

POLITICS

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Forecasting US Voter Turnout

Michael Bednarczuk, *Austin Peay State University, USA*

Michael Bednarczuk is an Assistant Professor of Political Science at Austin Peay State University.

He can be reached at bednarczukm@apsu.edu.

Abstract

Voter turnout is a crucial indicator of democratic health, yet forecasting turnout remains an understudied area in political science. This article presents two pioneering models for predicting U.S. presidential election turnout: The National Model and The State Model. The National Model, using data from 1868-2020, employs lagged turnout as its sole predictor. The State Model, covering 1984-2020, incorporates demographic and institutional variables to forecast state-level participation. The National Model predicts 65.3% turnout for 2024, while the State Model forecasts increased turnout in 41 states compared to 2020. The models' ability to generate early predictions offers valuable lead time for planning and resource allocation, which has implications for election administrators and political campaigns as well as for the vibrancy of civic engagement in America.

Why Turnout?

Predicting elections has a long history in *PS: Political Science & Politics*. While early predictions focused on forecasting the winner of the popular vote for the American presidency, more recent models have expanded to predicting the winner of the Electoral College or the distribution of Congressional seats.

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However, predicting election *turnout* is a far less-studied phenomenon. The most recent article on the topic is now more than a decade old. Furthermore, nothing to date has focused on forecasting turnout in the United States.

Voter turnout is a fundamental pillar of democracy and a key indicator of the health of a country. Participation in elections has profound implications for the proper functioning of government. Turnout rates are linked to important aspects of democratic governance, ranging from the accuracy of representation to the perceived legitimacy of those who are elected.

The importance of turnout can be seen in examining its role across different political contexts. In authoritarian regimes, for instance, reported turnout figures are frequently viewed as manipulated or coerced and are often met with skepticism by international observers. Conversely, in established democracies, low turnout rates can be a source of considerable concern and frustration. This is especially true for elections that receive less attention, such as midterm congressional races or special elections. In these cases, diminished voter participation may raise questions about the mandate of those elected as well as the overall health of the democratic process.

Many factors help to shape turnout, encompassing a range of social, political, and institutional variables. The rules and structures governing the electoral process may inadvertently create barriers to voting, while others encourage or facilitate greater participation. Differences in social or demographic factors can shape turnout and may reflect varying levels of political engagement, access to information, or feelings of efficacy. Additionally, the perceived importance of a particular election, the competitiveness of races, and the broader political climate may shape how individuals approach each election.

However, while we understand its importance as well as the forces that can change it, there has not been work in forecasting turnout in the American context. This article is thus an attempt to lay a foundation for this field.

Why should we forecast turnout? Such an exercise has several real-world implications. For practical reasons, forecasting may shape how election administrators perform their work. It could assist with preparation for elections to ensure that there are an adequate number of polling places or poll workers. It may also serve as a check against anomalies; forecasting could check against unusually high or low turnout. Given an atmosphere where many have fears concerning the fair counting of ballots, forecasting turnout may serve as a balm to guard against politicized claims of fraud.

There are also strategic reasons to forecast turnout. Campaigns may use forecasting to better understand the structural forces in elections. Modeling turnout may also help with the distribution of financial resources, as campaigns may wish to prioritize mobilization under some circumstances and persuasion in others.

Two models will be introduced: The National Model and The State Model. The former model attempts to predict national turnout, while the latter model is a forecast at the state level. The National Model predicts that turnout will be 65.3% for 2024, while the State Model finds that turnout will generally increase across the country from 2020.

What Has Been Done?

While there have been countless studies of turnout, there has only been one recent forecast of turnout. Evans and Ivaldi (2012) built a model to predict turnout for European Union elections. They found that lagged turnout was the most important predictor, but that electoral circumstances and structures also mattered, such as the absence or presence of a compulsory

voting system, the time since the last election, and the number of parties. Quite different from forecasts of elections, no economic variables were significant.

What To Do?

In deciding what to model, there were several considerations that were top of mind. Variables should be logical; that is, there should be prima facie support for their inclusion. Ideally, the variables should be available far in advance of the election so that the forecast can be made early; however, this desire may have to be balanced with increased precision that may come from the use of data gathered shortly before the election.

