

Redistricting Simulation Analysis of the Preliminary State House Reapportionment Plan

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Introduction

- Positions
 - ▶ Current: Professor in the Department of Government and Department of Statistics, Harvard University
 - ▶ Previous: Professor in the Department of Politics and Center for Statistics and Machine Learning, Princeton University
- Research fields
 - ① Causal inference
 - ② Computational social science
- Relevant expertise
 - ▶ Redistricting simulation analysis
 - ▶ Development and application of simulation algorithms
 - ▶ Open-source software package *redist* (over 30,000 downloads)



Overview of redistricting simulation analysis

- What is redistricting simulation analysis?
 - ▶ generate a large number of **alternative plans** under a specified set of redistricting criteria
 - ▶ compare them with a proposed plan to evaluate its properties

- What are the benefits of redistricting simulation analysis?
 - 1 can control for **state-specific** political geography and redistricting rules
 - 2 **transparency** and ability to isolate a relevant factor
 - 3 mathematical guarantee \rightsquigarrow **representative sample** of alternative plans

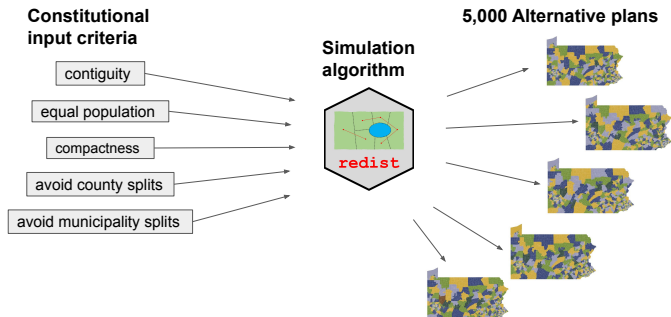
- **Input criteria** to simulation algorithms must be carefully chosen

Key conclusions

- 1 The consideration of majority-minority districts, in addition to constitutional constraints, in simulation algorithms substantially alters the conclusions of simulation analyses
- 2 When the majority-minority districts are considered, there is no empirical evidence that the preliminary plan is a partisan gerrymander

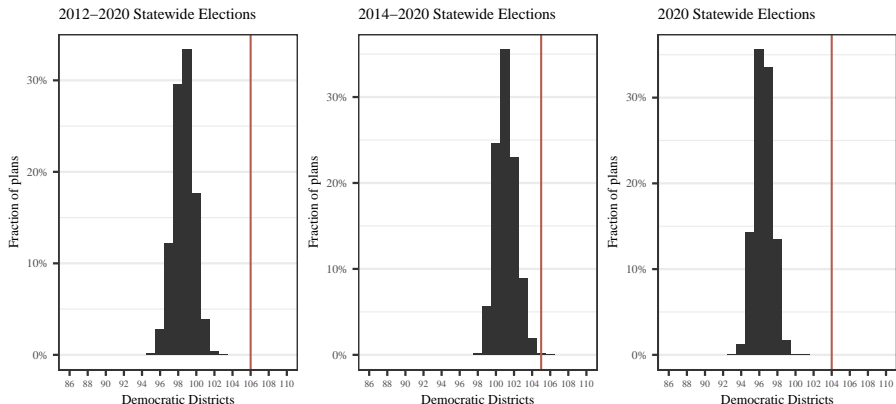
Race-blind simulation setup

- 5 constitutional criteria
 - ① 203 geographically contiguous districts
 - ② equal population ($\pm 5\%$)
 - ③ compactness
 - ④ avoid county splits
 - ⑤ avoid municipality splits



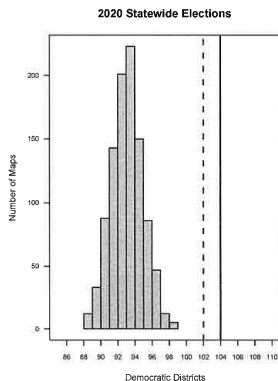
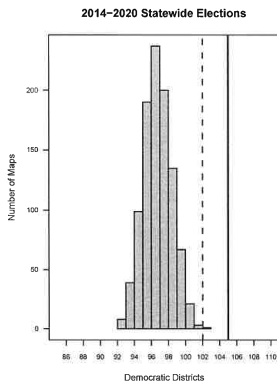
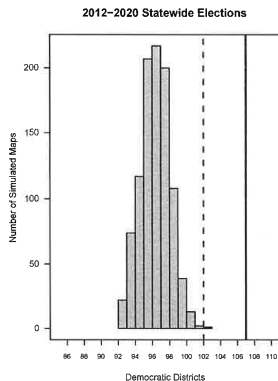
- Could not replicate Prof. Barber's race-blind simulation due to insufficient information

Race-blind simulation results



- I used the same 3 sets of statewide elections as Professor Barber: other composite of statewide elections may produce different results
- The preliminary plan yields 4 to 8 more Democratic districts than the *race-blind* simulated plans

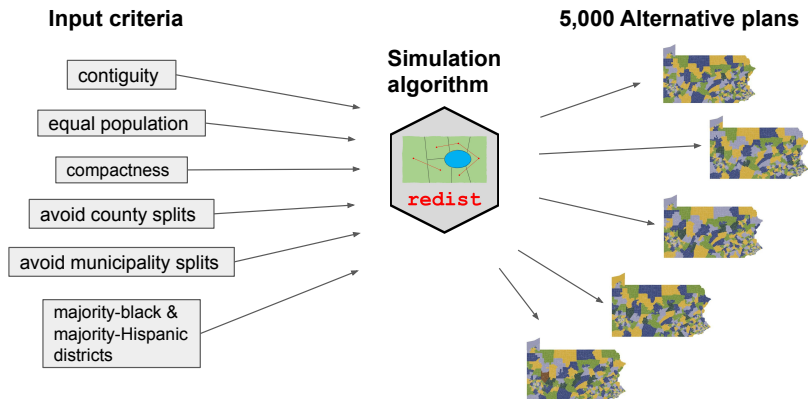
Comparison with Professor Barber's results



