \sim \text{Normal}(0, 5)$$

The model is run in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). The default priors from `rstanarm` are used for both GLM Bayesian models. The intercept normal prior with $\mu = 50$ and $\sigma = 10$ reflects the central tendencies of Harris and Trump's polling percentages, influenced by prior knowledge and the predictors use a normal prior with $\mu = 0$ and $\sigma = 5$ (Goodrich et al. 2022).

3.1.1 Model justification

We use separate Bayesian regression models with the same predictors to estimate *pct_harris* and *pct_trump*.

because using only one model to predict support for Harris (*pct_harris*) and calculating support for Trump, *pct_trump*, as 100% - *pct_harris*, or vice versa, would be insufficient and lead to inaccurate results because there are third-party candidates who will receive a small percentage of the vote nationally and in each of the battleground states. It is possible for either candidate to win the popular vote or a swing state with less than 50% of the vote because of third-party candidates, and simply assuming that *pct_trump* = 1 - *pct_harris* (or vice versa) would not account for this. In 2020, President Biden won Arizona with and Georgia with. In 2016, Hillary Clinton beat former President Trump in the popular vote % to %.

We used the default priors from `rstanarm` in both our models because using a normal prior with $\mu = 50$ and $\sigma = 10$ for the intercept of each model allows us to reflect the central

tendencies of *pct_harris* and *pct_trump* and the prior knowledge from the FiveThirtyEight (2024) presidential polls that show a close race between Vice President Harris at the national popular vote level and in each of the seven battleground states (Goodrich et al. 2022).

Model validation and checking results can be found in Appendix D

3.1.2 Alternative model considered

We initially used only one Bayesian regression model to predict *pct_harris* with `end_days_num` (spline term), `state`, `pollster`, and `pollscore` as predictors. We then calculated *pct_trump* as 1 - *pct_harris*. This approach was insufficient and may have produced misleading or inaccurate results because there are third-party candidates who will receive a small percentage of the vote nationally and in each state, so Harris or Trump could win a state or the popular vote with less than 50%.

3.1.3 Model weaknesses and limitations

A limitation of our model is …Support for Harris at a given time is not a predictor for support for Trump and vice versa The models used to predict support for Harris and Trump do not consider support for the other candidate at any given time. Support for Harris likely has a negative relationship with support for Trump; when support for Harris increases, support for Trump likely decreases. Third party candidates also matter when quantifying this and our models do not consider them at all.

Another weakness in our model is the fact that it does not give higher-quality polls more weight or influence. Our A next step might be to give polls with a larger sample size or better pollscore more influence.

4 Results

4.1 National Popular Vote Results

We applied the Harris model and the Trump model defined in Section 3.1 to predict candidate's share of the national popular vote.
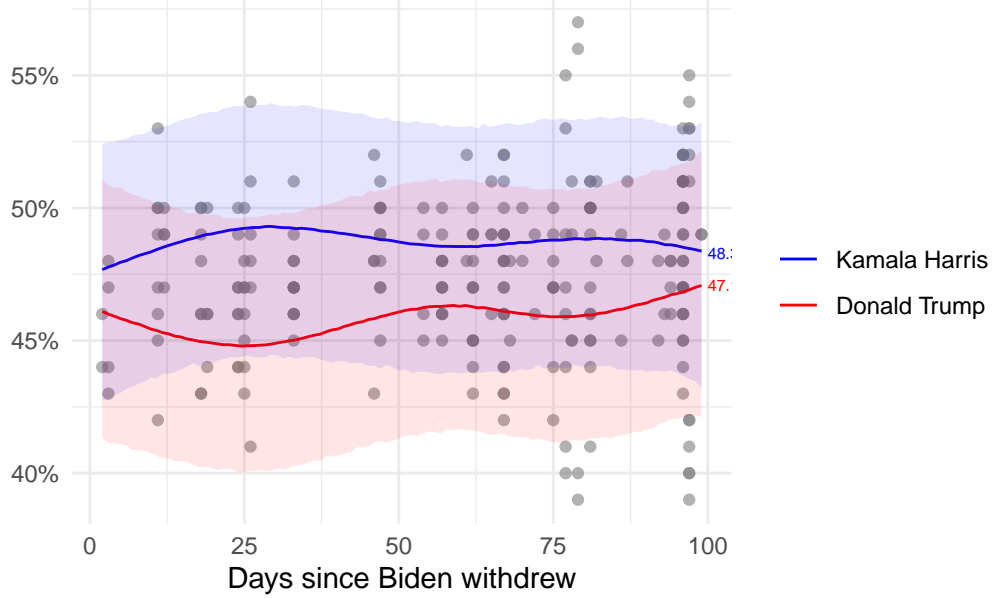
Figure 4: Results of applying Bayesian regression models with spline to predict support for Harris and Trump show that Harris is leading the popular vote 48.3% to 47.1% as of October 29. Lines are moving averages from applying the model, points are individual polls, and the shaded areas show the range of values within the margin of error.

