Project #1

James Sobrino

Problem Statement

Standardized test scores have been used to determine college placement as well as a metric for teaching outcomes. This project aims to identify any trends with education spending per pupil, and SAT/ACT scores using U.S. census data.

Background

For this project I used: US census data 2019 Public Elementary-Secondary Education Finance Data, 2019 SAT data provided, and 2019 ACT data provided.

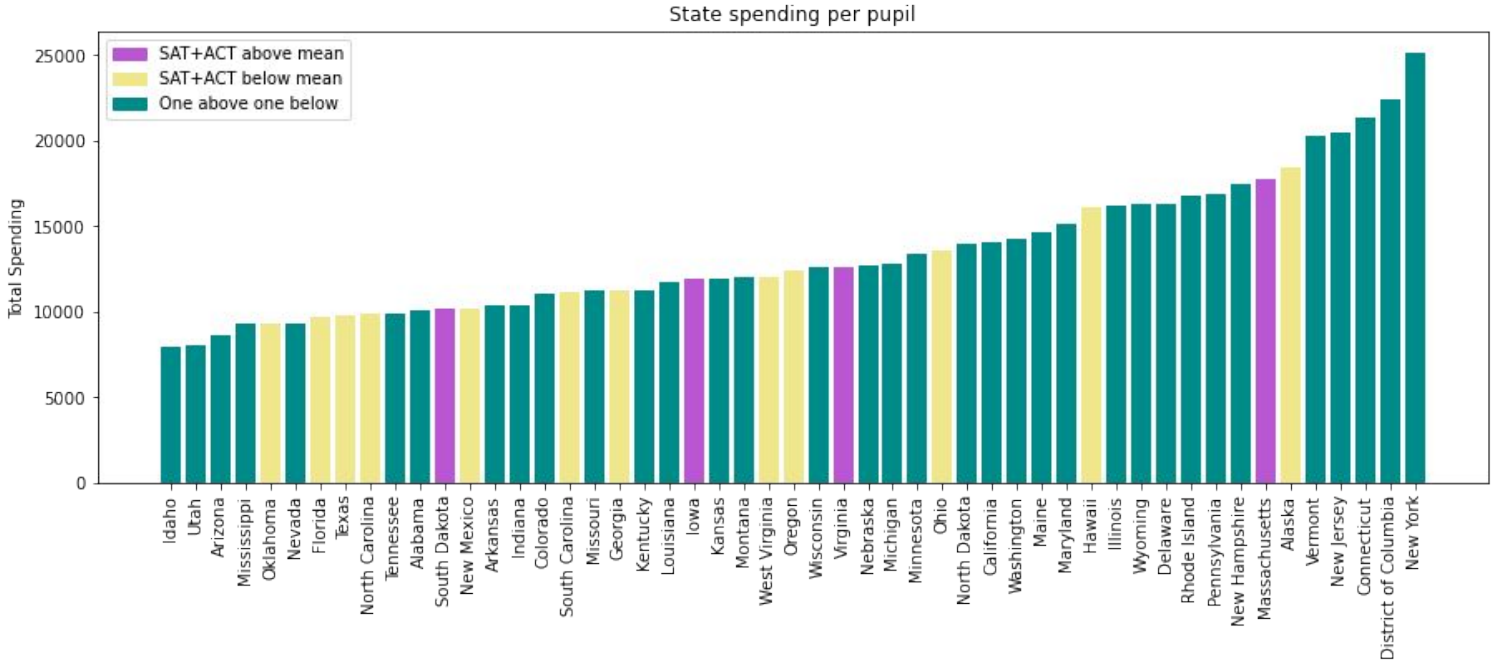
The SAT average mean score for states was 1113.0

The ACT average mean score for states was 21.46

The average state spending per pupil was $13381.18

New York was an outlier in spending: $25139.00 per pupil.

There were no significant trends comparing school spending per pupil to SAT/ACT scores. There were some states that spent much less per pupil compared to others and were able to mirror or surpass the results of states that spent more. Instead, test participation rate was a stronger predictor of state mean scores.

