PARTISAN LEAN OF STATES: 
ELECTORAL COLLEGE AND POPULAR VOTE

ANDREY SARANTSEV

Abstract. We compare federal election results for each state versus the USA each second year 1992–2018 to model partisan lean of each state and its dependence on the nationwide popular vote. For each state, we model both its current partisan lean and the rate of change. We apply this to model the Electoral College (EC) outcome. In particular, taking evenly distributed popular vote between Democrats and Republicans, we find the probability of EC win, and verify the claim (commonly stated in the popular media) that the EC is biased in favor of Republicans. We work in both classical (frequentist) and Bayesian framework.

1. Introduction

Numerous models aim to forecast nationwide popular vote (PV) in the USA presidential elections. They derive it from economic data, foreign policy, ethnic composition and other factors: the book [1] and articles [2] 4 [5] 6. However, in this country, uniquely among developed nations, the winner is decided by the Electoral College (EC), rather than PV.

The EC consists of 538 people, with each of the 50 states delegating the number equal to its House and Senate members combined, and Washington, District of Columbia (DC) delegating 3 members. (DC is not a state since it does not have representatives in the House and the Senate.) For each state and the DC, its members of the EC must vote for the winner of the popular vote in the state. (Exceptions are Maine and Nebraska; see Section 2.) The current two-party system of Democrats and Republicans dates back to the Civil War age, and the third-party candidates have never won a presidential election; only on a few occasions, they won some EC votes. In case of winning 270 or more Electoral College votes the candidate is declared to be the president. If there is a tie: Each major-party candidate wins exactly 269 votes, then the decision is deferred to the House of Representatives. (This has not happened in this country so far.)

This peculiarity of election system in the USA moved to the forefront since 2000, which was the first time since 1888 when the winner of the Electoral College lost the popular vote (that is, got lower % of votes than the other major-party candidate). It became particularly famous in 2016, when the same situation repeated. Both times, the winners of the EC were Republicans. This stirred a debate in the media whether the Electoral College system currently has a built-in bias against Democrats. It is impossible to do full justice to this literature; let us mention as an example [3] [10]. Here, we investigate this question.

Another feature of the USA electoral system is the division of states into ‘red’, ‘blue’, and ‘purple’. A ‘red’ state has a very high probability of being won by Republicans, so that its EC members will vote for Republicans by a large margin. A ‘blue’ state is the opposite: It is very likely to be won by Democrats, and the margin is likely to be large. ‘Purple’ states, otherwise known as ‘swing’ or ‘battleground’ states, have a significant probability of being won by either party. This classification is somewhat informal, and there are no generally accepted thresholds. In particular, political analysts often split states into more...
than three categories: ‘Solid Democrat’, ‘Likely Democrat’, ‘Lean Democrat’, ‘Swing’, ‘Lean Republican’, ‘Likely Republican’, and ‘Solid Republican’.

In the election season, American and international media often feature maps of the USA with states colored in various shades of red, blue, and purple, as election prediction. For example, California is considered a solidly blue state: It was won by Democrats in every presidential election since 1992, and the margin is now overwhelming (over 20%). Conversely, Texas is considered a solidly red state; the Republicans’ margin of victory is large, although in 2016 it was only $9\%$.

Cook Political Report www.cookpolitical.com created a somewhat more formal version of this classification: Cook Partisan Voting Index based on the last two President election, by comparing statewide vs nationwide election results. A popular web site 538 www.fivethirtyeight.com uses a similar version of this index. However, we would like to make this research more formal and statistically rigorous. We would like to use not only presidential, but other federal elections: House and Senate.

In this article, we would like to trace the evolution of states from red to blue and vice versa. We define the partisan lean of each state and model its time evolution, as well as correlation with the nationwide popular vote percentages. We use not only presidential elections (which happen every 4 years in the USA), but House and Senate elections (which happen every 2 years). We collect publicly available data from the House Clerk, Federal Election Commission (FEC) and Wikipedia, starting from 1992. See [7, 9] on related topics.

