Appendix

State-Level Forecasts for the 2020 U.S. Presidential Election: Tough Victory Ahead for Biden

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Contents

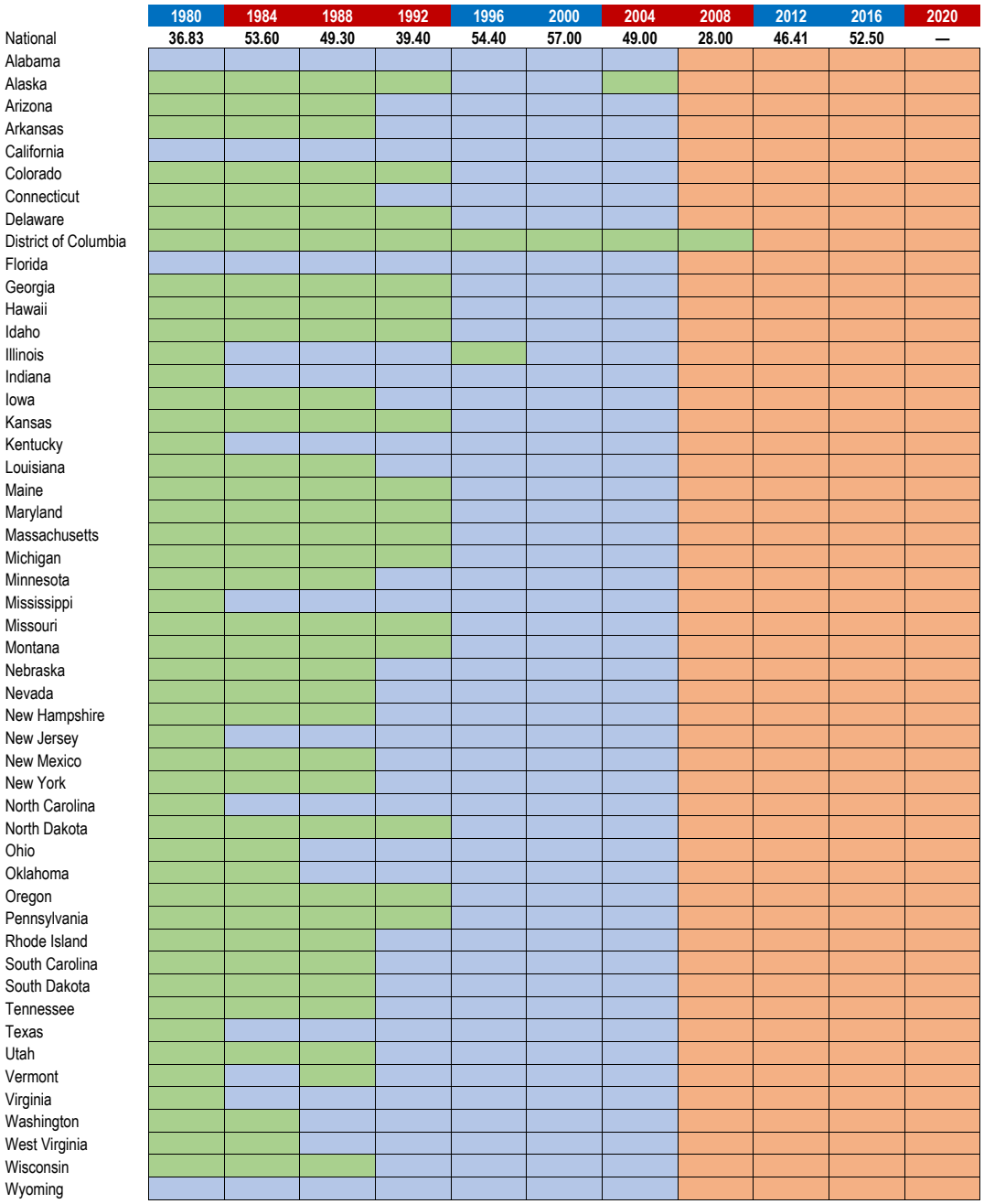
A Data and variables

A.1 Data sources

The necessary data to create the model were gathered from the sources below.

- **Partisan composition of state legislatures.** Partisan composition data were retrieved from the website of the National Conference of State Legislatures.
- **Presidential election results.** Election results and electoral data were retrieved from The American Presidency Project.
- **Primary election results.** For the 1980–1996 period, election results were retrieved from Cook (2000). For the 2000–2020 period, elections results were retrieved from Wikipedia (see 2000 Republican Party presidential primaries; 2004 Democratic Party presidential primaries; 2008 Democratic Party presidential primaries; 2012 Republican Party presidential primaries; 2016 Republican Party presidential primaries; 2020 Democratic Party presidential primaries).
- **President's job approval ratings.** For the 1980–2004 period, approval ratings were retrieved from The U.S. Officials Job Approval Ratings (JAR) Collection (see Beyle, Niemi and Sigelman 2002). For the 2008–2020 period, approval ratings were retrieved from Gallup. See Figure A1.
- **Unemployment.** Unemployment data (for each state) were retrieved from the U.S. Bureau of Labor and Statistics.

Figure A1. Job approval data, 1980–2020



Note: **Blue.** U.S. Officials Job Approval Ratings Collection. **Orange.** Gallup data. For the forecast, 2020 data are simulated using the last available Gallup job approval rating per state (2018) and Gallup job approval rating at the national level (December 2018 to June 2020). **Green.** Computation of the missing data by the authors. Approval ratings were simulated using known annual data (Gallup) and historical deviations from the national level for each state (from known data).

A.2 Variables

The following variables were used to construct the model:

- **2P-INCV$_{i,t}$**

  The two-party vote share in the i^{th} state including the District of Columbia ($i = 1$ ... 51) and for election t ($t = 1980, 1984$ ... 2016) obtained by the incumbent party.[1] The incumbent party candidate was a Democrat in 1980, 1996, 2000, 2012, and 2016 and a Republican in 1984, 1988, 1992, 2004, 2008, and 2020.

- **ΔU**

  The change in the local (i.e., state-level) unemployment rate from the election quarter (i.e., the fourth quarter) of the previous election year and the second quarter of the election year. For example, the value of the unemployment variable for the 2020 forecast was obtained by computing the difference between the unemployment rate in the second quarter (i.e., the average unemployment rate in April–May–June) of 2020 and the fourth quarter (i.e., the average unemployment rate in October–November–December) of 2016. A positive change in state unemployment (i.e., more unemployment) should negatively affect the vote share of the incumbent party candidate.

- **LEGCONT**

  Partisan composition of state legislatures. States in which both the lower and upper chambers of the legislature are controlled by the same party as the party of the president as of January of the election year are coded 1. States in which the legislature is controlled by the party of the challenger candidate are coded 0. When control of the legislature is divided (split)—i.e., the lower chamber is controlled by one party and the upper chamber by the other—a value of 0.5 is given to the state. Note that the local government of the District of Columbia has a legislative branch (i.e., the Council of the District of Columbia) since 1973. This legislature is unicameral. The Council has always been dominated by the Democratic Party (see List of members of the Council of the District of Columbia). Hence, the District of Columbia is always coded 1 when the incumbent candidate is a Democrat and 0 otherwise. Note also that the legislature of Nebraska is officially unicameral and non-partisan since the mid-1930s (although the legislators generally identify with a party). Since the legislature is officially non-partisan, determining party control is not as easy as for the other states. However, over the 1980–2020 period, it appears that the legislature was always dominated by the Republican Party. At the time of the 1996 presidential election, the Speaker of the Nebraska legislature was a Democrat but we were not able to find any indication of "Democratic" control at one point or another. Hence, Nebraska is always coded 1 when the incumbent candidate is a Republican and 0 otherwise. We expect "in-party" control of the state legislature (i.e., a state legislature controlled by the party of the president) to be positively associated with the vote share of the incumbent party candidate because

[1] For the other variables listed below, we voluntarily omit the i and t subscripts.

it serves as a potentially strong indicator of local party strength and partisan leanings. Furthermore, the relationship between presidential and state elections has been noted in previous work (see Campbell 1997, 189–90) and this linkage could already be found in 19th-century American politics (see Engstrom and Kernell 2014, 138).

– **PJA**

The president's job approval rating at the state level six months before the election. For the incumbent party candidate, the higher the president's popularity is, the higher the electoral premium should be. However, the impact of popularity should not be the same in every election: we expect the impact of this variable to depend on whether or not the incumbent is seeking a second term. Thus, **PJA2** is the president's popularity when seeking a second term (and 0 otherwise). **PJA0** is the president's job approval when the incumbent is not running for a second term. Presidential approval ratings capture all aspects of the president's leadership, including how the incumbent administration responds to crisis situation. Hence, for 2020, it is reasonable to assume that the impact of the COVID-19 pandemic is also taken into account by the approval measure used in the model. Between 1980 and 2004, the approval data come from the JAR database which brings together a variety of approval questions (using different scales). Responses were collapsed into "percent positive" and "percent negative" categories. The standard job performance question (referred to as type 1 in the JAR database) was used when available—that is, in the majority of cases—with the type 6 (excellent, good / only fair, poor) or type 10 (excellent, pretty good / only fair, poor) rating scales. Otherwise we used the type 4 question asking respondents to make a retrospective assessment of the whole term (see the codebook of the JAR database for more details). From 2008 onwards, we use the Gallup approval question, which reads as follows: "Do you approve or disapprove of the way [president's name] is handling his job as president?" (possible answers: approve, disapprove, no opinion). We simply take the share of respondents who approve of the way the president is handling his job.

– **PPI**

The partisan pattern index takes into account the characteristics of the partisan cycle in each state. PPI is divided into two local partisan domination variables, one named **PPI5216** to code states having significant partisan domination since 1952 and another one called **PPI8016**, or "new domination" since 1980, which includes recent southern Republican strongholds. More precisely, PPI5216 gives for each state over the 1952–2016 period the rate of success for each party when this rate was at least 71 percent for the Democrats and 88 percent for the Republicans (this variable takes a value of 0 otherwise). PPI8016 gives for each state over the 1980–2016 period the rate of success for each party when this rate was at least 70 percent for the Democrats and 80 percent for the Republicans (this variable takes a value of 0 otherwise). It was first assumed that a party needed to win at least 12 elections out of 17 in a state since 1952 (meaning a 71 percent success rate threshold), for that state to enter the 'stronghold' category. We then reconsidered this minimal threshold by looking at the patterns of electoral success for each party over the 1952–2016 period. A total of 21 states reach the 71 percent threshold for the Republicans, while this is the case for only six states for the

Democrats over the 1952–2016 period. Hence, we chose a more restrictive definition of 'strongholds' for the Republican Party by keeping states with a minimal success rate of 88 percent, that is 15 out of 17 elections. A total of 11 states fall in the stronghold category for the Republicans (the Democrats never reached the 88 percent threshold except in the District of Columbia and Hawaii). We made this choice in order to take into account the asymmetry between Democrats and Republicans. The electoral foundation of Democratic strongholds is weaker than that of Republican strongholds. We followed the same procedure for the 1980–2016 period. 'New' Democratic strongholds were defined as those won by the Democratic Party in seven out of 10 elections (nine states), while new Republican strongholds were defined as those won by the Republican Party in eight out of 10 elections (12 states).

  - Democratic strongholds, 1952–2016: DC, HI, MA, MD, MN, and RI.
  - Democratic strongholds, 1980–2016: CT, DE, IL, ME, NJ, NY, OR, WA, and WI.
  - Republican strongholds, 1952–2016: AK, AZ, ID, IN, KS, MT, ND, NE, OK, SD, and WY.
  - Republican strongholds, 1980–2016: AL, AR, GA, KY, LA, MO, MS, NC, SC, TN, TX, and UT.