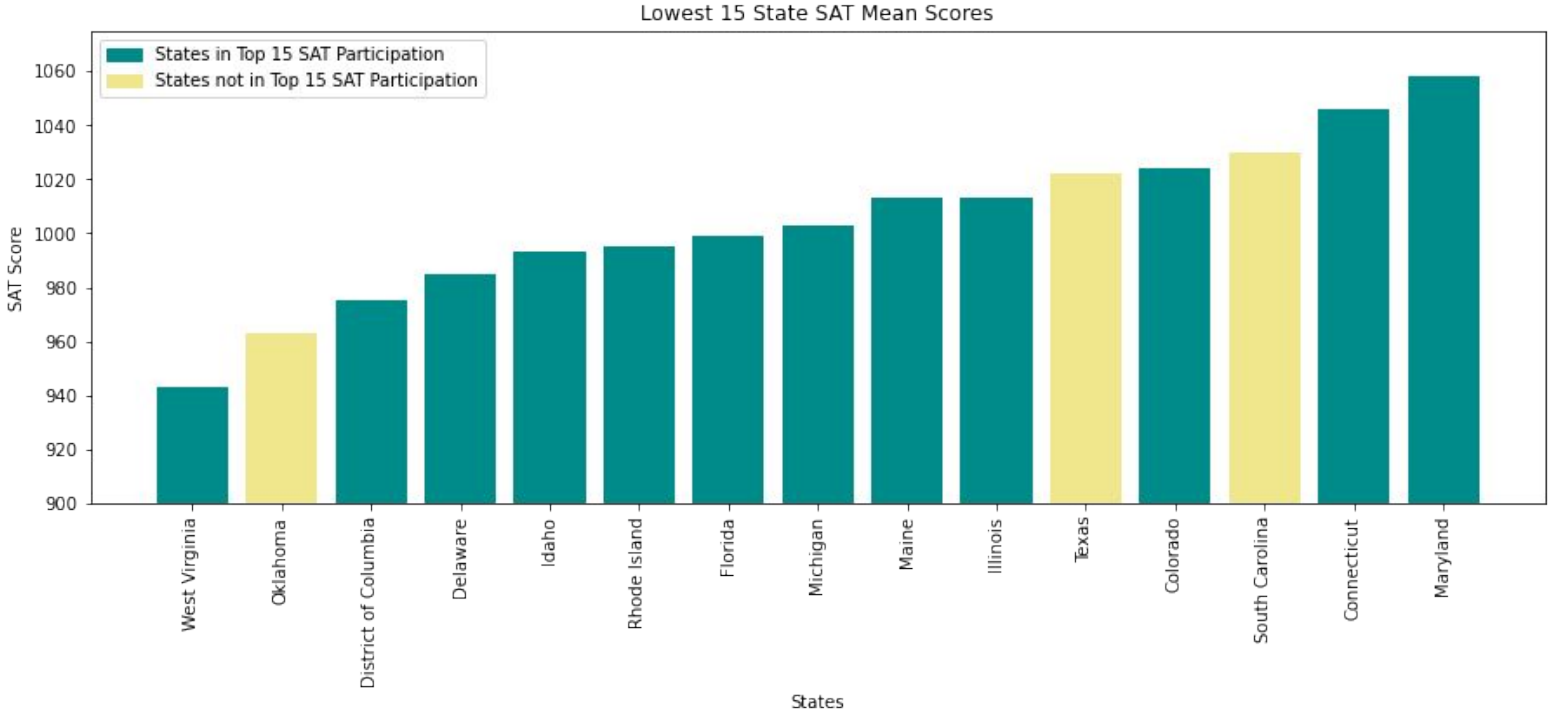


State Spending

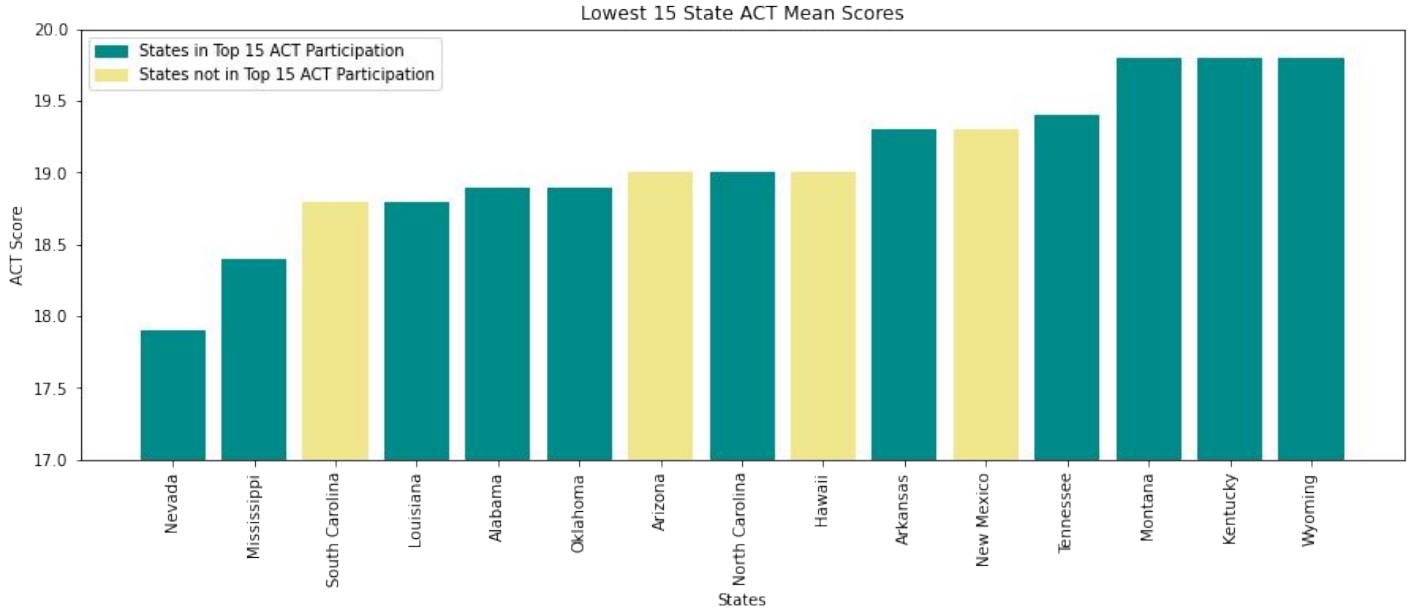
Only 1 state that was in the top 10 of spending per pupil scored above the mean on both tests, Massachusetts. Additionally only 4 states scored above the mean on both tests: Iowa, Massachusetts, South Dakota, and Virginia.

None of these states had 100% participation for either test. For these states, the mean score for the test with the higher participation rate was closer to the test mean than the other test. For example: Virginia had an SAT participation rate of .68 and a mean score of 1119, SAT total mean: 1113.0, and an ACT participation rate of .21 and a mean score of 24.0 ACT total mean: 21.46

The best predictor for whether a state scored below the mean was their participation rate. States that had 100% participation rate for a test tended to score very low.



My hypothesis for this observation: States with mandatory participation add testees to their testing population who are not college aspiring. As a result, these states dilute their testing population with students who either do not care about the results of the test, or who are not as well prepared for the test compared to states who do not have mandatory participation.



Some states stood out more in terms of bad results compared to other states.

Alaska: Spent the 6th most out of all states per pupil. Both SAT/ACT scores were below the mean, and neither test had above 50% participation rate.

SAT: 1097 Participation Rate: .41

ACT: 20.1 Participation Rate: 20.1

Oklahoma: Spent the 5th least per pupil compared to other states. Both SAT/ACT scores were below the mean in the 2nd standard deviation of scores compared to all 50 states. Out of all outcomes, this was the most concerning.

SAT: 963 Participation Rate: .22

ACT: 18.9 Participation rate: 1

Florida- Spent the 7th least per pupil. Scored below the mean in the 2nd standard deviation of scores for the SAT. Scored below the mean within the 1st standard deviation of scores for the ACT.

SAT: 999 Participation Rate: 1

ACT: 20.1 Participation Rate: .54

Texas- Spent 8th least per pupil. Scored below the mean on the SAT and was on the cusp of falling into the 2nd standard deviation of scores. ACT score was below the mean as well.