1.1. Organization. In Section 2, we describe the data collection and organization, including some special data points which we had to modify for consistency. In Section 3, we introduce our linear regression model. Sections 4 and 5 are devoted to results in frequentist and Bayesian settings, respectively. Section 6 concludes the article and proposes future research.

1.2. Acknowledgements. I am thankful to my undergraduate students Jaucelyn Canfield and Franklin Fuchs for collecting the data and helping me code the program. I am also thankful to my undergraduate student Akram Reshad for pointing to me the data source: FEC, which made data collection much easier. I would also like to thank Professors Aleksey Kolpakov and Thomas Kozubowski for useful discussion and pointing relevant literature.

2. Election Data

2.1. Data description. We collect statewide % of popular vote for each of the two major parties, for each of the 50 states for each presidential, House, and Senate election since 1992.

A House election happens every two years. Each state is split into several congressional districts, for each of which a representative for the House is elected for two years. The state with the most districts is California (53). Several low-populated states (Alaska, Wyoming, and others) have only one congressional district: district-at-large. In other states, districts are numbered: California 1, . . . , California 53; and similarly for other states.

For each state, we sum votes in all congressional districts of this state, for each major party. Then we divide these two numbers by the overall popular vote (for all major and minor parties together) in this state. The quantity of such congressional districts and their shape is determined by the population of the state relative to the USA. Each 10 years, after Census, the number and the shape of these districts are recalculated. In particular, after the coming 2020 Census, Texas is projected to gain 3 congressional districts, due to large growth in population in the previous decade.
Every state has two senators, which are elected statewide. Each senator has a six-year term. All 100 senators in the Senate are split evenly into three so-called Classes: Class I, Class II, and Class III, which determines their election years. This means that each state has Senate elections every two out of three even years. For example, California had Senate elections in 2016 and 2018, but will not have them in 2020.

The President of the USA is elected every four years: 1992, 1996, 2000, ... As described in the Introduction, each state is assigned EC members, equal in number to the total sum of House and Senate members. For the 48 states other than Maine and Nebraska, these EC members vote for the popular vote winner in this state.

There is an issue of faithless electors, which break this rule. However, so far there were only very few such electors, and this has not influenced the outcome. It is hard to model the behavior of potential faithless electors, and we shall not attempt this.

Maine and Nebraska use a hybrid system: They assign two EC votes to the statewide winner, and other EC votes to winners of congressional districts. This can lead to splits, for example 2008, Nebraska 2 vs the state of Nebraska; 2016, Maine 2 vs the state of Maine. However, the boundaries of the districts change with each redistricting, and thus we cannot compare the same district in different years. For the purposes of this article, we simply assume that Maine and Nebraska assign all EC votes to the statewide winner. This will introduce an error to our analysis, but it is of order 1 electoral vote, which is not much.

Finally, we have a benchmark: nationwide popular vote. For a Presidential election, this is self-explanatory. For a House election, this is the sum of votes in all 435 congressional districts. A Senate election is not nationwide (as explained above, each state has Senate elections 2 out of 3 even years). Thus we use the nationwide House PV of the same year.

We do not model DC because it overwhelmingly voted Democratic in recent elections.

For each of these elections: House, Senate, Presidential, take \( D \) and \( R \), the numbers of votes by major parties, and compute the quantity \( z = \ln(D/R) \).

