SAT & ACT Analysis (2017-2018)

General Assembly - Data Science Immersive

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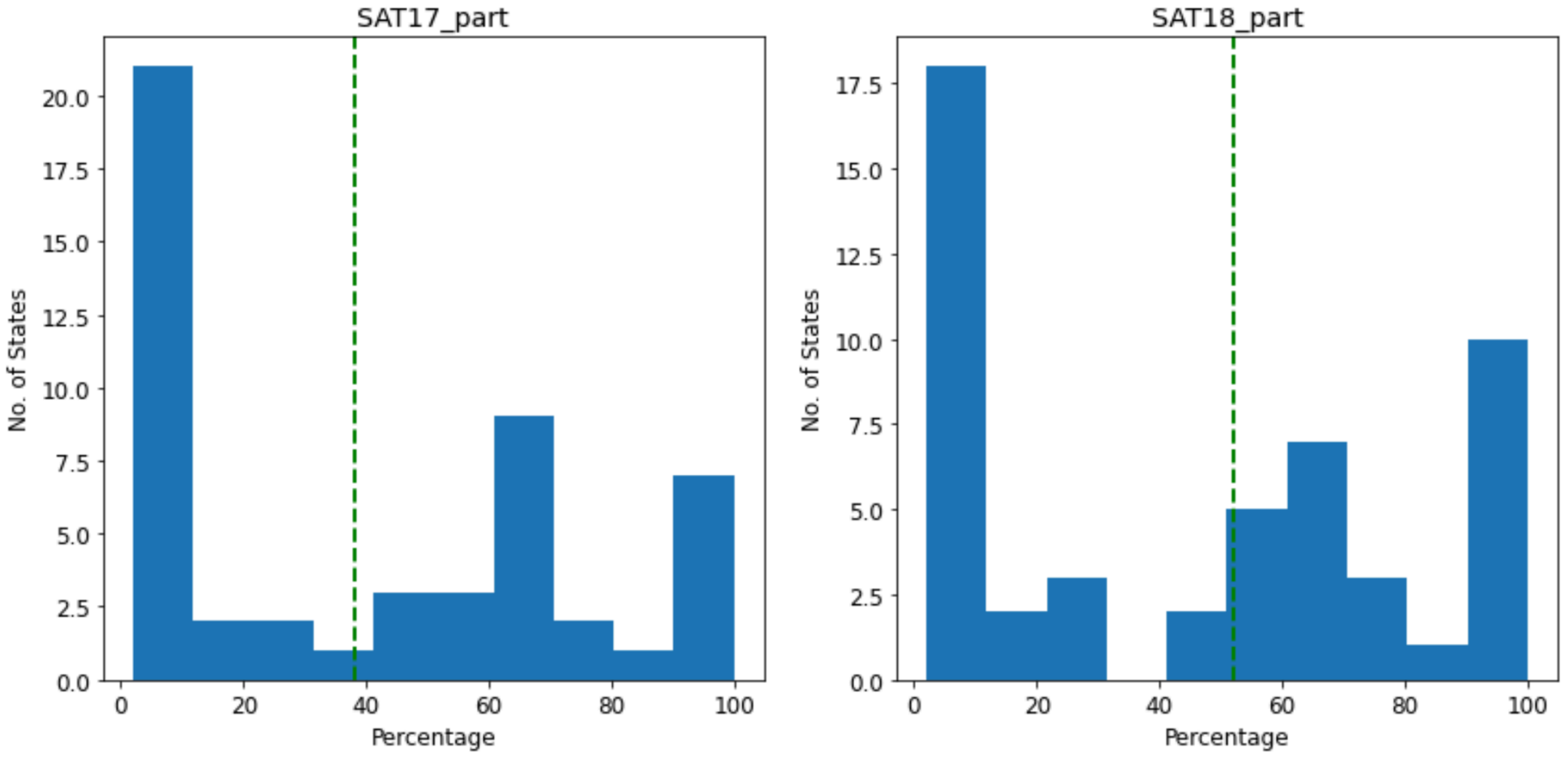
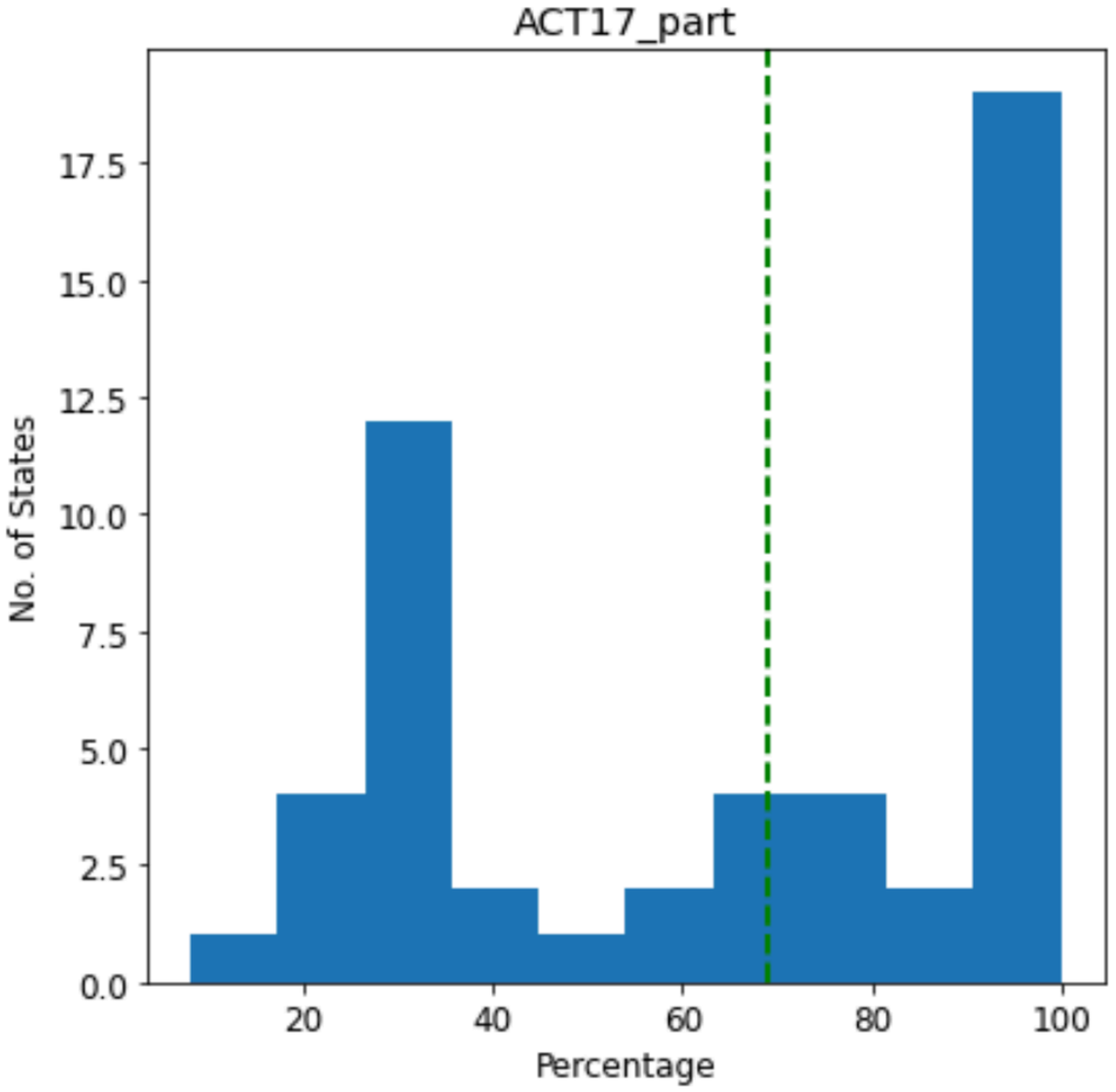
The Problem Statement:

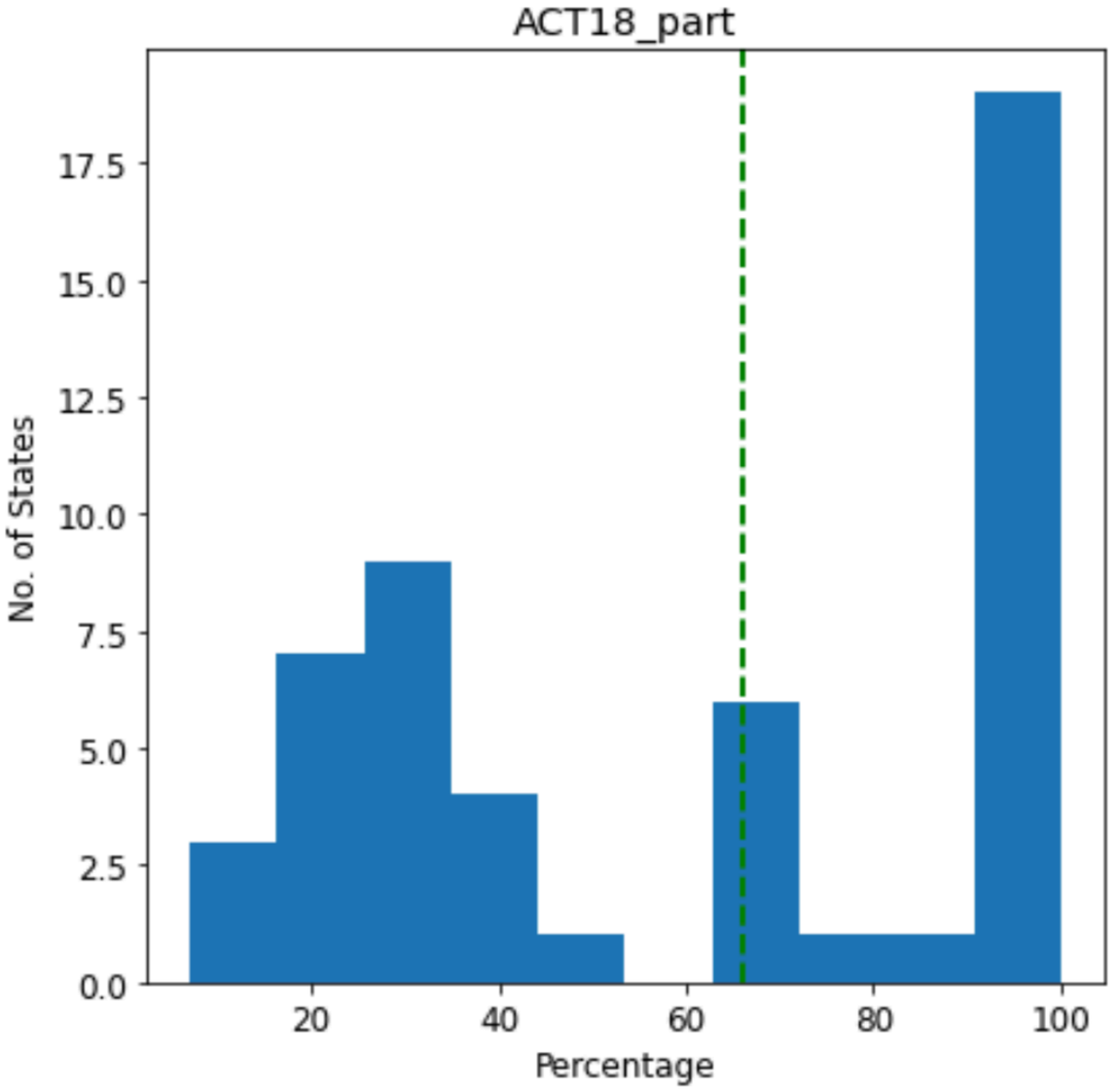
The SAT and ACT are two popular college entrance tests in the United States, and the participation rates for both tests are some of the top concerns that educational boards often grapple with.

In this project, we aim to study the 2017 and 2018 data on both tests to have a better understanding of what most affects their participation rates. Based on our analysis and research we will then provide subtantiated recommendations on what educational policies can best improve participation rates in the entrance tests.

