ECON 573 PROJECT

IMPACT OF SCHOOL RESOURCES AND DEMOGRAPHICS ON DISTRICT TEST SCORE PERFORMANCE

A regional analysis using classification methods

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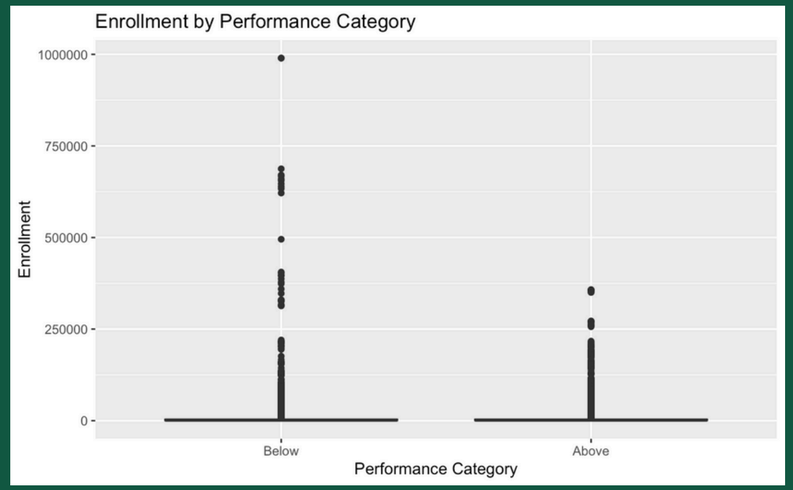
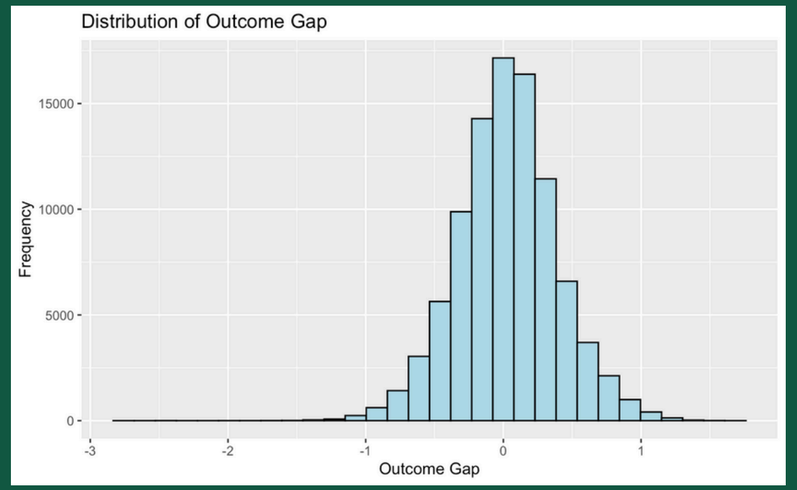
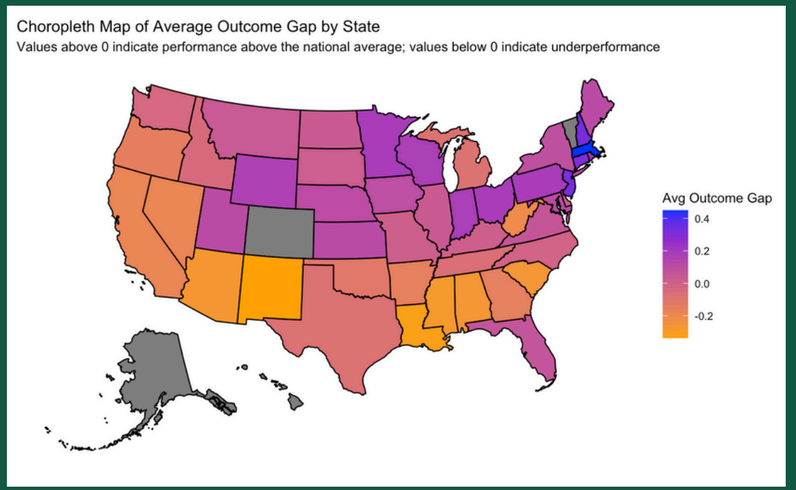
WHY DOES THIS MATTER?