Inspired by the literature on voter turnout and on the earlier model of forecasting turnout, the independent variables will be classified as either Institutional, Campaign, Economic, or Demographic. Institutional variables capture the rules and structures that may shape turnout. These rules include laws such as same-day voter registration (Grumach and Hill 2022) and automatic voter registration (Kim 2023), both of which have been shown to increase turnout.

Campaign variables focus on features in the political environment that can impact turnout. For example, the presence of other high-profile races (such as senatorial or gubernatorial contests) can shape turnout (Jackson 2002, Springer 2012). The presence of additional candidates can also increase turnout (Bol and Ivandic 2022).

Economic variables will include measures of the economic forces that may impact turnout. Various economic measures have been found to shape turnout, ranging from the global (Park 2023) to the national (Frank and Martinez i Coma 2023) to the individual; for example, Aytac et al. (2020) recently found that turnout is lower among the unemployed.

Demographic variables will include group identities that may shape turnout. For example, Barber and Holbein (2022) recently documented how turnout is much lower among minority citizens and young people.

As with many models, some ideas worked, while others did not. Given the novelty of these models, some time will be spent in the following sections detailing what worked and what did not work when formalizing them.

The National Model

The National Model will attempt to forecast turnout for the country as a whole. It includes the years 1868 through 2020 and is represented by the following formula:

$$Y = \beta_0 + \beta_1(\text{lagged turnout}) + \varepsilon, \text{ where}$$

Y = voter turnout, β_0 = intercept, β_1 = coefficient for lagged voter turnout, and ε = error term

The model initially had several more independent variables, which will now be discussed. Data for the initial model came from elections from 1960-2020. The values for the dependent variable came from the United States Election Project and reflect the turnout for the voting-eligible population.

Campaign variables included the presence of an elected incumbent and the presence of a sizable third-party challenge, included if a poll showed a minor party earning more than 10% of the potential vote during an election year. Economic variables included the national unemployment rate for the year and the change in GDP from the prior presidential election. This data came from the Bureau of Labor Statistics and the Federal Reserve Bank of St. Louis (FRED), respectively. Demographic variables included the percent of the country over 65 and the percent of the country that was nonwhite, both of which came from Census data. Lagged turnout was also included.

Using a time series cross-section regression model, and after various combinations of independent variables, the only variable that was significant was prior turnout. Additionally, the results showed poor model fit. Altogether, this is an unsatisfactory result for forecasting.

Table 1: The National Model

	Years: 1868-2020	
Variable	Coefficient	SE
Lagged Turnout	0.835	0.083
Constant	0.101	0.053
	N=39	
	R ² =0.7312	

* Note: Variables that are significant at the 0.05-level are in **bold**

What might help to explain these results? Two possible explanations center around the sample size and the variation in the dependent variable. Less than 20 observations were included, and turnout varied by less than 20 percentage points. Given either complicating factor, creating a useful forecast may have been challenging, but the presence of both may have been too much to overcome.