Analysis: Participation

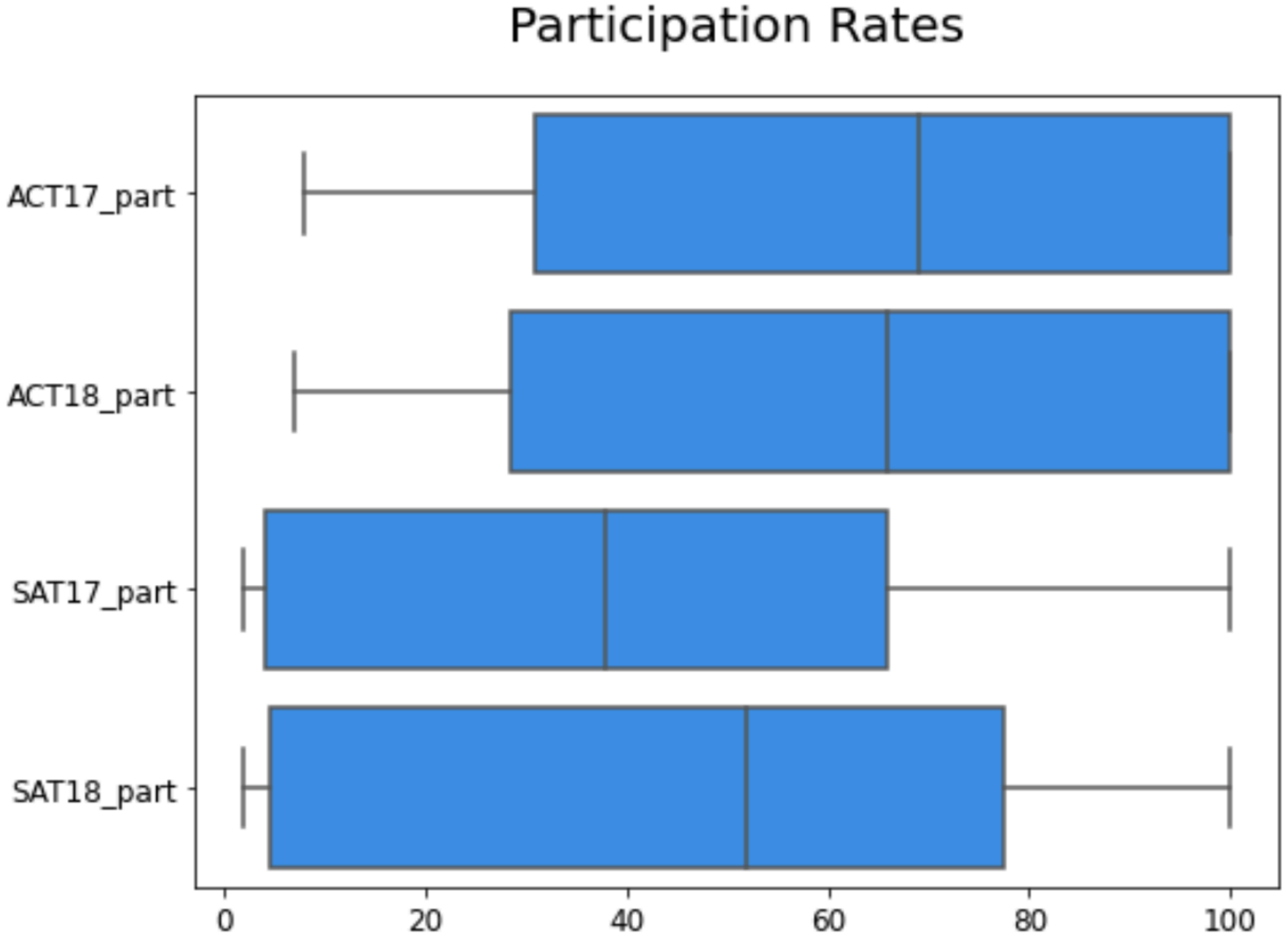

Participation Rates for ACT and SAT
SAT17_part
SAT18_part
No. of States
Percentage
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
0
20
40
60
80
100


ACT17_part
No. of States
Percentage
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20
40
60
80
100


ACT18_part
No. of States
Percentage
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20
40
60
80
100

Take-Away

- Participation seems to be very extreme to the left and right. We can see that the most of the bars are pretty far from the median line.
- However, ACT does seem to have a higher proportion of states with very high participation (70-100%).
- This is in contrast with the SAT's, which have a high proportion of states with 0-20% participation.
- This boxplot clearly shows that participation for ACT seems to be better than for SAT.


Participation Rates
ACT17_part
ACT18_part
SAT17_part
SAT18_part
0
20
40
60
80
100