4.2 State-Level Results for the Seven Battleground States and Nebraska's Second Congressional District

Vice President Harris starts out with 225 electoral college votes from states that went to both Hillary Clinton in 2016 and Joe Biden in 2020 (270 to Win 2024), including: . These states are considered safe or likely Democrat and available poling from FiveThirtyEight (2024) shows Vice President Harris with a lead outside the five percent margin of error and in most cases, a double-digit lead. Former President Trump starts out with 219 electoral college votes from states that he won in both 2016 and 2020 (270 to Win 2024), from the following states: . These states are considered safe or likely Republican and available polling data from FiveThirtyEight (2024) shows former President Trump with a lead outside the five percent margin of error, and in most cases, a double-digit lead. Therefore, the results of the Bayesian models presented in Section 3 focus on estimating support for Vice President Harris and former President Trump in Arizona, Nevada, Georgia, North Carolina, Wisconsin, Michigan, Pennsylvania, and Nebraska's second congressional district, which are worth a total of 94 electoral votes (270 to Win 2024).

We applied the Harris model and the Trump model defined in Section 3.1 at the state-level to predict the percentage of the vote that each candidate will receive in each of the seven

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battleground states. This will allow us to predict the winner of the electoral college and who will become the 47th President. Figure 5 shows the results of applying the Harris and Trump Bayesian models with spline at the state-level over time.

Figure 5 shows former President Trump leading in Arizona, Nevada, Georgia, and North Carolina and Vice President Harris leading in Michigan, Wisconsin, Pennsylvania, and Nebraska's second congressional district as of October 29, 2024. If these results hold on election night, Vice President Harris would defeat former President Trump in the electoral college with exactly 270 electoral votes, compared to Trump's 268 electoral votes. Based on the results of the Bayesian models to predict support for Harris and Trump, Vice President Harris is likely to win Nebraska's second congressional district and its single electoral vote, but it is within the 5-point margin of error for either candidate to win any of the seven battleground states. This means that it is within the margin of error for Harris or Trump to win any combination of the seven battleground states, ranging from none of them to all of them. If Vice President Harris wins all seven battleground states, plus Nebraska-2, she would defeat former President Trump in the electoral college 319 to 219. If former President Trump wins all seven battleground states and loses Nebraska-2, he would defeat Vice President Harris in the electoral college 313 to 225. The electoral college results that fall within the range of likely values are summarized in

5 Discussion

5.1 Margin of error, close race, why either could win

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

5.2 Polling flaws in 2016, 2020, and 2022

Discuss polling flaws in 2016 and 2020, how support for Trump was underestimated. Discuss how this was overcorrected in 2022, and how support for GOP house and senate candidates was overestimated. Discuss Trump's unique appeal to a certain segment of the electorate. Refer to Nate Silver articles.

