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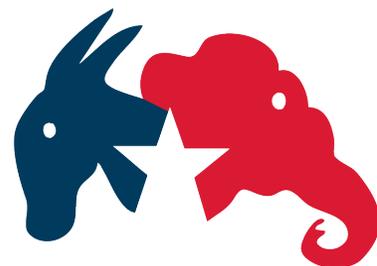
PEORIA Project

2020 Election Predictions Model Results

Nevada Caucuses - Democratic Party

Sanders likeliest to win,
Biden, Buttigieg, and Warren in close race to take a distant second place

Innovative Model Incorporates Social Media Variable
of Twitter Mentions to Yield Ranges of Likely Results



Two Models that Depict the Uncertainty of the 2020 Race



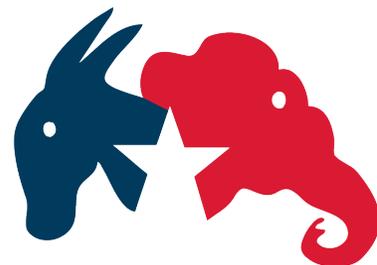
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We present two models predicting the outcome of the Nevada Caucuses:

The first, or “basic,” model uses our key three variables to predict a Sanders victory, followed distantly by Biden, Warren, and Buttigieg in a close grouping for second place.

The second model captures the “momentum” of the race, incorporating the results of the New Hampshire primary election. This model makes roughly the same vote share predictions, but with greater error when accounting for the surprising results in New Hampshire (with Biden and Warren underperforming and Buttigieg and Klobuchar overperforming), yielding a slightly different ordering of potential second-place finishers.

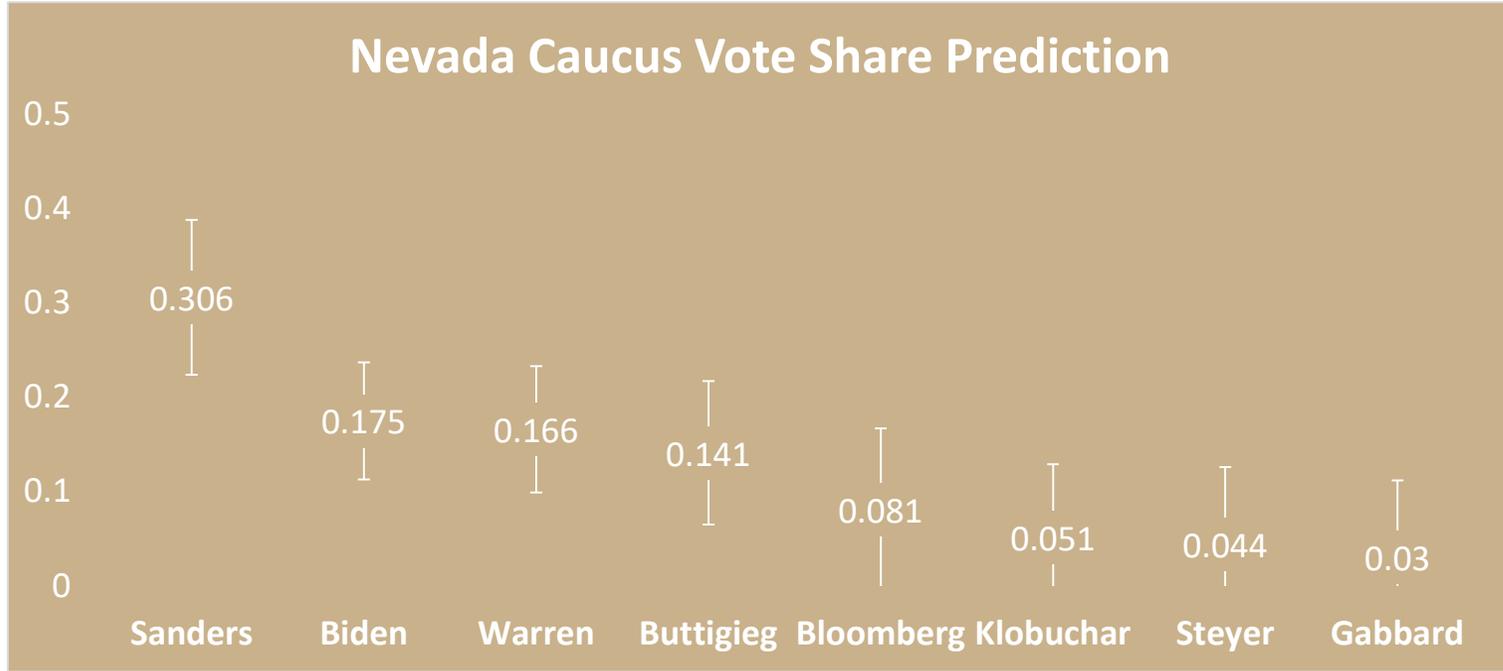
Presenting these two models tests for how momentum affects predictions. In this case, given the results in New Hampshire, the concept of momentum introduces a great deal of uncertainty, underscoring the volatility of the 2020 race.