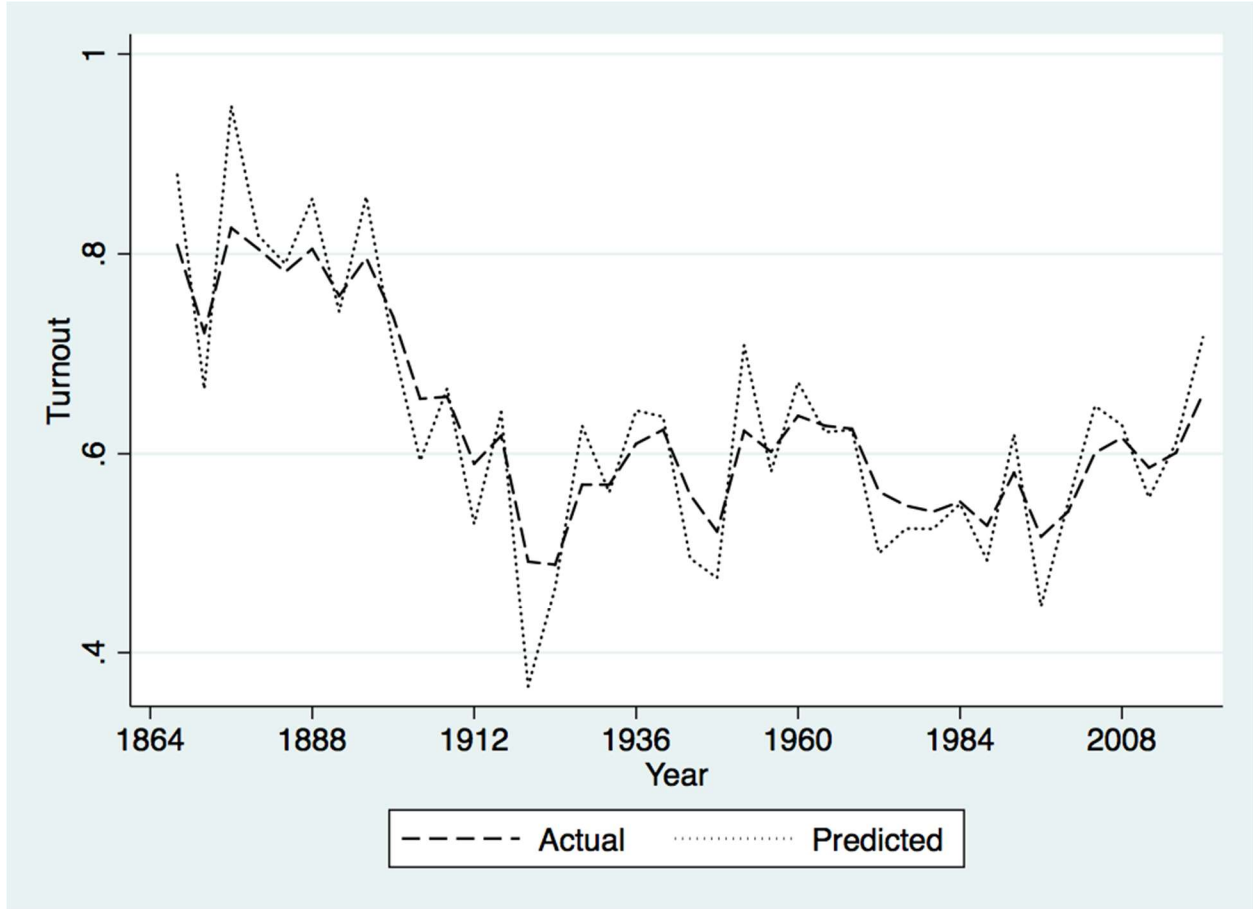
Therefore, additional models were considered. Based on the results of the earlier model, the only independent variable was lagged turnout. Given data availability, this could extend the series back to the election of 1792 to increase the sample size to 58. While this greatly improved the model fit, there were sizable residuals. This is largely driven by the low levels of turnout in antebellum elections. Thus, another model was considered that only included post-Civil War turnout. This became The National Model.

To check model fit, a plot of the predicted results and the actual turnout can be seen in the following figure. Some of the largest misses appear to be driven by times of great change in the composition of the electorate. For example, the predicted turnout of 37% in 1920 was far less than the actual turnout of 49%; this may be because it was the first presidential election following the ratification of the Nineteenth Amendment.

An additional check analyzed the out-of-sample performance of the model. This was done by dropping an election, re-estimating the model, and checking the difference between the prediction for this missing election and the actual turnout rate. Doing this showed that the model fit has improved for recent elections; the average miss since 1956 has been less than 3%, with the overall average miss at 4%. For example, the prediction for 2016 was 59%, while actual turnout was 60%.

The National Model predicts a national turnout for 2024 of 65.3%, with a confidence interval that ranges from 63.6%-67.0%.

Figure 1: Plot of Predicted Versus Actual National Turnout, 1868-2020



The State Model

The State Model will attempt to forecast turnout state-by-state. Data again comes from the United States Election Project, which only has state-level data from 1980 through 2020. Given that lagged turnout will be included, this means that only 1984-2020 will be used. Therefore, this state-level model will have a sample size of 500. Turnout varies across states from a low of 36.5 (Nevada in 1996) to a high of 74.8 (Minnesota in 2020), with a mean turnout across years of 56.1.