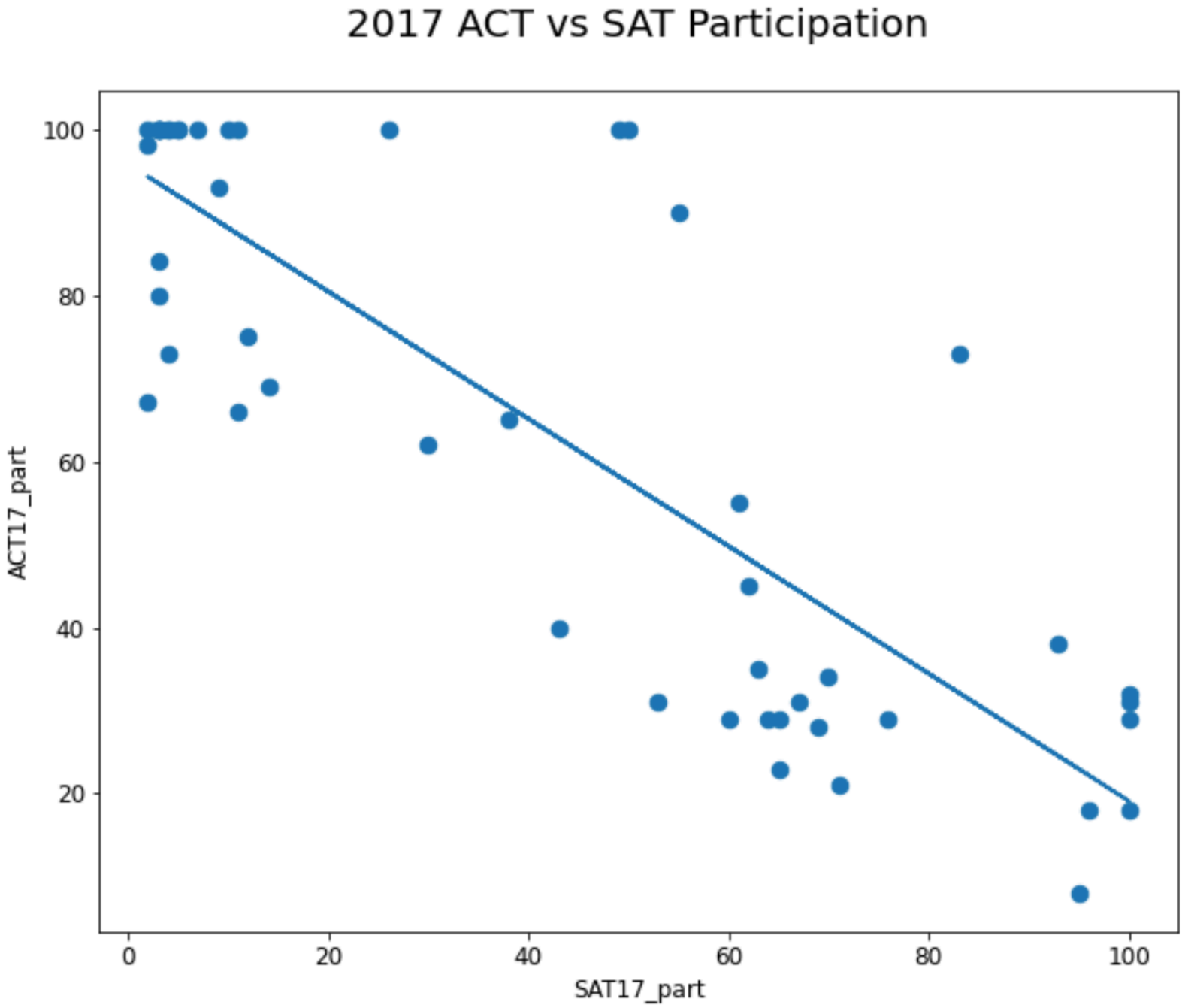
Take-Away

- This boxplot clearly shows that participation for ACT seems to be better than for SAT.
- The upper quartile for ACT Participation is at 100%, while the lower quartile for SAT Participation is close to 0%.

Further Analysis: Participation

- Only 3 states with more than 50% participation in both tests.
- This suggests, again, that states seem to prioritise one test over the other.

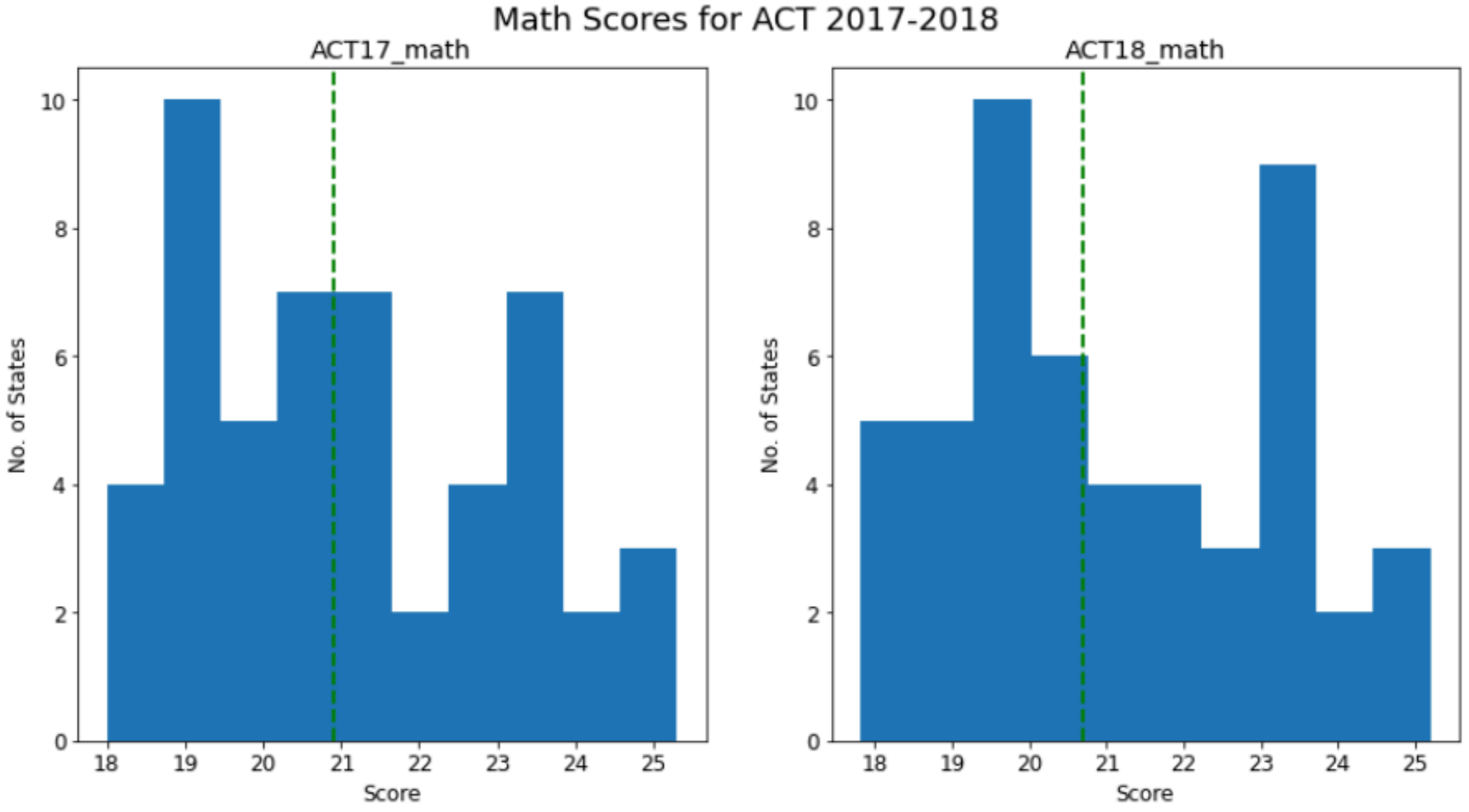
	state	ACT17_part	SAT17_part
9	Florida	73.0	83.0
10	Georgia	55.0	61.0
11	Hawaii	90.0	55.0

