

# **2024 US Election**

Wasan Al-Habahbeh 0228426

Liyan Nofal 0228240

Malek Al-Saudi 0224407

Hamza Al-Bayyat 0223916

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## 1.0 Introduction

The 2024 US Election cycle presents a fundamental puzzle: the old rules of political alignment are failing. The core visualization problem is that the dominant predictive variables are so deeply interdependent that relying on simple scatter plots and heatmaps fundamentally obscures the true causal relationships. Assumptions that guided past cycles, such as a linear relationship between income and voting, are now obsolete.

Our project is dedicated to solving this by quantifying the political breakage point. Our objective is to move beyond mere correlations to expose, analyze, and communicate the complex predictor interaction effects most notably, the discovery that the influence of wealth is entirely conditional on credential attainment (The Class Reversal). This level of granular insight allows strategic decision-makers to target messaging with unprecedented precision.

## 2.0 Dataset

The foundation of our analysis is the “**2024 county-level vote totals**” dataset, which includes preliminary counts for Votes\_Trump, Votes\_Harris, Votes\_Tot, and the core county identifiers.

However, raw vote counts alone are not enough for a predictive model, as they lack the socioeconomic context needed to explain the voting margin.

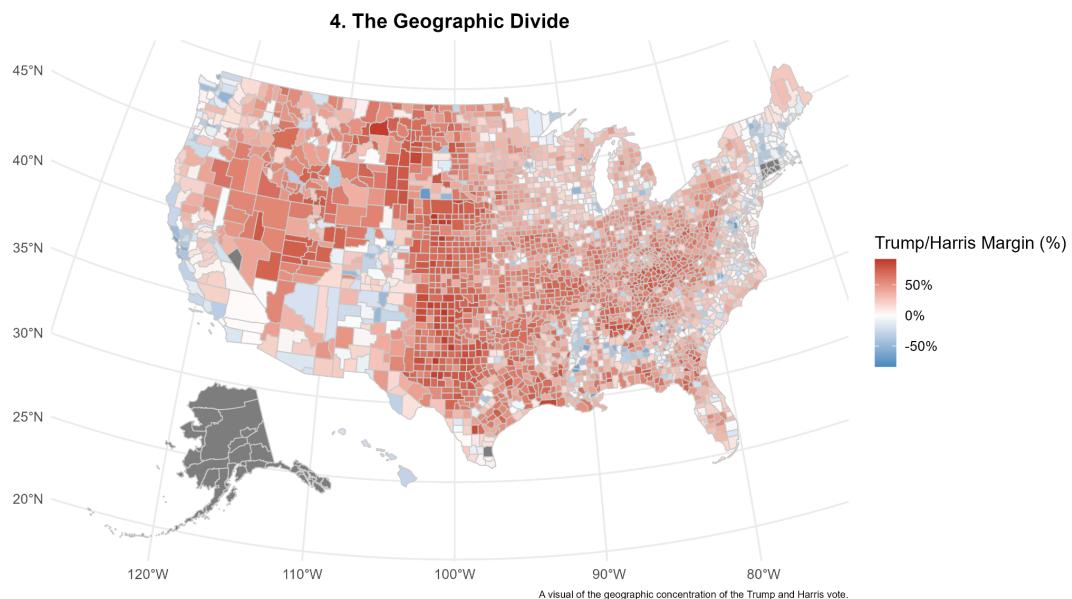
To address this limitation, we merged the original vote data with detailed county-level indicators. Using the “**tidycensus**” R package, we pulled comprehensive 2023 American Community Survey (ACS) data and joined it with the vote dataset.

This enrichment process resulted in an approximately 3,000-record dataset that provides granular insight into the political behavior of U.S. counties, supported by a wide range of socioeconomic variables.

## 3.0 Visual Analytics

### 3.1 Baseline and Geographic Context

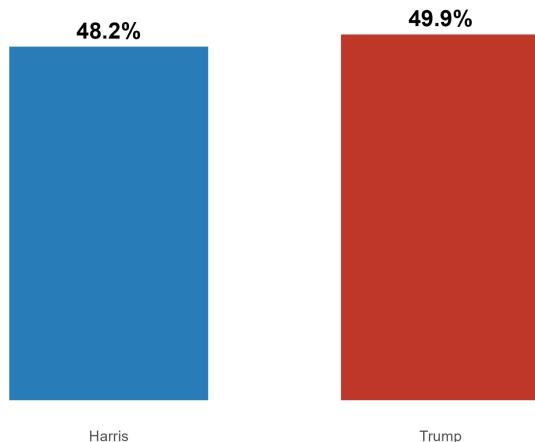
#### 1. The Geographic Divide (Choropleth)



The primary introductory visual. Shows the Trump/Harris margin for every county. It immediately illustrates the scale of polarization, distinguishing between dense urban concentrations (Harris) and vast rural land area (Trump).

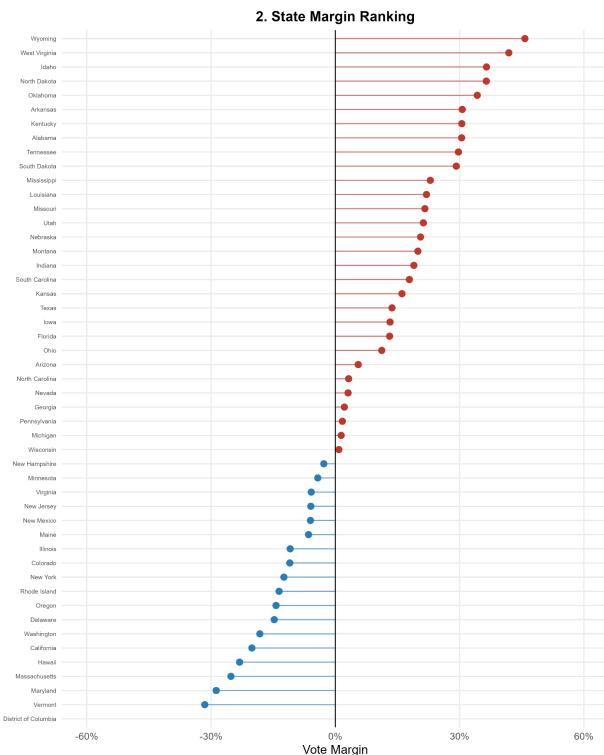
#### 2. National Vote Share (Bar Chart)

