



# Regression Discontinuity Design Interactive Lesson

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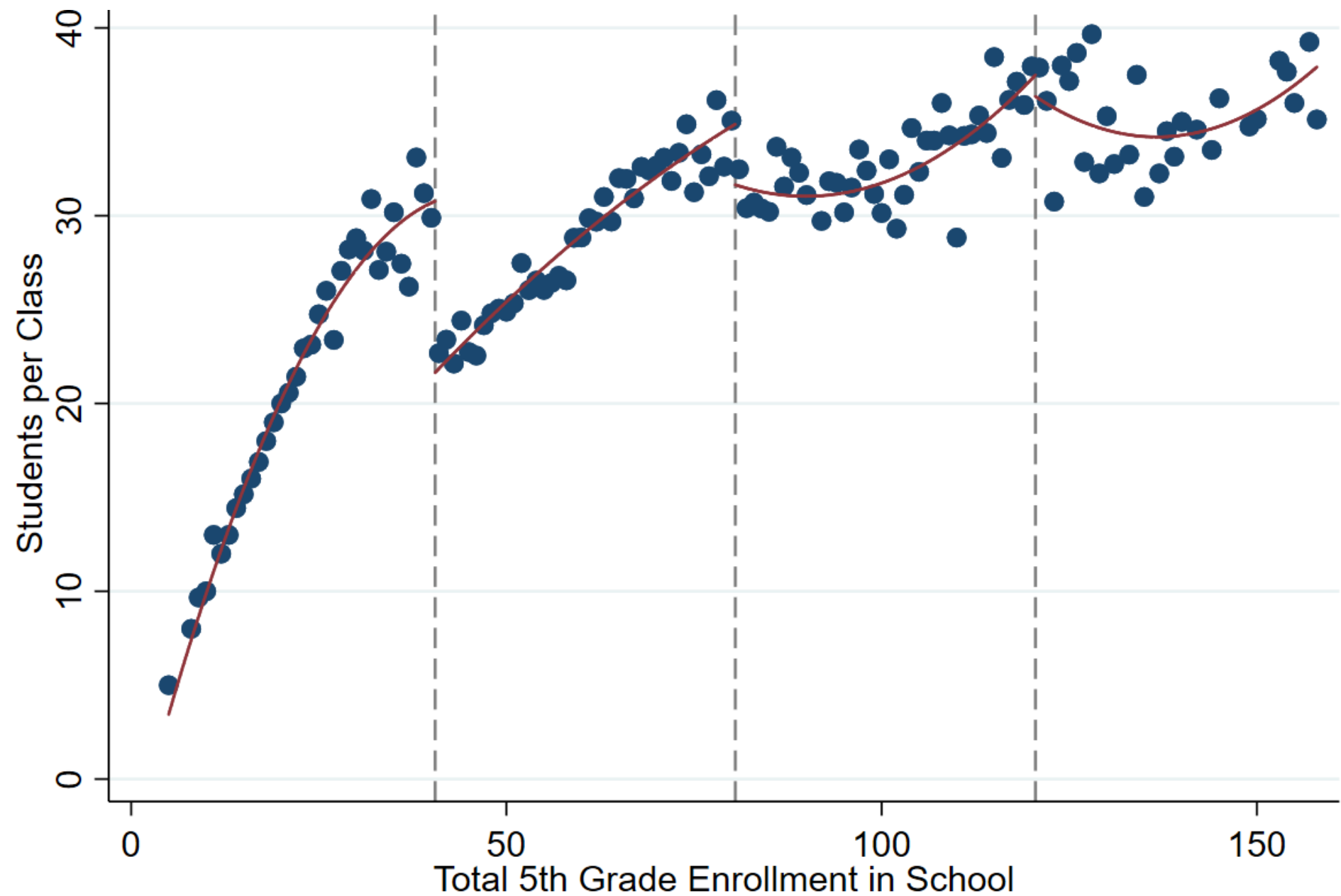