  When the partisan leaning of the state is the same as that of the incumbent party candidate, it carries a positive sign; otherwise, it carries a negative sign. In sum, this means that the incumbent party candidate will be rewarded in states that are ideologically similar and punished in states that are ideologically dissimilar. The PPI8016 variable was constructed in the same way, except for the fact that the rate of success was calculated over the 1980–2016 period.

- **CHAVP**

  The vote share per state won by the nominee of the challenger party during the primaries. Here we assert that the higher the score of the challenger nominee is, the more threatened the incumbent party candidate could be. Given the tough fight between Bernie Sanders and Joe Biden in certain states this could represent a bonus for Donald Trump in some cases. The estimated coefficient shows that a one-point gain in vote share for the opposition nominee costs about 0.03 percentage points to the incumbent party candidate.

- **INDV**

  Vote share for the independent and third party (e.g., Libertarian, Green, Reform, etc.) candidates who had a real "nuisance" power for the incumbents (0 otherwise). This includes, for instance, John Anderson in 1980, Ross Perot in 1992 and 1996, Ralph Nader in 2002, or even Evan McMullin or Jill Stein in 2016. This variable shows that a one-point gain in vote share for independent and third party candidates costs about 0.28 percentage points to the incumbent party candidate (whichever party he or she is from). Note that this variable is included in the model to obtain better estimates. As we obviously do not know the scores of independent and third party candidates before the election takes place, the value of this variable is set to 0 in every state in order to estimate the model for 2020.

– **DHSC, RHSC**

Dummy variables scored 1 in states where Democrats (DHSC) or Republicans (RHSC) have systematically high scores (i.e., scores above their average national score) and 0 otherwise.

- Democrats: MA, MD, NJ, NY, and RI.
- Republicans: AK, ID, NE, UT, and WY.

– **DCDS, DCRS**

Dummy variables scored 1 in the District of Columbia when Democrats (DCDS) or Republicans (DCRS) are incumbents and 0 otherwise. A high premium is expected when Democrats are incumbents while Republicans should pay a high cost in the reverse case.

B Winning probability at the state level

The winning probability of a candidate in a given state (or, more precisely, the probability of crossing the 50 percent mark) is obtained by computing the complementary cumulative density function (CCDF). First, to find the probability that the two-party vote share is less than or equal to the threshold X (here 50) in a distribution with a mean (μ) equal to the predicted two-party vote share and a standard deviation (σ) equal to that of the estimated model, we need to convert the X value to a z-score (i.e., the distance of X from μ expressed as a standard deviation). Equation 1 shows how to do this:

$$z = \frac{X - \mu}{\sigma} \tag{1}$$

Second, looking at a standard normal cumulative distribution function (CDF) table, we find the area to the right of the z-score. Finally, to find the area to the left of the z-score, we use the complement rule and compute 1 – CDF (i.e., the CCDF) which gives us the probability a candidate will cross the 50 percent mark in a given state. In Stata, all of this can be achieved by using the following line of code (and inserting the proper values for μ and σ): `display 1 - normal((50 - μ)/σ)`.

Imagine that the forecast for the incumbent party candidate in an state is 45 percent of the two-party vote and that the standard deviation of the model is 3. We wish to know what is the probability that the incumbent party candidate will cross the 50 percent mark in the state. Using Equation 1, we find that the z-score is approximately equal to 1.67. This z-score is associated with a 0.95 probability (or a 95 percent chance) of falling below or at the 50 percent mark. In other words, the incumbent candidate only has a 0.05 probability (or a 5 percent chance) of crossing the 50 percent mark.

C Detailed results, 1980

Table C1 shows the popular vote and Electoral College jackknife out-of-sample forecasts[2] for each candidate in each state.

Table C1: Forecasts by state, 1980 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Carter	Reagan	Carter	Reagan	
Alabama	42.59	57.41		9	Yes
Alaska	39.87	60.13		3	Yes
Arizona	43.75	56.25		6	Yes
Arkansas	47.83	52.17		6	Yes
California	52.63	47.37	45		No
Colorado	48.97	51.03		7	Yes
Connecticut	57.63	42.37	8		No
Delaware	59.73	40.27	3		No
District of Columbia	94.45	5.55	3		Yes
Florida	52.98	47.02	17		No
Georgia	45.95	54.05		12	No
Hawaii	64.68	35.32	4		Yes
Idaho	32.59	67.41		4	Yes
Illinois	52.71	47.29	26		No
Indiana	34.16	65.84		13	Yes
Iowa	46.08	53.92		8	Yes
Kansas	37.43	62.57		7	Yes
Kentucky	40.83	59.17		9	Yes
Louisiana	45.98	54.02		10	Yes
Maine	55.99	44.01	4		No
Maryland	57.66	42.34	10		Yes
Massachusetts	60.31	39.69	14		No
Michigan	48.67	51.33		21	Yes
Minnesota	58.81	41.19	10		Yes
Mississippi	42.42	57.58		7	Yes
Missouri	47.06	52.94		12	Yes
Montana	36.10	63.90		4	Yes
Nebraska	36.46	63.54		5	Yes
Nevada	50.60	49.40	3		No
New Hampshire	47.11	52.89		4	Yes
New Mexico	52.68	47.32	4		No
New York	60.68	39.32	41		No

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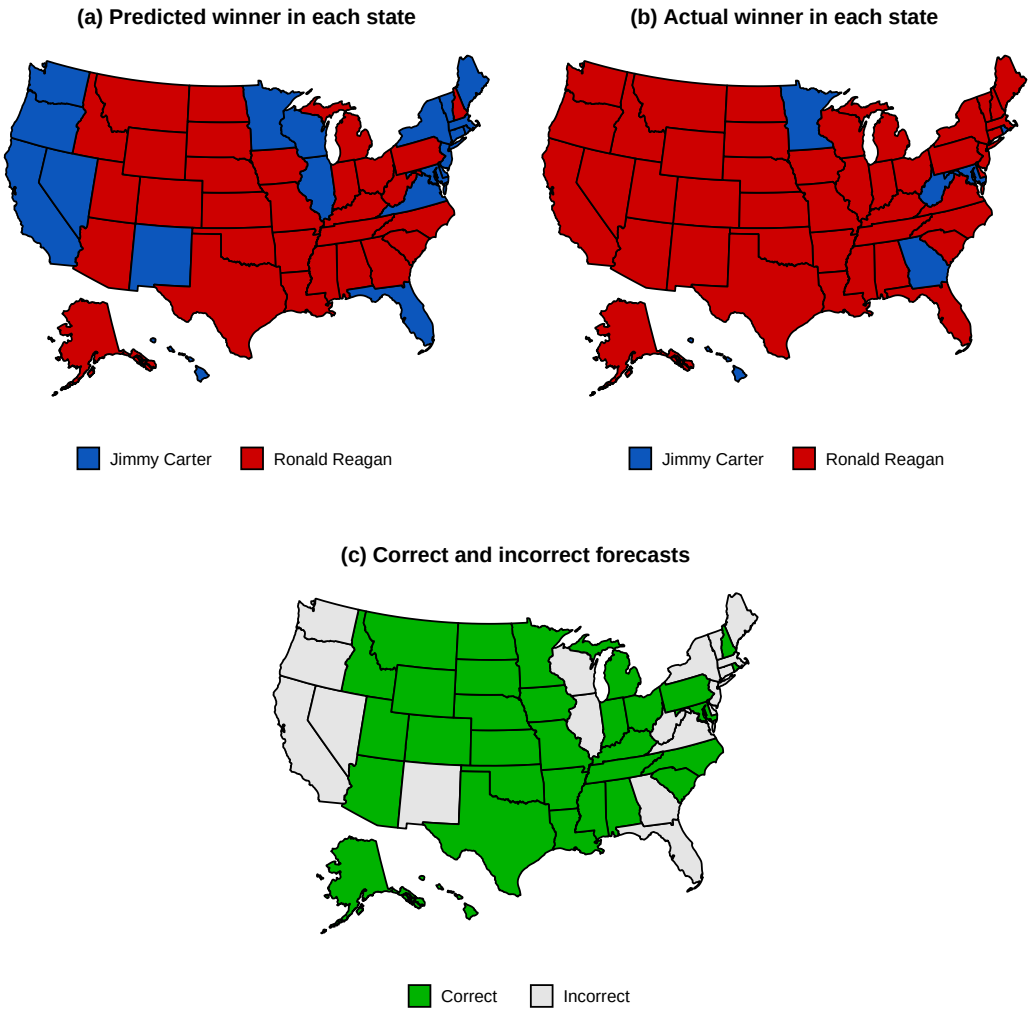
[2]Such forecasts are obtained by dropping one election at a time and predicting the result(s) of the election that was dropped based on the available data for all other elections.

Table C1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Carter	Reagan	Carter	Reagan	
North Carolina	45.03	54.97		13	Yes
North Dakota	41.71	58.29		3	Yes
New Jersey	50.82	49.18	17		No
Ohio	47.15	52.85		25	Yes
Oklahoma	44.67	55.33		8	Yes
Oregon	54.79	45.21	6		No
Pennsylvania	47.89	52.11		27	Yes
Rhode Island	57.23	42.77	4		Yes
South Carolina	44.35	55.65		8	Yes
South Dakota	36.01	63.99		4	Yes
Tennessee	43.49	56.51		10	Yes
Texas	44.59	55.41		26	Yes
Utah	40.03	59.97		4	Yes
Vermont	53.48	46.52	3		No
Virginia	53.51	46.49	12		No
Washington	55.47	44.53	9		No
West Virginia	44.58	55.42		6	No
Wisconsin	53.78	46.22	11		No
Wyoming	40.64	59.36		3	Yes
Nationwide	–	–	254	284	33/51

a. Was the state attributed to the right candidate by the model?

Figure C1. Predicted and actual outcomes, 1980 presidential election



D Detailed results, 1984

Table D1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table D1: Forecasts by state, 1984 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Reagan	Mondale	Reagan	Mondale	
Alabama	56.72	43.28	9		Yes
Alaska	68.40	31.60	3		Yes
Arizona	66.25	33.75	7		Yes
Arkansas	59.23	40.77	6		Yes
California	51.83	48.17	47		Yes
Colorado	56.45	43.55	8		Yes
Connecticut	47.12	52.88		8	No
Delaware	48.26	51.74		3	No
District of Columbia	11.52	88.48		3	Yes
Florida	54.78	45.22	21		Yes
Georgia	54.62	45.38	12		Yes
Hawaii	45.71	54.29		4	No
Idaho	70.09	29.91	4		Yes
Illinois	50.85	49.15	24		Yes
Indiana	62.69	37.31	12		Yes
Iowa	53.95	46.05	8		Yes
Kansas	60.53	39.47	7		Yes
Kentucky	56.59	43.41	9		Yes
Louisiana	58.87	41.13	10		Yes
Maine	48.36	51.64		4	No
Maryland	45.81	54.19		10	No
Massachusetts	44.17	55.83		13	No
Michigan	54.93	45.07	20		Yes
Minnesota	50.02	49.98	10		No
Mississippi	59.11	40.89	7		Yes
Missouri	58.46	41.54	11		Yes
Montana	61.83	38.17	4		Yes
Nebraska	70.06	29.94	5		Yes
Nevada	53.91	46.09	4		Yes
New Hampshire	55.89	44.11	4		Yes
New Jersey	48.67	51.33		16	No
New Mexico	53.17	46.83	5		Yes
New York	47.93	52.07		36	No
North Carolina	59.79	40.21	13		Yes