- McMahon (2000): Poverty as primary predictor of underachievement
- Commonwealth Institute (2023): High-poverty schools face significant resource and performance challenges
- Influences educational policy and funding decisions
- Highlights equity and resource allocation issues
- Addresses socioeconomic disparities in education

OUR DATA SPREAD







At First Glance

Standardized Variables

Across the USA

METHODOLOGY

4 REGIONS

Northeast, Midwest, South, West

94,000+

Sample SIze

7+

Classification Methods

85.5%

Accurate Model Performance

NORTHEAST REGION

01

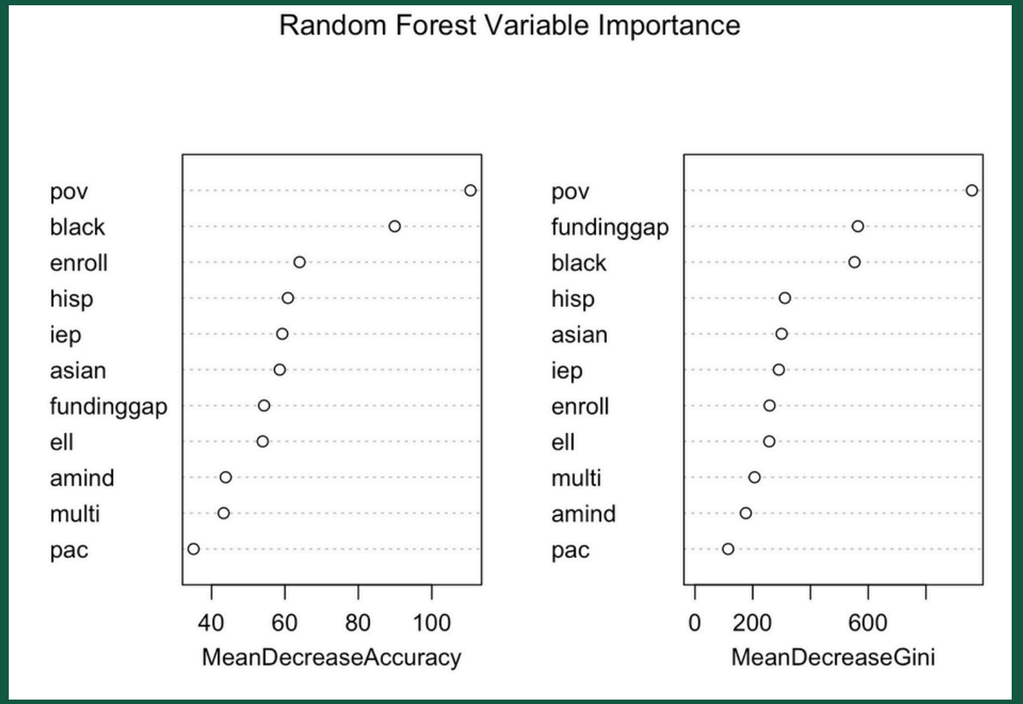
Best Model:
Random Forest (90.8% accuracy).

