

Final Exam: ST 433

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Data Set-up

We took all the polling data among the three years and calculated the percent GOP support (GOP count / Total count)

Then we created weights by month and sample size

We put a greater weight on the months because we felt that the more recent polls would be more accurate

We also used sample size though because we felt that a larger sample would produce more accurate results

Month Weighting System

We took the written start month and assigned a value to each poll for month

January = 2 February = 4 March = 8

April = 16 May = 32 June = 64

July = 128 August = 256 September = 512

October = 1024 November = 2048

Month Weighting System (Continued)

Then we subset each poll by state and took the sum of each states monthly weight

For each poll we then divided month score given from above by the sum of all the scores in each state

This value was then assigned 75% of the total weight

Sample Size Weight

We took the sample sizes and used the same state subset from earlier

Then we divided out the sum of the sample sizes for each state

This value was then assigned a 25% weight to the system

Data Set-up

Once the weights were set, we multiplied the found GOP support by the weights

Then we added up the new weighted values for each state to get a total.

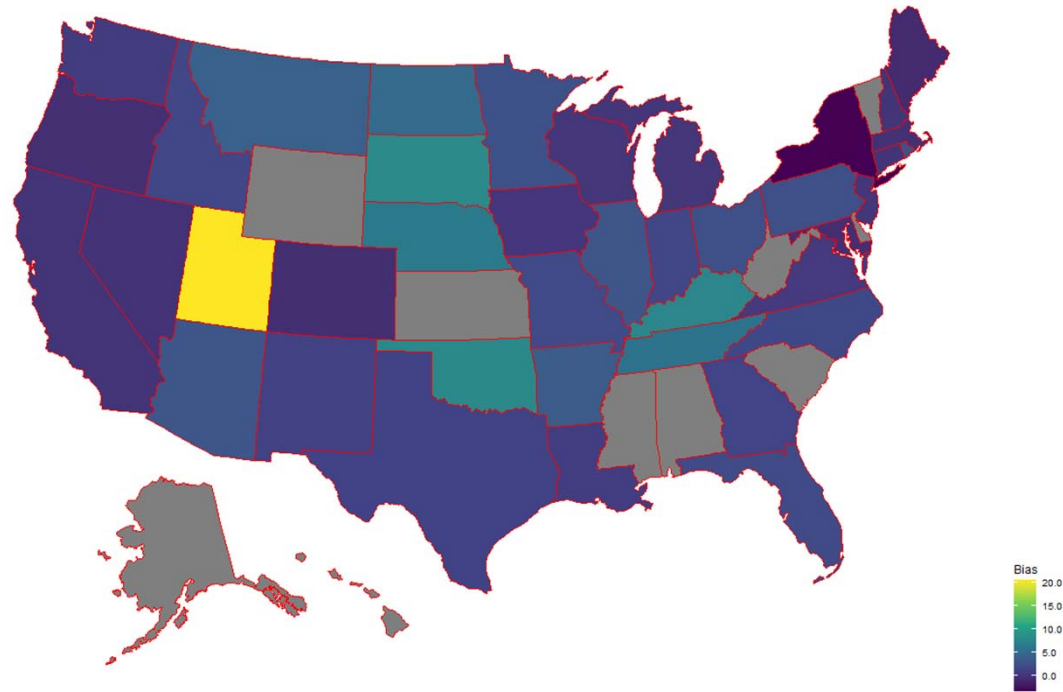
We then threw out data for Alaska and Hawaii to run with the adjacency matrix

Then we took the actual GOP results and subtracted out our new weighted results for each state

While doing this we separated by year, but for our later models we averaged the three years values