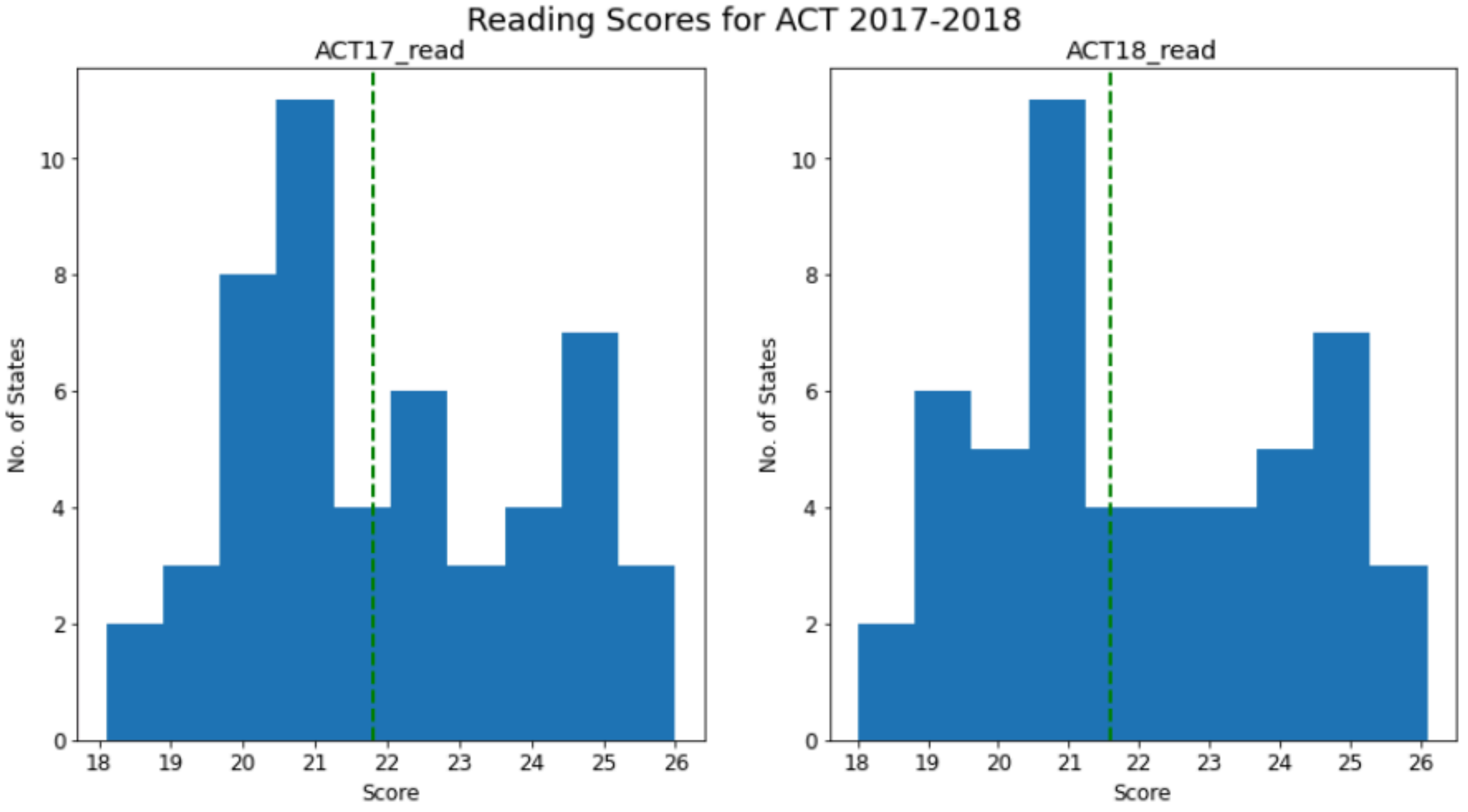

2017 ACT vs SAT Participation
ACT17_part
SAT17_part
100
80
60
40
20
0
20
40
60
80
100

Take-Away

- We can see a very strong negative correlation between the participation rate in both tests
- This makes sense as it is unlikely for a student to sit for both tests to qualify for a university, as most students will just pick one
- The strong negative correlation also suggests that there are strong state factors that affect a student's decision within that state to choose ACT over SAT or vice versa
- This could be due to educational policies in the different states