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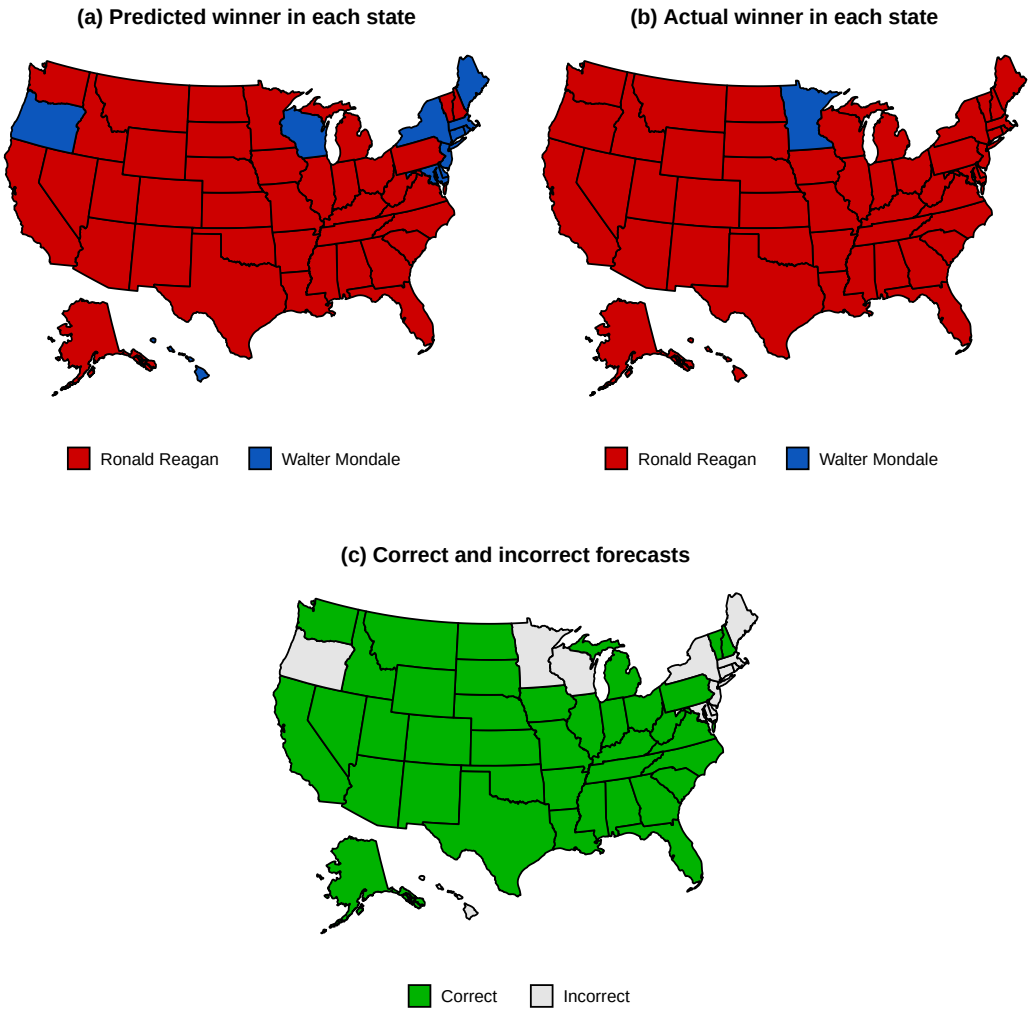
Table D1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Reagan	Mondale	Reagan	Mondale	
North Dakota	64.00	36.00	3		Yes
Ohio	55.90	44.10	23		Yes
Oklahoma	64.57	35.43	8		Yes
Oregon	47.83	52.17		7	No
Pennsylvania	51.27	48.73	25		Yes
Rhode Island	42.91	57.09		4	No
South Carolina	62.34	37.66	8		Yes
South Dakota	67.00	33.00	3		Yes
Tennessee	58.84	41.16	11		Yes
Texas	61.45	38.55	29		Yes
Utah	71.52	28.48	5		Yes
Vermont	53.35	46.65	3		Yes
Virginia	55.30	44.70	12		Yes
Washington	51.02	48.98	10		Yes
West Virginia	51.92	48.08	6		Yes
Wisconsin	48.77	51.23		11	No
Wyoming	70.37	29.63	3		Yes
Nationwide	–	–	419	119	39/51

a. Was the state attributed to the right candidate by the model?

Figure D2. Predicted and actual outcomes, 1984 presidential election



E Detailed results, 1988

Table E1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table E1: Forecasts by state, 1988 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Bush	Dukakis	Bush	Dukakis	
Alabama	57.98	42.02	9		Yes
Alaska	65.11	34.89	3		Yes
Arizona	61.50	38.50	7		Yes
Arkansas	55.01	44.99	6		Yes
California	45.04	54.96		47	No
Colorado	52.29	47.71	8		Yes
Connecticut	43.13	56.87		8	No
Delaware	46.92	53.08		3	No
District of Columbia	12.13	87.87		3	Yes
Florida	51.53	48.47	21		Yes
Georgia	51.23	48.77	12		Yes
Hawaii	43.15	56.85		4	Yes
Idaho	65.21	34.79	4		Yes
Illinois	46.91	53.09		24	No
Indiana	58.62	41.38	12		Yes
Iowa	51.12	48.88	8		No
Kansas	57.41	42.59	7		Yes
Kentucky	56.90	43.10	9		Yes
Louisiana	55.19	44.81	10		Yes
Maine	45.46	54.54		4	No
Maryland	41.83	58.17		10	No
Massachusetts	39.99	60.01		13	Yes
Michigan	51.84	48.16	20		Yes
Minnesota	45.51	54.49		10	Yes
Mississippi	59.61	40.39	7		Yes
Missouri	54.32	45.68	11		Yes
Montana	56.74	43.26	4		Yes
Nebraska	65.41	34.59	5		Yes
Nevada	51.35	48.65	4		Yes
New Jersey	51.06	48.94	16		Yes
New York	43.36	56.64		36	Yes
North Carolina	55.79	44.21	13		Yes
North Dakota	57.40	42.60	3		Yes
New Hampshire	49.78	50.22		4	No

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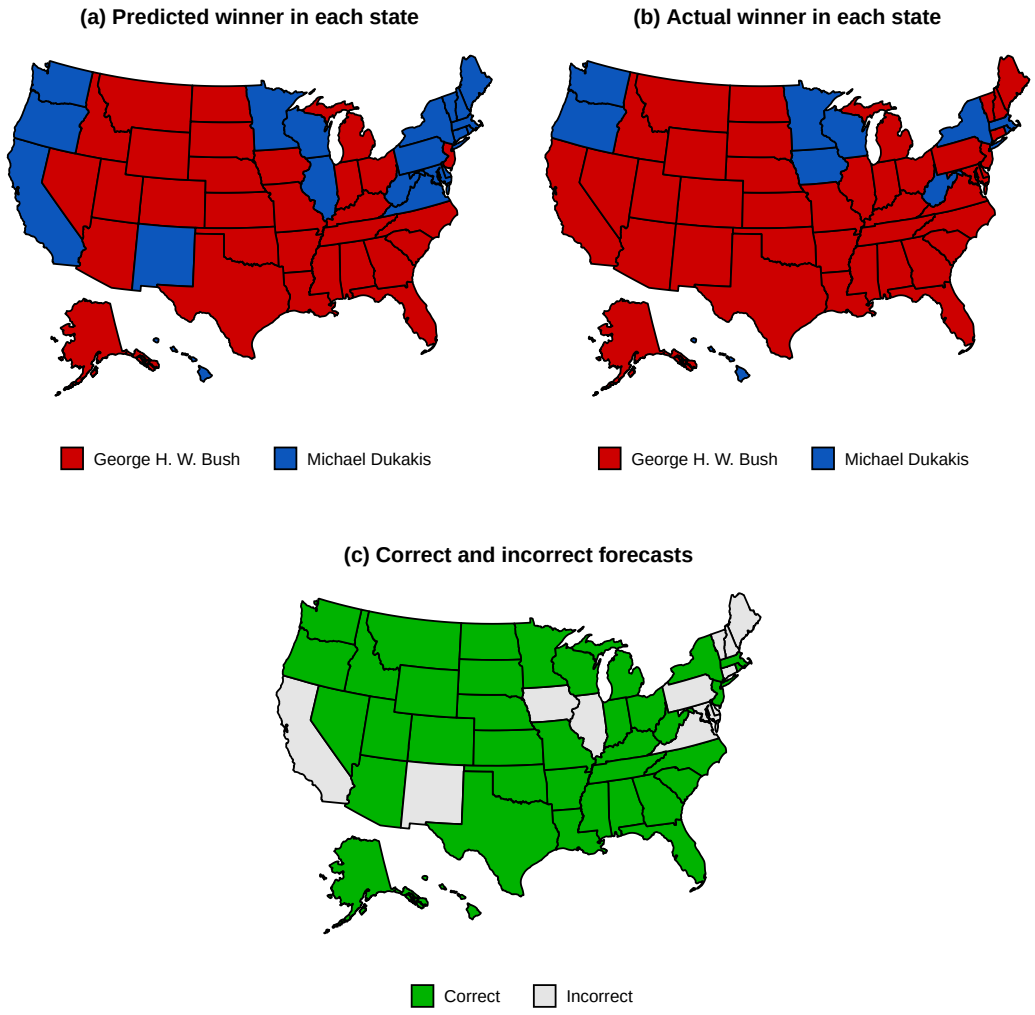
Table E1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Bush	Dukakis	Bush	Dukakis	
New Mexico	48.74	51.26		5	No
Ohio	50.50	49.50	23		Yes
Oklahoma	62.74	37.26	8		Yes
Oregon	44.62	55.38		7	Yes
Pennsylvania	48.18	51.82		25	No
Rhode Island	38.79	61.21		4	Yes
South Carolina	58.29	41.71	8		Yes
South Dakota	62.36	37.64	3		Yes
Tennessee	56.02	43.98	11		Yes
Texas	54.08	45.92	29		Yes
Utah	67.39	32.61	5		Yes
Vermont	48.25	51.75		3	No
Virginia	49.15	50.85		12	No
Washington	46.90	53.10		10	Yes
West Virginia	45.73	54.27		6	Yes[b]
Wisconsin	45.30	54.70		11	Yes
Wyoming	64.88	35.12	3		Yes
Nationwide	–	–	289	249	39/51

a. Was the state attributed to the right candidate by the model?
b. Michael Dukakis received only five of the six electoral votes in West Virginia. Lloyd Bentsen (Democratic) received one of the state's electoral votes from a faithless elector.