(a) Avg Trump lead +1.61

(b) Avg Trump lead +3.01

(c) Avg Trump lead +0.37

(d) Avg Trump lead +0.44

(e) Avg Harris lead +2.22

(f) Avg Harris lead +2.57

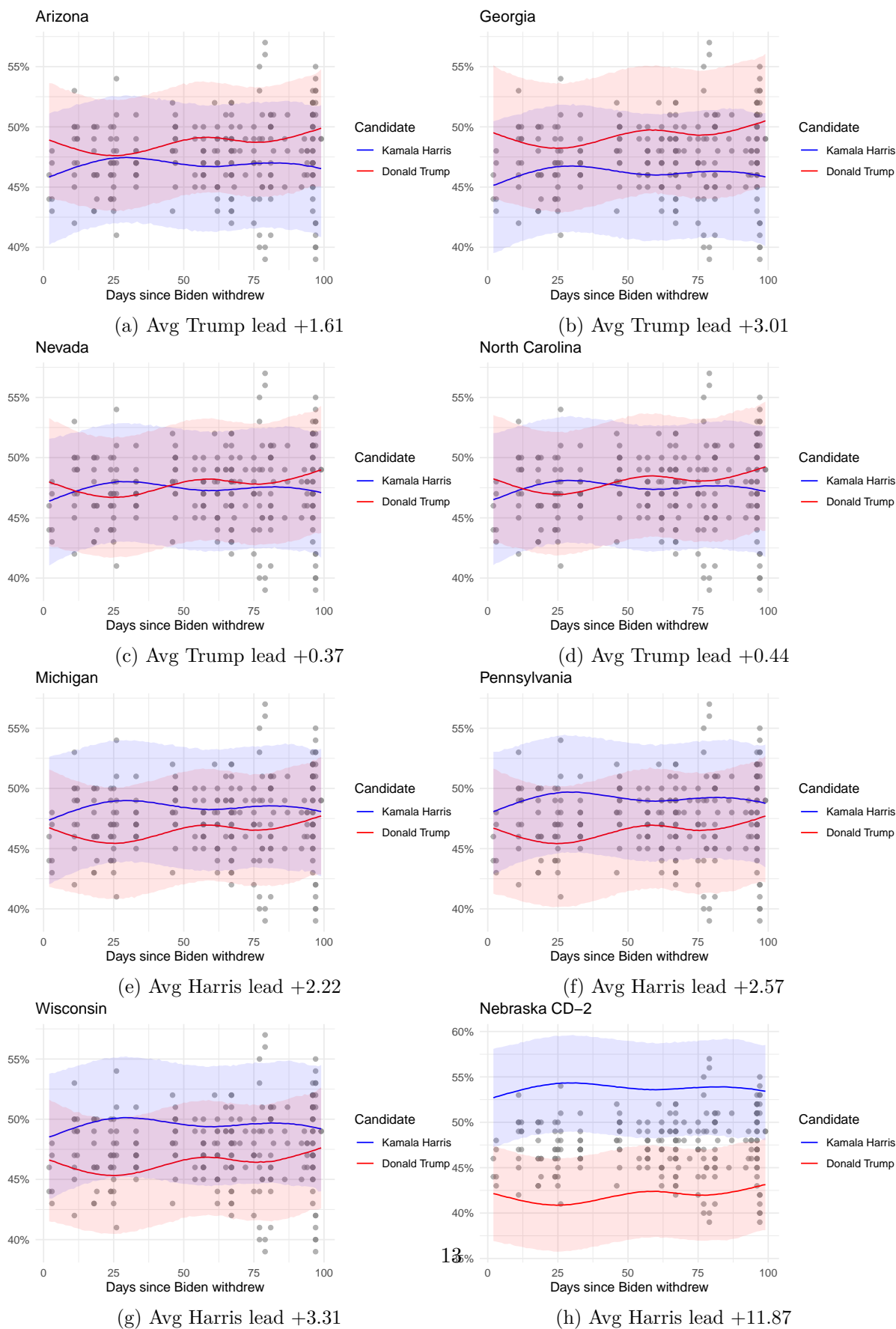(g) Avg Harris lead +3.31

(h) Avg Harris lead +11.87

Figure 5: The lines are the weighted moving averages resulting from applying the Bayesian model with spline, dots are individual state-level polls, and shaded areas show range of values within the margin of error.

5.3 Something else about polling, nonresponse, and how a repeat of any of these flaws could swing the race either way

5.4 Weaknesses, limitations, and next steps

Biden's withdrawal, use of two models, no third-party candidates, only national popular vote and swing states were analyzed, we did not consider how the pollsters in our dataset handled nonresponse when modeling. Weaknesses and next steps should also be included.

Appendix

A Idealized methodology

A.1 Survey objectives

A.2 Sampling approach

The target population for our idealized survey is likely voters in the United States. We will use the L2 voter database from L2 (2024) to build a representative sampling frame. The L2 voter database is one of the most trusted sources for enhanced voter data and it includes detailed demographics and voting history data (L2 2024). Using this data set is the first step towards ensuring that our sample aligns with the general electorate and is representative of likely voters so that we can sample precisely.

We will use a stratified sampling approach to closely examine voter demographics. Stratified sampling allows us to look at every stratum and carry out simple random sampling with those strata (Alexander 2024). Its main goal is to ensure that every strata of the population is represented (Neyman 1934). We selected stratified sampling because it will allow us to have representation within the subgroups that we are interested in and it has a reduced sampling error and improved accuracy rate (Alexander 2024). We considered simple random sampling, but ultimately chose stratified sampling instead because it tends to produce more precise accurates when used to forecast U.S. elections (Pew Research Centre 2024). The U.S. election is decided by the electoral college, not the popular vote so we will oversample from the seven battleground states that are expected to decide the 2024 election: Arizona, Nevada, Georgia, North Carolina, Wisconsin, Michigan, and Pennsylvania (FiveThirtyEight 2024). Oversampling from the swing states will allow us to put an emphasis on forecasting their results and increase the accuracy of our electoral college estimate. Our target sample size of 100,000 respondents will provide a margin of error of 2% at a 95% confidence level; this will allow us to be precise while still accounting for budgetary constraints (Pew Research Centre 2024).