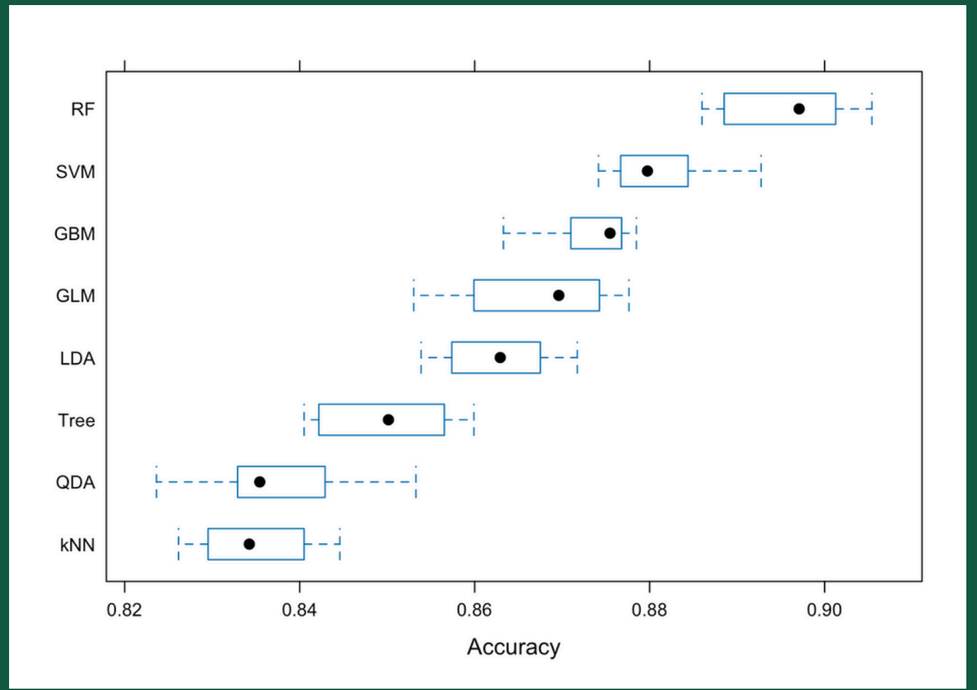
02

- Top Predictors:
- Poverty Rate, Racial/Ethnic Composition,
- Funding Gap

03

- Key Takeaway:
- Demographics more predictive than funding adequacy.
- Variables that perform well on both MDA and MDG = most critical for policy.





SOUTHERN REGION

01

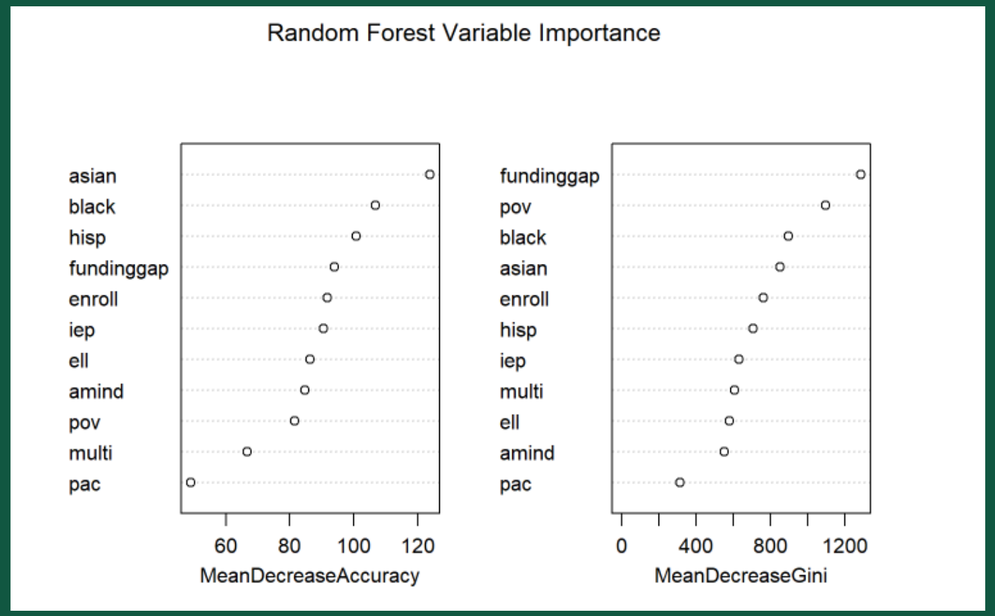
Best Model: Random Forest (83% accuracy)
AUC: 0.913
Sensitivity: 0.944
Specificity: 0.617
Balanced Accuracy: 0.7811