The State Model is represented by the following formula:

$Y = \beta_0 + \beta_1(\text{lagged turnout}) + \beta_2(\text{same-day registration}) + \beta_3(\text{percent white}) + \beta_4(\text{percent college}) + \varepsilon$, where

Y = voter turnout, β_0 = intercept β_1 = coefficient for lagged voter turnout, β_2 = coefficient for same-day voter registration, β_3 = coefficient for percent of population that is white, β_4 = coefficient for percent of population with a 4-year degree, and ε = error term

Several other variables were tested prior to the formalization of this model. First, a new category of independent variables was introduced (Institutional), as there are varying laws across states which may shape turnout. For this, whether or not states allow same-day registration through election day is modeled. This data was collected from the National Conference of State Legislatures. Campaign variables include the presence of significant statewide contests (gubernatorial or senatorial) and whether or not those races featured an incumbent; this data was gathered from a review of elections results from each state. Economic variables include the unemployment rate in the state for the first three months of the election year, as well as the median household income per state. Unemployment data was gathered from FRED, while median household income was derived from Census data. Demographic variables include the percent of the state that is nonwhite, the percent that has at least a bachelor's degree, and the percent of the state in poverty, all of which came from Census and American Community Survey data. Lagged turnout is also included.

A time series cross-section regression model was again employed. After various combinations of the proposed independent variables, the best-fitting model included lagged turnout, same-day registration, race, and education. More college-educated voters and a smaller minority population suggest higher turnout in a state, as does the presence of same-day registration. However, the variable that has the largest effect is lagged turnout.¹