A.3 Respondent recruitment

We will use multi-channel respondent recruitment, including both phone and digital outreach. Phone outreach will allow us to capture older demographics and individuals who use the internet and social media less. Digital outreach, such as targeted social media ads, email lists, and news websites will enable us to recruit a broad sample. Digital outreach channels are cost effective and can reach younger demographics. We will allocate $28,000 of our budget for rewarding survey respondents to improve our response rates, particularly within harder-to-reach groups such as young people and low-information voters (Alexander 2024). As shown

by Smith et al. (2019), incentives increase survey participation, particularly amongst lower-response demographics.

A.4 Survey Design

Our survey is conducted using GoogleForms, which allows for an easy, user-friendly experience and increases respondent likelihood. The survey length is kept within the five to ten minute range, with thirteen questions to balance the need for data collection with the need for respondent engagement (Stantcheva 2023).

The survey includes the following sections:

- Demographics: In this section, we collect essential demographic data that we will use for post-survey weighting. This includes gender and ethnicity.

- Candidate evaluation: This section includes direct questions about candidate support, vote choice, and support level.

- Key issues and concerns: This section includes questions that aim to identify the top issues driving voter decisions, such as abortion rights and the economy.

A.5 Data Validation

Common issues with surveys include incomplete or inconsistent responses, duplicate responses, and fake responses by bots. We will use automate validation checks to detect and filter out incomplete or inconsistent responses, IP tracking to prevent duplicate responses, and CAPTCHA technology to minimize bot interference (Zhang et al. 2019).

A.6 Poll Aggregation

We will use the seven-day average method to aggregate polls because it decreases fluctuations in daily responses by smoothing out temporary spikes. This will make trends clearer.

A.7 Weighting and Data Adjustments

We will use post-stratification weighting to correct demographic imbalances in our final sample (The New York Times 2024a).

A.8 Budget

A.9 Idealized survey questions

2024 U.S. Presidential Election Poll This survey collects information about voters' political views and who they support in the 2024 U.S. Presidential Election. The data collected will not be shared with any external parties and will strictly be used for analytical purposes. This survey is completely anonymous and your data will be protected. Any published material regarding the results drawn from this survey cannot be traced back to you. The goal of this survey is to draw conclusions about the 2024 presidential elections held in the United States. Please answer as accurately as possible. If you have any questions or concerns, please reach out to aliza.mithwani@mail.utoronto.ca (correspondence will not be shared with any external parties).

1. Are you a registered voter in the United States ? Yes No
2. Do you plan to vote in the upcoming presidential election? Yes No Undecided

Demographics Questions

3. Would you consider yourself: White Black or African American Hispanic or Latino Asian American Indian or Alaskan Native Middle Eastern or North African Native Hawaiian or Pacific Islander Prefer not to say Other (specify)

4. What is your age? 18-29 20-44 45-64 65+ Prefer not to say

5. What sex were you assigned at birth, on your original birth certificate? "Female" "Male" Prefer not to say

6. How do you currently describe yourself (select all that apply)? "Female" "Male" "Transgender" Prefer not to say Other (Specify)

7. What is your household income? Less than $20,000 $20,000-59,999 $60,000-79,999 $80,000-99,999 $100,000 or more Prefer not to say

8. In which state do you currently reside? Dropdown list of states

Candidate Evaluation

9. If the 2024 presidential election were held today, who would you vote for?

Donald Trump, Republican Kamala Harris, Democrat Jill Stein, Green Party Write-in Don't know Prefer not to say Other (please specify)

(Optional) If you selected "Write-in" for the last question, please specify below:

10. Do you consider yourself a Democrat, a Republican, an Independent, or a member of another party? Democrat Republican Independent Another Party Don't know Prefer not to say

Key Issues and Concerns

11. Rate these issues in order of importance to you (1 being most important and 7 being the least important): (use multiple choice grid with 7 rows and 7 columns) Abortion Immigration The state of democracy/corruption Foreign policy The economy Character Climate change?

12. If you had to assign a value from 1 to 5 to your level of optimism about the future of the United States, where 1 means highly pessimistic and 5 means highly optimistic, where would you place yourself? 1 (Highly pessimistic) 2 3 4 5 (Highly optimistic)

13. What would you say to someone who is undecided about voting in this election?

Confirmation Message

Thank you for your response! Your answers have successfully been recorded.

Link to survey: https://forms.gle/h7MTA8k21ZbYxahT6

B Pollster methodology overview and evaluation

B.1 Overview

The Siena College/New York Times (Times/Siena) poll is a collaboration between the New York Times and the Siena College Research Institute that aims to capture voter sentiment in battleground states and at a national level (The New York Times 2024b). Its accuracy has made it a highly regarded poll for predicting U.S. election results. The NYT/Siena poll uses live poll interviews to reach a representative sample of voters and measure their political preferences, views, and issue priorities (The New York Times 2024b).