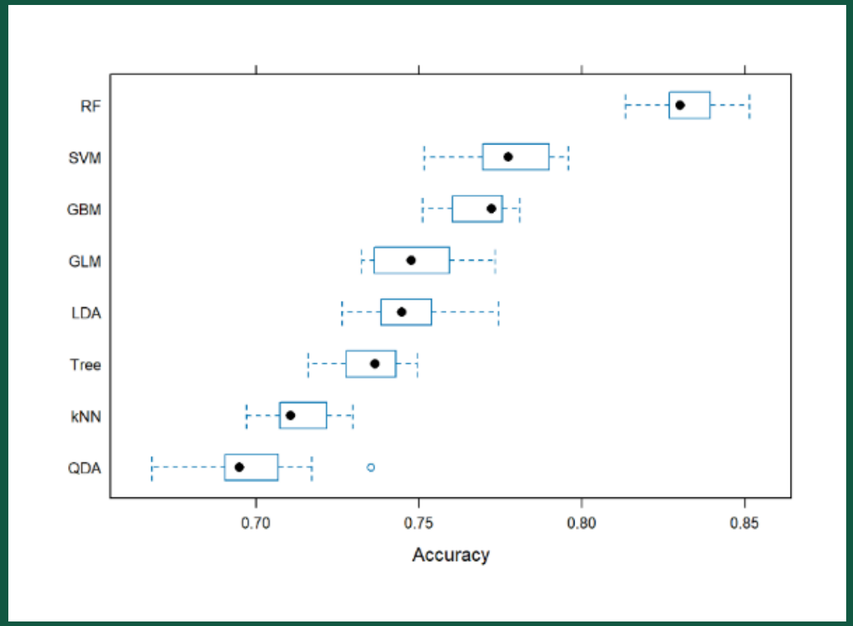
02

- Top Predictors:
- Poverty Rate, Racial/Ethnic Composition,
- Funding Gap

03

- Insights:
  - High influence of race and poverty.
  - Logistic regression confirms strong negative impact of poverty and Black/Special Ed indicators.
  - Possible regional inequities in funding distribution.





WESTERN REGION

01

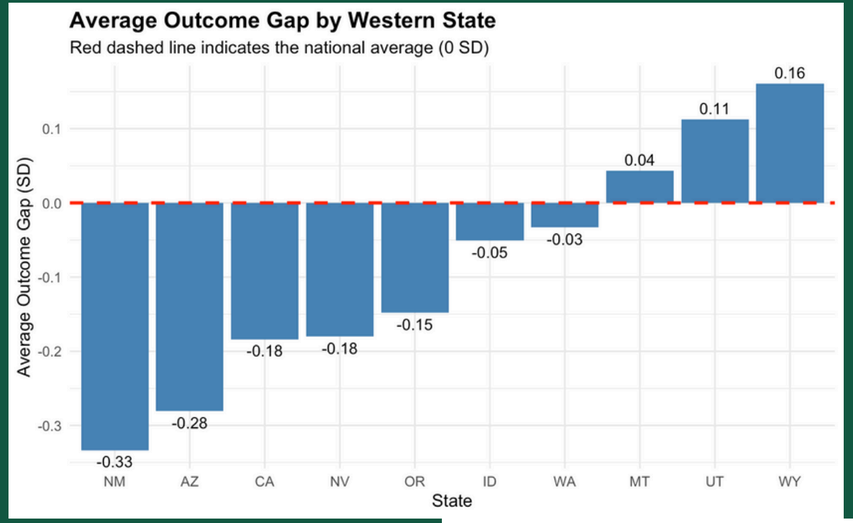
Best Model: Random Forest (87.4% accuracy)
AUC: 0.9431446
Sensitivity: 0.9325 (“Below”)
Specificity: 0.7634 (“Above”)