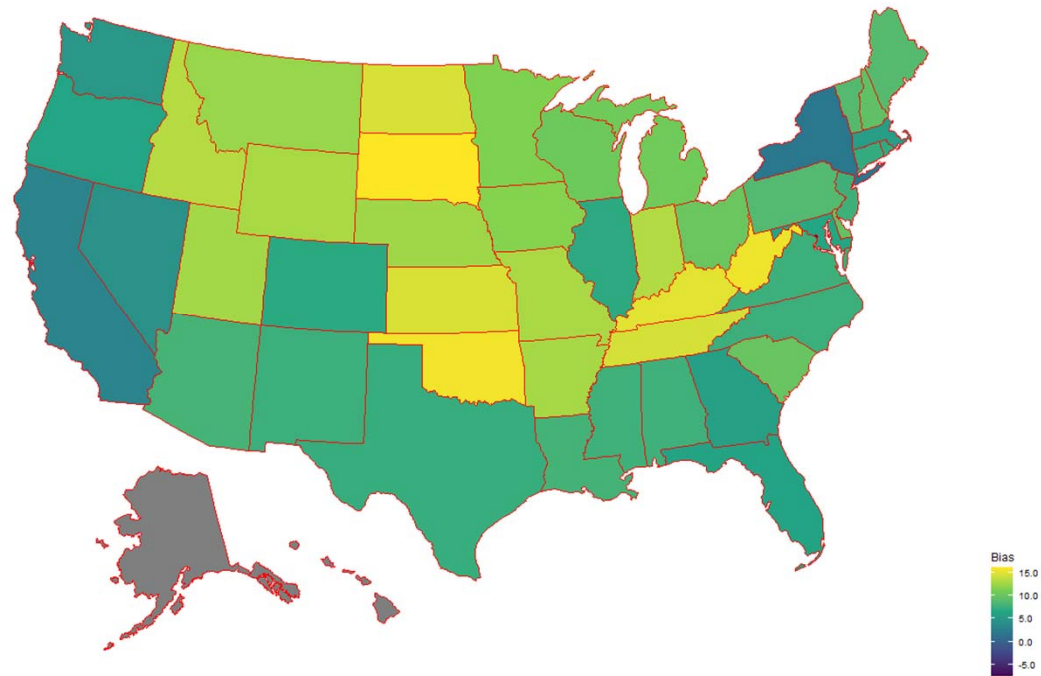
Graph of the Bias in the US In 2012

Map of the Bias in the US in 2012



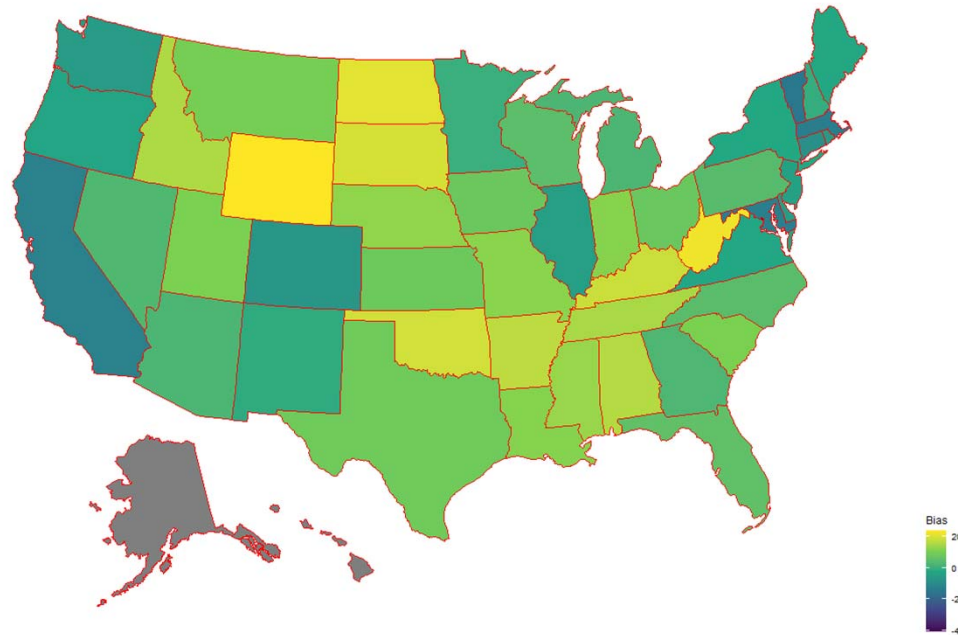
Graph of the Bias in the US In 2016

Map of the Bias in the US in 2016



Graph of the Bias in the US In 2020

Map of the Bias in the US in 2020



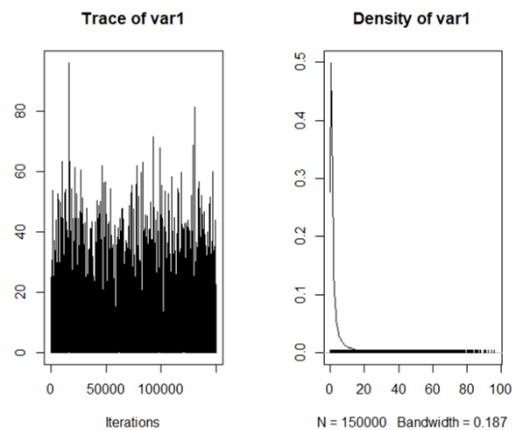
Building the Model

- Bias was calculated for all three years and became the response (Z_{it})
- The average was then computed across all states and years to produce an overall mean of 5.681781
 - This becomes our B_{it} (our only covariate)
- The error is represented by CAR model with parameters ν^2 , τ^2 , and ρ
 - W matrix is the adjacent states in the US
 - W matrices were combined across years to create one large matrix that was used in the CAR model