The data and Python code is available at GitHub:
https://github.com/asarantsev/Electoral-College-Vs-Popular-Vote

2.2. Data sources. Our data is collected in the file updatedData.xlsx with sheet Raw Data containing total numbers \( D \) and \( R \) of votes for the two major parties for each election, with comments inserted when we need to skip or modify some data — see below; and the sheet Logarithms contains the quantity \( z = \ln(D/R) \) for these election. For 2018, we take the House and the Senate data from Wikipedia pages, which exist for every state, as well as for the whole nation. For 2000–2016, the data is taken from the FEC: https://transition.fec.gov/pubrec/electionresults.shtml in Excel:

- 2004, 2008, 2012, 2016: Tables 2, 6, 7;
- 2006, 2010, 2014: Tables 4, 5;
- 2002: Tables 2, 3;
- 2000: Sheets 2, 4, 5.

For 1992–1998, the data is taken from the House Clerk web page:

- http://clerk.house.gov/member_info/electionInfo/1998/Table.htm
- http://clerk.house.gov/member_info/electionInfo/1996/Table.htm
- http://clerk.house.gov/member_info/electionInfo/1994/94Recapi.htm
- http://clerk.house.gov/member_info/electionInfo/1992/92Recapi.htm
2.3. **Special elections.** There are some elections for which we cannot literally take available data, but have to modify it.

1. A top-two primary system has two top vote-getters in the primary advance to the general election, regardless of the party. Such system is used in Washington House and Senate elections since 2008, and in California House and Senate elections since 2014. In 2016 and 2018 California Senate elections, this led to both Democrats as general election candidates in California. For these Senate races, Thus we use the primary election, summing votes for all candidates from the two major parties.

2. For House races, same-party runoffs happened, too, but for less than half of districts in each state, for each election. Since the general election has a much higher turnout than the primary election, we consider the general election in this case more representative. In this research, we set the following rule: We ignore a House election if in at least half of districts there was no candidate from either Democrats or Republicans.

3. Louisiana has a system similar to California and Washington: There, the November election takes the form of a *jungle primary*: All candidates run together, not separated by party. If no candidate gets 50%, a runoff election is in December. We sum votes for all candidates from the two major parties in both the jungle primary and the runoff, if it happens, and divide these by the total vote. We ignore Louisiana House elections for 1996, 1998, 2002, 2012, 2014, and 2016: In each of these years, in at least half of districts, runoff elections were one-party.

4. We treat Bernie Sanders from Vermont and Angus King of Maine as Democrats. Bernie Sanders took part in House elections for Vermont at-large district in 1992–2004 and in Senate elections for Vermont in 2006, 2012, and 2018. Angus King took part in Senate elections for Maine in 2012 and 2018. For each of these elections, we sum the votes of Bernie Sanders or Angus King and a Democrat in the same race, if such Democrat existed; and assign this percentage to Democrats.

There are some other elections which we have to ignore.

1. 2016 House election in Vermont at-large had Peter Welch, for both major parties: He is a Democrat, but won the Republican primary on write-in votes.

2. 2006 Senate election in Connecticut featured incumbent Joe Lieberman running (and winning) as an independent, because he lost the Democratic primary. Same applies to Lisa Murkowski in 2010, Alaska Senate race: She lost the Republican primary.

3. The following Senate elections did not have a Democratic candidate: 2010, South Dakota; 2002, Virginia; 2002, Mississippi; 2002, Virginia; 2006, Indiana; 2000, Arizona; 2014, Alabama; 2004, Idaho; 2014, Kansas. In each case, there was no opposition, or other candidates were not ideologically similar to Democrats.

4. The following Senate elections did not have a Republican candidate: 2002, Massachusetts; 2008, Arkansas. In each case, there was no opposition, or other candidates were not ideologically similar to Republicans.

5. The following House elections did not have a Republican opponent for at least half of the districts in the state: 2008, Vermont at-large; 2008, Arkansas 1, 2, 4; 2006, Rhode Island 2; 1996 and 1998, West Virginia 1, 3; Massachusetts, 2000–2008, 2014, 2016.