### 1. National Vote Share



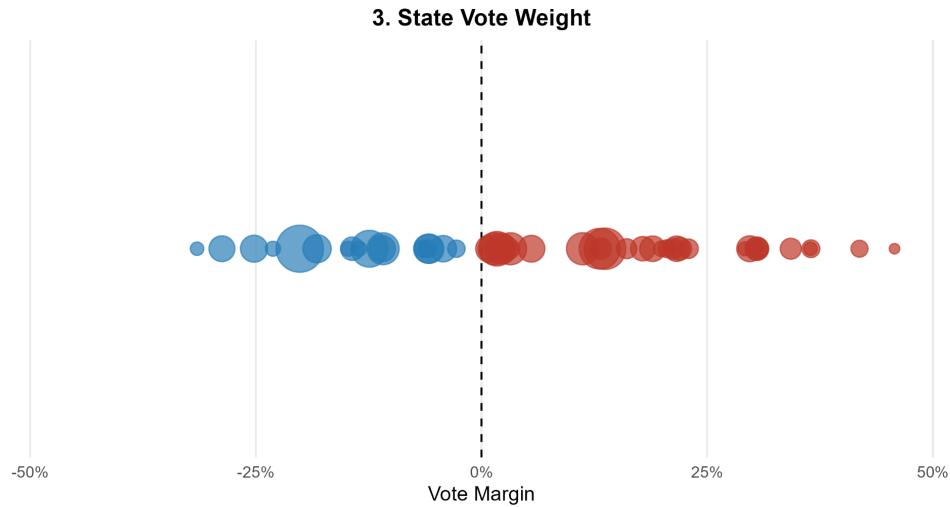
The popular vote baseline. Displays the aggregated raw vote percentage split between the two candidates across the entire dataset, setting the national electoral context before county-level detail is explored.

### 3. State Margin Ranking (Lollipop Chart)



Ranks all included states from the most Harris-leaning to the most Trump-leaning based on their statewide vote margin. Used to understand the depth and breadth of the political divide by state.

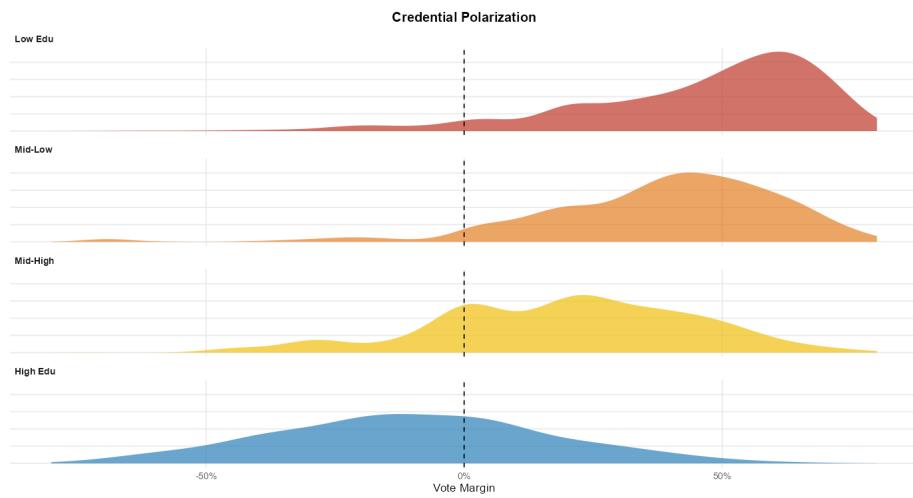
#### 4. State Vote Weight (Bubble Spectrum Chart)



Plots state vote margin against total votes cast (bubble size). This is critical for distinguishing between highly partisan, low-population states and large, high-electoral-weight swing states.

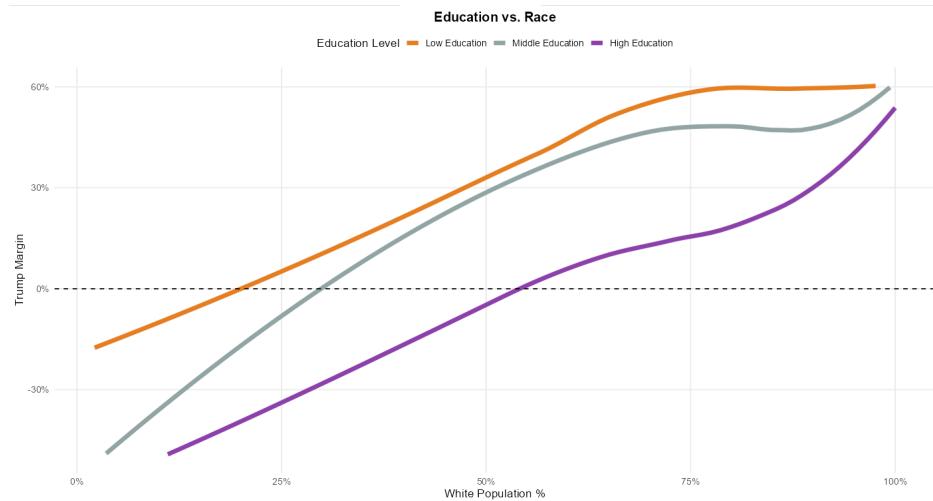
### 3.2 Primary Socioeconomic Predictors