 - Intercept was removed due to calculation problems
- Fitted values were used to calculate standard deviations that were used in confidence intervals for each state at each year

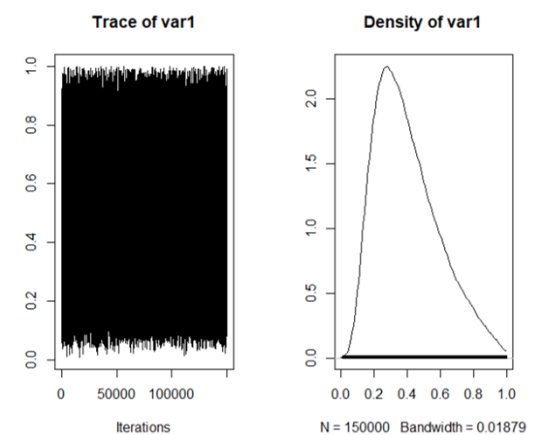
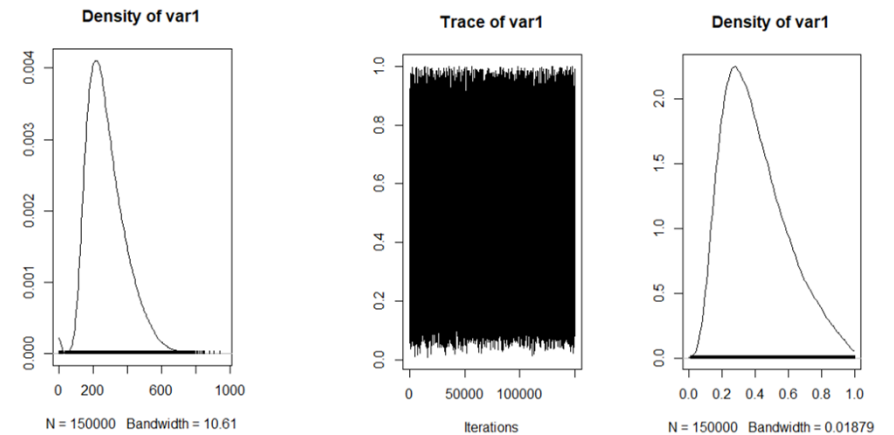
Convergence of the Parameters

- All the parameters appear to converge well, with number effective samples is >1000 for all parameters

Nu^2



Tau^2

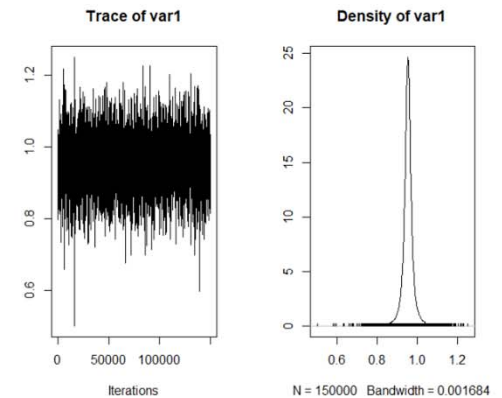


Model Results

Posterior quantities and DIC

	Median	2.5%	97.5%	n.effective	Geweke.diag
finalmean1	0.9538	0.8977	1.0109	141780.1	0.1
nu2	1.3200	0.2542	21.0622	1873.1	0.6
tau2	258.3904	119.1905	538.2846	20407.7	0.4
rho	0.3680	0.1186	0.8460	24505.1	1.1