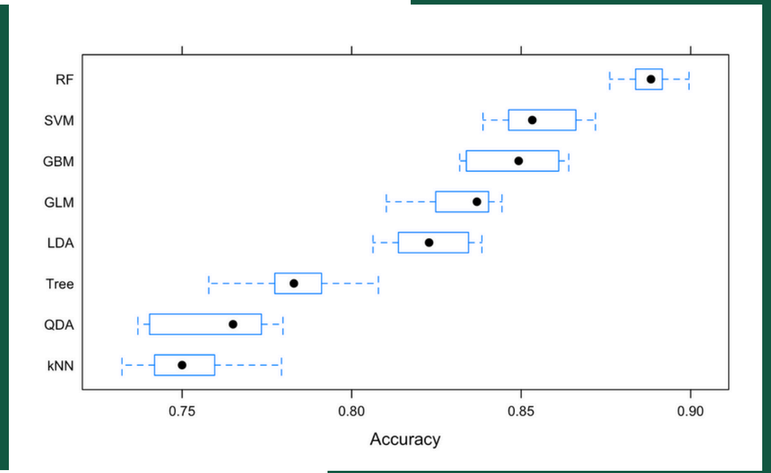
02

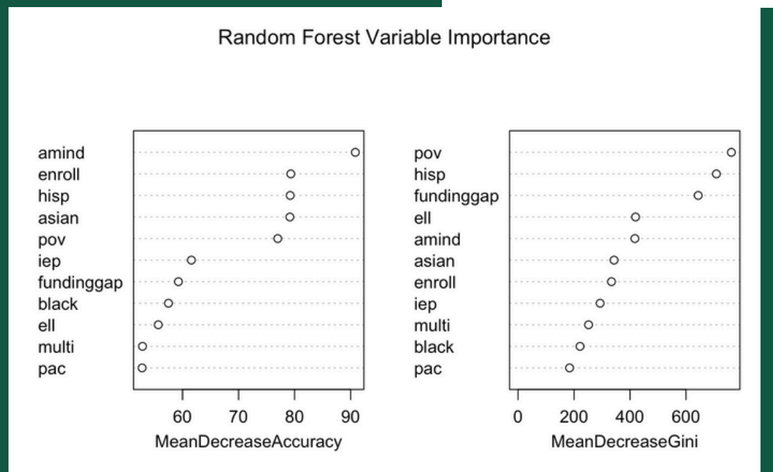
Top Predictors/Classifiers:
Poverty, Enrollment, Ethnicity (% Native, Hispanic)
Bottom predictors:/Classifiers:
% Pacific Islander/Hawaii, % Black

03

Key takeaway:
Policies should focus on reducing poverty and rectifying funding inadequacies while also considering the specific demographic context of each district. Targeted interventions are likely to have the most significant impact in raising district performance relative to the national standard.







MIDWEST REGION

01

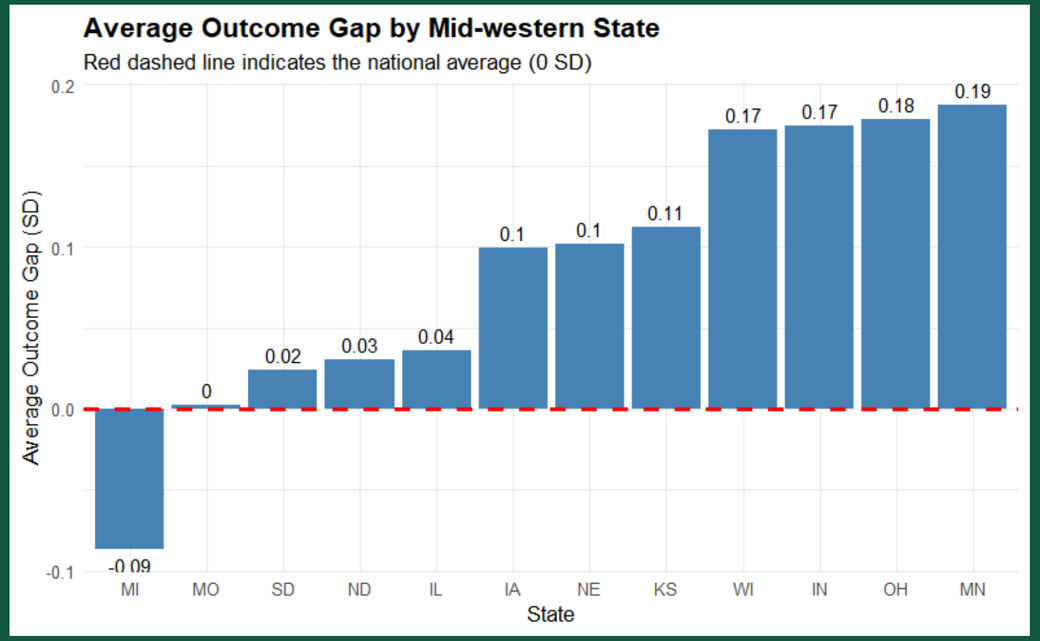
Best Model: Random Forest (80.7% accuracy)
AUC: 0.8858784
Sensitivity: 0.7241
Specificity: 0.8553 (despite more being above)
Balanced Accuracy: 0.7897