6. The following House elections did not have a Democratic opponent for at least half of the districts in the state: 2016, Arkansas 1, 3, 4; 1998, Nevada 2; 2012, Kansas 1, 3; 2002, Nebraska 1, 3.
3. Regression Model

We denote election years 1992–2018 by $t = -13, \ldots, -1, 0$, for convenience. We wish to make the latest election year (2018, as of this article) to be $t = 0$.

Let $S$ be the set of 50 states. Let $E$ be the set of all 35 House, Senate, and President elections. For each election $e \in E$, we denote its year by $t(e)$, and the party vote percentages nationwide by $d(e)$ and $r(e)$. Recall that we use House nationwide popular vote percentages for the corresponding Senate election. For an election $e$ and a state $s$, we denote by $d_s(e)$ and $r_s(e)$ the percentage of the statewide vote for Democrats and Republicans for each election. The corresponding logarithms of ratios are denoted by

$$x(e) = \ln \frac{d(e)}{r(e)} \quad \text{and} \quad y_s(e) = \ln \frac{d_s(e)}{r_s(e)}.$$

We consider the following linear regression:

$$y_s(e) = \alpha_s + \beta_s x(e) + \gamma_s t(e) + \sigma_s \varepsilon_s(e), \quad \varepsilon_s(e) \sim \mathcal{N}(0, 1) \quad \text{i.i.d.}$$

Here, $\alpha_s$ is the current partisan lean, $\beta_s$ is elasticity of the state: its responsiveness to changes in the national environment (measured by $x(e)$), and $\gamma_s$ is partisan lean rate of increase or decrease. The two terms $\alpha_s + \gamma_s t(e)$ together make partisan lean of this state in election $e$. 

Figure 1. President, House, and Senate elections: $\ln(D/R)$ for D and R votes.
| State       | $\alpha$ | $\beta$ | $\gamma$ | $\sigma$ | Quantity |
|------------|----------|---------|----------|----------|----------|
| California | 0.538    | 0.828   | 0.034    | 0.083    | 30       |
| Connecticut| 0.493    | 0.306   | 0.027    | 0.214    | 30       |
| Florida    | -0.209   | 1.656   | -0.009   | 0.285    | 31       |
| Nevada     | -0.001   | 0.732   | 0.007    | 0.236    | 30       |
| Texas      | -0.438   | 0.930   | -0.016   | 0.170    | 30       |
| Washington | 0.312    | 0.970   | 0.015    | 0.104    | 31       |
| Wisconsin  | 0.026    | 0.980   | -0.001   | 0.219    | 31       |

Table 1. Regression Parameters: Selected States

We borrow terms from quantitative finance: A stock’s alpha is the excess return compared with the whole market, and its beta is its sensitivity to changes in the whole market. We find point estimates for each coefficient $\alpha_s, \beta_s, \gamma_s, \sigma_s, s \in S$.

Next, we simulate national elections. For example, in year 2020 ($t = 1$) we fix nationwide PV percentages $d(e)$ and $r(e)$, and compute $x(e) = \ln(d(e)/r(e))$. Democrats win state $s$ if

\[ \alpha_s + \beta_s x(e) + \gamma_s + \sigma_s \varepsilon_s(e) = y_s(e) = \ln \frac{d_s(e)}{r_s(e)} > 0 \]

which has probability (for $\Phi$ the CDF of $N(0,1)$):

\[ p_s := \Phi (\sigma_s^{-1}(\alpha_s + \beta_s x(e) + \gamma_s)) \]

Then we simulate many times each state, independently of others, and sum the corresponding EC votes. We get the distribution of EC votes, and the probability that Democrats win (by getting more than 269 EC votes).