Figure E1. Predicted and actual outcomes, 1988 presidential election



F Detailed results, 1992

Table F1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table F1: Forecasts by state, 1992 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Bush	Clinton	Bush	Clinton	
Alabama	51.66	48.34	9		Yes
Alaska	46.68	53.32		3	No
Arizona	54.41	45.59	8		Yes
Arkansas	56.85	43.15	6		No
California	33.18	66.82		54	Yes
Colorado	41.37	58.63		8	Yes
Connecticut	27.12	72.88		8	Yes
Delaware	33.72	66.28		3	Yes
District of Columbia	4.65	95.35		3	Yes
Florida	47.05	52.95		25	No
Georgia	42.56	57.44		13	Yes
Hawaii	35.89	64.11		4	Yes
Idaho	52.45	47.55	4		Yes
Illinois	35.13	64.87		22	Yes
Indiana	46.07	53.93		12	No
Iowa	46.05	53.95		7	Yes
Kansas	40.98	59.02		6	No
Kentucky	46.90	53.10		8	Yes
Louisiana	51.09	48.91	9		No
Maine	26.14	73.86		4	Yes
Maryland	33.13	66.87		10	Yes
Massachusetts	24.86	75.14		12	Yes
Michigan	39.20	60.80		18	Yes
Minnesota	37.33	62.67		10	Yes
Mississippi	54.73	45.27	7		Yes
Missouri	45.12	54.88		11	Yes
Montana	44.74	55.26		3	Yes
Nebraska	62.62	37.38	5		Yes
Nevada	37.11	62.89		4	Yes
New Jersey	33.06	66.94		15	Yes
New Mexico	33.90	66.10		5	Yes
New York	37.23	62.77		33	Yes
North Carolina	46.11	53.89		14	No
North Dakota	44.46	55.54		3	No

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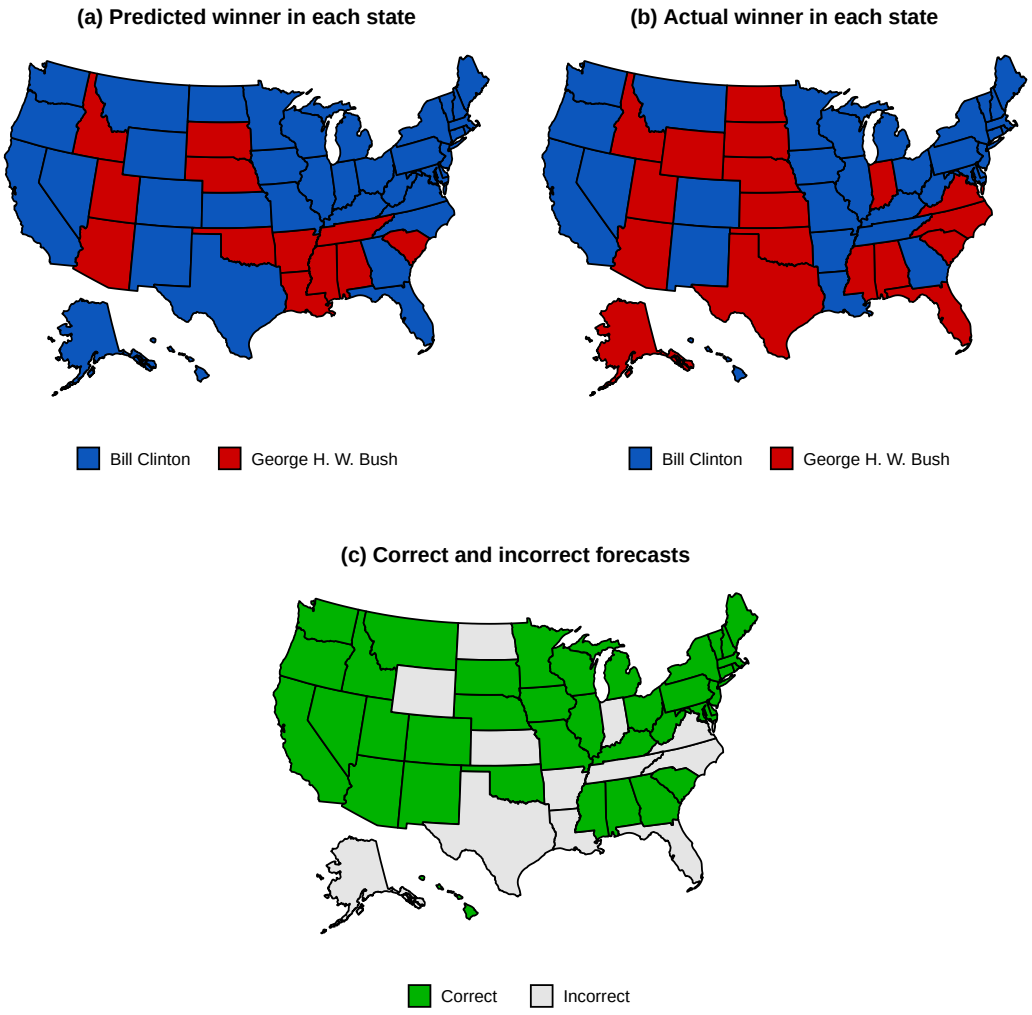
Table F1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Bush	Clinton	Bush	Clinton	
New Hampshire	43.45	56.55		4	Yes
Ohio	44.38	55.62		21	Yes
Oklahoma	55.07	44.93	8		Yes
Oregon	32.10	67.90		7	Yes
Pennsylvania	36.02	63.98		23	Yes
Rhode Island	20.62	79.38		4	Yes
South Carolina	57.51	42.49	8		Yes
South Dakota	57.84	42.16	3		Yes
Tennessee	51.05	48.95	11		No
Texas	46.29	53.71		32	No
Utah	56.98	43.02	5		Yes
Vermont	39.61	60.39		3	Yes
Virginia	42.07	57.93		13	No
Washington	41.65	58.35		11	Yes
West Virginia	42.36	57.64		5	Yes
Wisconsin	30.96	69.04		11	Yes
Wyoming	44.09	55.91		3	No
Nationwide	–	–	83	455	39/51

a. Was the state attributed to the right candidate by the model?

Figure F1. Predicted and actual outcomes, 1992 presidential election



G Detailed results, 1996

Table G1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table G1: Forecasts by state, 1996 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Clinton	Dole	Clinton	Dole	
Alabama	42.82	57.18		9	Yes
Alaska	39.17	60.83		3	Yes
Arizona	41.99	58.01		8	No
Arkansas	48.90	51.10		6	No
California	57.62	42.38	54		Yes
Colorado	48.68	51.32		8	Yes
Connecticut	54.08	45.92	8		Yes
Delaware	51.95	48.05	3		Yes
District of Columbia	95.30	4.70	3		Yes
Florida	46.69	53.31		25	No
Georgia	45.32	54.68		13	Yes
Hawaii	62.68	37.32	4		Yes
Iowa	50.27	49.73	7		Yes
Idaho	34.84	65.16		4	Yes
Illinois	51.54	48.46	22		Yes
Indiana	36.56	63.44		12	Yes
Kansas	40.76	59.24		6	Yes
Kentucky	43.53	56.47		8	No
Louisiana	51.47	48.53	9		Yes
Maine	53.91	46.09	4		Yes
Maryland	60.89	39.11	10		Yes
Massachusetts	61.84	38.16	12		Yes
Michigan	50.71	49.29	18		Yes
Minnesota	61.43	38.57	10		Yes
Mississippi	43.83	56.17		7	Yes
Missouri	46.34	53.66		11	No
Montana	38.62	61.38		3	Yes
Nebraska	38.59	61.41		5	Yes
Nevada	48.36	51.64		4	No
New Hampshire	50.12	49.88	4		Yes
New Jersey	54.48	45.52	15		Yes
New Mexico	51.15	48.85	5		Yes
New York	59.53	40.47	33		Yes
North Carolina	43.26	56.74		14	Yes

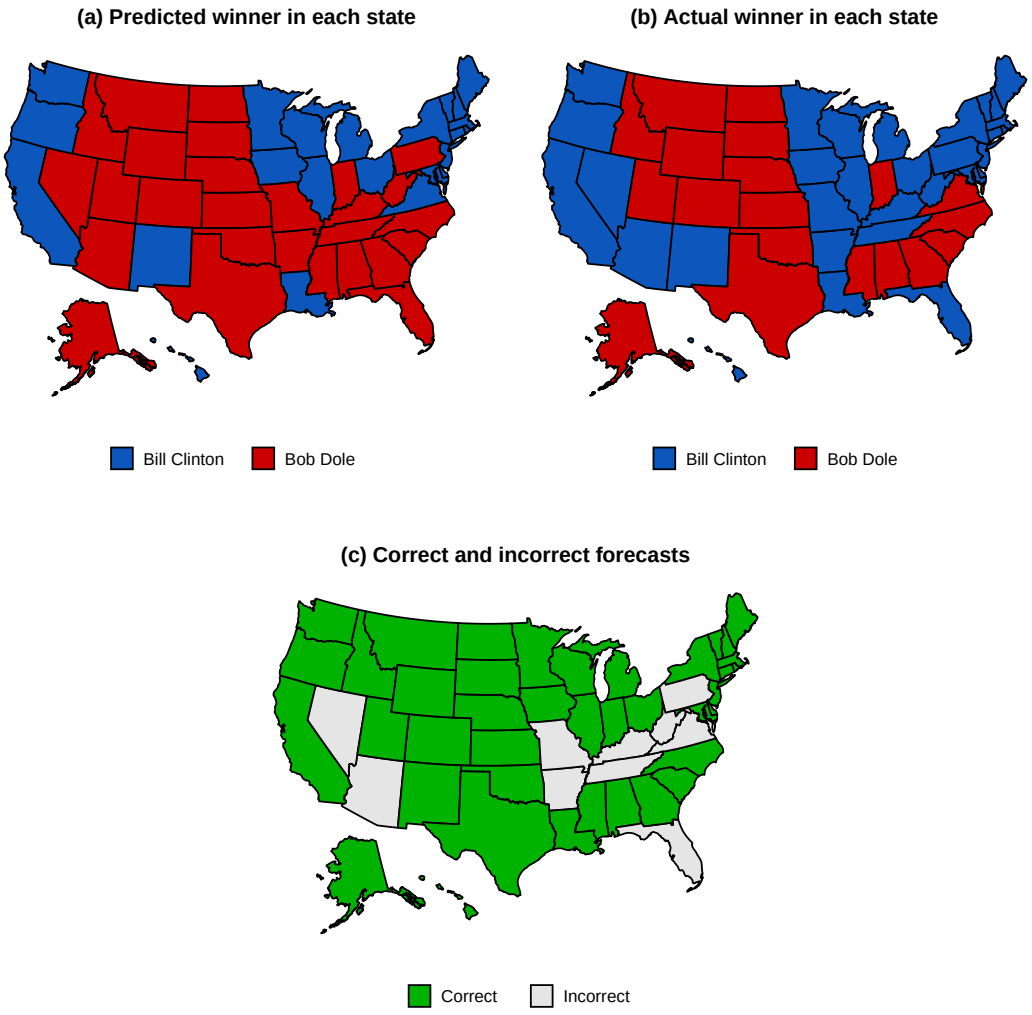
Continued on next page

Table G1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Clinton	Dole	Clinton	Dole	
North Dakota	37.55	62.45		3	Yes
Ohio	50.28	49.72	21		Yes
Oklahoma	38.96	61.04		8	Yes
Oregon	53.75	46.25	7		Yes
Pennsylvania	48.98	51.02		23	No
Rhode Island	60.44	39.56	4		Yes
South Carolina	43.85	56.15		8	Yes
South Dakota	38.92	61.08		3	Yes
Tennessee	48.49	51.51		11	No
Texas	43.30	56.70		32	Yes
Utah	41.11	58.89		5	Yes
Vermont	52.43	47.57	3		Yes
Virginia	51.41	48.59	13		No
Washington	53.60	46.40	11		Yes
West Virginia	49.20	50.80		5	No
Wisconsin	52.20	47.80	11		Yes
Wyoming	39.84	60.16		3	Yes
Nationwide	–	–	291	247	41/51

a. Was the state attributed to the right candidate by the model?