B.2 Population and Sampling Frame

The target population, defined by Alexander (2024) as the population that the Times/Siena poll aims to speak about, is registered voters and likely voters in the United States. Some polls conducted by Times/Siena have a target population of registered voters, while others use likely voters (The New York Times 2024a). The sampling frame, defined by Alexander (2024) as the individuals from the target population that Times/Siena can get data about is drawn from various voter registration databases, including the L2 voter database (The New York Times 2024b). In polls for the 2024 presidential election, Times/Siena has put an emphasis on gathering nationally-representative and state-specific samples for the seven battleground states that decided the 2020 presidential election and are expected to decide the 2024 presidential election: Arizona, Nevada, Georgia, North Carolina, Michigan, Wisconsin, and Pennsylvania (The New York Times 2024b). A sampling frame that includes various voter registration

databases helps ensure precise targeting and that the sample reflects the demographics of registered or likely voters in the upcoming U.S. election (The New York Times 2024b).

B.3 Respondent Recruitment Strategy

Times/Siena recruits respondents for its poll at random, from a national list of registered voters gathered from various high-quality voter registration databases (The New York Times 2024b).

B.4 Sampling Approch and Trade-offs

B.5 Strengths and Limitations of Methodology

B.5.1 Strengths

B.5.2 Limitations

C Additional data details

C.1 Data Cleaning

C.2 Polling averages from before President Joe Biden ended his re-election campaign

D Model details

Model summary is shown in Table 4

D.1 Posterior predictive check

D.1.1 Harris Model

In **?@fig-ppcheckandposteriorvspriorharris-1** we implement a posterior predictive check. This shows...

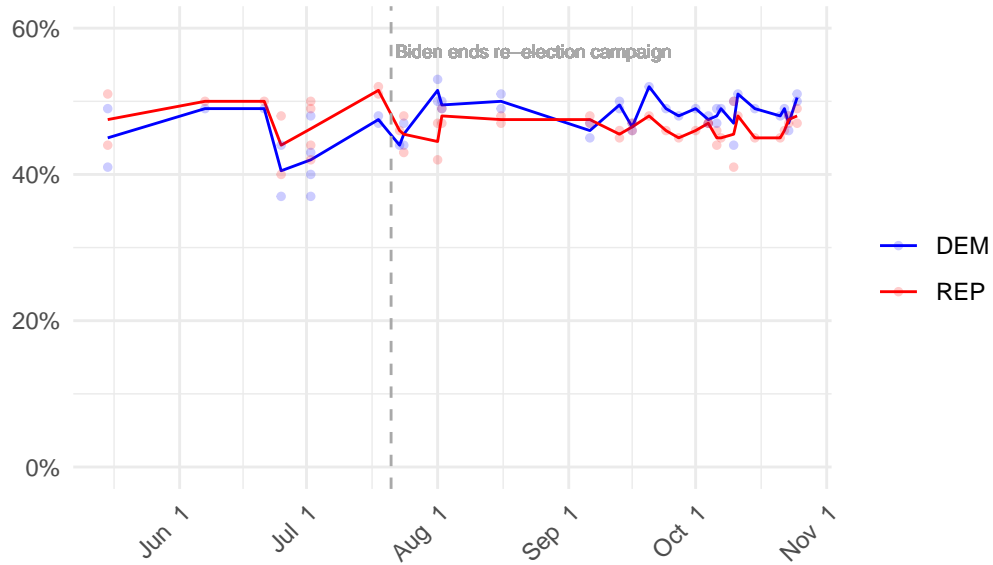In **?@fig-ppcheckandposteriorvspriorharris-2** we compare the posterior with the prior. This shows...