DIC = 478.1546 p.d = 20.49301 LMPL = -378.9

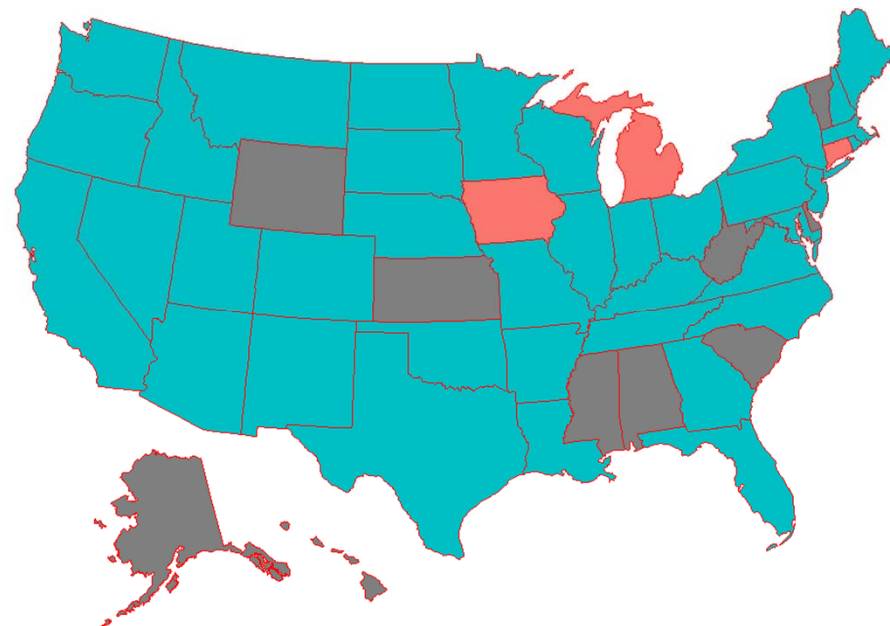


- Zero is not included in the confidence interval of beta, meaning that there is polling bias under the assumption that bias is constant over state and year
- Rho is low, indicating low strength in spatial dependence
- Convergence appears to be good for the beta parameter

Statically Significant States in 2012

- Most of the confidence intervals produced for the states in 2012 did not contain zero
- Most of the states in 2012 have statistically significant levels of bias

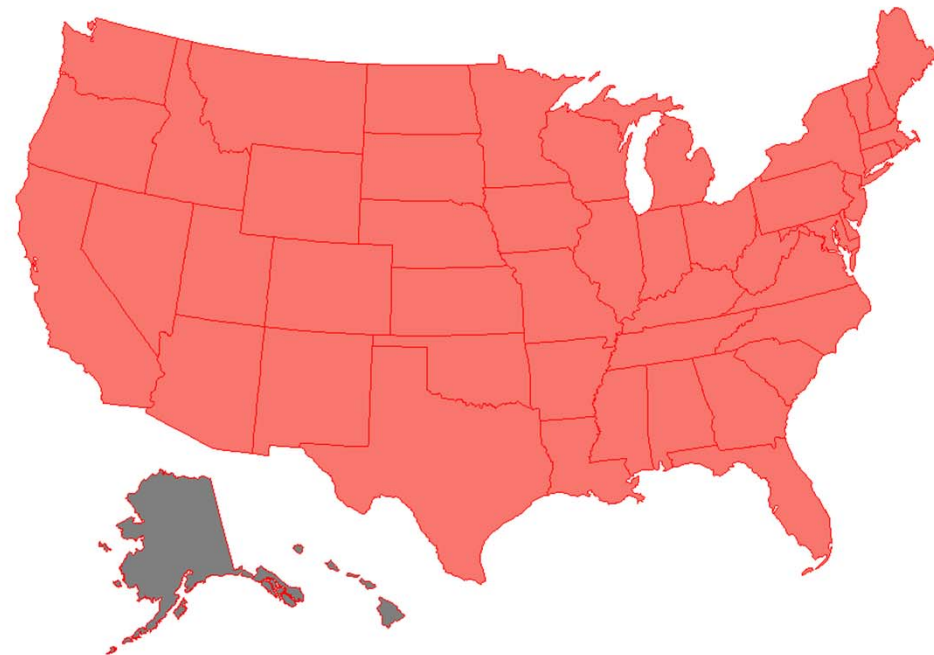
Map of Statistically Significant States in the US for 2012



Statistically significant States in 2016

- All of the confidence intervals produced for the states in 2016 did not contain zero
- All states in 2016 have statistically significant levels of bias

Map of Statistically Significant States in the US for 2016



Statistically Significant States in 2020

- Most of the confidence intervals produced for the states in 2020 did not contain zero
- Most of the states in 2020 have statistically significant levels of bias

Map of Statistically Significant States in the US for 2020