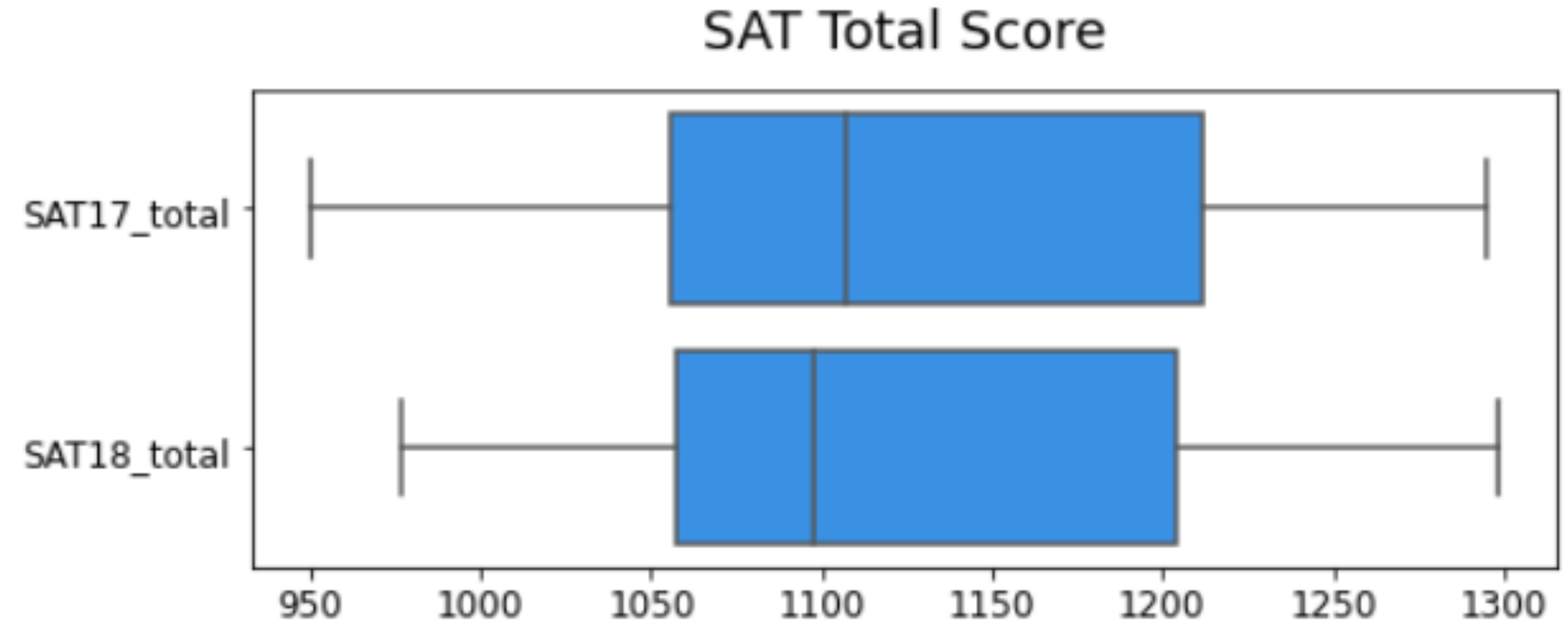
Analysis: Test Scores

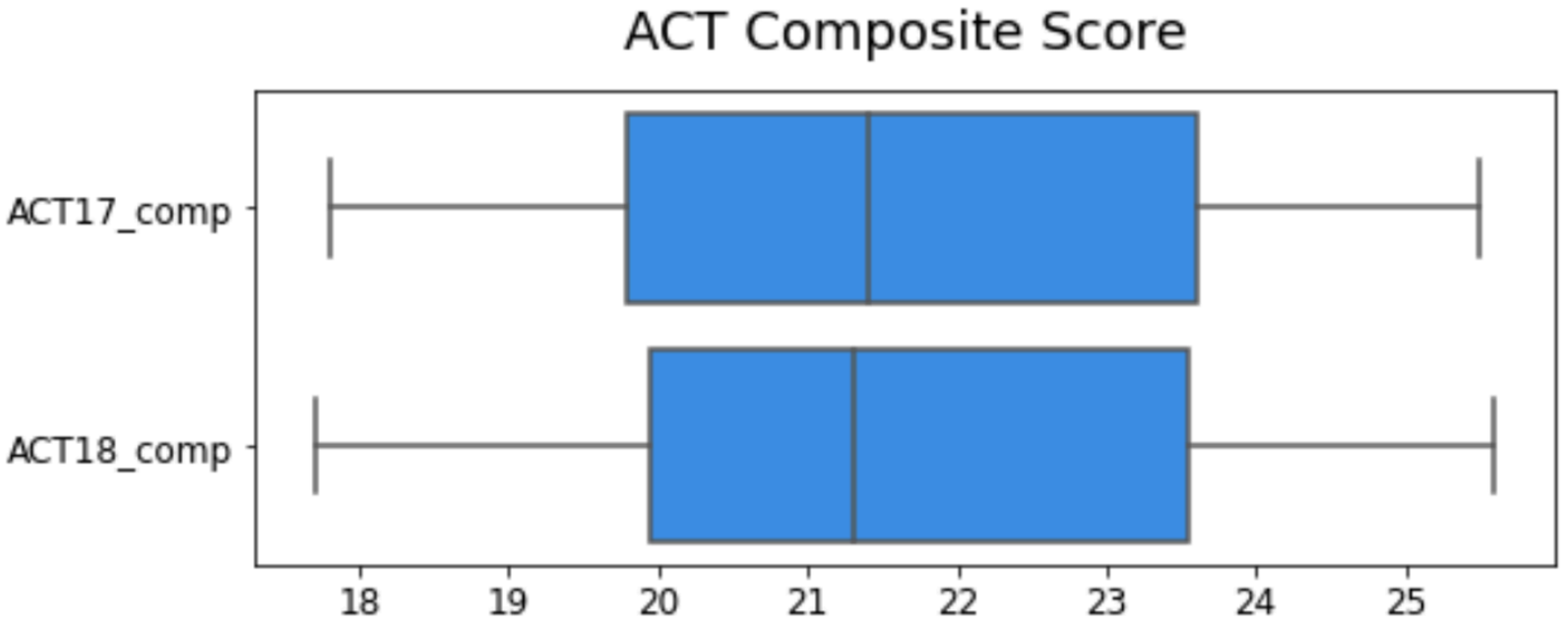

Math Scores for ACT 2017-2018
ACT17_math
ACT18_math
No. of States
Score
0
2
4
6
8
10
18
19
20
21
22
23
24
25


Reading Scores for ACT 2017-2018
ACT17_read
ACT18_read
No. of States
Score
0
2
4
6
8
10
18
19
20
21
22
23
24
25
26

Take-Away

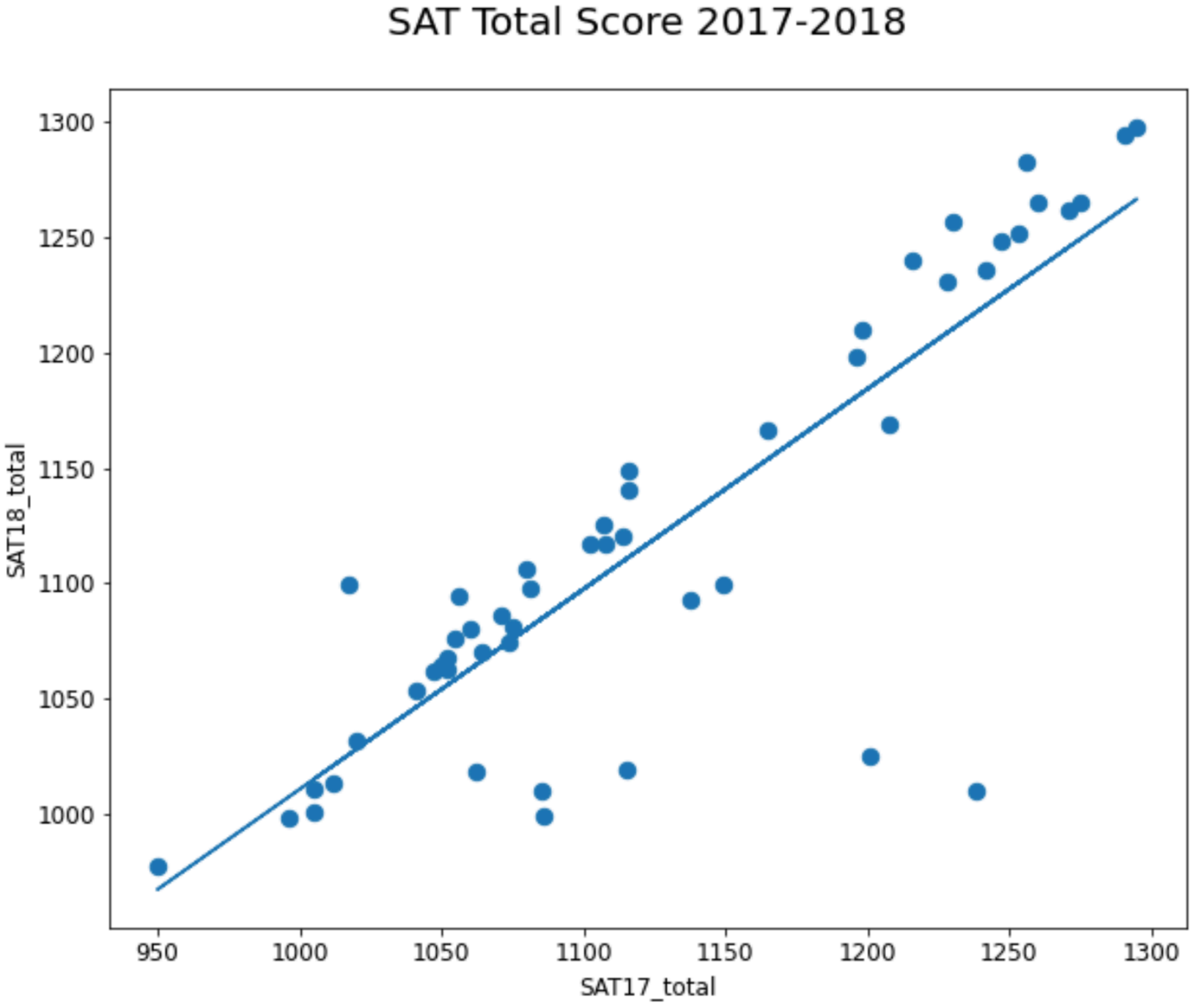
- Both reading scores and math scores are not really normally distributed
- However, the reading scores do seem to be *closer* to a Normal distribution than the math scores
- This suggests that students' aptitude in reading varies less from state to state, compared to their aptitude in math