#### 1. Education: Credential Polarization (Density Plot)



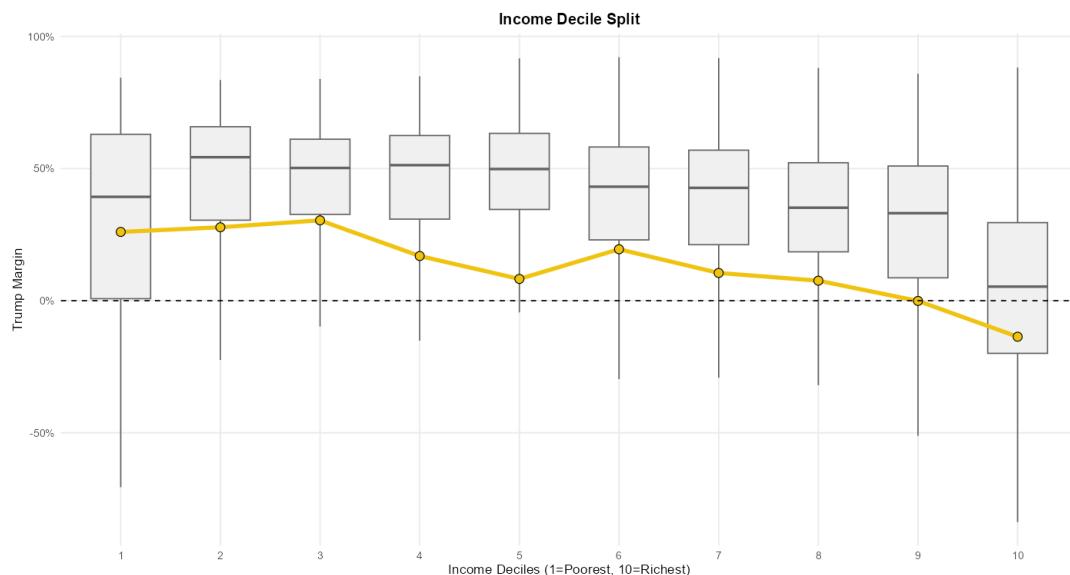
Shows the distribution of the population-weighted vote margin when conditioned on four categorical levels of bachelor's degree attainment. Each facet displays the vote margin distribution for a specific educational tier, clearly demonstrating where the Harris majority begins and ends.

## 2. Income: Income's Racial Buffer (Smooth Line Chart)



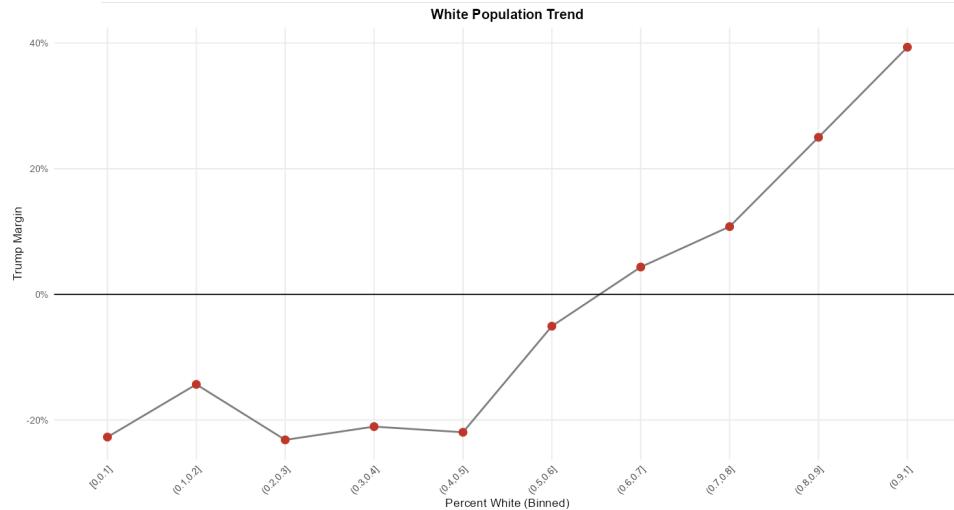
This plot isolates the protective effect of high income against the powerful pro-Trump shift driven by race. It plots White Population % (X-axis) vs. Trump Margin (Y-axis), with three separate trend lines conditioned by Income Tier. High Income demonstrates a clear reduction in the magnitude of the pro-Trump vote across all racial compositions.

## 3. Income: Decile Split (Boxplot with Population-Weighted Trend Line)



Plots the Trump Margin across 10 deciles of Median Household Income. The boxplot shows the wide variability among counties (the "land"), while the heavy gold line reveals the critical population-weighted average trend (the "people").

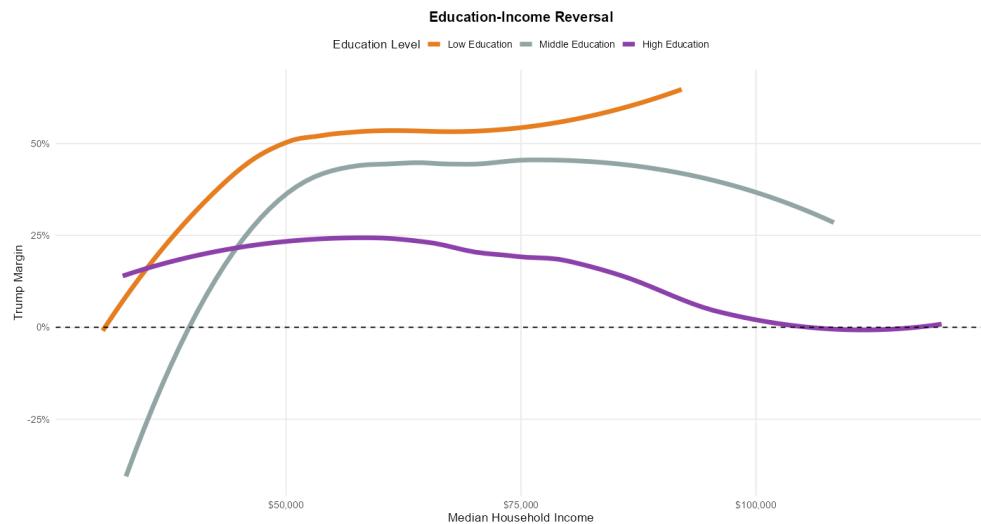
#### 4. White Population Trend (Line Plot)



Confirms the foundational linear relationship: plots the population-weighted Trump Margin against binned White Population Percentage. This single, monotonic line establishes the strong, predictable baseline of how race conditions the vote.