Figure 6: National popular vote averages for the Democratic and Republican presidential nominees since May 5, 2024 (six months before election day) show former President Trump leading before Biden ended his campaign, the gap narrowing after Harris became the Democratic nominee, Harris taking the lead in August, and a dead heat in September and October.
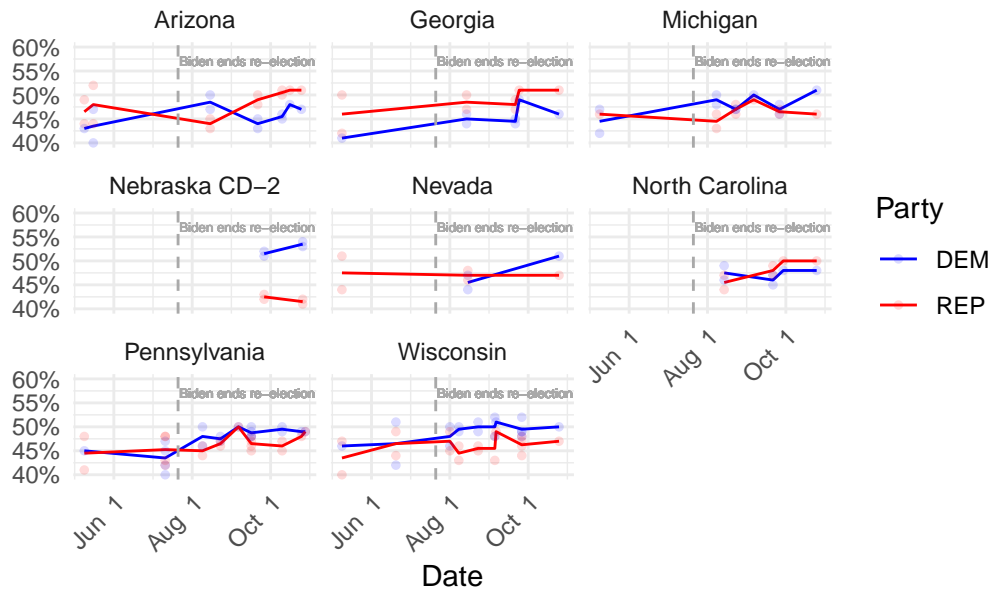

Figure 7: Democratic vs Republican presidential polling averages from May 5 to October 29, 2024, including both Biden and Harris as the Democratic nominee and Trump as the Republican nominee.

Table 4: Explanatory models of support for Harris and Trump based on end date (number of days since Biden ended re-election campaign on July 21, 2024), state, pollster, and pollscore

	Harris	Trump
(Intercept)	48.99	48.59
	(5.02)	(5.21)
ns(end_date_num, df = 5)1	0.49	0.96
	(1.10)	(1.04)
ns(end_date_num, df = 5)2	1.25	−0.58
	(1.41)	(1.44)
ns(end_date_num, df = 5)3	0.83	0.59
	(1.47)	(1.45)
ns(end_date_num, df = 5)4	2.74	−0.98
	(2.22)	(2.11)
ns(end_date_num, df = 5)5	−0.87	2.45
	(1.10)	(1.05)
stateFlorida	−4.13	4.45
	(1.19)	(1.21)
stateGeorgia	−0.81	0.61
	(0.93)	(0.96)
stateMichigan	1.57	−2.18
	(0.86)	(0.88)
stateMinnesota	4.10	−5.70
	(1.82)	(1.79)
stateMissouri	−5.98	4.82
	(1.82)	(1.79)
stateMontana	−5.88	7.63
	(1.41)	(1.37)
stateNational	1.66	−2.81
	(0.71)	(0.72)
stateNebraska	−5.55	4.29
	(1.46)	(1.55)
stateNebraska CD-2	6.75	−6.76
	(1.09)	(1.12)
stateNevada	0.42	−0.91
	(1.20)	(1.16)
stateNew Hampshire	3.28	−3.88
	(1.75)	(1.87)
stateNorth Carolina	0.74	−0.64
	(0.96)	(0.93)
stateOhio	−2.29	1.41
	(1.10)	(1.09)
statePennsylvania	2.06	−2.19
	(0.80)	(0.80)
stateTexas	−2.80	1.53
	(0.95)	(0.97)
stateVirginia	3.22	−4.82
	(1.82)	(1.91)
stateWisconsin	2.59	−2.29
	(0.85)	(0.85)
pollsterMarquette Law School	−1.34	−0.08
	(1.02)	(1.01)
pollsterMcCourtney Institute/YouGov	−1.93	−0.70
	(1.95)	(1.84)
pollsterSiena/NYT	−2.43	−0.12
	(1.98)	(1.95)
pollsterThe Washington Post	−1.71	1.22
	(1.28)	(1.26)
pollsterYouGov	−1.34	1.31
	(0.88)	(0.85)
pollscore	1.29	−0.01
	(4.44)	(4.54)
Num.Obs.	117	117
R2	0.715	0.697
R2 Adj.	0.629	0.603
Log.Lik.	−224.988	−224.011
ELPD	−249.5	−248.2
ELPD s.e.	8.2	7.6
LOOIC	499.0	496.3
LOOIC s.e.	16.3	15.2
WAIC	495.1	492.1
RMSE	1.57	1.56

Examining how the model for support for Harris fits, and is affected by, the data

D.1.2 Trump Model

In **?@fig-ppcheckandposteriorvspriortrump-1** we implement a posterior predictive check. This shows...

In **?@fig-ppcheckandposteriorvspriortrump-2** we compare the posterior with the prior. This shows...