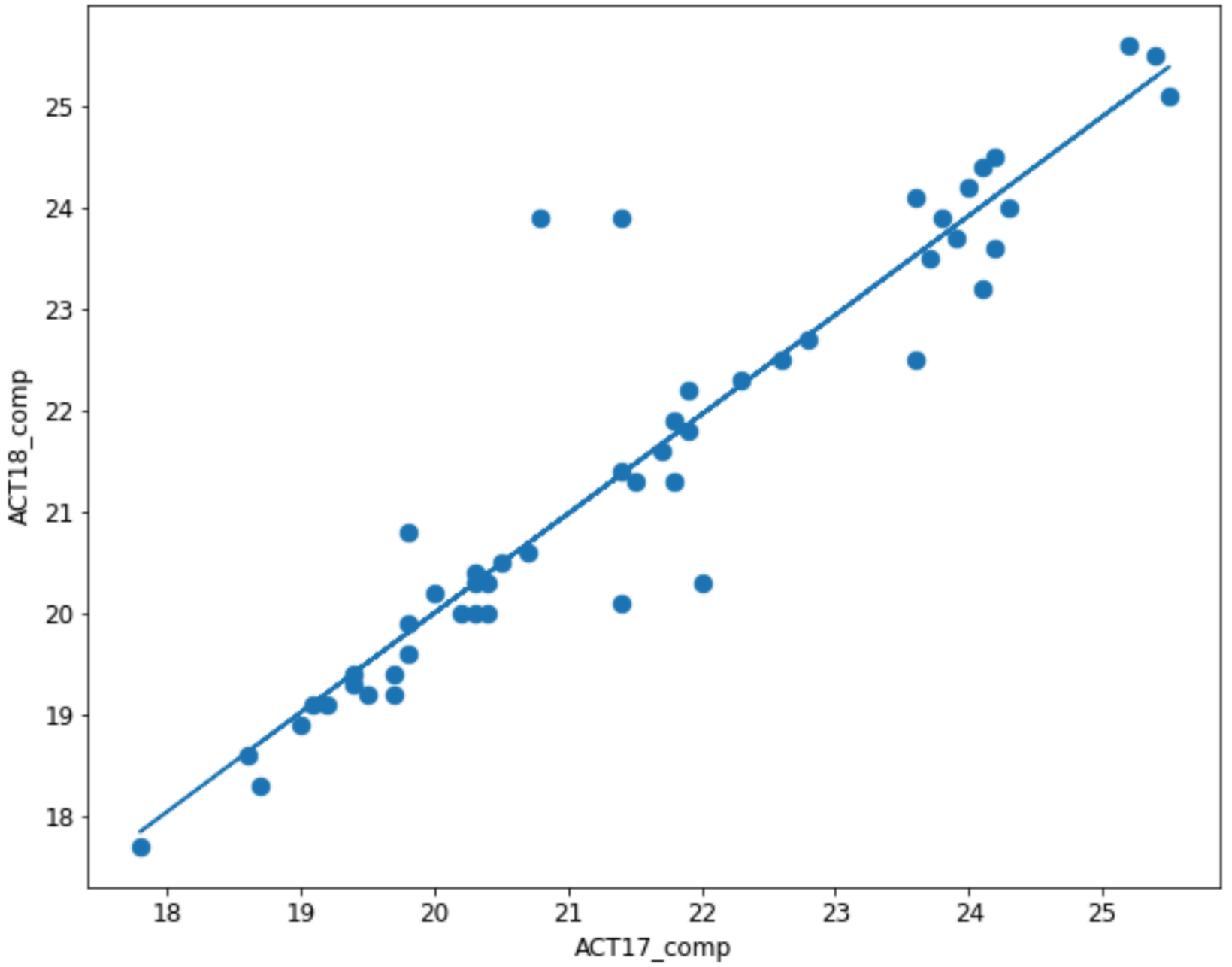

SAT Total Score
SAT17_total
SAT18_total
950
1000
1050
1100
1150
1200
1250
1300


ACT Composite Score
ACT17_comp
ACT18_comp
18
19
20
21
22
23
24
25

Take-Away

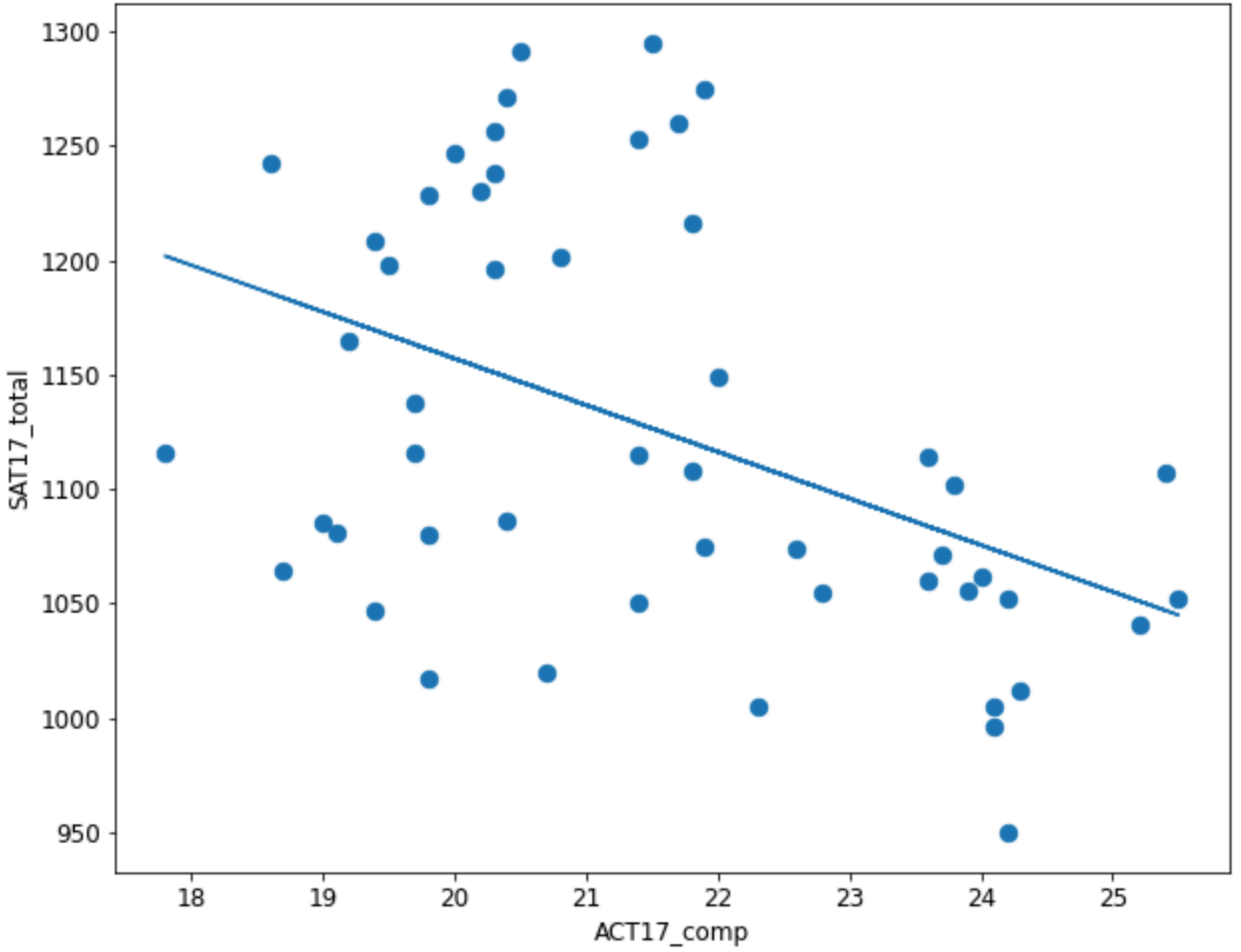
- The distribution of test scores seem pretty consistent from 2017 to 2018.
- The spread of data is not too high, and there are no outliers seen on all test scores.


SAT Total Score 2017-2018
SAT18_total
SAT17_total
1300
1250
1200
1150
1100
1050
1000
950
1000
1050
1100
1150
1200
1250
1300


ACT Composite Score 2017-2018
ACT18_comp
ACT17_comp
18
19
20
21
22
23
24
25

Take-Away

- Further evidence that test scores across the states do not differ much from year to year


ACT vs SAT Total Score 2017
SAT17_total
ACT17_comp
1300
1250
1200
1150
1100
1050
1000
950
18
19
20
21
22
23
24
25

Take-Away

- When we cross-referenced the Total/Composite Scores of the SAT and the ACT's, there was a negative correlation.
- This provides further evidence that each state favours only one of the tests, and that most students only did one of the test and not both.
- Our previous scatter plots comparing test results in the 2017-2018 SAT's and the 2017-2018 ACT's further supports this: every state performed nearly identically to how they performed in the previous years.

Additional Research

	state	SAT17_part	SAT18_part	SAT_part_change
13	Illinois	9.0	99.0	90.0
5	Colorado	11.0	100.0	89.0
39	Rhode Island	71.0	97.0	26.0
48	West Virginia	14.0	28.0	14.0
30	New Jersey	70.0	82.0	12.0

	state	ACT17_part	ACT18_part	ACT_part_change
35	Ohio	75.0	100	25.0
27	Nebraska	84.0	100	16.0
2	Arizona	62.0	66	4.0
20	Maryland	28.0	31	3.0
37	Oregon	40.0	42	2.0

“The 25 percent increase in SAT test-takers can be attributed to the growth of SAT School Day, a program in which students take the SAT in their own school on a weekday, rather than taking it on a Saturday in a different school than the one they attend.