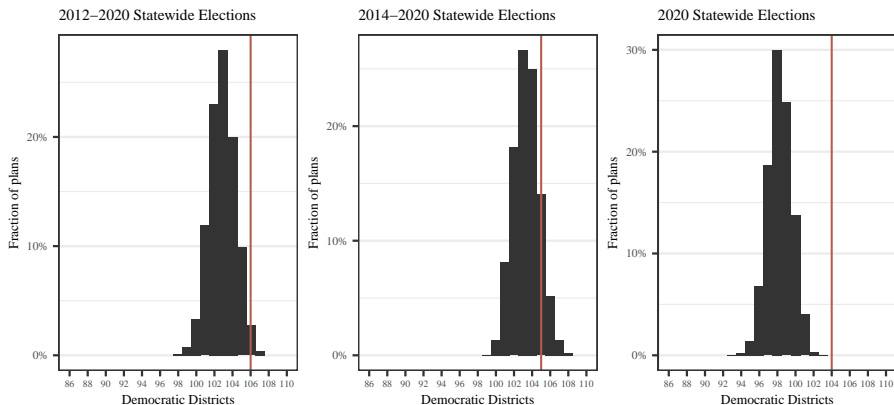
- Professor Barber's race-blind analysis substantially underestimates the likely number of Democratic districts in comparison to my *race-blind* simulation analysis

Simulation A setup

- 5 constitutional constraints are met
- Additional constraint for 8 **majority-black** and 4 **majority-Hispanic** districts



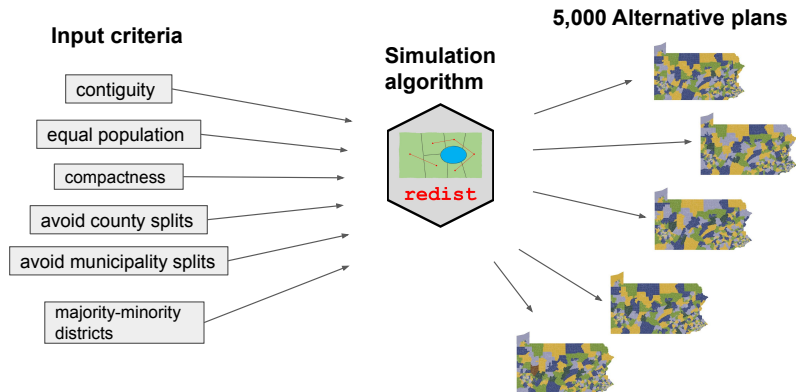
Simulation A results



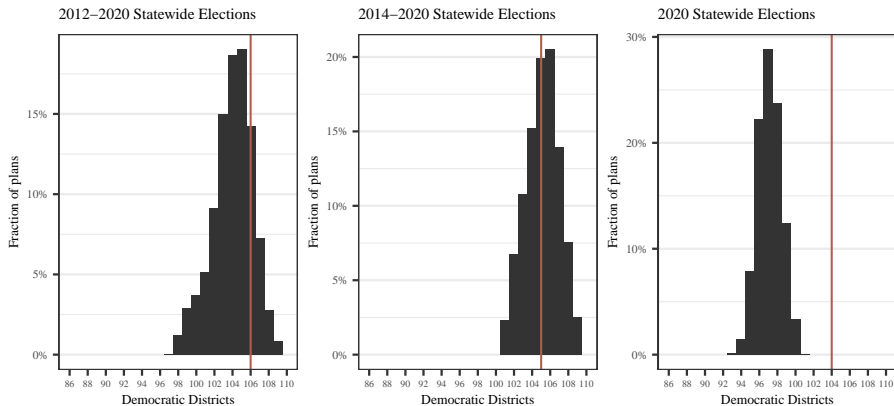
- The preliminary plan is **not statistically distinguishable** from the simulated plans, depending on the specific set of elections analyzed
- When the majority-black and majority-Hispanic districts are additionally considered, the preliminary plan is **not a partisan gerrymander**, depending on the specific set of elections analyzed

Simulation B setup

- 5 constitutional constraints are met
- Additional constraint for 25 **majority-minority** districts including 13 coalition districts



Simulation B results



- The preliminary plan is **not statistically distinguishable** from the simulated plans, using the 2012–2020 and 2014–2020 elections
- When the majority-minority districts are additionally considered, the preliminary plan is **not a partisan gerrymander**, using the 2012–2020 and 2014–2020 elections

Summary of findings

- 1 My race-blind simulation analysis shows that the preliminary plan most likely yields 2 to 4 fewer Democratic districts than Prof. Barber's analysis implies
- 2 When the majority-black and majority-Hispanic districts are additionally considered, the preliminary plan is not statistically distinguishable from the simulated plans, depending on the specific set of elections analyzed
- 3 When the majority-minority districts are additionally considered, the preliminary plan is not statistically distinguishable from the simulated plans, using the 2012–2020 and 2014–2020 statewide elections
- 4 When the majority-minority districts are additionally considered, the preliminary plan is not a partisan gerrymander in terms of the likely number of Democratic districts