Examining how the model for support for Trump, and is affected by, the data

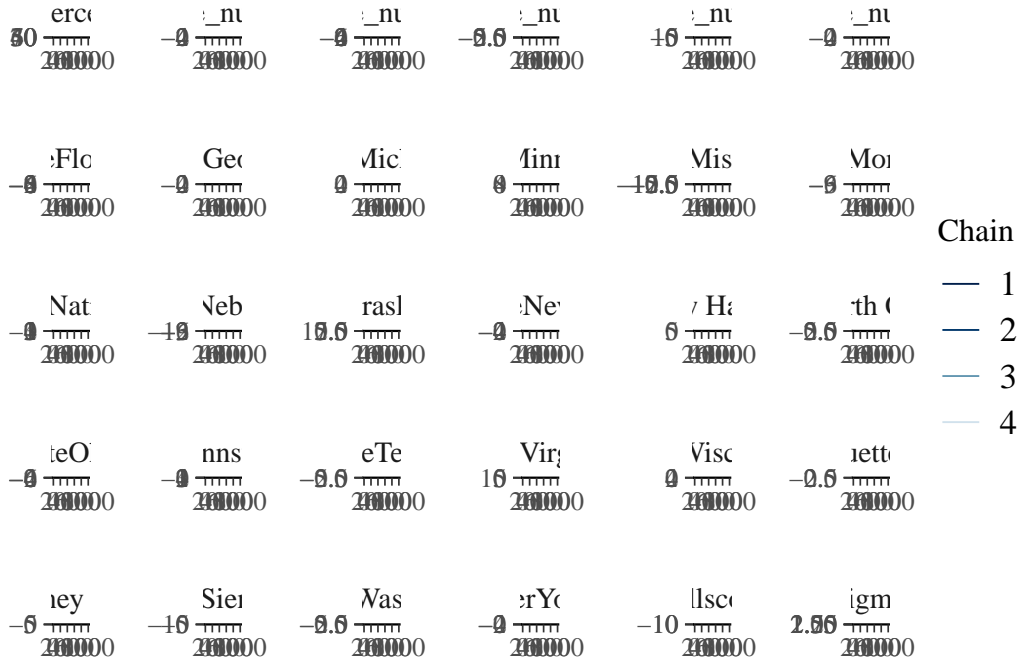## D.2 Model Diagnostics

D.2.1 Harris Model

Figure 8a is a trace plot. It shows... This suggests...

Figure 8b is a Rhat plot. It shows... This suggests...

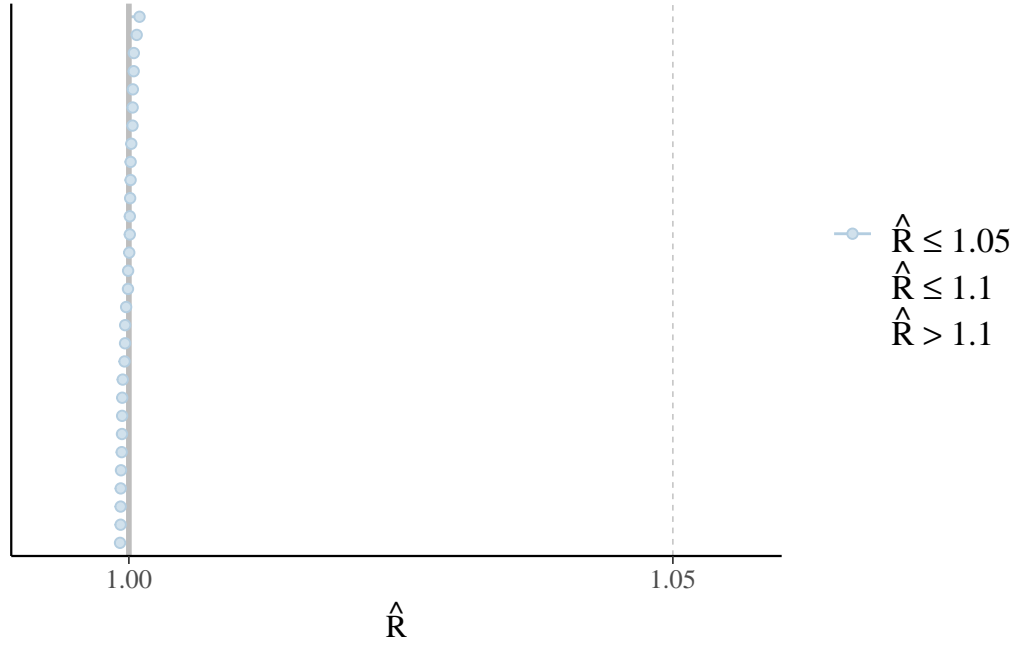### D.2.2 Trump Model

Figure 9a is a trace plot. It shows... This suggests...

