

SAT Analysis

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Problem Statement

Having been hired by a collection of university admissions to find out if the SAT is truly a fair way to measure if a student is ready for college, I've been assigned the role to find out if wealth and SAT scores have any correlation or if it's all just speculation.



What Data will we be using?



We will take a look at a variety of dataset sources such as college board themselves, statista, large Data projects collected from schools, and the government's reportings in order to extract

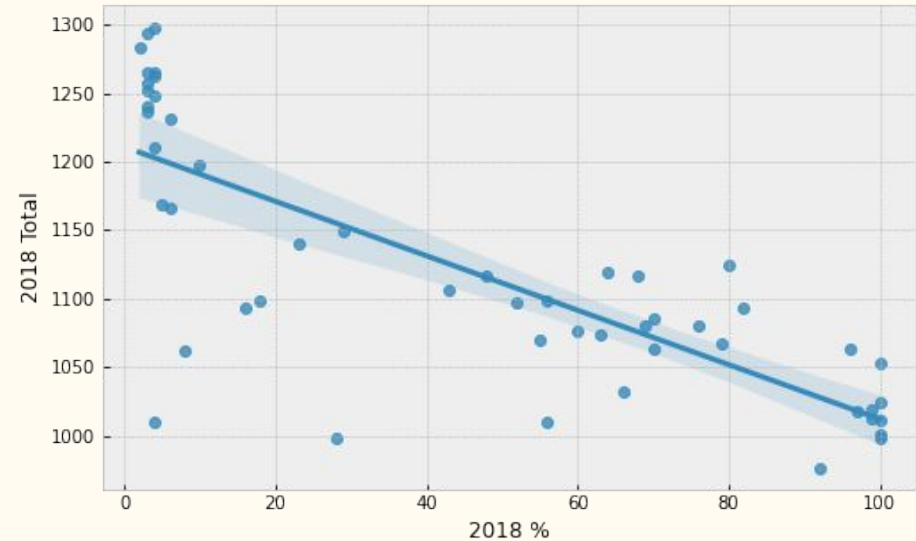
- Total scores based on financial standings.
- Participation rates based on family wealth.
- Average state test scores.
- State ranks based on Per Capita Income.
- Participation rates per state.

Total Score vs State Participation

Total Score VS State Participation 2017



Total Score VS State Participation 2018



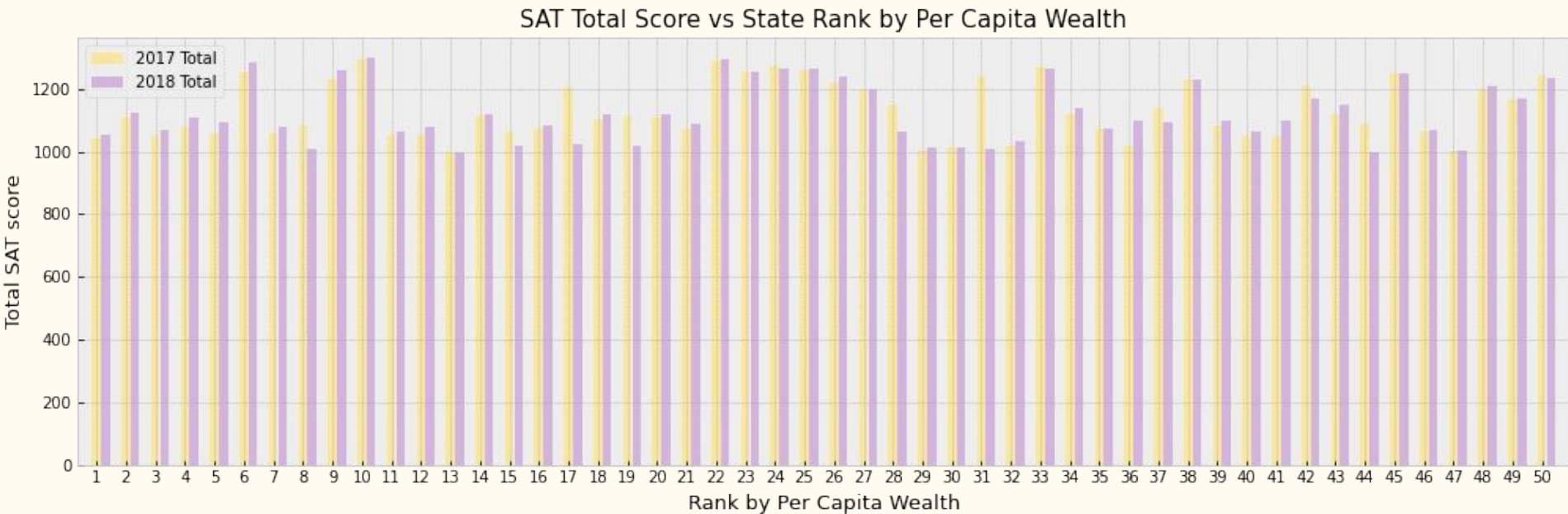
Observations:

1. The states that did well ALL have a lower participation rate.
2. Overall, the lower the percentage of people taking the SAT, the higher the average score for the State.
3. The trend might be due to the fact that the ones who take it voluntarily will have studied for it vs just another forced standardized test.
 - Keep in mind that while there is a trend between higher scores and lower participation rate, a low participation rate does not ensure a high total score.

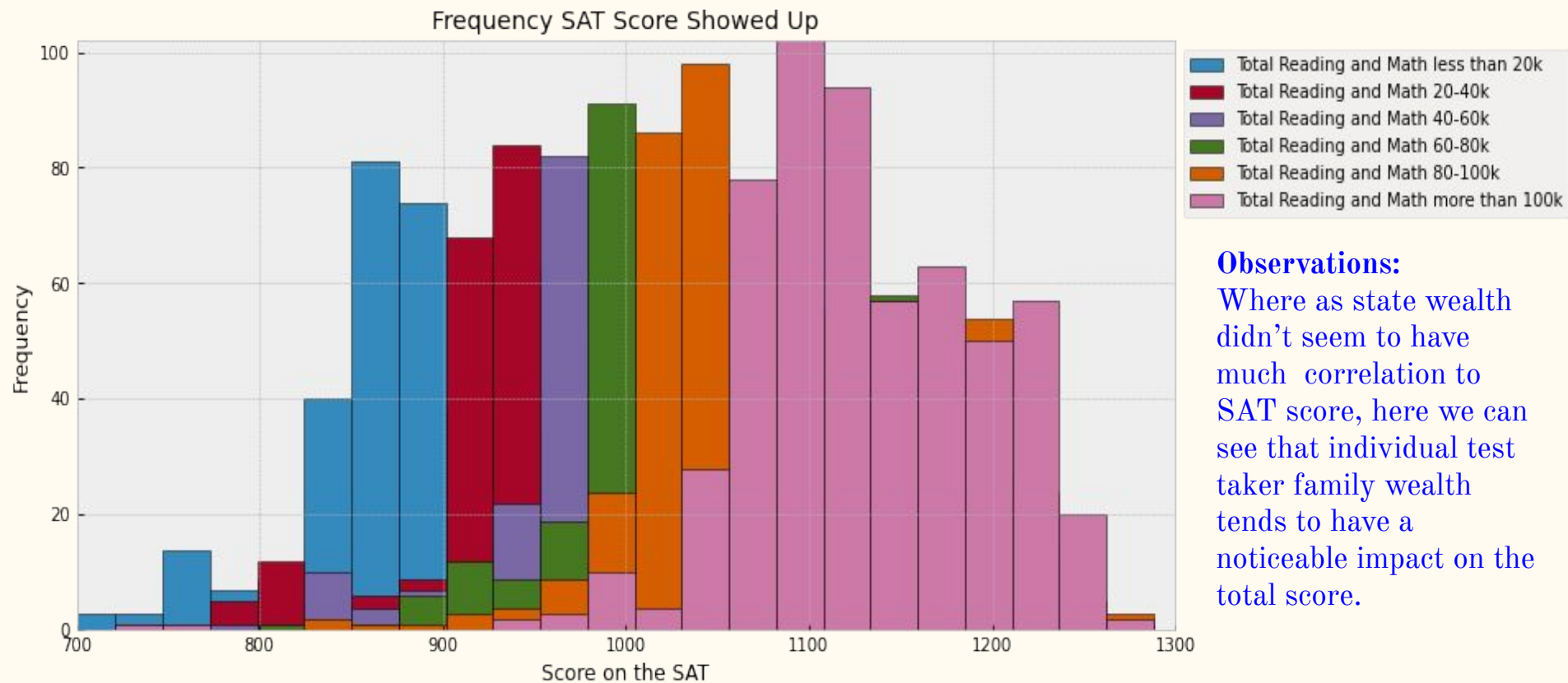
SAT By State Rank in wealth

Observations:

This graph of scores based on the rank of the State (1 being wealthiest) seems to give the impression that wealth doesn't play as big a part in Total test scores as first suspected.