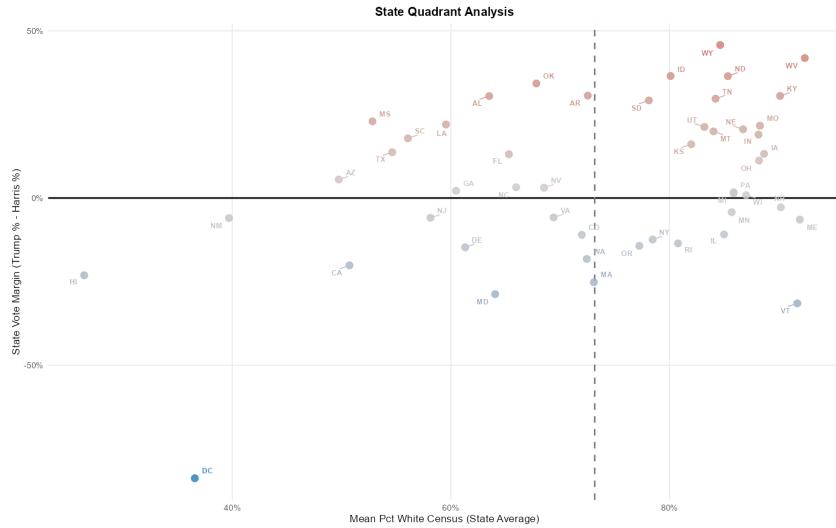
### 3.3 Interaction Effects and Cultural Breakpoints

#### 1. Education-Income Reversal (Smooth Line Chart)



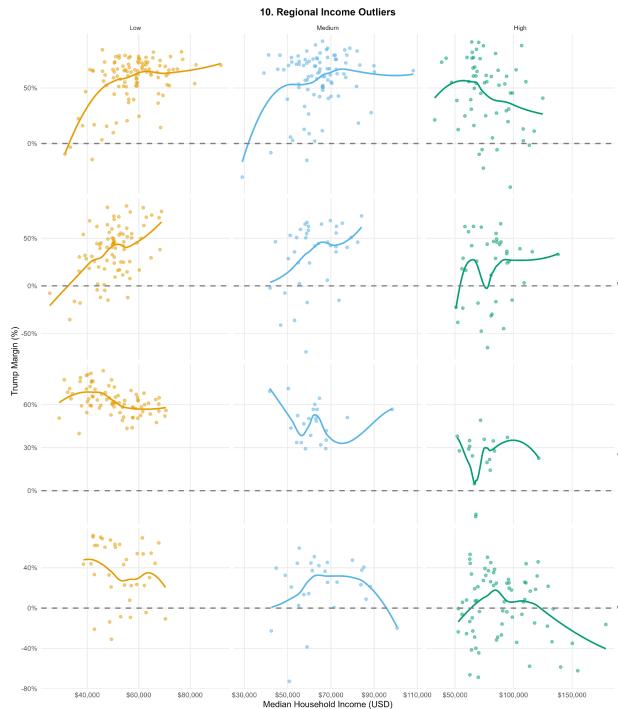
The core predictive finding. Plots Median Income (X-axis) vs. Trump Margin (Y-axis), with three separate, non-linear trend lines conditioned by Low, Middle, and High education counties. It clearly reveals the complete reversal of the income effect: income drives Harris votes only in high-education counties.

## 2. State Quadrant Analysis (Plot with State Labels)



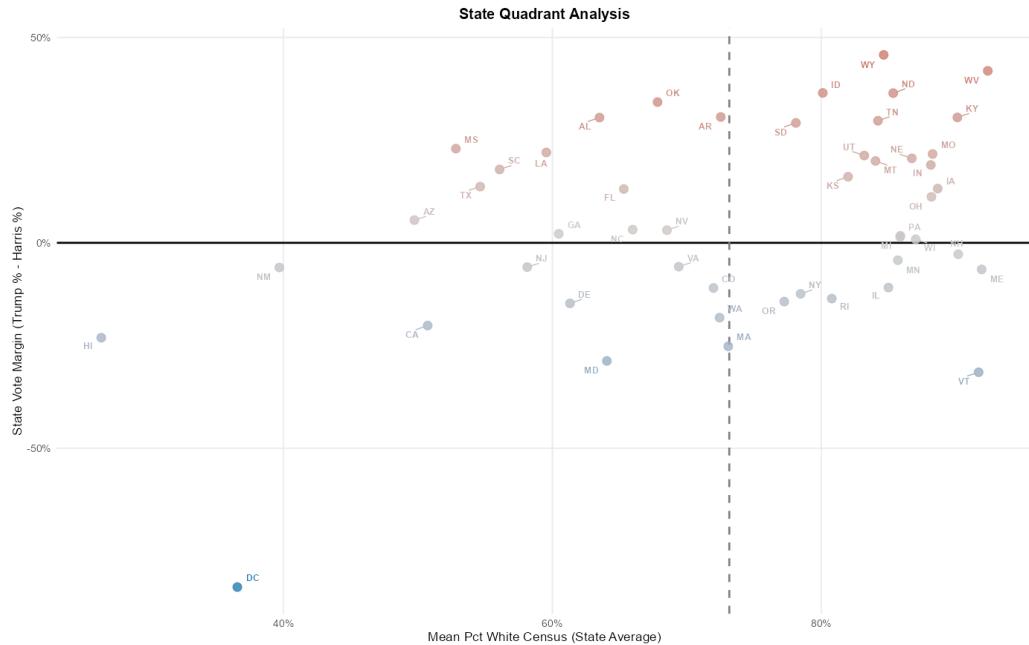
Outlier identification. This plot positions states based on two metrics: State White Population % (X-axis) and State Trump Margin (Y-axis). It helps find states that are exceptions to the racial baseline (example: highly white states voting Harris or diverse states voting Trump).