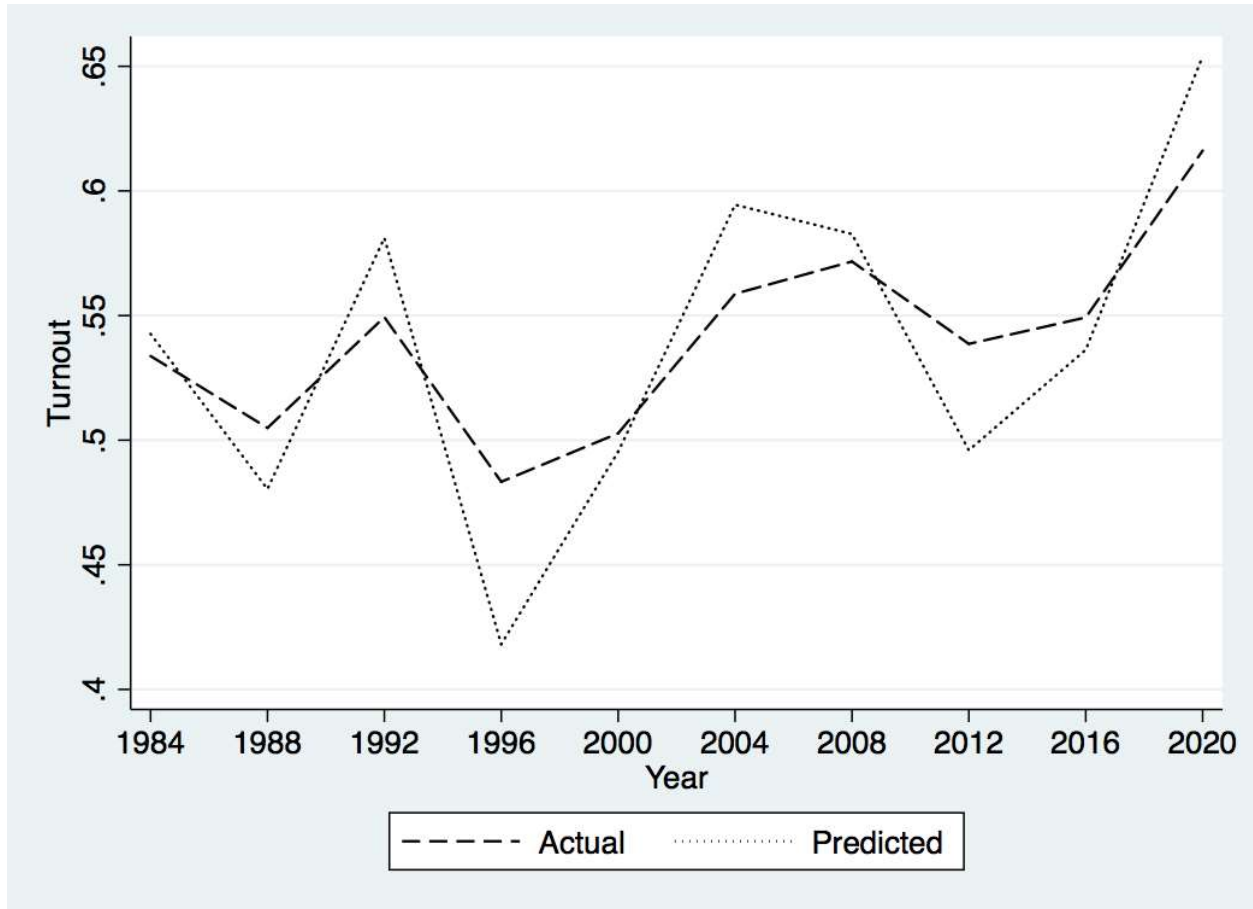
Table 2 The State Model, 1984-2020

Variable	Coefficient	SE
Lagged Turnout	0.687	0.027
Same-Day Registration	2.018	0.561
Percent White	0.063	0.021
Percent College	0.237	0.025
Constant	7.243	1.703
N=500		
R ² =0.7092		

* Note: Variables that are significant at the 0.05-level are in **bold**

To check model fit, a plot of the predicted turnout and the actual turnout was created and can be seen in the following figure. To make this figure, the predicted turnout for each state was weighed by its voting-eligible population and then aggregated by year and then compared to the actual national turnout. The forecast tracks closely to actual turnout; the average result misses by less than 3%. As an additional check, the out-of-sample performance of this model was also analyzed. Much like the National Model, the average miss per state was less than 4%.

Figure 2: Plot of Predicted Versus Actual Aggregated State Turnout, 1984-2020



This model was then used to forecast turnout for each state for this fall. Data for unemployment came from FRED, while college graduate data and data on the racial makeup of states came from the most recent American Community Survey.

Turning to predictions for the upcoming election, 41 states are forecasted to see an increase in their turnout from 2020. The average shift from 2020 turnout is 1.5 percentage points. States seeing the largest prospective gains in turnout tend to be states with same-day voter registration; their turnout shifted by an average of 2.3 percentage points, while those without saw

movement around 0.8 percentage points. Nine states are forecasted to have a turnout in excess of 70%, while thirteen are expected to see turnout of less than 60%.²

Table 3: The State Model Predicted Turnout - 2024

State	Predicted Turnout	Lower Bound	Upper Bound
Alabama	60.68	59.87	61.49
Alaska	63.82	62.86	64.78
Arizona	59.96	59.22	60.7
Arkansas	54.15	53.7	54.6
California	60.58	59.36	61.8
Colorado	74.11	72.71	75.51
Connecticut	67.99	66.8	69.18
Delaware	64.46	63.33	65.59
Florida	63.34	62.4	64.27
Georgia	60.69	59.59	61.79
Hawaii	55.76	54.32	57.2
Idaho	65.7	64.75	66.65
Illinois	64.83	63.76	65.9
Indiana	59.5	58.88	60.11
Iowa	70.2	69.21	71.17
Kansas	62.26	61.35	63.18
Kentucky	61.58	60.94	62.23
Louisiana	57.64	56.85	58.43
Maine	74.79	73.62	75.96
Maryland	67.2	65.73	68.67
Massachusetts	67.93	66.44	69.43
Michigan	70.27	69.2	71.34
Minnesota	75.13	73.84	76.42
Mississippi	56.42	55.54	57.31
Missouri	63.51	62.7	64.32
Montana	71.9	70.84	72.95

Nebraska	65.34	64.38	66.29
Nevada	59.1	58.05	60.14
New Hampshire	74.52	73.24	75.79
New Jersey	66.52	65.09	67.96
New Mexico	59.73	58.76	60.69
New York	59.08	57.98	60.18
North Carolina	67.65	66.51	68.78
North Dakota	62.82	62.03	63.6
Ohio	64.54	63.67	65.4
Oklahoma	54.29	53.72	54.86
Oregon	69.09	67.91	70.26
Pennsylvania	67.26	66.17	68.35
Rhode Island	63.13	62.04	64.21
South Carolina	61.28	60.41	62.15
South Dakota	63.16	62.37	63.94
Tennessee	58.46	57.83	59.1
Texas	54.93	54.15	55.71
Utah	67.35	66.28	68.42
Vermont	75.07	73.68	76.47
Virginia	67.07	65.7	68.45
Washington	69.71	68.57	70.85
West Virginia	57.46	56.81	58.11
Wisconsin	72.02	70.96	73.09
Wyoming	64.52	63.6	65.44

