The Decoupling of Demography and Destiny:

A Zero-Loss Decomposition of the 2024 U.S. Electorate

Donald Moratz

University of Pennsylvania

dmoratz@sas.upenn.edu

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Outline

A Core Challenge in Electoral Analysis

- Electoral analysis frequently conflates two distinct forces:
  1. **Shifts in Voter Preference** (Group Loyalty / Rate)
  2. **Changes in Demographics** (Group Size / Composition)
- This conflation leads to **significant interpretive errors**, misattributing millions of votes.
- Example: Is a party's vote change due to a group getting larger, or the group becoming more loyal? Standard models can't cleanly separate them.
- Recent Work (Marble et al., 2024; Fraga et al., 2024; Hill et al., 2021) has attempted to tackle this question, but methodological challenges remain

The "Demographics are Destiny" Argument

- This narrative predicts that demographic shifts (increasing non-White populations) will inevitably lead to long-term partisan advantages (e.g., for the Democratic Party).
- This paper examines this core assumption by providing a tool that **isolates the demographic effect** from the loyalty effect.

Introducing the RCVD Framework

The **Rate, Composition, and Volume Decomposition (RCVD)** is a novel, zero-loss methodology that precisely partitions the total vote change (ΔZ) into three analytically distinct components.

- **1. Rate Effect (ΔR):**
  Change in **Group Loyalty** (preference/vote rate).
- **2. Composition Effect (ΔC):**
  Change in **Group Proportion** (demographic shifts).
- **3. Volume Effect (ΔV):**
  Change in **Overall Participation** (turnout/total electorate size).

The Core Specification

The underlying dynamics of an election are a non-linear combination of the Rate, Composition, and Volume for a given election at time t. For any group, i, the total contribution to the election result is given by:

$$Z_i(t) = R_i(t) \times C_i(t) \times V(t)$$

Therefore, any attempt to analyze these components needs to account for the non-linear relationship between them. The total vote change (ΔZ_i), is the difference between an election at time t_0 and a second election at time t_1:

$$\Delta Z_i = Z_i(t_1) - Z_i(t_0)$$

The Zero-Loss Principle

- **Zero-Loss:** The RCVD ensures that the sum of the changes within the three components **exactly equals** the total observed vote change (ΔZ).

$$\Delta Z = \Delta R + \Delta C + \Delta V$$

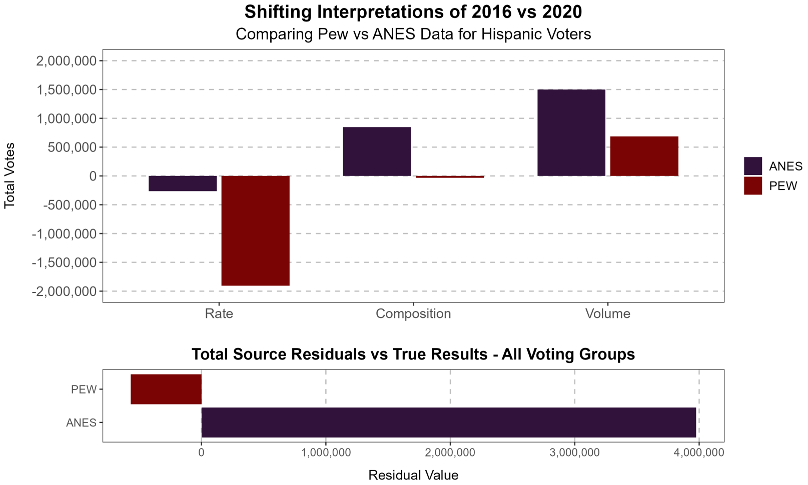
- **Mathematical Definition:**
  The decomposition is based on sequential differencing and marginal analysis.
- **Formula (Simplified):**

$$\Delta R = \text{Base Size} \times (\text{New Rate} - \text{Old Rate}) \times \text{Base Volume}$$
$$\Delta C = \text{New Rate} \times (\text{New Proportion} - \text{Old Proportion}) \times \text{Base Volume}$$
$$\Delta V = \text{New Rate} \times \text{New Proportion} \times (\text{New Volume} - \text{Old Volume})$$

Diagnostic Application: Data Resolution

- Applying RCVD to different data sources (e.g., ANES vs. Pew) reveals systemic differences in measurement.
- **Key Finding:** Data sources often disagree significantly on the size of the ΔC and ΔR components, even when the total ΔV is similar.
- This indicates: RCVD is a crucial diagnostic tool for quantifying the **data resolution problem** in existing electoral surveys.

Diagnostic Application: ANES vs PEW



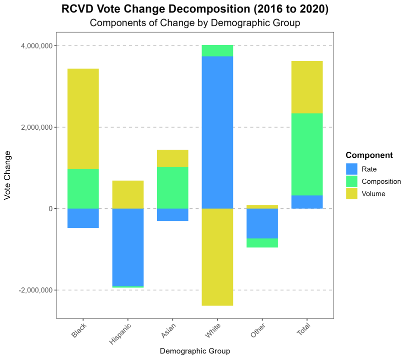
Analysis of the 2016–2024 Cycles

- The framework was applied to U.S. Presidential Election cycles: 2016 $\rightarrow$ 2020 $\rightarrow$ 2024.
- **Context (2016-2020):** Initial evidence of a dampening effect, where ΔR and ΔC worked against each other.
- **Focus: The 2024 Election Result**
  The 2024 cycle revealed a decisive and total decoupling of these effects.