In 2017-18, 10 states (Colorado, Connecticut, Delaware, Idaho, Illinois, Maine, Michigan, New Hampshire, Rhode Island, and West Virginia) and the District of Columbia covered the cost of the SAT for all their public school students. Three years ago, only three states and the District of Columbia did so.”

- Education Week

“OKLAHOMA CITY (Sept. 7, 2017) – Oklahoma increased its ACT participation by 29 percent in one year – the largest gain of ACT-tested graduates in the country…

…Oklahoma tied for 10th place for the top average composite score. Accompanying the dramatic influx of test-takers, Oklahoma’s average ACT score dropped only one point, from 20.4 to 19.4.

In 2017, participation grew to 42,405 students from 32,854 in 2016. This change reflects efforts of a statewide 2016 pilot program in which the Oklahoma State Department of Education (OSDE) gave all high school juniors an opportunity to take the exam free of charge.”

- Oklahoma State Department of Education

Conclusions and Recommendations

State Funding & “School SAT Day”

Main Financial and Logistical Barriers

- Our analysis shows that the simplest, most effective way to improve participation rates is through state funding of exam fees for **all** students
- This is especially so for the SAT's, where we see huge improvements in the states of Illinois, Rhode Island and West Virginia
- The second recommendation is to facilitate the test-taking for the students **during school hours and within the same school that the student normally goes to**.

Moving Forward

Identifying additional barriers

- The two measures previously mentioned erases the two largest barriers to student participation: financial and logistical
- If state educational boards are able to identify what other barriers their students face, that may help them facilitate student participation in such tests