We can also simulate it for 2024 ($t = 3$), but the EC will be different by then: Texas will gain 3 votes, Florida will gain 2 votes, Arizona, Colorado, Montana, North Carolina, Oregon will each gain 1 vote, New York will lose 2 votes, and Alabama, Illinois, Missouri, Minnesota, Ohio, Pennsylvania, Rhode Island, West Virginia will each lose 1 vote. For $t = 3$, the formula (1) takes the form

\[ \alpha_s + \beta_s x(e) + 3\gamma_s + \sigma_s \varepsilon_s(e) = y_s(e) = \ln \frac{d_s(e)}{r_s(e)} > 0; \]

and the formula (2) will take the form $p_s := \Phi (\sigma_s^{-1}(\alpha_s + \beta_s x(e) + 3\gamma_s))$. If the nationwide PV is split evenly: $x(e) = 0$, what is the probability of Democrats winning?

4. Point Estimates

The estimates and confidence intervals corresponding to level 90% are summarized in the file `coefficients.csv`. The column ‘stderr’ stands for $\sigma$, ‘EC’ means Electoral College, and ‘Nelect’ means the number of observed elections.

- The reddest state in 2018, measuring by $\alpha$, is Wyoming, $\alpha = -1.102$.
- The bluest state in 2018 is Hawaii, $\alpha = 0.948$.
- For 2020, the results above stay the same, measured by $\alpha + \gamma \cdot t$ for $t = 1$.
- The most neutral state in 2018 is Nevada, $\alpha = -0.0009$.
- The most rapidly blueing state is Vermont, $\gamma = 0.069$.
- The most rapidly reddening state is North Dakota, $\gamma = -0.128$. 


The state with least change rate is Massachusetts, $\alpha = 0.0007$.
The state which is most sensitive to the national environment is Alaska, $\beta = 2.29$.
The least sensitive state is Hawaii, $\beta = 0.005$.

The histograms of EC votes in 2020 ($t = 1$) are in Figure 2, with red line = 269 votes.
We did 40000 simulations of each of the 50 states, in four scenarios:

- Equal nationwide PV: 50%-50% split;
- As in 2004 Presidential election: Republicans 50.7%, Democrats 48.3%;
- As in 2008 Presidential election: Republicans 45.7%, Democrats 52.9%;
- As in 2016 Presidential election: Republicans 46.1%, Democrats 48.2%.

Given equal nationwide PV for two parties, the probability of Democrats winning the EC in 2020 is 48.5%. Thus the EC (significantly) favors the Republicans. After the 2020 Census, the EC will change: The biggest gainer will be Texas (3 votes), Florida will gain 2 votes, and Oregon, Montana, Colorado, Arizona, North Carolina will each gain 1 vote. The biggest loser will be New York (2 votes), and Minnesota, Pennsylvania, West Virginia, Illinois, Ohio, Alabama, Michigan, and Rhode Island will each lose 1 vote. We simulate 40000 times 2024 election ($t = 3$) for two scenarios: equal split in the nationwide PV, and PV as in 2016. See Figure 3. For the case of even PV, the EC is significantly biased towards Republicans: Win probability for Democrats is 48.2%.

The probabilities of Democrats capturing states in these 6 scenarios are in scenarios.csv. This is the summary of our results:

- Democrats win California and New York with probability 100.0% in all 6 scenarios.
Democrats’ 2024 EC votes given nationwide PV

- Republicans win Alabama, Kansas, Idaho, and Oklahoma with probability 100.0% in all 6 scenarios.
- Democrats win Texas in 2020 for even PV or 2008 PV with probability 0.4% and 3.1%, respectively.
- For 2020 election with even PV, Democrats win Nevada with probability 51.1%, the closest to 50% among 50 states. The same is true for 2024 election with even PV.
- For 2020 or 2024 elections with 2016 PV, such state is Iowa.
- For 2020 election with 2008 or 2004 PV, such state is Arizona or New Hampshire, respectively.