The Initial Hints: Weakening Support in 2020

- In the 2016-2020 cycle, the effects were more aligned with the demographics hypothesis, but still complex.
- ΔC (Composition) was positive for Democrats
  - Driven by a strong shift out of White Voters and into Black and Hispanic Voters
- Weakness in ΔR (Rate) for Democrats
  - Rate was slightly positive for Democrats
  - However, this was driven by significant increases in Rate amongst White voters
  - ΔR (Rate) effects however were already showing weakness amongst non-White voting groups.

RCVD Decomposition: 2020 Summary

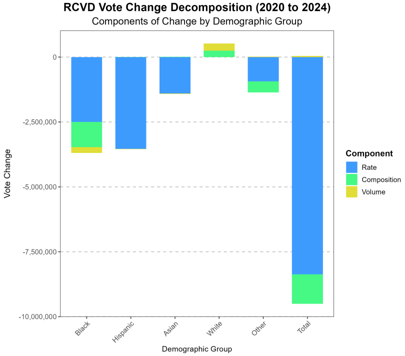


- The total net change (ΔV) was positive for Democrats, reflecting higher turnout levels.
- The small **positive Rate effect** (≈.3M) was dwarfed by the large positive Composition effect (≈2M)

The Main Finding: Decoupling in 2024

- The long-predicted Democratic **Compositional Advantage** (ΔC):
  - Substantial growth in non-White groups (Hispanic, Black, All Others).
  - This was expected to create a net positive vote gain for Democrats purely based on group size.
- The **Neutralizing Negative Rate Swing** (ΔR):
  - Significant erosion of partisan loyalty among **non-White electorates**, particularly Hispanic voters.
  - This resulted in a net negative vote loss for Democrats based on preference shifts.

RCVD Decomposition: 2024 Summary



- The total net change (ΔV) was marginal.
- The large **negative Rate effect** (≈-8.4M) was so dramatic that the net Composition effect (≈-1.1M) was actually also negative.

The Decoupling: Key Takeaway

- **What Happened:** The predicted demographic tailwind for one party ($\Delta C > 0$) was entirely flipped, driven by a simultaneous, unprecedented shift in group loyalty ($\Delta R < 0$).
- **Conclusion:** The RCVD framework allows researchers to examine the "demographics are destiny" narrative, fundamentally challenging the underlying assumptions
- **Core Takeaway:** Electoral success for Democrats depends less on passive demographic growth and more on active loyalty maintenance (Rate) within growing groups.

Takeaways and Future Work

- **RCVD is a superior diagnostic tool** that resolves long-standing interpretive ambiguity in vote change analysis.
- The **2024 Decoupling** is a critical empirical finding: Compositional growth can be entirely offset, or even reversed, by Rate erosion.
- **Future Work:**
    - Applying the RCVD to state-level and local elections.
    - Integrating the RCVD framework into standard public polling methodologies.

Thank You.

Questions?

Bernard L. Fraga, Yamil R. Velez, and Emily A. West. Reversion to the Mean, or Their Version of the Dream? Latino Voting in an Age of Populism. *American Political Science Review*, pages 1–9, May 2024. ISSN 0003-0554, 1537-5943. doi: 10.1017/S0003055424000406. URL https://www.cambridge.org/core/product/identifier/S0003055424000406/type/journal_article.

Seth J. Hill, Daniel J. Hopkins, and Gregory A. Huber. Not by turnout alone: Measuring the sources of electoral change, 2012 to 2016. *Science Advances*, 7(17): eabe3272, April 2021. ISSN 2375-2548. doi: 10.1126/sciadv.abe3272. URL https://www.science.org/doi/10.1126/sciadv.abe3272.

William Marble, Justin Grimmer, and Cole Tanigawa-Lau. Measuring the Contribution of Voting Blocs to Election Outcomes. *The Journal of Politics*, page 732964, September 2024. ISSN 0022-3816, 1468-2508. doi: 10.1086/732964. URL https://www.journals.uchicago.edu/doi/10.1086/732964.

Appendix A: Mathematical Details

- **RCVD Approach**
- Total vote change for party P between t_0 and t_1:

$$\Delta Z = Z(t_1) - Z(t_0)$$

- The decomposition is defined as:

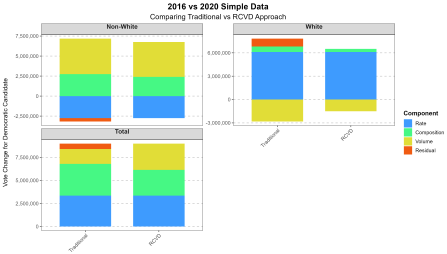
$$\Delta Z = \Delta R + \Delta C + \Delta V$$

Appendix A: Mathematical Details

Final RCVD Specification for Group i

$$\begin{aligned}\Delta Z_i = & \Delta R_i * C_i(t_1) * V(t_1) + \\ & R_i(t_2) * \Delta C_i * V(t_1) + \\ & R_i(t_2) * C_i(t_2) * \Delta V\end{aligned}$$

Appendix B: Comparison to Traditional Methods



- The RCVD method achieves zero-loss compared to older decomposition methods (like the simplified derivative-based approach (DBA)).
- Interpretation: Older methods can introduce significant, systematic errors in the estimation of group-level components (ΔR and ΔC).

Appendix C: Data Caveats

- **Data Dependence:** RCVD is highly dependent on the initial quality and consistency of the underlying exit-poll or survey data (e.g., ANES, Pew).
- **Solution:** The paper proposes that the RCVD output itself (specifically the residuals when comparing different data sources) should be used as a measure of data reliability.
- Limitation: While RCVD accounts for all observed change, it cannot correct for initial mismeasurement of the underlying group sizes or vote rates.