Predicting NV Vote Share: The Basic Model

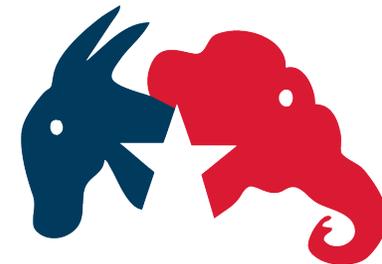


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Candidate	Average Predicted Vote Share	Lower Bound	Upper Bound
Sanders	0.306	0.224	0.388
Biden	0.175	0.113	0.237
Warren	0.166	0.099	0.233
Buttigieg	0.141	0.065	0.217
Bloomberg	0.081	-0.005	0.167
Klobuchar	0.051	-0.027	0.129
Steyer	0.044	-0.038	0.126

The chart and table report the predicted caucus vote share in Nevada for each candidate. For example, Bernie Sanders is predicted to receive 30.6% of the vote share. The bars indicate the upper and lower bounds for the prediction (95% confidence interval).

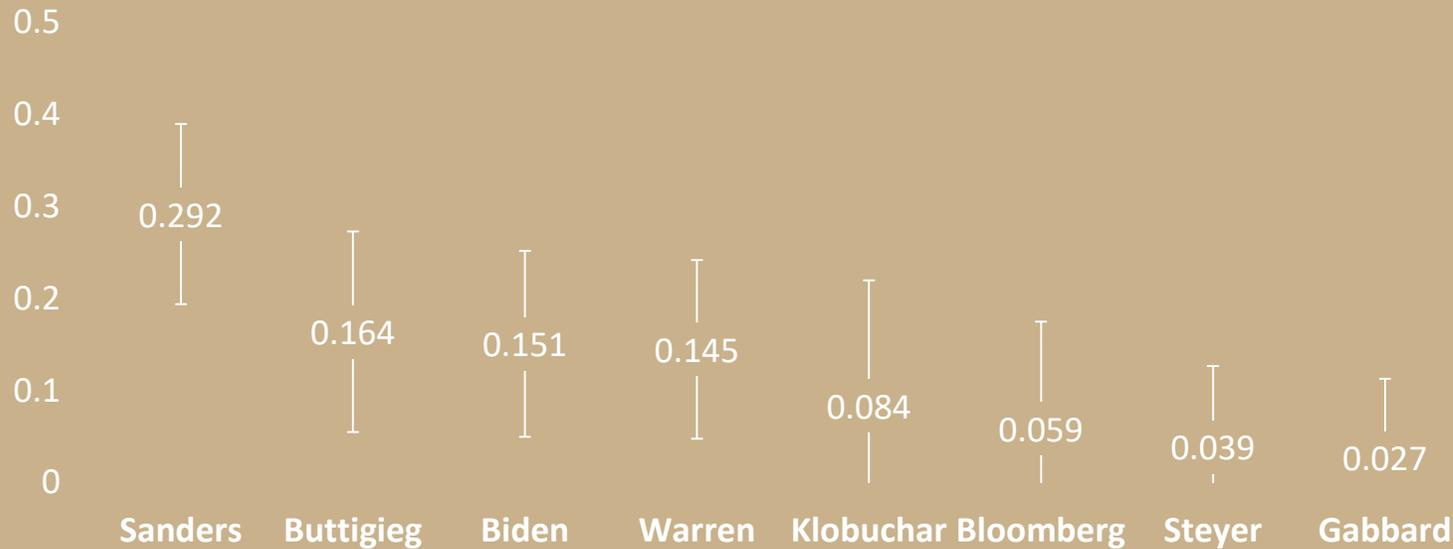


Predicting NV Vote Share: The Momentum Model



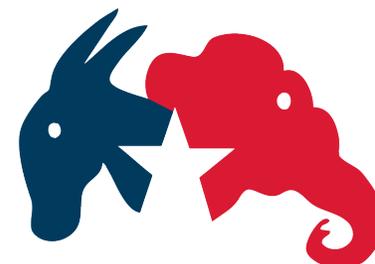
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Nevada Caucus Vote Share Prediction



