2024 US Presidential Election Swing State Analysis Report

Abstract

This report analyzes the potential outcomes of the 2024 US Presidential Election focusing on seven crucial swing states using both Monte Carlo and Bayesian simulation methods. Based on current polling data, the analysis examines the electoral prospects of candidates Harris (KH) and Trump (DT), starting from their respective base electoral votes of 225 and 219, and evaluates their pathways to reaching the required 270 electoral votes through swing state victories.

Introduction

The 2024 US Presidential Election outcome heavily depends on seven key swing states: Pennsylvania (19 EVs), North Carolina (16 EVs), Michigan (15 EVs), Georgia (16 EVs), Wisconsin (10 EVs), Arizona (11 EVs), and Nevada (6 EVs). These states, characterized by their historical tendency to shift between parties, collectively represent 93 electoral votes that could determine the election's outcome.

Methodology

The analysis employed two distinct statistical approaches:

1. Monte Carlo Simulation
   - Conducted multiple simulations based on current polling margins
   - Incorporated standard polling error of 2.5% for each state
   - Analyzed state-by-state win probabilities and tipping point scenarios

2. Bayesian Analysis
   - Utilized prior probabilities with Beta distribution
   - Incorporated current polling data as likelihood
   - Generated posterior probabilities for overall victory

Current Polling Analysis

State-by-State Breakdown:

1. Pennsylvania (19 EVs)
   - Harris: 48.0% | Trump: 48.3%
   - Current Margin: R+0.3
   - Win Probability: Harris 45.2% | Trump 54.8%

2. North Carolina (16 EVs)
   - Harris: 47.7% | Trump: 48.8%
   - Current Margin: R+1.1
   - Win Probability: Harris 33.1% | Trump 66.9%

3. Michigan (15 EVs)
   - Harris: 48.4% | Trump: 47.2%
   - Current Margin: D+1.2
   - Win Probability: Harris 31.5% | Trump 68.5%

4. Georgia (16 EVs)
   - Harris: 47.7% | Trump: 48.9%

   - Current Margin: R+1.2
   - Win Probability: Harris 31.5% | Trump 68.5%

5. Wisconsin (10 EVs)
   - Harris: 48.7% | Trump: 47.7%
   - Current Margin: D+1.0
   - Win Probability: Harris 34.6% | Trump 65.4%

6. Arizona (11 EVs)
   - Harris: 46.9% | Trump: 49.3%
   - Current Margin: R+2.4
   - Win Probability: Harris 17.4% | Trump 82.6%

7. Nevada (6 EVs)
   - Harris: 48.0% | Trump: 48.4%
   - Current Margin: R+0.4
   - Win Probability: Harris 43.7% | Trump 56.3%

Prediction Results

Monte Carlo Simulation Findings
The Monte Carlo simulation suggests a competitive race but with a significant advantage for Trump. The margin of uncertainty remains substantial, with polling volatility (SD: 2.5) affecting all state-level predictions.

Bayesian Analysis Results
The Bayesian simulation, incorporating prior probabilities and current polling data, indicates:
- Harris Victory Probability: 20.31%
- Trump Victory Probability: 79.69%

Key Findings
1. Trump holds an advantage in most swing states, with particularly strong positions in Arizona and North Carolina.
2. Pennsylvania emerges as the most competitive major swing state, with the narrowest margin between candidates.
3. Harris shows strength in Wisconsin and Michigan but faces challenges in converting polling numbers into winning probabilities.
4. The high volatility in state-level polling (SD: 2.5) suggests the race remains fluid and subject to change.

Conclusion
Based on current polling data and both simulation methods, Trump holds a significant advantage in the electoral college through swing states. However, several factors warrant consideration:

1. The high standard deviation (2.5) in polling suggests considerable uncertainty.
2. Several states remain within the margin of error.
3. The time remaining until the election allows for potential shifts in voter preferences.
4. The Bayesian analysis suggests a more decisive advantage for Trump than the Monte Carlo simulation.

Summary

The 2024 presidential election analysis indicates Trump currently holds an electoral college advantage through swing states, with approximately 80% chance of victory according to Bayesian analysis. However, the fluid nature of political campaigns, combined with polling volatility, suggests this advantage could shift significantly before election day. Pennsylvania emerges as a critical battleground, potentially serving as the tipping point state in multiple scenarios.