The current state partisan lean is $\alpha_s$ for the state $s$. We did linear regression of the list of these 50 $\alpha_s$, $s \in S$, vs Cook Partisan Voting Index. This dependence is very strong, with $R^2 = 96\%$. However, $\alpha$ includes not only the last two President elections (at the time of this writing, 2012 and 2016),

Finally, we are interested in the evolution of the EC bias. We simulate (each scenario 40000 times) President elections in 2012, 2016, and 2020, when the current EC was in place. Thus we see that the EC bias towards Republicans was much more pronounced in 2012: Democrats’ win probability is 40.7%; was less in 2016: 44.0%, and will be 48.5% in 2020.

But each state has only few observations, at most 31 (14 House + 7 President + 10 Senate elections). Thus we cannot assume that these estimates of $\alpha$, $\beta$, and $\gamma$ for each state are very precise. In particular, confidence intervals will be large. We computed them for confidence level 90%. They are in the file coeffIntervals.csv (an extended version of coefficients.csv). As we see, they are large, particularly for $\beta$. To account for this uncertainty, we use Bayesian linear regression in the next section.

5. BAYESIAN REGRESSION

For background on Bayesian linear regression modeling, see the textbook [8]. Assume a non-informative prior for each state $s \in S$:

$$\pi_s(\alpha_s, \beta_s, \gamma_s, \sigma_s^2) \propto \sigma_s^{-2}.$$  

Let us introduce the following notation: the inverse $\chi^2$ distribution: $\text{Inv}\chi^2_n(\sigma)$ with $n$ degrees of freedom and scale $\sigma$, $n_s$ is the number of elections for state $s$, and the $3 \times 3$ matrix $M_s$ is given by $M_s = [1_s \ x \ t]$ where $1_s$ is a vector of $n_s$ unit numbers, $x$ is the vector of the
quantities $x(e)$ for each election $e$ valid for the state $s$, and $t$ is the vector of their times. Then the posterior is

$$p(\alpha_s, \beta_s, \gamma_s \mid \sigma_s^2) = N_3((\hat{\alpha}_s, \hat{\beta}_s, \hat{\gamma}_s), \hat{\sigma}_s^2(M_s^T M_s)^{-1}),$$

$$p(\sigma_s^2) = \text{Inv\,\chi}^2_{n_s-3}(\hat{\sigma}_s^2),$$

Thus the posterior marginal distribution of $\sigma_s^2$ is $\text{Inv\,\chi}^2$, and the posterior conditional distribution of the three regression coefficients given $\sigma_s^2$ is multivariate normal. It follows from here that the posterior marginal distribution of $(\alpha_s, \beta_s, \gamma_s)$ is multivariate Student, with
heavy tails. This is not surprising, since by choosing the parameters of this regression to be random, we introduced new randomness.

We simulate each $\sigma^2_s$, then $\alpha_s, \beta_s, \gamma_s$, and then the result of an election in the 6 scenarios above: 2020 election with even PV, 2004 PV, 2008 PV, and 2016 PV; and 2024 election with even PV and 2016 PV. We repeat this simulation 40000 times. As we see, now 2020 EC is not biased, $p = 0.7$, but 2024 EC is biased against Democrats, $p = 0.001$.

Probabilities of Democrats winning each state, as well as the nation, are given in the file BayesianScenarios.xlsx. They are not very different from the frequentist setting from the previous section. Histograms of parameters $\alpha, \beta, \gamma$ for California and Nevada are provided in Figures 6 and 7. Histograms for EC votes are in Figures 4 and 5.