## 3. Regional Income Outliers (Double Facet Grid)



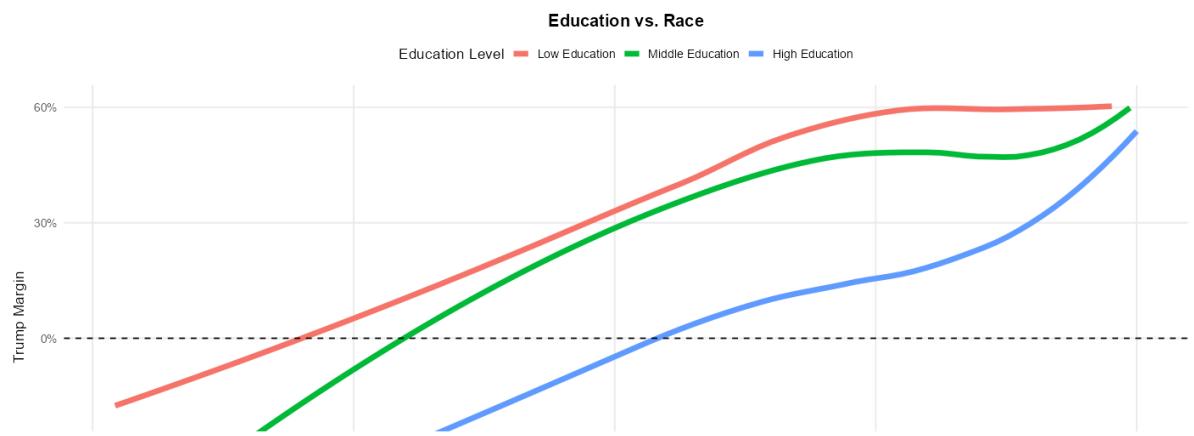
A high-granularity visual that tests the robustness of The Class Reversal. It shows the Income vs. Margin scatter plot, faceted by State (rows) and Education Tier (columns), exposing how strong regional political culture overrides the national socioeconomic trend in specific states.

#### 4. State Quadrant Analysis (Plot with State Labels)



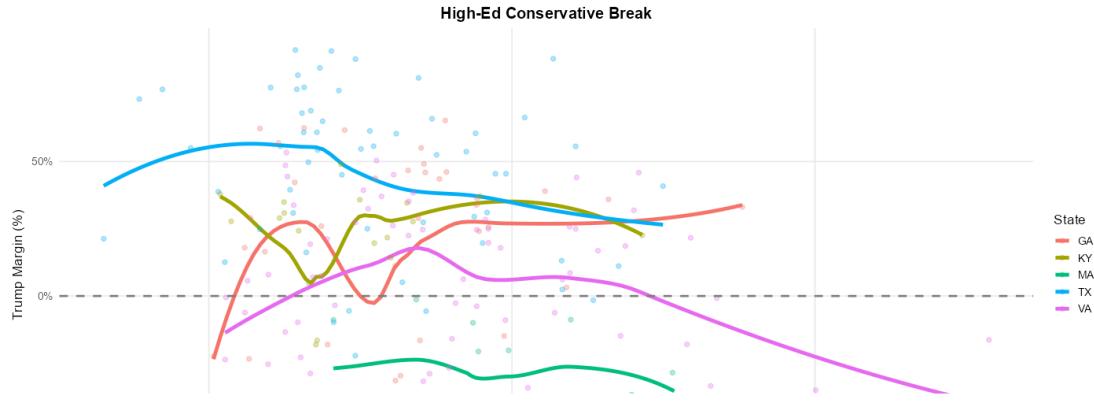
Outlier identification. This plot positions states based on two metrics: State White Population % (X-axis) and State Trump Margin (Y-axis). It helps find states that are exceptions to the racial baseline (example: highly white states voting Harris or diverse states voting Trump).

#### 5. Education vs. Race (Smooth Line Chart)



Plots White Population % (X-axis) vs. Trump Margin (Y-axis), separated by Education Tier. Demonstrates the "analytical dam" effect: high education acts to significantly restrict the pro-Trump shift normally driven by higher White population percentages.

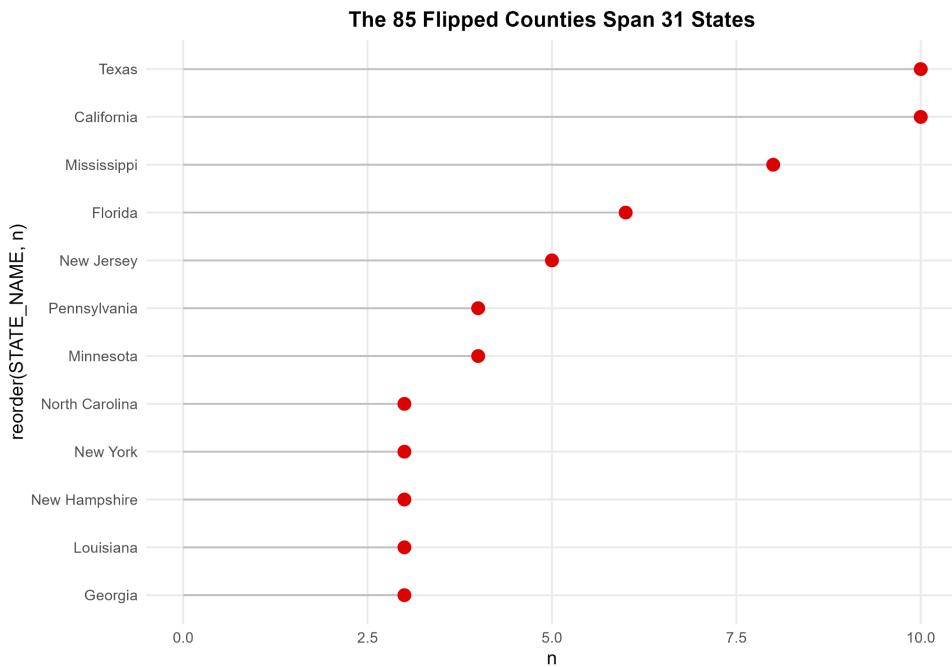
## 6. High-Education Conservative Break (Smooth Line Chart)



Focuses exclusively on counties in the highest education tier. It plots the Income vs. Margin trend, coloring lines by specific States, to prove that even among the most educated voters, the expected pro-Harris income effect can collapse in deeply conservative cultural states like Texas and Kentucky.