Figure G1. Predicted and actual outcomes, 1996 presidential election



H Detailed results, 2000

Table H1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table H1: Forecasts by state, 2000 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Gore	Bush	Gore	Bush	
Alabama	47.15	52.85		9	Yes
Alaska	41.27	58.73		3	Yes
Arizona	45.98	54.02		8	Yes
Arkansas	49.88	50.12		6	Yes
California	58.53	41.47	54		Yes
Colorado	51.15	48.85	8		No
Connecticut	59.42	40.58	8		Yes
Delaware	58.27	41.73	3		Yes
District of Columbia	89.81	10.19	3		Yes[b]
Florida	52.05	47.95	25		No
Georgia	49.96	50.04		13	Yes
Hawaii	63.19	36.81	4		Yes
Idaho	40.28	59.72		4	Yes
Illinois	57.83	42.17	22		Yes
Indiana	44.44	55.56		12	Yes
Iowa	51.98	48.02	7		Yes
Kansas	44.61	55.39		6	Yes
Kentucky	47.44	52.56		8	Yes
Louisiana	49.07	50.93		9	Yes
Maine	56.32	43.68	4		Yes
Maryland	64.01	35.99	10		Yes
Massachusetts	65.65	34.35	12		Yes
Michigan	52.65	47.35	18		Yes
Minnesota	59.64	40.36	10		Yes
Mississippi	47.62	52.38		7	Yes
Missouri	49.62	50.38		11	Yes
Montana	40.35	59.65		3	Yes
Nebraska	40.26	59.74		5	Yes
Nevada	54.13	45.87	4		No
New Hampshire	51.79	48.21	4		No
New Jersey	59.94	40.06	15		Yes
New Mexico	52.46	47.54	5		Yes
New York	62.09	37.91	33		Yes
North Carolina	48.81	51.19		14	Yes

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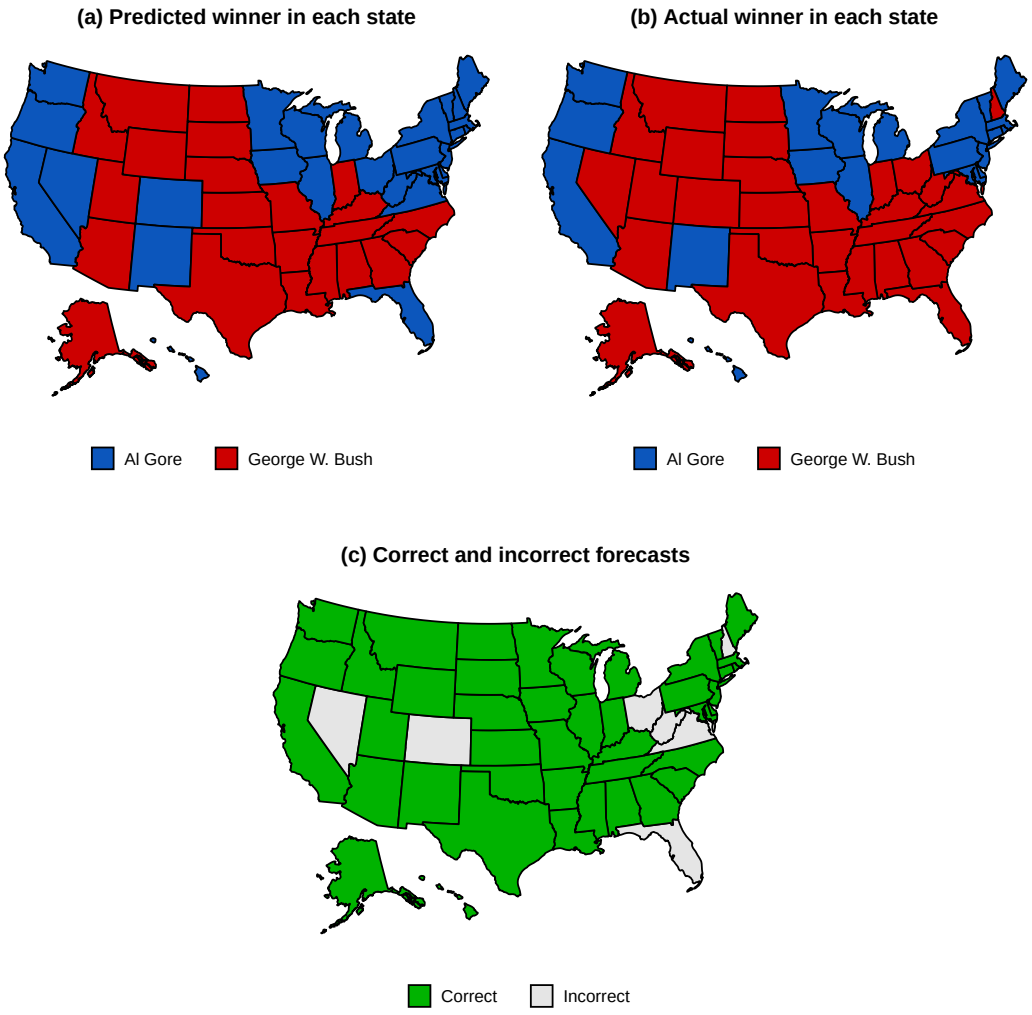
Table H1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Gore	Bush	Gore	Bush	
North Dakota	43.23	56.77		3	Yes
Ohio	51.51	48.49	21		No
Oklahoma	45.25	54.75		8	Yes
Oregon	53.19	46.81	7		Yes
Pennsylvania	51.61	48.39	23		Yes
Rhode Island	66.40	33.60	4		Yes
South Carolina	47.69	52.31		8	Yes
South Dakota	44.29	55.71		3	Yes
Tennessee	49.29	50.71		11	Yes
Texas	43.73	56.27		32	Yes
Utah	41.91	58.09		5	Yes
Vermont	57.46	42.54	3		Yes
Virginia	51.74	48.26	13		No
Washington	56.14	43.86	11		Yes
West Virginia	53.85	46.15	5		No
Wisconsin	54.91	45.09	11		Yes
Wyoming	42.52	57.48		3	Yes
Nationwide	–	–	347	191	44/51

a. Was the state attributed to the right candidate by the model?
b. Al Gore received only two of the three electoral votes in the District of Columbia as one elector abstained.

Figure H1. Predicted and actual outcomes, 2000 presidential election



I Detailed results, 2004

Table I1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table I1: Forecasts by state, 2004 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Bush	Kerry	Bush	Kerry	
Alabama	58.12	41.88	9		Yes
Alaska	69.05	30.95	3		Yes
Arizona	63.01	36.99	10		Yes
Arkansas	56.21	43.79	6		Yes
California	45.45	54.55		55	Yes
Colorado	53.10	46.90	9		Yes
Connecticut	46.61	53.39		7	Yes
Delaware	47.98	52.02		3	Yes
District of Columbia	11.22	88.78		3	Yes
Florida	54.70	45.30	27		Yes
Georgia	62.19	37.81	15		Yes
Hawaii	43.43	56.57		4	Yes
Idaho	68.55	31.45	4		Yes
Illinois	43.54	56.46		21	Yes
Indiana	58.42	41.58	11		Yes
Iowa	54.29	45.71	7		Yes
Kansas	61.50	38.50	6		Yes
Kentucky	60.81	39.19	8		Yes
Louisiana	57.81	42.19	9		Yes
Maine	48.73	51.27		4	Yes
Maryland	45.75	54.25		10	Yes
Massachusetts	41.23	58.77		12	Yes
Michigan	54.46	45.54	17		No
Minnesota	48.60	51.40		10	Yes[b]
Mississippi	56.66	43.34	6		Yes
Missouri	60.01	39.99	11		Yes
Montana	62.44	37.56	3		Yes
Nebraska	68.39	31.61	5		Yes
Nevada	54.30	45.70	5		Yes
New Jersey	48.31	51.69		15	Yes
New Mexico	52.92	47.08	5		Yes
New York	45.73	54.27		31	Yes
North Carolina	59.88	40.12	15		Yes
North Dakota	59.72	40.28	3		Yes

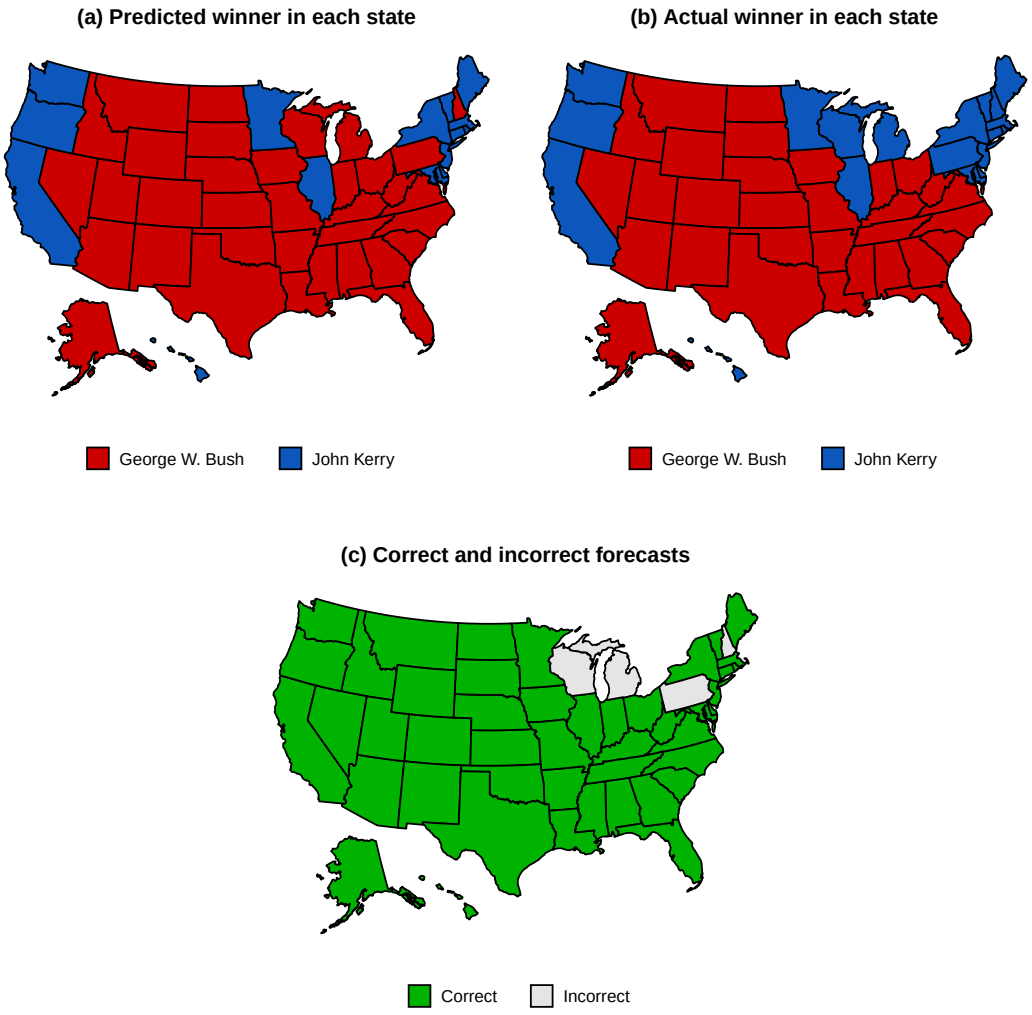
Continued on next page

Table I1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Bush	Kerry	Bush	Kerry	
New Hampshire	57.53	42.47	4		No
Ohio	55.91	44.09	20		Yes
Oklahoma	68.45	31.55	7		Yes
Oregon	47.95	52.05		7	Yes
Pennsylvania	53.92	46.08	21		No
Rhode Island	42.30	57.70		4	Yes
South Carolina	60.52	39.48	8		Yes
South Dakota	62.95	37.05	3		Yes
Tennessee	60.43	39.57	11		Yes
Texas	61.62	38.38	34		Yes
Utah	70.33	29.67	5		Yes
Vermont	46.63	53.37		3	Yes
Virginia	54.16	45.84	13		Yes
Washington	48.58	51.42		11	Yes
West Virginia	53.40	46.60	5		Yes
Wisconsin	52.17	47.83	10		No
Wyoming	68.53	31.47	3		Yes
Nationwide	–	–	338	200	47/51

a. Was the state attributed to the right candidate by the model?
b. John Kerry received only nine of the 10 electoral votes in Minnesota. John Edwards (Democratic) received one of the state's electoral votes from a faithless elector.