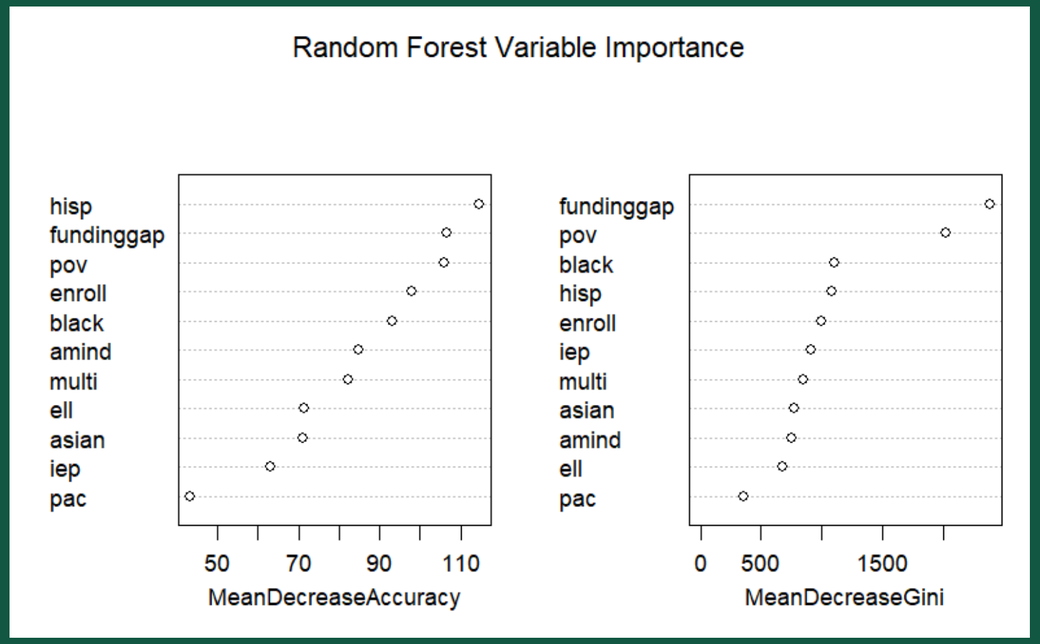
02

Top Predictors/Classifiers:
Funding Gap, Poverty, % Black and % Hispanic
Bottom predictors/Classifiers:
% Pacific Islander/Hawaii, % English Learner

03

Key takeaway:
Socioeconomic factors and the percent of more commonly marginalized groups appear to have the most impact.