### 3.4 Demographics of the Shift

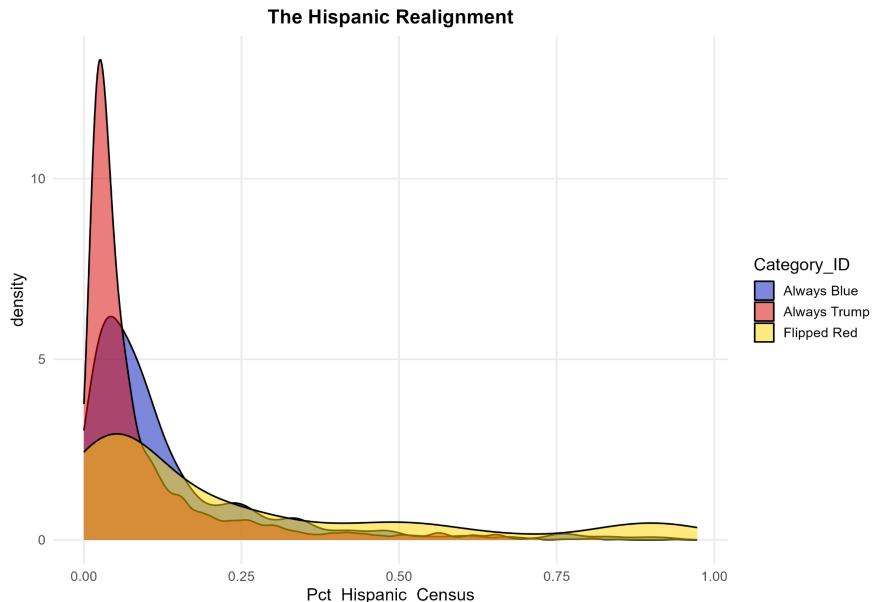
#### 1. Top Flipped Counties (dot Plot)



This chart proves that the 85 county flips weren't just isolated to swing states, they happened everywhere. Surprisingly, the most volatility occurred in Texas and California, two states usually considered 'safe'

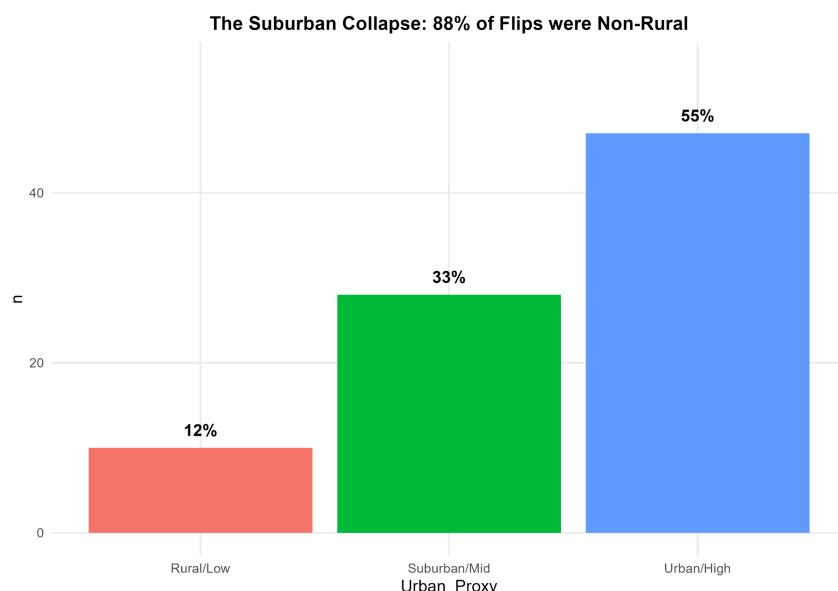
strongholds for opposite parties. This tie at the top emphasizes that the political ground is shifting across the entire country, not just in the places we typically watch.

## 2. The Hispanic Realignment (Density Plot)



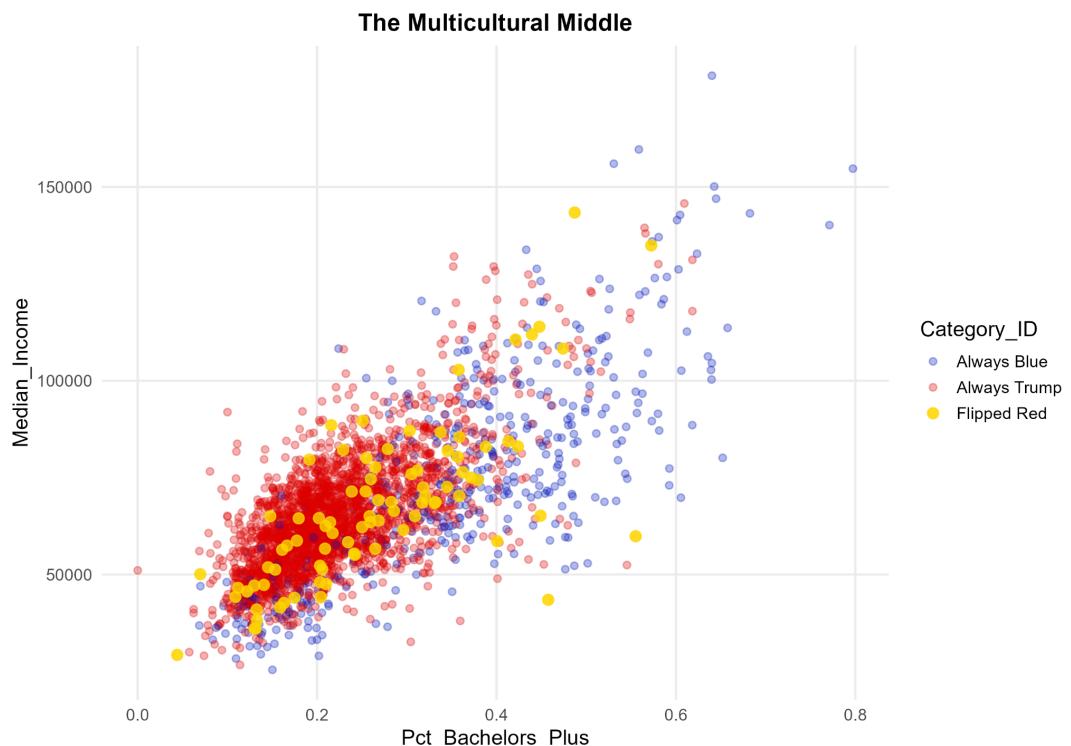
The shape of the gold curve reveals that the political 'flip' was driven by diversity. Unlike the stable red and blue counties, which cluster around low Hispanic populations, the flipped counties (in gold) are spread across a much wider demographic range. This visual confirms that counties with higher Hispanic populations were significantly more likely to shift their political allegiance.