Candidate	Average Predicted Vote Share	Lower Bound	Upper Bound
Sanders	0.292	0.194	0.390
Buttigieg	0.164	0.055	0.273
Biden	0.151	0.050	0.252
Warren	0.145	0.048	0.242
Klobuchar	0.084	-0.052	0.220
Bloomberg	0.059	-0.057	0.175
Steyer	0.039	-0.049	0.127

The chart and table report the predicted caucus vote share in Nevada for each candidate. For example, Bernie Sanders is predicted to receive 29.2% of the vote share. The bars indicate the upper and lower bounds for the prediction (95% confidence interval).



Our Key Three or Four Variables

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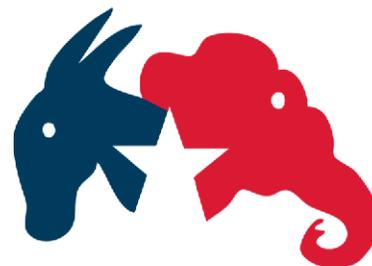
Our models predict a candidate's performance based on three or four factors (depending on the model): Twitter mentions, cash on hand, endorsements, and performance in the last nomination contest.

While we are aware that in important ways the Twitter universe does not necessarily reflect the electorate, the quantity of **Twitter Mentions** is a good proxy for the “buzz” a candidate is getting within the wider electorate, and reflects the activity of important opinion leaders.

Cash on Hand reflects the strength of the candidate in the “money primary.”

Endorsements indicate each candidate's strength within the party, which speaks to the debate over whether the party decides the outcome of the nomination.

Performance in the Last Nomination Contest is the vote share received in the immediately preceding primary or caucus.



Explanation of Models



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What Our Models Do

Our models predicts the Nevada caucus vote share for each Democratic candidate using three or four predictor variables generated by an equation estimated through an Ordinary Least-Squares (OLS) multiple regression. See the following pages for equations.

How We Predict Vote Share

In order to predict each candidate's vote share, we input the latest variable data (see below) into the regression model to generate an estimate as well as an upper- and lower-bound for the predicted performance of each candidate.

Twitter Mentions: Measured as the number of mentions on Twitter for each candidate as a percentage share of the total number of mentions for all candidates within the party. The data for these models were tallied through one month leading up to the week prior to the date of the contest. We focused specifically on those Tweets generated from Nevada. Source for data: Crimson Hexagon.

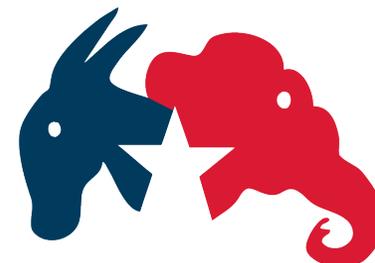
Cash on Hand: Measured as a percentage share of the total cash on hand for all candidates within the party. The most recent data were for Quarter 4 of 2020. Source for data: [FEC.gov](https://www.fec.gov)

Endorsements: Measured as the total number of endorsements for each candidate by US Senators, members of the US House of Representatives, former Presidents and Vice Presidents, former presidential candidates from the current election cycle who had dropped out of the race, elected statewide officials, state legislative leaders, and mayors of large cities. The data for these models were tallied through one month leading up to the week prior to the date of the contest. Source for data: [FiveThirtyEight.com](https://www.fivethirtyeight.com)

Performance in the Last Nomination Contest : Measured as each candidate's share of the total vote within the party in the immediately preceding caucus or primary. For the estimates for Nevada, the immediately preceding contest was the New Hampshire primary election.

How We Chose Our Model

To find the best fitting model, we used campaign data from 2012 and 2016 for the three predictor variables above with Nevada vote share for each year as the dependent variable. Several models were created, including OLS, longitudinal (using Q1 through Q4 cash on hand as well as monthly twitter mentions), lasso, ridge, logistic, partial least squares, and principal component regressions. The models with the lowest RMSE while maintaining the highest possible R^2 was chosen for this report (in this case, OLS regression).