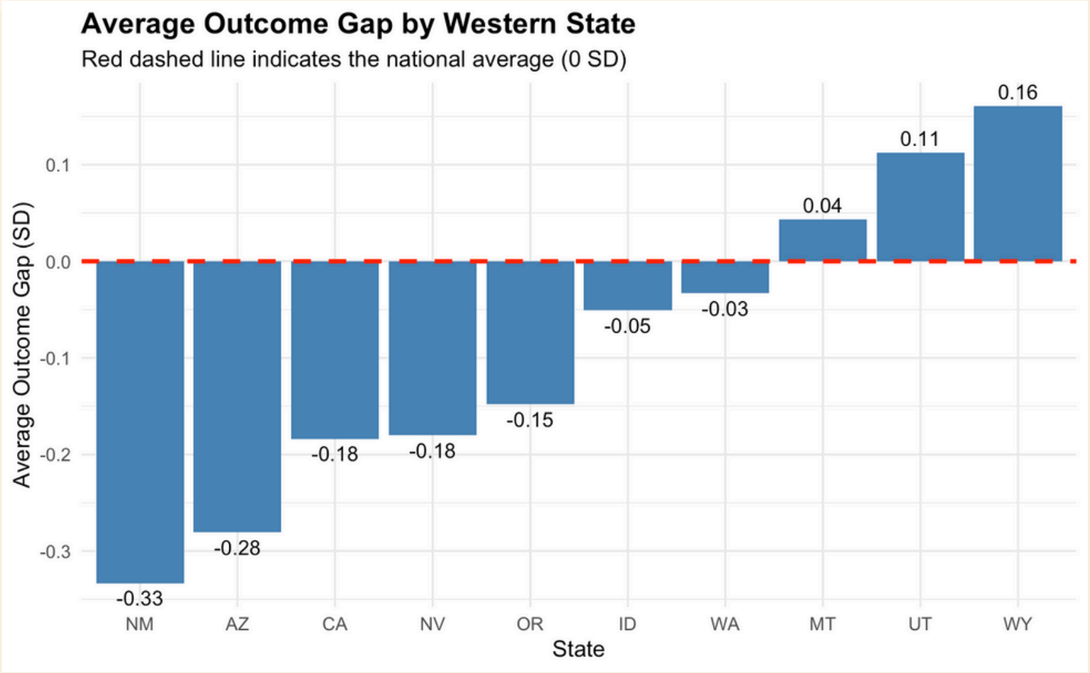


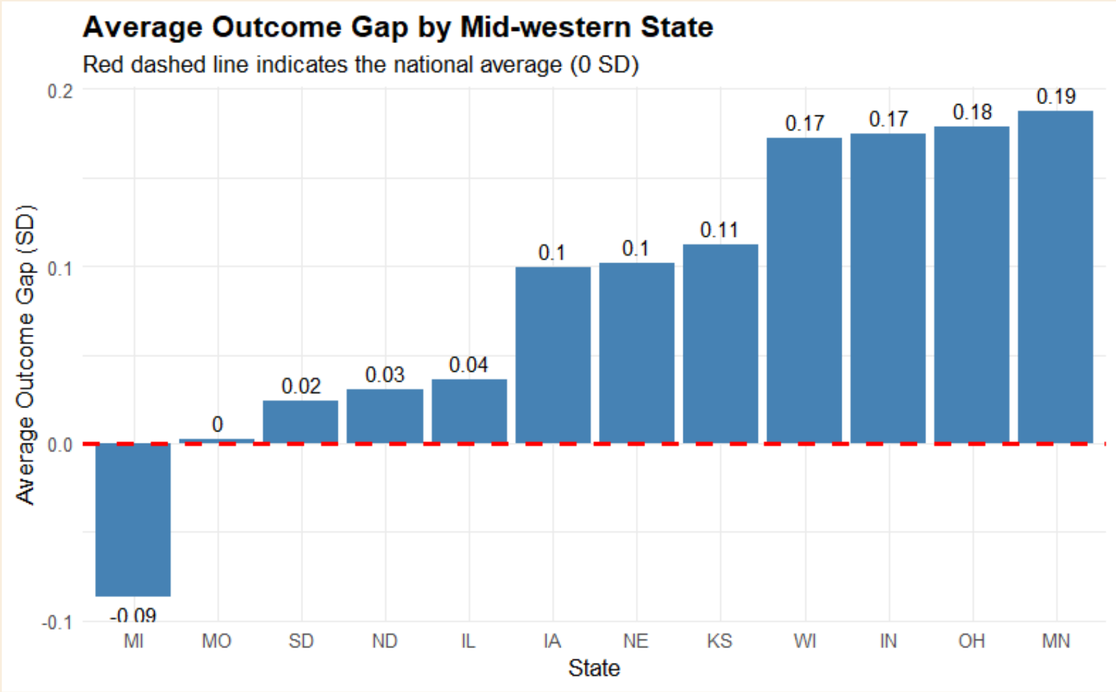


REGIONAL SYNTHESIS

- **Common Patterns**:
  - **Poverty and Funding Gap** consistently predict outcomes.
  - **Random Forest** outperforms other models in all regions.
- **Differences**:
  - Demographic weight varies by region (e.g., race in South/Northeast)
  - Quantity of States above or below the national average.

Model sensitivity differs - Midwest strongest at identifying underperformance.





POLICY AND ECONOMIC IMPLICATIONS

Phone

text