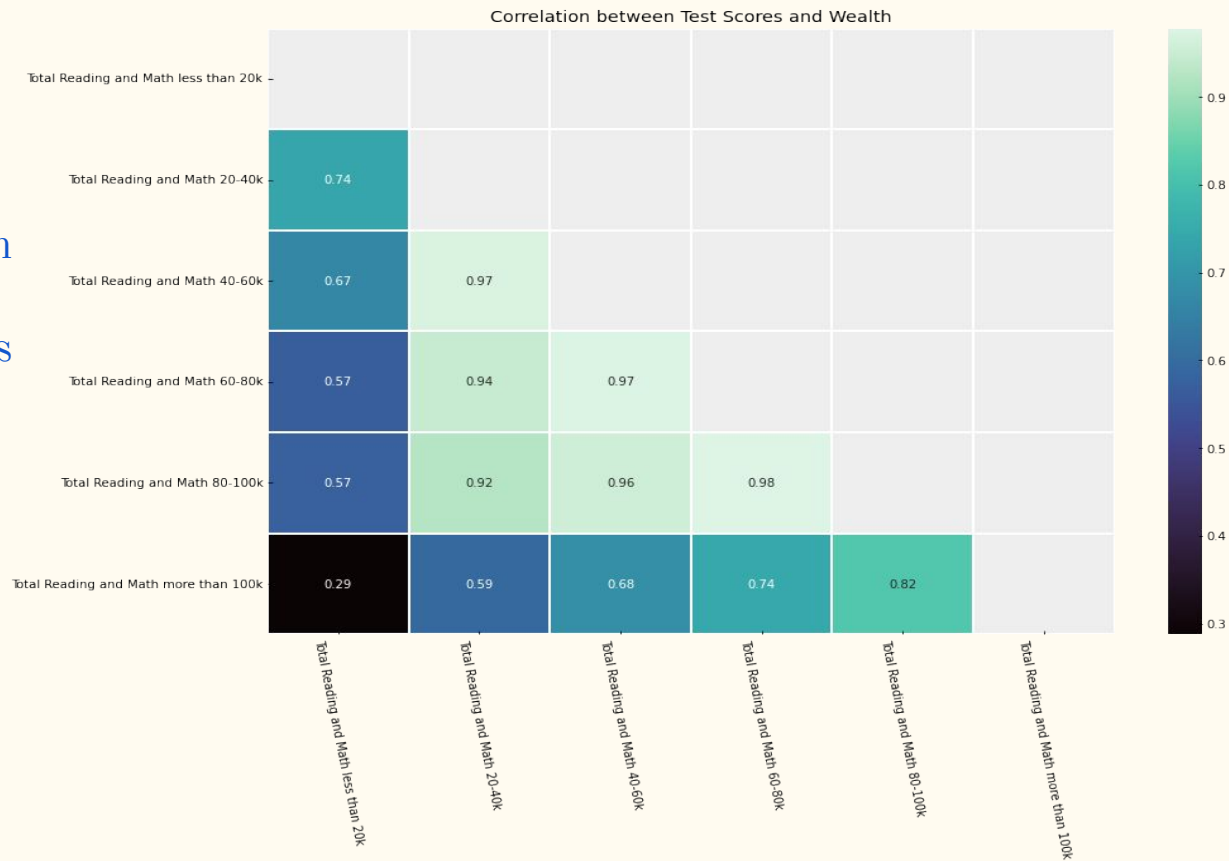
Histogram of SAT Score Colored by Wealth