What do these results suggest for the potential swing states in 2024? First, let's look at the Democratic "blue wall" of the Midwest, which consists of Wisconsin, Michigan, and Pennsylvania. All three are high-turnout states, but they have some important differences. Wisconsin's turnout could be higher than it was in 2016, driven by its largely homogenous

population and by having same-day registration. Michigan should be right behind, brought down slightly by its more diverse population. Lagging these states is Pennsylvania, which is broadly similar in demographics to Michigan but lacks same-day registration. Given the high turnout in these states, motivating people to go to the polls may not be as large a problem as in other states, but Democrats would have to focus more on Pennsylvania than on the other two.

There are other states to consider as well. Potential key states in the Sun Belt include Arizona, Nevada, and Georgia. These are lower-turnout states than the Midwestern states; all three cluster around 60% turnout. This suggests there may be more room for growing the electorate. Arizona and Nevada both have same-day registration, which may make them easier states to mobilize given their late deadlines. Georgia, on the other hand, would require an earlier get-out-the-vote effort.

Discussion

Why the lack of independent variables for forecasting turnout with The National Model? This could be based on the lack of campaign variables in the model. Perhaps the inclusion of measures such as campaign interest and spending or the number of battlegrounds may improve fit; however, those variables would restrict the model to the most recent elections, and such a reduction in sample size may not be worth the tradeoff.

A similar critique can be made of The State Model. While related variables, such as down ballot campaigns, did not have a demonstrable effect on turnout, other electoral variables, such as whether or not a state is a battleground or swing state, should be considered in additional models. Relatedly, this model did not include any candidate-specific variables. Measures of interest or popularity may be relevant.

Future models may also wish to consider the effect of other demographic variables, especially if the current variables become less predictive over time. Considerations may need to be given to the dependent variable as well; there may be factors that shape the size of the voting eligible population that should be modeled. Perhaps changes over time in state laws regarding the restoration of felon voting rights should be included.

The lack of economic indicators is also striking. While normally linked to turnout, no combination of economic measures in either model had an effect. Similarly, this is also what was found in Evans and Ivaldi (2012)'s forecast of European Union turnout. Perhaps these indicators do more to shape vote choice than they do the choice to vote.

However, the lack of economic indicators does point to a general strength of both models: they are able to generate a prediction well in advance of an election. The National Model can issue its prediction for 2028 once the official turnout records for 2024 are tabulated, while The State Model is ready during the beginning of an election year. Given the sometimes competing interest of lead time and accuracy in forecasting, these models decidedly tilts towards the former. This could be useful for both election administrators and political campaigns as they prepare for the fall election cycles.

Conclusion

This article set out to create a model to forecast turnout for US presidential elections. Two models were created: The National Model and The State Model. While The National Model relied strictly on lagged turnout, demographic and institutional variables were included in The State Model.

This forecast suggests a more positive reading on the health of democracy across the country in 2024 that might be garnered from other sources. Turnout is forecasted to be higher

across most of the country for 2024, which is impressive given the high turnout in 2020. Furthermore, while some forces may work against each other (increasing levels of education contrasting with increasing racial diversity) with respect to turnout, there are some reforms that do appear to have a liberalizing effect on turnout, such as same-day voter registration. May this model be one of many to analyze turnout, and may there be a robust debate on this topic in *PS* in the years to come.

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Data Availability Statement

Research documentation and data that support the findings of this study have not yet been verified by PS's replication team. Data will be openly available at the Harvard Dataverse upon publication of the final article.

Conflicts of Interest

The author declares no ethical issues or conflicts of interest in this research.

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¹ A model that mirrored the National Model was also tested, but model fit improved with additional covariates, so the more parsimonious model is omitted.

² Forecasting this fall's national turnout using the aggregate of state turnout for 2024 would require knowing the voting-eligible population in each state for this year to accurately weight the forecast, so such a prediction is omitted.