Descriptive Table of Variables and Regression Model for Nevada Vote Share: The Basic Model



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Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	<i>1</i>	<i>2</i>
1. Nevada Twitter Mentions	0.231	0.192		
2. Cash on Hand	0.206	0.220	0.549	
3. Endorsements	258.000	336.011	0.273	0.601

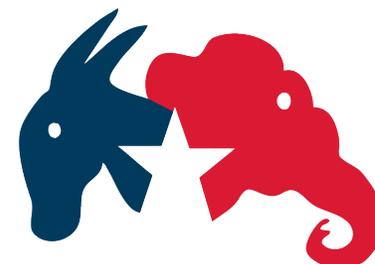
Summary of Regression of the Nevada Caucus Primary Vote Share Prediction

Variable	<i>Estimate</i>	<i>SE B</i>	β
Intercept	0.00175	0.03816	
Twitter Mentions	0.60029**	0.14831	0.58493
Cash on Hand	0.40080*	0.15632	0.44577
Endorsements	0.00003	0.00009	0.04705

adj R² = 0.8262, F(3,9) = 20.02

**p < 0.05. **p < 0.01.*

- The equation representing the model is:
- Predicted Vote Share = 0.00175 + (0.60029 * Twitter Mentions) + (0.40080 * Cash on Hand) + (0.00003 * Endorsements)
- We can interpret the Twitter coefficient as such: As one candidate increases their share of Twitter by 1%, their vote share is predicted to increase by 0.0060029.



Descriptive Table of Variables and Regression Model for Nevada Vote Share: The Momentum Model



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Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>
1. Nevada Twitter Mentions	0.231	0.192			
2. Cash on Hand	0.206	0.220	0.549		
3. Endorsements	258.000	336.011	0.273	0.601	
4. NH Vote Share	0.204	0.856	0.949	0.702	0.243

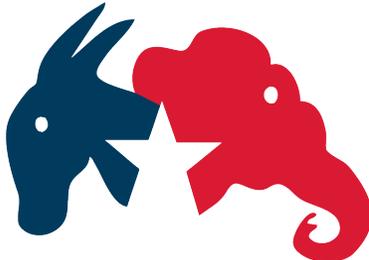
Summary of Regression of the Nevada Caucus Primary Vote Share Prediction with NH

Variable	<i>Estimate</i>	<i>SE B</i>	β
Intercept	-0.00249	0.03911	
Twitter Mentions	0.45204	0.25880	0.44047
Cash on Hand	0.30706	0.20817	0.34151
Endorsements	0.00006	0.00010	0.09568
NH Vote Share	0.24659	0.34769	0.22005

adj R² = 0.816, F(4,8) = 14.31

**p < 0.05. **p < 0.01.*

- The equation representing the model is:
- Predicted Vote Share = -0.00249 + (0.45204 * Twitter Mentions) + (0.30706 * Cash on Hand) + (0.00006 * Endorsements) + (0.24659 * NH Vote Share)
- We can interpret the Twitter coefficient as such: As one candidate increases their share of Twitter by 1%, their vote share is predicted to increase by .0045204.



Thanks for reading!
Come back each week for new predictions!



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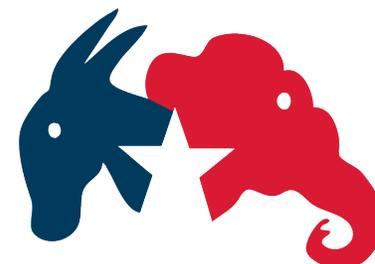
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Appendix: Twitter Data



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2012 Candidate	NV Mentions	Share within Party
Ron Paul	3061	0.413
Mitt Romney	2121	0.286
Newt Gingrich	1271	0.171
Rick Santorum	963	0.130
Barack Obama	757	0.997
Fred Karger	3	0.000
Randall Terry	2	0.003
Darcy Richardson	0	0.000
Bob Ely	0	0.000

2016 Candidate	NV Mentions	Share within Party
Donald Trump	14013	0.483
Bernie Sanders	10794	0.549
Hillary Clinton	8864	0.451
Ted Cruz	8382	0.289
Marco Rubio	2678	0.092
Jeb Bush	2056	0.071
Ben Carson	1354	0.047
John Kasich	529	0.018

2020 Candidate	NV Mentions	Share within Party
Donald Trump	40228	0.997
Bernie Sanders	27120	0.365
Joe Biden	16302	0.216
Elizabeth Warren	12308	0.166
Pete Buttigieg	8818	0.119
Amy Klobuchar	3125	0.042
Michael Bloomberg	2819	0.038
Tom Steyer	2192	0.029
Tulsi Gabbard	1917	0.026
Bill Weld	131	0.003
Rocky De La Fuente	1	0.000

Republican candidates in red, Democratic candidates in blue.

For more information: [The PEORIA Project](#), and the [2020 Weekly Tweeterboard](#).

For a discussion of the differences between the social media electorate and the broader electorate, click [here](#).