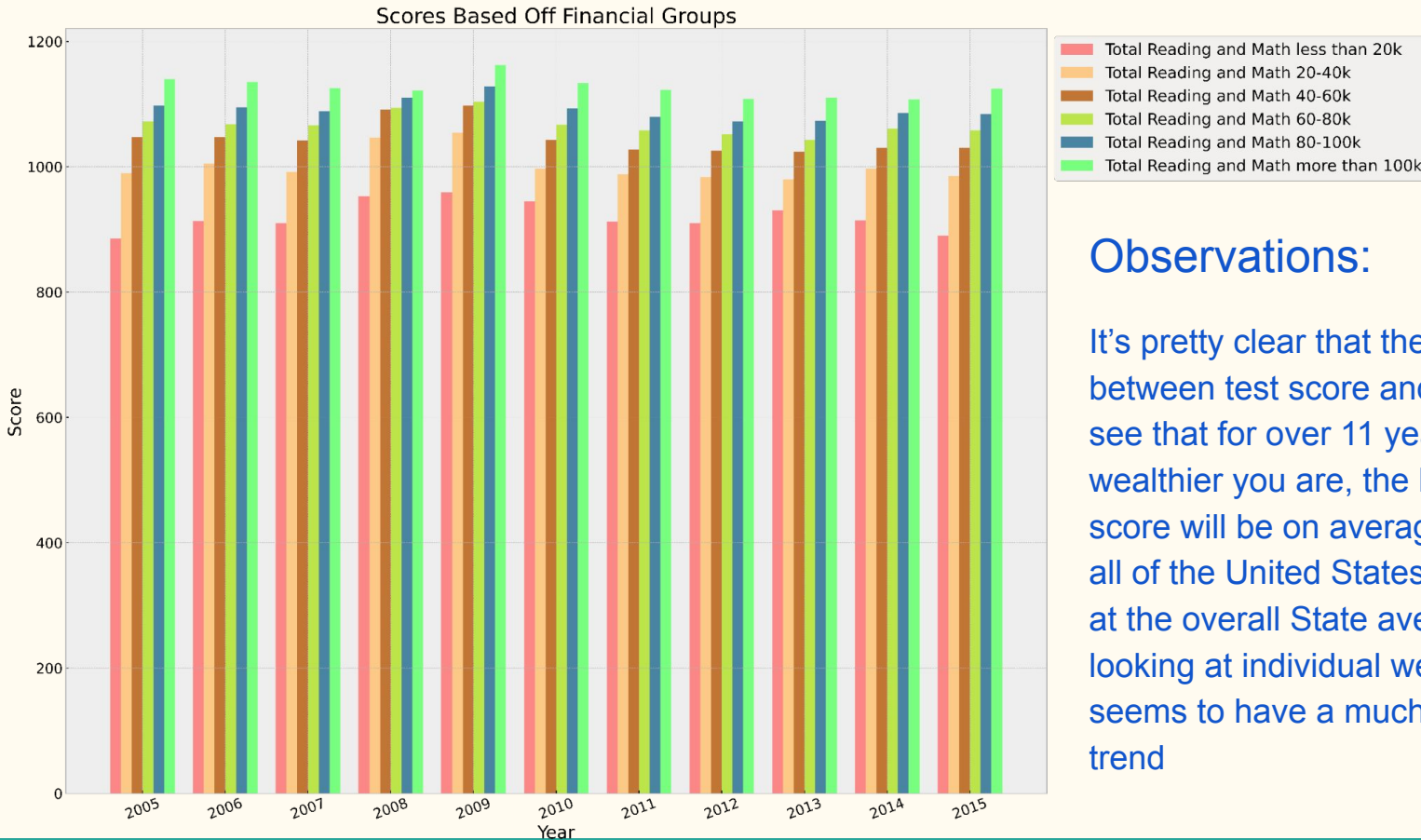
Histogram of SAT Score Colored by Wealth

Observations:

As the wealth brackets closer to each other (either left to right or upwards) we see that the correlation between each wealth group gets closer to 1. This further strengthens our assumption from the histogram in the previous slide, with the wealthiest and least wealthy group having a correlation of almost 0.