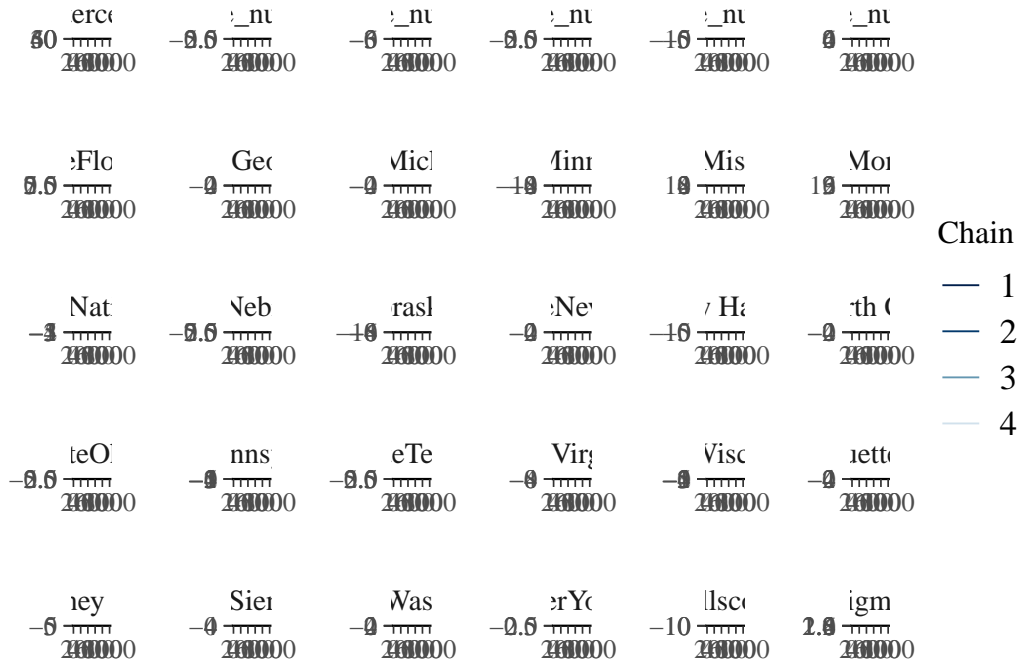Figure 9b is a Rhat plot. It shows... This suggests...
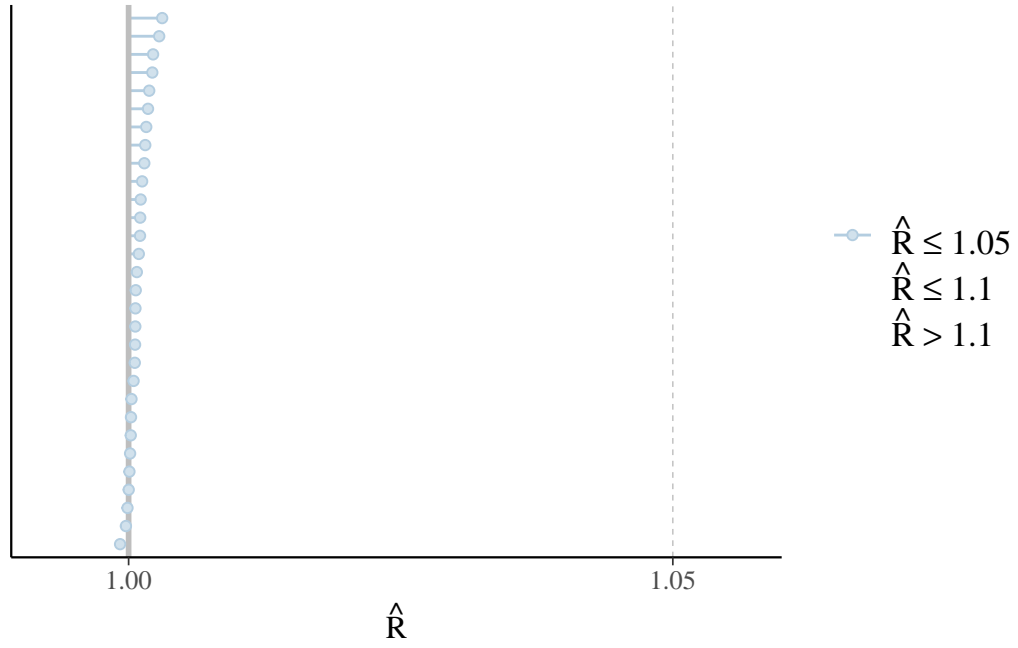
(a) Trace plot

(b) Rhat plot

Figure 8: Checking the convergence of the MCMC algorithm for the Harris model

(a) Trace plot

(b) Rhat plot

Figure 9: Checking the convergence of the MCMC algorithm for the Harris model

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