## 3. The Suburban Collapse (Bar Chart)



This chart breaks down the 85 flipped counties by population density, showing a clear trend away from rural influence. Only 12% of the flips occurred in rural areas, while the vast majority happened in suburban and urban centers. This suggests the political battleground has decisively shifted toward higher-density communities.

#### 4. The Multicultural Middle (Scatter Plot)



The plot shows the 'Class Reversal' idea by comparing income and education levels. Counties that stayed loyal to one party sit at the extremes—either high-income and highly educated or lower-income and less educated. The counties that flipped, shown in yellow, gather in the middle. This suggests the recent political shifts weren't led by the richest or the poorest groups, but by people in the middle, caught between the two traditional bases.

#### 5. The Education Dam (Density Plot)

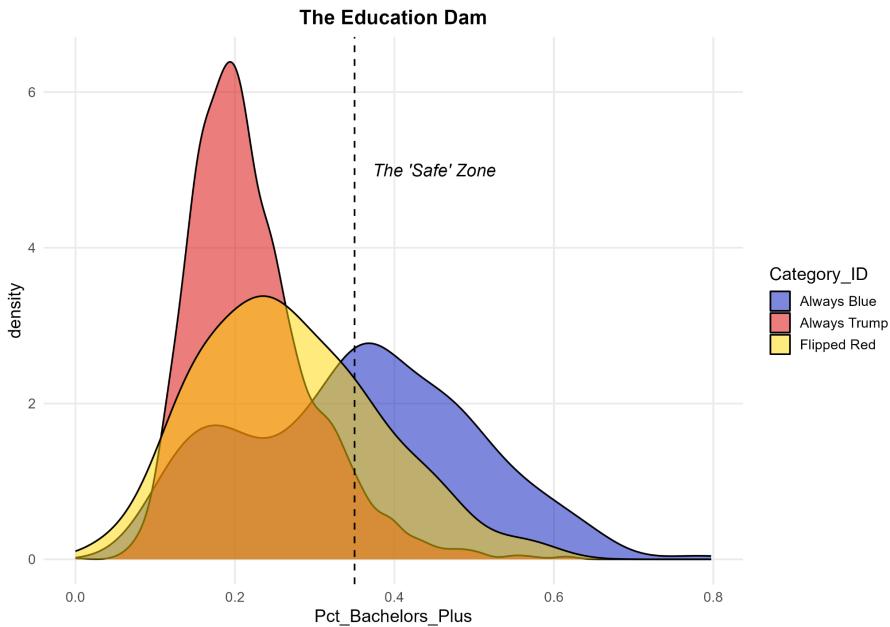


Figure X identifies a critical educational threshold for the observed political shifts. While the 'Always Blue' counties (in blue) span a wide range of educational attainment, the distribution of flipped counties (in yellow) terminates sharply at the 35% mark for Bachelor's degrees. This visual confirms that higher education levels acted as a firm barrier, or 'dam,' effectively insulating communities with over 35% college graduates from the broader realignment trend.

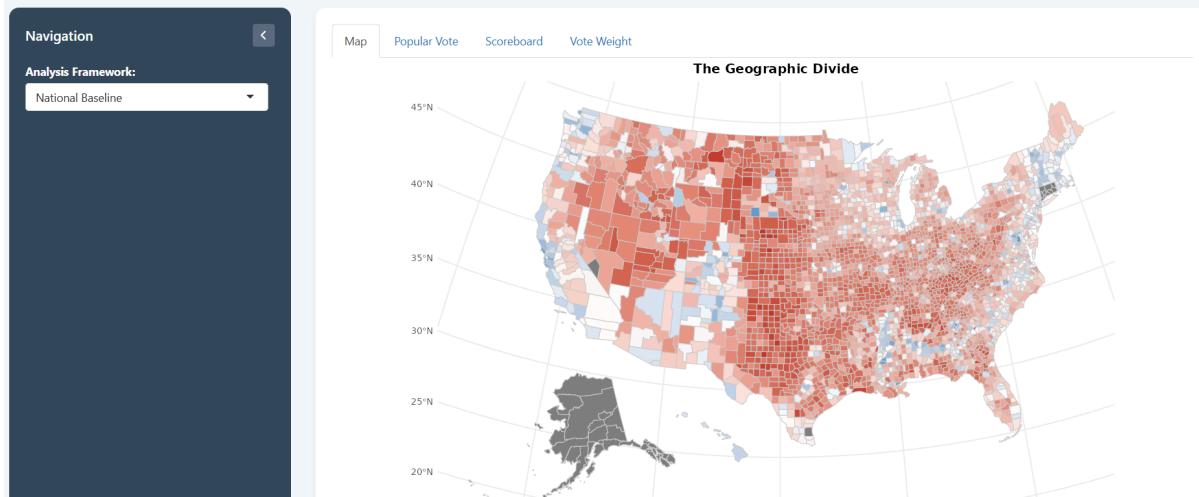
## 4.0 User Manual

This guide simplifies how to use the interactive **R Shiny dashboard** for the 2024 US Election analysis. The tool helps you visualize how income, education, and race influenced the election, and also includes a deep dive into the counties that flipped parties.