SAT: 1022 Participation Rate: .68

ACT: 20.5 Participation Rate: .39

North Carolina- Spent the 9th least per pupil. Scored just below the mean SAT score. ACT participation was 100% and scored below the mean in the 2nd standard deviation.

SAT: 1100 Participation Rate: .51

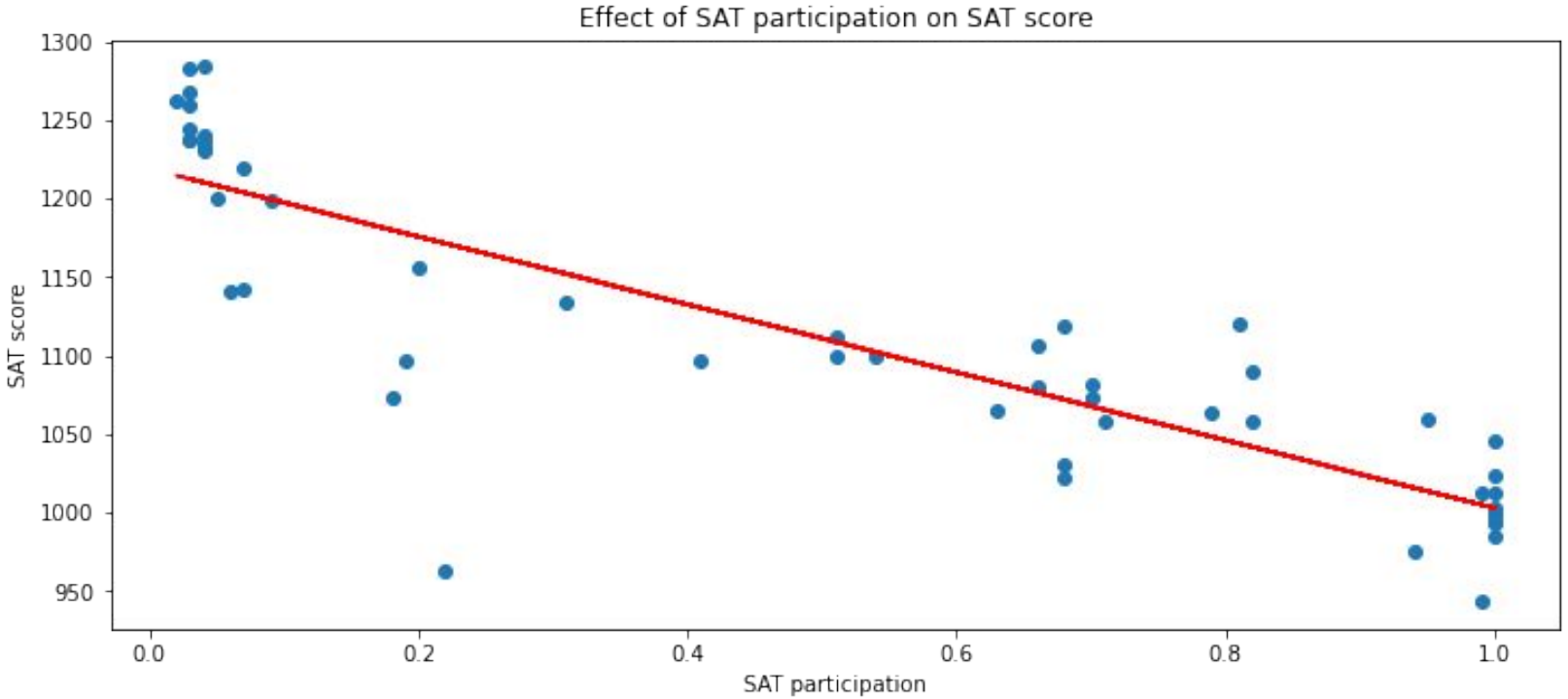
ACT: 19 Participation Rate: 1

Recommendations

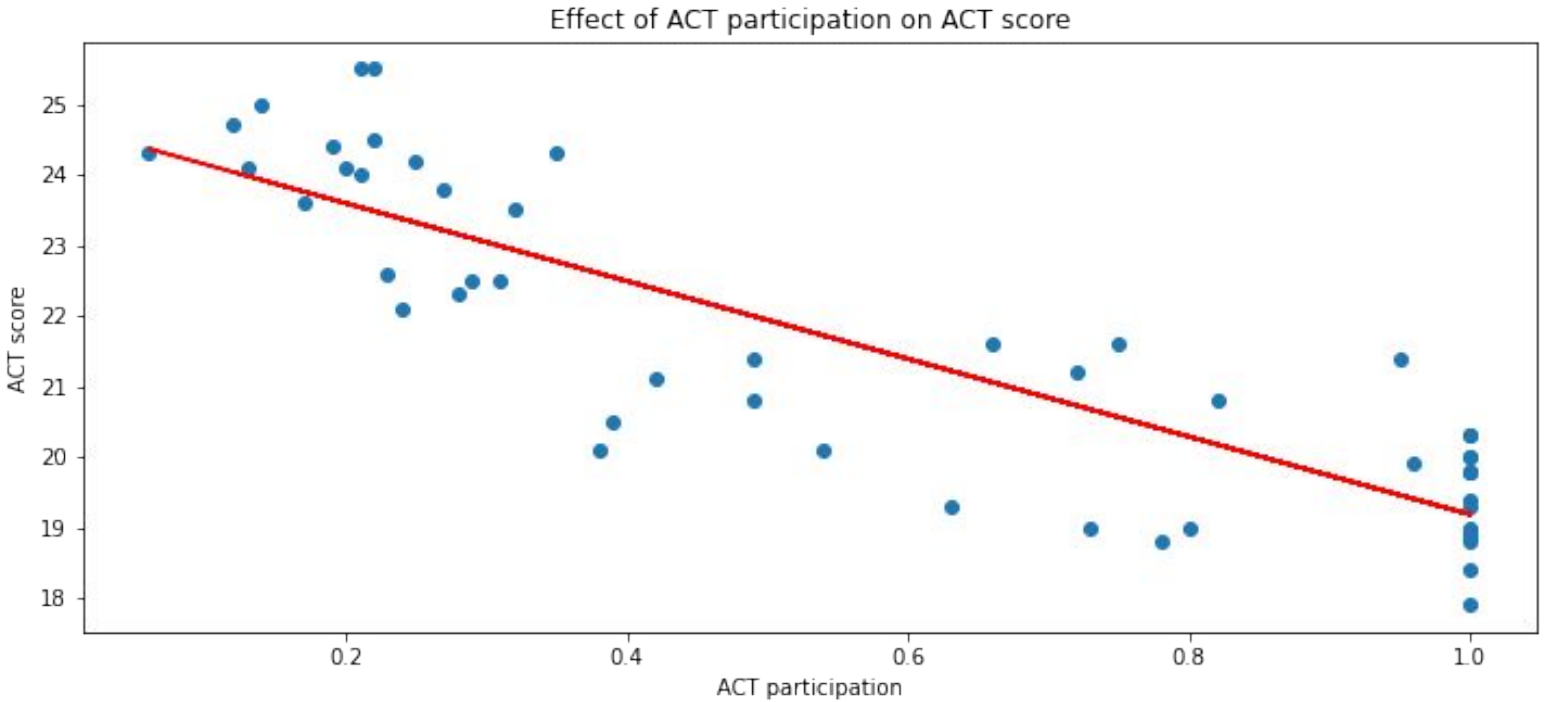
Additional analysis focusing on the 4 states performing above average to discern why they over perform on both tests could provide insight into increasing test scores.

Possible explanations are better allocation of funds, state policies, or teaching curriculum. There is also the possibility of random chance that these schools have performed better compared to other states.

I recommend to not have mandatory testing. The graph below shows how states with lower participation rates tend to have higher scores.



States that use ACT or SAT to track student outcomes are negatively effecting their state test scores. Other metrics can be used instead, for example California uses the CAHSEE test to measure student success rates.



Conclusion:

For states with high participation rates as a result of using these tests as a measure for student success, investing into an high school exit exam like california could increase test scores.

If your state is Oklahoma, you should audit your education system. While you spend very little on education, you are not producing the same results as a comparable state spender such as Utah. Your SAT test scores are shockingly low for a state with very low participation.