- Democrats win California with probability 100.0% in all 6 scenarios, and New York with probability 100.0% in 5 scenarios: In 2020 elections with 2004 PV, the win probability decreases slightly to 99.9%.
- Republicans win Oklahoma with probability 100.0% in 5 scenarios, except the 2020 elections with 2008 PV; then the probability is 99.9%. For 2020 election with 2008 PV, Republicans win Alabama and Idaho with probability 99.8%, and Kansas with probability 98.5%.
- Democrats win Texas in 2020 for even or 2008 PV with probability 1.0% and 4.9%.
- The states closest to 50% win probability remain the same in each of the 6 scenarios, after we switch to Bayesian setting: Nevada for 2020 and 2024 election with even PV, Iowa for 2020 and 2024 election with PV as in 2016, New Hampshire and Arizona for 2020 election with 2004 and 2008 PV.
If we simulate the EC for even PV in 2012, 2016, and 2020, then Democrats’ win probability is 42.0%, 45.6%, and 49.9%, respectively. We see the same broad picture as in frequentist setting: EC was biased in favor of Republicans in 2012, but much less so in 2016, and the bias will disappear in 2020. However, this bias will reappear in 2024 (although not nearly as
much as in 2012 or 2016). Electoral maps for 2020 given even nationwide PV and 2008 PV are in Figure 8. States with Dem win probability greater than 90% are colored in dark blue, 70%-90% light blue, 30%-70% green, 10%-30% orange, and below 10% red. We see which staes are battleground in each scenario.

6. Conclusion

We found the partisan lean of each state, its time dynamics, and its dependence of the national political environment. We do this by fitting linear regression of statewide election PV vs election year and national PV. Then we simulate linear regression.

Our main goal is to test the hypothesis that the EC is unbiased. To this end, we set the nationwide PV to be equal for two major parties, and simulate the EC votes. We go back in time 2012–2018 and forward to 2020 and 2024 (when the EC changes slightly because of redistricting after the 2020 Census). Arguably, Bayesian framework for linear regression is a more rigorous approach than frequentist (Fisherian), because each state has few data points.

We get that in 2012 the EC was strongly biased for Republicans, but during the last decade, this bias was decreasing, until in 2020 there will not be any bias. But in 2024, the new EC will again have bias for Republicans.

Subsequent research might focus on more sophisticated models, which include ethnic and economic statewide data, or the power of incumbency. Another possible line of research is trying to make sense of elections which we disregarded (see Section 2), and include state and local elections (governors, state secretaries, county commission, city council). We can try to capture correlations between states, and the size effect: Do large states vote differently than small states, other things equal? Finally, it seems important to model Maine and Nebraska congressional districts, since these two states split their EV.

REFERENCES

[1] James E. Campbell (2008). *The American Campaign: U.S. Presidential Campaigns and the National Vote*. Texas A&M University Press.
[2] James E. Campbell (2016). The Trial-Heat and Seats-in-Trouble Forecasts of the 2016 Presidential and Congressional Elections, *Political Science & Politics* 49 (4), 664–668.
[3] George C. Edwards III (2011). *Why the Electoral College Is Bad for America*. 2nd edition, Yale University Press.
[4] Robert S. Erikson, Christopher Wlezien (2016). Forecasting the Presidential Vote with Leading Economic Indicators and the Polls. *Political Science & Politics* 49 (4), 449–472.
[5] Andreas Graefe (2014). Accuracy of Vote Expectation Surveys in Forecasting Elections. *Public Opinion Quarterly* 78 (S1), 204–232.
[6] Andreas Graefe, Scott J. Armstrong, Alfred G. Cuzán, Randall J. Jones (2014). Accuracy of Combined Forecasts for the 2012 Presidential Elections: The PollyVote. *Political Science & Politics* 47 (2), 427–431.
[7] Jason R. Jurjevich, David A. Plane (2012). Voters on the Move: The Political Effectiveness of Migration and its Effects on State Partisan Composition. *Political Geography* 31 (7), 429–443.
[8] Peter D. Hoff (2009). *A First Course in Bayesian Statistical Methods*. Springer.
[9] Richard L. Morrill, Gerald R. Webster (2015). Spatial and Political Realignment of the U.S. Electorate, 1988–2012. *Political Geography* 48, 93–107.
[10] Tara Ross (2012). *Enlightened Democracy: The Case for the Electoral College*. 2nd edition, Colonial Press.

Department of Mathematics & Statistics, University of Nevada, Reno
E-mail address: asarantsev@unr.edu