Figure I1. Predicted and actual outcomes, 2004 presidential election



J Detailed results, 2008

Table J1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table J1: Forecasts by state, 2008 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	McCain	Obama	McCain	Obama	
Alabama	50.46	49.54	9		Yes
Alaska	54.31	45.69	3		Yes
Arizona	51.95	48.05	10		Yes
Arkansas	45.09	54.91		6	No
California	38.25	61.75		55	Yes
Colorado	40.88	59.12		9	Yes
Connecticut	36.15	63.85		7	Yes
Delaware	35.74	64.26		3	Yes
District of Columbia	9.93	90.07		3	Yes
Florida	42.69	57.31		27	Yes
Georgia	47.93	52.07		15	No
Hawaii	37.01	62.99		4	Yes
Idaho	56.95	43.05	4		Yes
Illinois	35.71	64.29		21	Yes
Indiana	51.45	48.55	11		No
Iowa	43.50	56.51		7	Yes
Kansas	53.70	46.30	6		Yes
Kentucky	47.70	52.30		8	No
Louisiana	50.74	49.26	9		Yes
Maine	35.72	64.28		4	Yes
Maryland	34.61	65.39		10	Yes
Massachusetts	34.56	65.44		12	Yes
Michigan	43.13	56.87		17	Yes
Minnesota	36.35	63.65		10	Yes
Mississippi	45.73	54.27		6	No
Missouri	48.50	51.50		11	No
Montana	48.30	51.70		3	No
Nebraska	51.01	48.99	5		Yes[b]
Nevada	39.55	60.45		5	Yes
New Hampshire	38.38	61.62		4	Yes
New Jersey	35.76	64.24		15	Yes
New Mexico	43.94	56.06		5	Yes
New York	36.09	63.91		31	Yes
North Carolina	47.78	52.22		15	Yes

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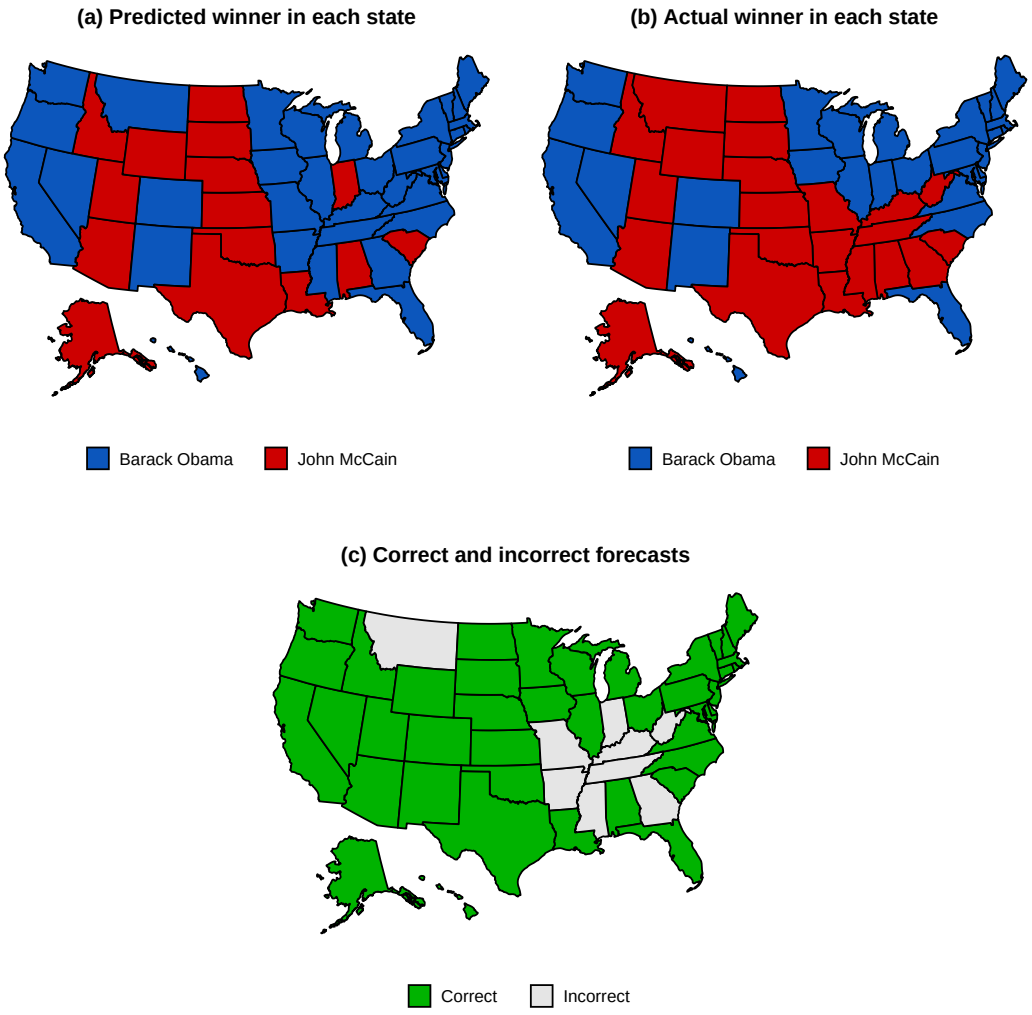
Table J1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	McCain	Obama	McCain	Obama	
North Dakota	51.85	48.15	3		Yes
Ohio	44.19	55.81		20	Yes
Oklahoma	51.84	48.16	7		Yes
Oregon	38.39	61.61		7	Yes
Pennsylvania	38.66	61.34		21	Yes
Rhode Island	31.36	68.64		4	Yes
South Carolina	51.35	48.65	8		Yes
South Dakota	55.03	44.97	3		Yes
Tennessee	49.99	50.01		11	No
Texas	51.20	48.80	34		Yes
Utah	57.80	42.20	5		Yes
Vermont	38.21	61.79		3	Yes
Virginia	44.09	55.91		13	Yes
Washington	38.58	61.42		11	Yes
West Virginia	41.87	58.13		5	No
Wisconsin	40.92	59.08		10	Yes
Wyoming	59.22	40.78	3		Yes
Nationwide	–	–	120	418	42/51

a. Was the state attributed to the right candidate by the model?
b. John McCain carried Nebraska's two at-large electoral votes and won Nebraska's 1st and 3rd congressional districts. He was thus awarded a total of four electoral votes. Barack Obama got one electoral vote by winning Nebraska's 2nd congressional district.

Figure J1. Predicted and actual outcomes, 2008 presidential election



K Detailed results, 2012

Table K1 shows the popular vote and Electoral College jackknife out-of-sample forecasts for each candidate in each state.

Table K1: Forecasts by state, 2012 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Obama	Romney	Obama	Romney	
Alabama	45.65	54.35		9	Yes
Alaska	41.98	58.02		3	Yes
Arizona	44.21	55.79		11	Yes
Arkansas	47.85	52.15		6	Yes
California	57.77	42.23	55		Yes
Colorado	52.31	47.69	9		Yes
Connecticut	58.42	41.58	7		Yes
Delaware	58.54	41.46	3		Yes
District of Columbia	91.75	8.25	3		Yes
Florida	52.37	47.63	29		Yes
Georgia	49.07	50.93		16	Yes
Hawaii	66.04	33.96	4		Yes
Idaho	40.43	59.57		4	Yes
Illinois	58.56	41.44	20		Yes
Indiana	42.93	57.07		11	Yes
Iowa	54.26	45.74	6		Yes
Kansas	43.93	56.07		6	Yes
Kentucky	47.07	52.93		8	Yes
Louisiana	47.55	52.45		8	Yes
Maine	55.82	44.18	4		Yes
Maryland	66.35	33.65	10		Yes
Massachusetts	66.47	33.53	11		Yes
Michigan	53.74	46.26	16		Yes
Minnesota	60.95	39.05	10		Yes
Mississippi	47.78	52.22		6	Yes
Missouri	48.49	51.51		10	Yes
Montana	41.81	58.19		3	Yes
Nebraska	43.12	56.88		5	Yes
Nevada	52.63	47.37	6		Yes
New Hampshire	51.62	48.38	4		Yes
New Jersey	62.04	37.96	14		Yes
New Mexico	52.96	47.04	5		Yes
New York	62.90	37.10	29		Yes
North Carolina	47.49	52.51		15	Yes

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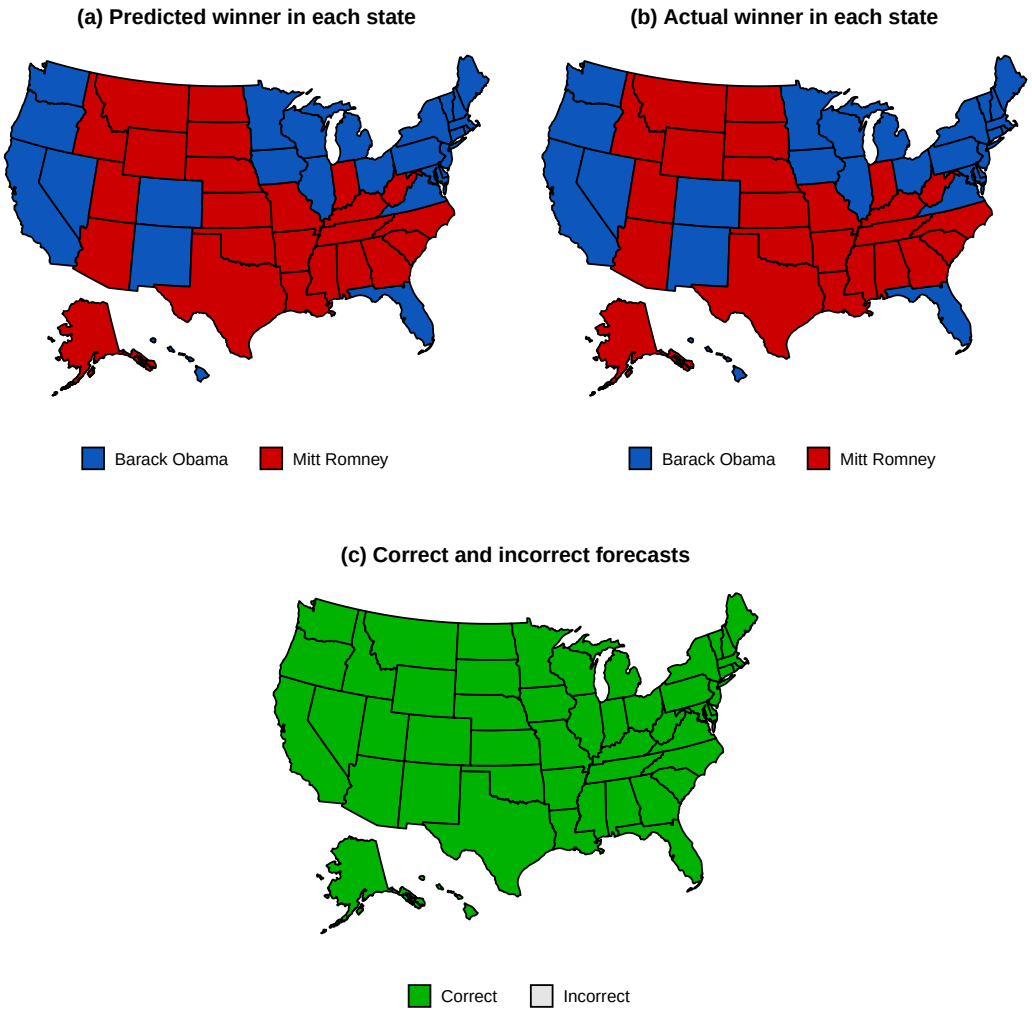
Table K1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Obama	Romney	Obama	Romney	
North Dakota	43.86	56.14		3	Yes
Ohio	52.35	47.65	18		Yes
Oklahoma	42.71	57.29		7	Yes
Oregon	56.44	43.56	7		Yes
Pennsylvania	51.77	48.23	20		Yes
Rhode Island	67.30	32.70	4		Yes
South Carolina	46.88	53.12		9	Yes
South Dakota	42.53	57.47		3	Yes
Tennessee	47.08	52.92		11	Yes
Texas	46.09	53.91		38	Yes
Utah	40.52	59.48		6	Yes
Vermont	60.97	39.03	3		Yes
Virginia	52.75	47.25	13		Yes
Washington	59.14	40.86	12		Yes
West Virginia	48.45	51.55		5	Yes
Wisconsin	56.20	43.80	10		Yes
Wyoming	39.93	60.07		3	Yes
Nationwide	–	–	332	206	51/51

a. Was the state attributed to the right candidate by the model?