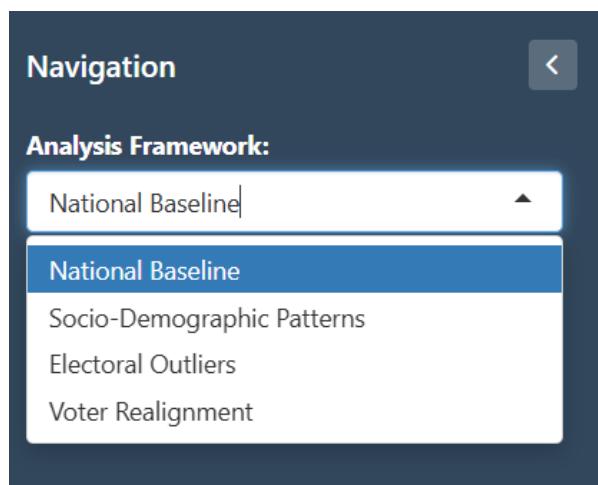
### 4.1 Dashboard Controls

The dashboard is split into two main sections: the sidebar (for selecting major topics) and the main panel (for viewing charts).

## 2024 U.S. Election Analytical Suite



A. The sidebar on the left lets you choose the main analytical topic.



1. Select Category : Switches the entire set of charts in the main panel.
2. Toggle Button : Click the chevron icons to collapse the sidebar and make the charts bigger.

B. Once a category is selected, use the tabs (e.g., "Map") across the top of the main panel to switch between individual charts.

## 4.2 Visualization Guide

The charts are organized to tell a complete story, starting with the national picture and ending with our most advanced findings.

### 1. National Baseline:

These visuals set the stage, showing where the votes are and how the states compare.

- Map: Vote Margin (U.S. County Map): The Big Picture. Shows which party won in every county. It immediately highlights the rural (Red) vs. urban (Blue) divide across the country.
- Popular Vote (Bar Chart): Shows the overall percentage split of the raw votes cast nationwide between the two candidates
- Scoreboard (Lollipop Chart): Ranks every state from the most Harris-leaning to the most Trump-leaning.
- Vote Weight (Bubble Chart): Compares state election margins with the total number of votes cast (the bubble size). This helps identify high-turnout, high-stakes states.

### 2. Socio-Demographic Patterns:

This section reveals the key economic forces and the discovery of the "Class Reversal."

- Class Divide (Income) (Boxplot with Gold Line): Shows how the vote margin changes across ten tiers of wealth (Income Deciles). The

gold line shows the actual voting trend for the majority of the population.

- Education Shift (Stacked Density Plots): Shows how voting tendencies change as a county's college degree attainment increases. It demonstrates exactly where the Democratic voting majority begins to form (the "High Edu" tier).
- Trend: Class Reversal (Colored Trend Lines ): The Core Finding. Plots wealth (X-axis) against voting margin (Y-axis), separated by three education levels. It proves that the effect of money *reverses* depending on whether a county is highly educated or not.
- Trend: Education Dam (Colored Trend Lines): Plots Race (X-axis) against Voting Margin (Y-axis), separated by Education Level. It shows how high education acts like a "dam," dramatically slowing down the expected pro-Trump vote shift in whiter counties.

### 3. Electoral Outliers:

This section explores race as a predictor, finds cultural exceptions, and identifies state outliers.

- Racial Slope (Line Plot): Shows the strong, direct correlation between the percentage of White population in a county and the resulting pro-Trump vote margin.
- Trend: Demographic Shield (Colored Trend Lines ): Income's Buffer. Plots Race (X-axis) against Voting Margin (Y-axis), separated by Income Level. It shows that higher income acts as a buffer, reducing the strength of the pro-Trump shift driven by race.
- State Racial Deviation (Scatter Plot ): Outlier Map. Plots all states on a 2x2 grid (Race vs. Margin) to identify exceptions—states that vote differently than their racial makeup suggests.
- State Exceptions (Income) (Gridded Scatter Plots ): The Granular Test. Splits the Income vs. Margin trend into 12 separate small charts (State \$\times\$ Education Level) to show how local culture in specific states completely breaks the national trends.
- High Edu Failure (Colored Trend Lines): Focuses only on the most educated counties. Plots Income vs. Margin, using lines for specific

states (e.g., TX, KY) to prove that the pro-Harris income effect fails in culturally conservative regions.

#### **4. Voter Realignment:**

This section serves as the core of the analysis, visualizing exactly who changed sides. It moves from the geographic spread to the specific demographic triggers: race, density, class, and education, that defined the shift.

- Top Red Flips (Lollipop Chart): The Geographic Spread. Ranks states by the number of counties that flipped parties. It reveals that the shift wasn't limited to traditional swing states, with the highest volatility occurring in "safe" strongholds like Texas and California.
- Hispanic Shift (Density Plot): The Demographic Reality. Compares the Hispanic population size in flipped counties (Gold) against stable partisan counties. The Gold curve extends far into high-Hispanic areas, confirming that the counties changing hands were significantly more diverse than the national norm.
- Suburban Collapse (Bar Chart): The Density Break. Breaks down the 85 flipped counties by population density (Rural, Suburban, Urban). It challenges the rural-voter narrative by showing that 88% of the flips occurred in non-rural zones, signaling a collapse of the traditional suburban "blue wall."
- Cultural Breakpoint and Outliers (Scatter Plot): The Class Reversal. Maps every county by Median Income (Y-axis) and Education Level (X-axis). While stable counties occupy the extremes, the flipped counties (Yellow) cluster tightly in the center, representing a "middle-ground" demographic that sits at the friction point between the two parties.
- Education Dam (Density Plot): The Safety Valve. Displays the distribution of Bachelor's degrees across the different political groups. It identifies a sharp cutoff at the 35% mark, suggesting that higher education levels acted as a "dam," effectively insulating the most highly educated communities from the flipping trend.