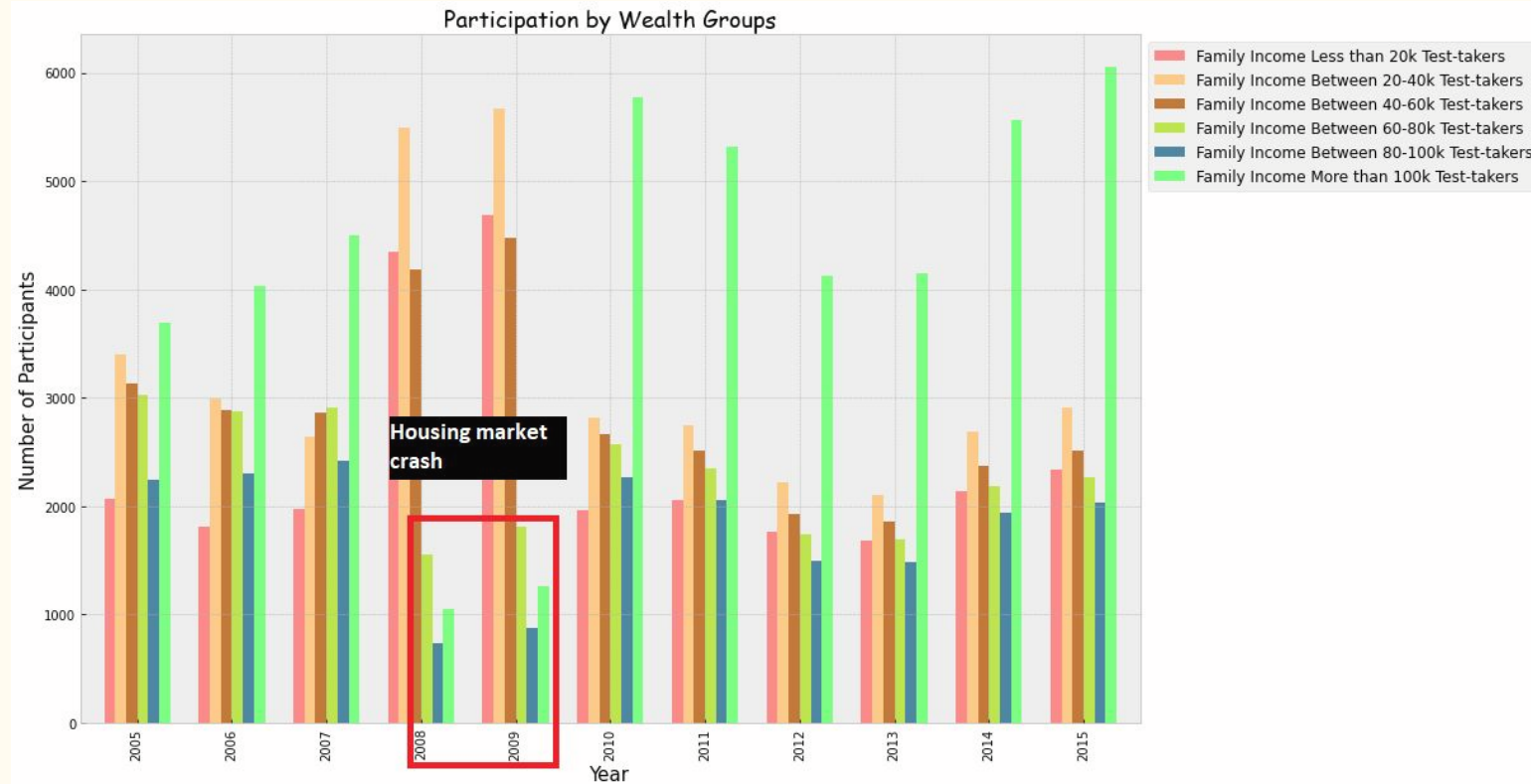
Total SAT Test Scores Separated by Wealth



Observations:

It's pretty clear that there is a correlation between test score and wealth. We can see that for over 11 years straight, the wealthier you are, the better your SAT score will be on average. This is for across all of the United States. Instead of looking at the overall State average, it seems that looking at individual wealth taking the test seems to have a much more prominent trend

Participation Rates by Wealth



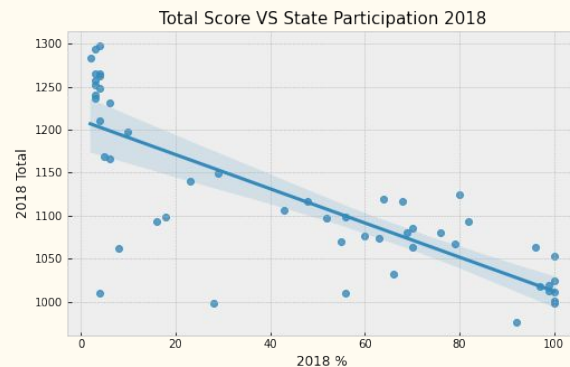
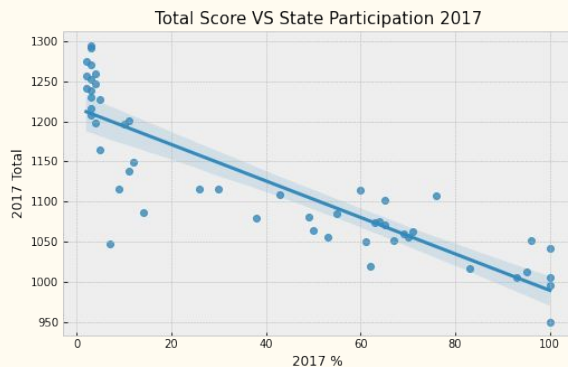
Observations:

Regardless of who has the most number of participants, the trend for all 11 years are the same. The surprising factor is that there are usually more of the wealthiest group participating in the SAT, yet instead of a having a lower average because the more people there are the more likely you are to have bad scores to bring the average down, they always score on top.

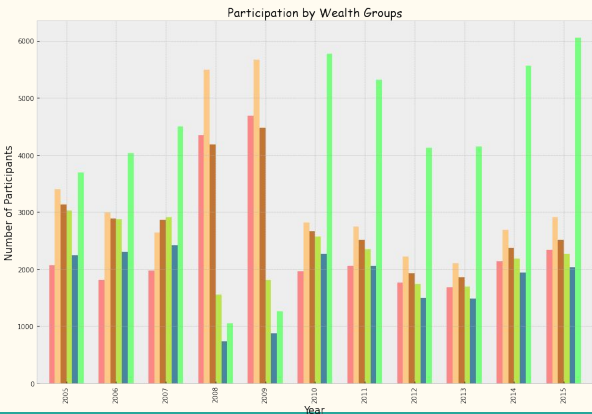
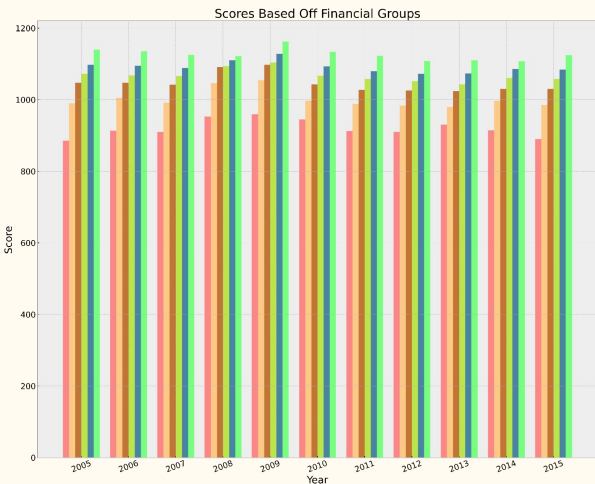
Conclusion

As seen from the scatter plot, The average trend is the higher the state participation, the lower the average SAT score the state will have, mostly likely due from a lot of students just treating the SAT like any other state mandated test and not efficiently studying for it.

Mini version of plot map from above for reference



Mini version of plot map from
above for reference



Conclusions

Regardless of the participations of each wealth group, the trend that the wealthier you are, the higher the average score, was consistent for all 11 years between 2005 and 2015. This shows that more than participation, wealth status of the test takers family has a greater impact on score than participation by group does.



I recommend!

1. Don't force people to take the SAT as the trend line shows scores drop with higher State participation.
2. Have an elective class in high school that will prepare the students specifically just for the SAT.
3. Make the test free for those who score below 1150 (example number).
 - Not only will this make college board more likely to push students and provide cheaper or even free materials in order to have a better pay in long run by having more people hit the target score, but those who are less fortunate can take the test multiple times getting a feel for it in a real test environment that they might not have been able to receive before.
4. Get rid of the SAT as a whole
 - This option might be unrealistic at the moment because it will most likely just be replaced with another standardized test that will end up having similar issues, but one that can be worked towards by having Colleges and Universities only look at the student's high school transcripts and extra curriculars with no additional testing.

Sources

1. 2017 SAT dataset
 - a. <https://blog.collegevine.com/here-are-the-average-sat-scores-by-state>
2. 2018 SAT dataset
 - a. <https://reports.collegeboard.org/archive/sat-suite-program-results/2018/state-results>
3. Capita Wealth dataset
 - a. <https://apps.bea.gov/regional/downloadzip.cfm>
4. School scores and more dataset
 - a. https://corgis-edu.github.io/corgis/csv/school_scores/
5. Income distribution dataset
 - a. <https://www.statista.com/statistics/203183/percentage-distribution-of-household-income-in-the-us/>