Figure K1. Predicted and actual outcomes, 2012 presidential election



L Detailed results, 2016

Table L1 shows the popular vote and Electoral College jackknife out-of-sample forecasts[3] for each candidate in each state.

Table L1: Forecasts by state, 2016 presidential election

State	Popular vote		Electoral vote		Correct forecast?[a]
	Clinton	Trump	Clinton	Trump	
Alabama	43.04	56.96		9	Yes
Alaska	38.67	61.33		3	Yes
Arizona	41.92	58.08		11	Yes
Arkansas	44.57	55.43		6	Yes
California	57.80	42.20	55		Yes
Colorado	52.19	47.81	9		Yes
Connecticut	55.47	44.53	7		Yes
Delaware	55.39	44.61	3		Yes
District of Columbia	87.96	12.04	3		Yes
Florida	50.67	49.33	29		No
Georgia	46.79	53.21		16	Yes
Hawaii	60.42	39.58	4		Yes[b]
Idaho	36.60	63.40		4	Yes
Illinois	56.38	43.62	20		Yes
Indiana	41.29	58.71		11	Yes
Iowa	49.26	50.74		6	Yes
Kansas	40.34	59.66		6	Yes
Kentucky	44.88	55.12		8	Yes
Louisiana	45.22	54.78		8	Yes
Maine	52.62	47.38	4		Yes[c]
Maryland	62.86	37.14	10		Yes
Massachusetts	63.20	36.80	11		Yes
Michigan	51.01	48.99	16		No
Minnesota	56.76	43.24	10		Yes
Mississippi	45.86	54.14		6	Yes
Missouri	44.23	55.77		10	Yes
Montana	40.67	59.33		3	Yes
Nebraska	39.61	60.39		5	Yes
Nevada	50.93	49.07	6		Yes
New Hampshire	48.19	51.81		4	No
New Jersey	61.29	38.71	14		Yes
New Mexico	48.89	51.11		5	No

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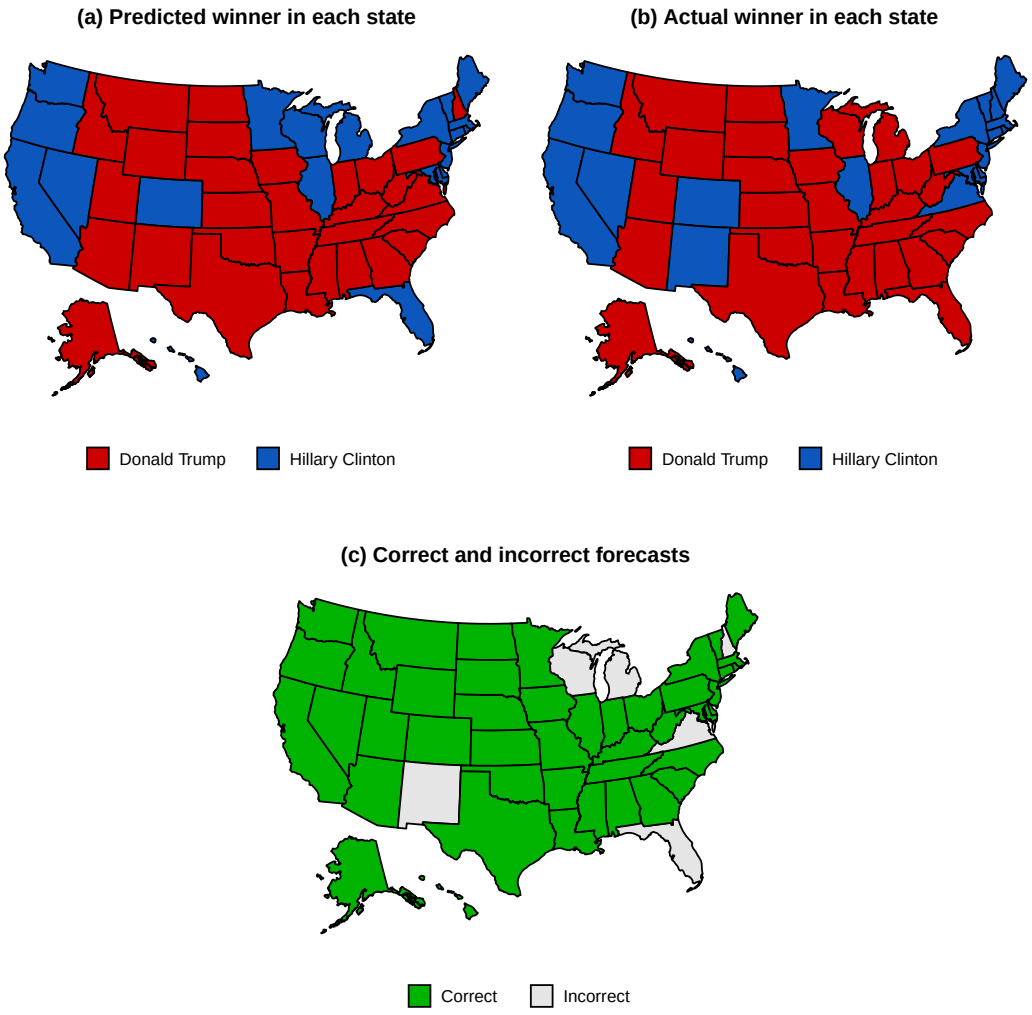
[3]For the 2016 election, jackknife out-of-sample forecasts are the same as before-the-fact forecasts since the forecasts are made using only data available before the election (i.e., 1980–2012).

Table L1 – *Continued from previous page*

State	Popular vote		Electoral vote		Correct forecast?[a]
	Clinton	Trump	Clinton	Trump	
New York	60.92	39.08	29		Yes
North Carolina	46.80	53.20		15	Yes
North Dakota	38.87	61.13		3	Yes
Ohio	49.28	50.72		18	Yes
Oklahoma	38.51	61.49		7	Yes
Oregon	53.88	46.12	7		Yes
Pennsylvania	49.10	50.90		20	Yes
Rhode Island	63.75	36.25	4		Yes
South Carolina	44.69	55.31		9	Yes
South Dakota	40.12	59.88		3	Yes
Tennessee	44.47	55.53		11	Yes
Texas	45.44	54.56		38	Yes[d]
Utah	36.64	63.36		6	Yes
Vermont	55.50	44.50	3		Yes
Virginia	49.73	50.27		13	No
Washington	53.19	46.81	12		Yes[e]
West Virginia	42.68	57.32		5	Yes
Wisconsin	53.02	46.98	10		No
Wyoming	37.58	62.42		3	Yes
Nationwide	–	–	266	272	45/51

a. Was the state attributed to the right candidate by the model?
b. Hillary Clinton received only three of the four electoral votes in Hawaii. Bernie Sanders (Democratic) received one of the state's electoral votes from a faithless elector.
c. Hillary Clinton carried Maine's two at-large electoral votes and won Maine's 1st congressional district. She was thus awarded a total of three electoral votes. Donald Trump got one electoral vote by winning Maine's 2nd congressional district.
d. Donald Trump received only 36 of the 38 electoral votes in Texas. John Kasich (Republican) and Ron Paul (Libertarian) both received one electoral vote from faithless electors.
e. Hillary Clinton received only eight of the 12 electoral votes in Washington. Colin Powell (Republican) received three of the state's electoral votes from faithless electors. The Faith Spotted Eagle received one electoral vote from a faithless elector.

Figure L1. Predicted and actual outcomes, 2016 presidential election



M Detailed results, 2020

Table M1 shows the popular vote and Electoral College before-the-fact forecasts for each candidate in each state.

Table M1: Forecasts by state, 2020 presidential election

State	Popular vote		Electoral vote		Probability[a]
	Trump	Biden	Trump	Biden	
Alabama	58.94	41.06	9		96.25
Alaska	65.54	34.46	3		99.90
Arizona	57.80	42.20	11		93.97
Arkansas	57.57	42.43	6		93.42
California	39.74	60.26		55	2.06
Colorado	47.07	52.93		9	27.97
Connecticut	45.06	54.94		7	16.29
Delaware	41.44	58.56		3	4.42
District of Columbia	8.72	91.28		3	0.00
Florida	49.46	50.54		29	45.75
Georgia	53.99	46.01	16		78.67
Hawaii	31.89	68.11		4	0.02
Idaho	64.57	35.43	4		99.81
Illinois	40.74	59.26		20	3.27
Indiana	56.39	43.61	11		89.84
Iowa	52.14	47.86	6		66.50
Kansas	58.86	41.14	6		96.11
Kentucky	56.93	43.07	8		91.61
Louisiana	54.74	45.26	8		82.72
Maine	44.01	55.99		4	11.67
Maryland	38.70	61.30		10	1.22
Massachusetts	36.25	63.75		11	0.31
Michigan	46.78	53.22		16	26.08
Minnesota	42.83	57.17		10	7.67
Mississippi	58.02	41.98	6		94.49
Missouri	57.06	42.94	10		92.00
Montana	58.97	41.03	3		96.30
Nebraska	63.64	36.36	5		99.67
Nevada	43.70	56.30		6	10.49
New Hampshire	44.84	55.16		4	15.22
New Jersey	39.50	60.50		14	1.83
New Mexico	47.02	52.98		5	27.66
New York	38.97	61.03		29	1.40
North Carolina	55.49	44.51	15		86.27

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Table M1 – *Continued from previous page*

State	Popular vote		Electoral vote		Probability[a]
	Trump	Biden	Trump	Biden	
North Dakota	62.67	37.33	3		99.42
Ohio	50.28	49.72	18		52.23
Oklahoma	60.06	39.94	7		97.74
Oregon	42.03	57.97		7	5.63
Pennsylvania	48.26	51.74		20	36.43
Rhode Island	37.87	62.13		4	0.79
South Carolina	57.06	42.94	9		92.02
South Dakota	61.18	38.82	3		98.70
Tennessee	57.31	42.69	11		92.72
Texas	54.64	45.36	38		82.24
Utah	63.03	36.97	6		99.53
Vermont	39.89	60.11		3	2.21
Virginia	47.45	52.55		13	30.59
Washington	41.79	58.21		12	5.11
West Virginia	55.36	44.64	5		85.69
Wisconsin	46.04	53.96		10	21.54
Wyoming	67.44	32.56	3		99.97
Popular vote	–	–	230	308	–

a. Probability to reach the 50 percent mark with a 5.02 error margin for Donald Trump (expressed in percentage form).

N National-level popular vote forecast

The model we propose does not directly produce a popular vote forecast at the national level. In order to obtain such an estimate for the 2020 presidential election, we computed an electoral weight for each state using voter registration data from November 2016 (see United States Census Bureau). The state electoral weight is computed by dividing the total number of registered voters in a state by the total number of registered voters nationwide. Table N2 shows the electoral weight as well as the number of registered voter (and percentage of registered voter) for each state. The table also shows the weighted popular vote (PV) share for Donald Trump and Joe Biden. The sum of each column gives the predicted national-level two-party vote share for each candidate. Trump is projected to win 48.31 percent of the two-party vote and Biden 51.69 percent.

Note that using the same weighting procedure and the out-of-sample forecasts presented in Table L1, we made a popular vote forecast for the 2016 presidential election. According to this forecast, Hillary Clinton should have received 50.97 percent of the two-party vote and Donald Trump 49.03 percent. Hillary Clinton actually received 51.11 percent of the two-party vote and Donald Trump 48.89 percent. This means that the revised model was not only able to correctly anticipate Trump's Electoral College victory, but also his defeat in terms of the popular vote.

Table N2: Popular vote forecast, 2020

State	Electoral weight	Registered voters		Weighted PV	
		Total	Percent	Trump	Biden
Alabama	0.016	2,526	67.96	0.94	0.66
Alaska	0.002	358	69.07	0.15	0.08
Arizona	0.020	3,145	60.53	1.15	0.84
Arkansas	0.009	1,456	65.69	0.53	0.39
California	0.102	16,096	53.84	4.06	6.15
Colorado	0.018	2,893	68.21	0.86	0.97
Connecticut	0.011	1,763	63.91	0.50	0.61
Delaware	0.003	487	66.81	0.13	0.18
District of Columbia	0.003	420	75.86	0.02	0.24
Florida	0.061	9,604	59.28	3.01	3.08
Georgia	0.031	4,892	64.15	1.68	1.43
Hawaii	0.003	530	49.83	0.11	0.23
Idaho	0.005	790	64.49	0.32	0.18
Illinois	0.042	6,665	68.55	1.72	2.51
Indiana	0.021	3,298	66.12	1.18	0.91
Iowa	0.011	1,657	69.22	0.55	0.50
Kansas	0.009	1,438	67.12	0.54	0.38
Kentucky	0.014	2,253	67.31	0.81	0.62
Louisiana	0.016	2,446	70.64	0.85	0.70

Continued on next page

Table N2 – *Continued from previous page*

State	Electoral weight	Registered voters		Weighted PV	
		Total	Percent	Trump	Biden
Maine	0.005	830	78.47	0.23	0.29
Maryland	0.020	3,114	67.35	0.76	1.21
Massachusetts	0.023	366	68.11	0.84	1.48
Michigan	0.034	5,434	71.27	1.61	1.84
Minnesota	0.019	3,055	72.90	0.83	1.11
Mississippi	0.011	1,725	78.30	0.64	0.46
Missouri	0.021	3,333	72.06	1.21	0.91
Montana	0.004	581	72.77	0.22	0.15
Nebraska	0.006	1,008	71.66	0.41	0.23
Nevada	0.009	1,371	61.38	0.38	0.49
New Hampshire	0.005	763	73.08	0.22	0.27
New Jersey	0.026	4,165	60.70	1.04	1.60
New Mexico	0.006	916	59.21	0.27	0.31
New York	0.058	9,142	58.96	2.26	3.54
North Carolina	0.033	5,194	68.07	1.83	1.47
North Dakota	0.003	424	72.81	0.17	0.10
Ohio	0.039	6,128	69.54	1.96	1.93
Oklahoma	0.012	1,861	63.66	0.71	0.47
Oregon	0.014	2,147	67.41	0.57	0.79
Pennsylvania	0.044	6,909	69.23	2.12	2.27
Rhode Island	0.003	538	64.37	0.13	0.21
South Carolina	0.016	2,575	68.98	0.93	0.70
South Dakota	0.003	437	69.28	0.17	0.11
Tennessee	0.021	3,251	64.29	1.18	0.88
Texas	0.074	11,724	58.12	4.07	3.37
Utah	0.009	1,398	66.70	0.56	0.33
Vermont	0.002	351	70.23	0.09	0.13
Virginia	0.028	4,399	69.35	1.32	1.47
Washington	0.025	3,906	69.86	1.04	1.44
West Virginia	0.006	913	63.63	0.32	0.26
Wisconsin	0.021	3,323	74.42	0.97	1.14
Wyoming	0.002	304	69.70	0.13	0.06
United States	–	157,596	64.19	–	–
Popular vote[a]	–	–	–	48.31	51.69

a. Two-party vote share.

O Replication of results

The analyses were conducted using Stata. The data file (data_2spe_model.dta) and the do-file (commands_2spe_model.do) to run the analyses can be found in the online supplementary materials. The online supplementary materials also include a file for unemployment data (unemployment_2spe_model.dta) and a do-file (unemployment_2spe_model.do) that allows computing the values of the unemployment variable used in the model. The cartograms and choropleth maps presented in the article and the appendix were created using the R programming language. The R file (figures_2spe_model.R) with the code used to create the figures can also be found in the online supplementary materials.

The meaning of the variable names can be found below.[4]

- **abbr.** State abbreviation.
- **abserr_o.** Absolute jackknife out-of-sample errors, 1980–2016.
- **abserr_w.** Absolute within-sample errors, 1980–2016.
- **biden_e_2020.** Electoral College vote forecasts by state for Joe Biden, 2020.
- **biden_npv_2020.** National two-party vote share forecast for Joe Biden (obtained from weighted state-level forecasts), 2020.
- **biden_v_2020.** Two-party vote share forecasts by state for Joe Biden, 2020.
- **biden_wpv_2020.** Two-party vote share forecasts weighted by registered voters by state for Joe Biden, 2020.
- **chae.** Actual challenger party candidate's Electoral College vote, 1980–2016.
- **chav.** Actual challenger party candidate's vote share, 1980–2016.
- **clinton_npv_2016.** National two-party vote share forecast for Hillary Clinton (obtained from weighted state-level forecasts), 2016.
- **clinton_wpv_2016.** Two-party vote share forecasts weighted by registered voters by state for Hillary Clinton (using out-of-sample forecasts), 2016.
- **dcds.** DCDS. See section A.2.
- **dcrs.** DCRS. See section A.2.
- **dhsc.** DHSC. See section A.2.
- **election.** Election year.

[4]The opposition refers to any candidate campaigning against the incumbent party candidate. The challenger is the opposition candidate affiliated with one of the two major parties (Democratic or Republican depending on which party controls the White House).

– **elecvote.** Number of Electoral College votes by state.

– **err_o.** Jackknife out-of-sample errors, 1980–2016 (i.e., ftwoincv_o – twoincv).

– **err_w.** Within-sample errors, 1980–2016 (i.e., ftwoincv_w – twoincv).

– **id.** Unique identification number.

– **ince.** Actual incumbent party candidate's Electoral College vote, 1980–2016.

– **incumbent.** Incumbent party (DEM = Democratic, REP = Republican).

– **incv.** Actual incumbent party candidate's vote share, 1980–2016.

– **indv.** INDV. See section A.2.

– **fchae_o.** Challenger party candidate's Electoral College vote forecasts by state, 1980–2016 (obtained from jackknife out-of-sample vote share forecasts).

– **fchae_w.** Challenger party candidate's Electoral College vote forecasts by state, 1980–2016 (obtained from within-sample vote share forecasts).

– **fince_o.** Incumbent party candidate's Electoral College vote forecasts by state, 1980–2016 (obtained from jackknife out-of-sample vote share forecasts).

– **fince_w.** Incumbent party candidate's Electoral College vote forecasts by state, 1980–2016 (obtained from within-sample vote share forecasts).

– **fips.** Federal Information Processing Standards (FIPS).

– **ftwochav_o.** Predicted challenger party candidate's two-party vote share, 1980–2016 (jackknife out-of-sample forecasts).

– **ftwochav_w.** Predicted challenger party candidate's two-party vote share, 1980–2016 (within-sample forecasts).

– **ftwoincv_o.** Predicted incumbent party candidate's two-party vote share, 1980–2016 (jackknife out-of-sample forecasts).

– **ftwoincv_w.** Predicted incumbent party candidate's two-party vote share, 1980–2016 (within-sample forecasts).

– **fstatewinner_2020.** Name of predicted winner in each state (Biden or Trump), 2020.

– **fstatewinner_o.** Name of predicted winner in each state (determined using out-of-sample vote share forecasts), 1980–2016.

– **fstatewinner_w.** Name of predicted winner in each state (determined using within-sample vote share forecasts), 1980–2016.

– **jpa0.** JPA0. See section A.2.

– **jpa2.** JPA2. See section A.2.

– **legcont.** LEGCONT. See section A.2.

– **legparty.** Party controlling the state legislature (DEM = both legislative chambers have Democratic majorities, REP = both legislative chambers have Republican majorities, SPLIT = neither party had majorities in both legislative chambers).

– **mabserr_o.** Mean absolute jackknife out-of-sample error, 1980–2016.

– **mabserr_w.** Mean absolute within-sample error, 1980–2016.

– **nationalcorrect_o.** Correct national forecast (determined from jackknife out-of-sample state forecasts) (yes or no), 1980–2016.

– **nationalcorrect_w.** Correct national forecast (determined from within-sample state forecasts) (yes or no), 1980–2016.

– **nationalwinner.** Name of the actual national winner, 1980–2016.

– **oppe.** Actual opposition's Electoral College vote, 1980–2016.

– **oppv.** Actual opposition's vote share, 1980–2016.

– **chavp.** CHAVP. See section A.2.

– **ppi5216.** PPI5216. See section A.2.

– **ppi8016.** PPI8016. See section A.2.

– **rhsc.** RHSC. See section A.2.

– **state.** State name.

– **statecorrect_o.** Correct state forecast (determined from jackknife out-of-sample forecasts) (yes or no), 1980–2016.

– **statecorrect_w.** Correct state forecast (determined from within-sample forecasts) (yes or no), 1980–2016.

– **statewinner.** Name of the actual winner in each state, 1980–2016.

– **sum_biden_e_2020.** Total predicted Electoral College votes for Joe Biden, 2020.

– **sum_fchae_o.** Total predicted Electoral College votes for the challenger party candidate (obtained from jackknife out-of-sample forecasts), 1980–2016.

– **sum_fchae_w.** Total predicted Electoral College votes for the challenger party candidate (obtained from within-sample forecasts), 1980–2016.

– **sum_fince_o.** Total predicted Electoral College votes for the incumbent party candidate (obtained from jackknife out-of-sample forecasts), 1980–2016.

– **sum_fince_w.** Total predicted Electoral College votes for the incumbent party candidate (obtained from within-sample forecasts), 1980–2016.

– **sum_trump_e_2020.** Total predicted Electoral College votes for Donald Trump, 2020.

– **trump_e_2020.** Electoral College vote forecasts by state for Donald Trump, 2020.

– **trump_npv_2016.** National two-party vote share forecast for Donald Trump (obtained from weighted state-level forecasts), 2016.

– **trump_npv_2020.** National two-party vote share forecast for Donald Trump (obtained from weighted state-level forecasts), 2020.

– **trump_v_2020.** Two-party vote share forecasts by state for Donald Trump, 2020.

– **trump_wpv_2016.** Two-party vote share forecasts weighted by registered voters by state for Donald Trump (using out-of-sample forecasts), 2016.

– **trump_wpv_2020.** Two-party vote share forecasts weighted by registered voters by state for Donald Trump, 2020.

– **twochav.** Actual challenger party candidate's two-party (Democratic–Republican) vote share, 1980–2016.

– **twoincv.** Actual incumbent party candidate's two-party (Democratic–Republican) vote share ($\text{2P-INCV}_{i,t}$), 1980–2016. See section A.2.

– **unemp.** ΔU. See section A.2.

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