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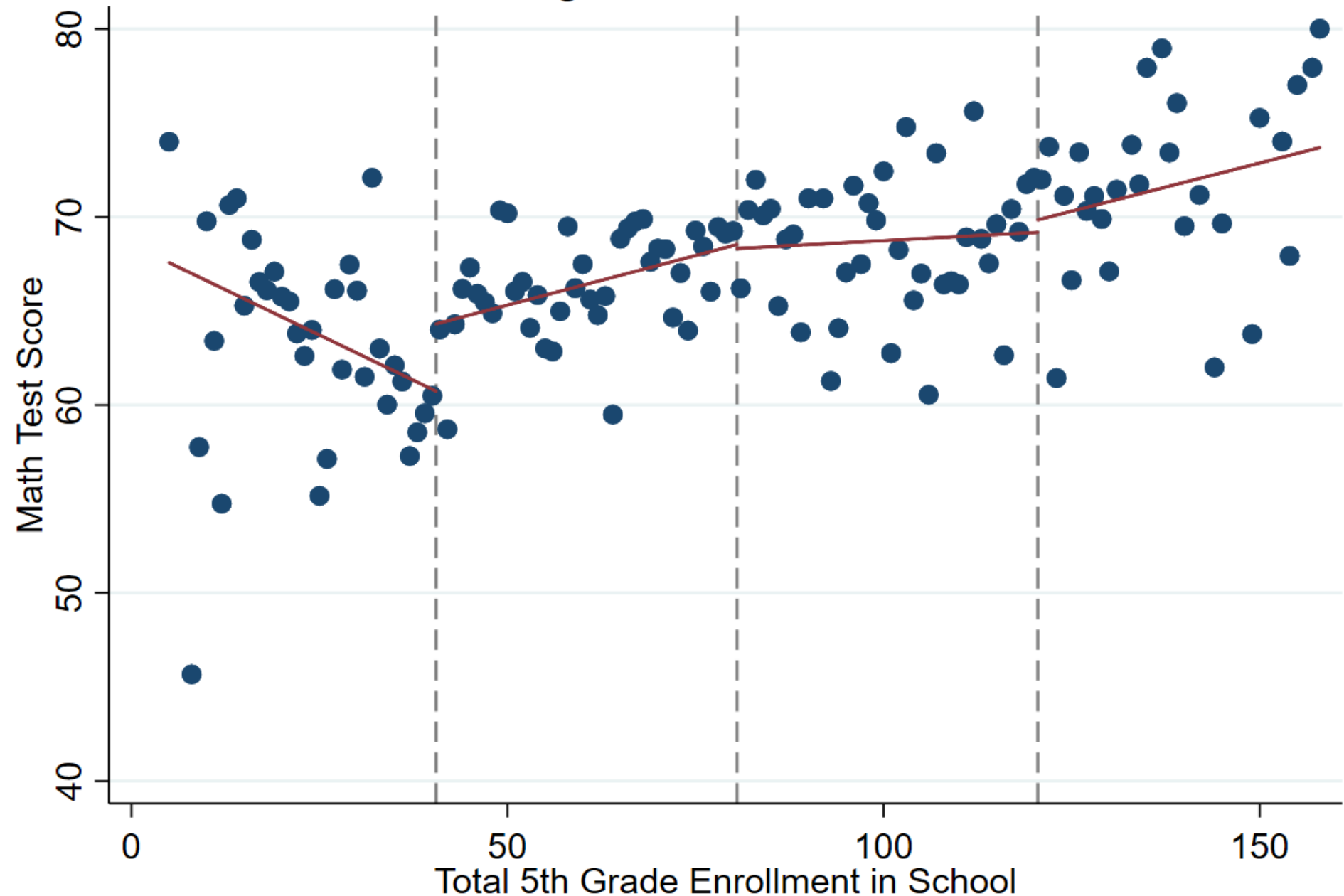
# Interactive Prototype for Regression Discontinuity Design Lesson

Students per Class with Quadratic Best Fit Line



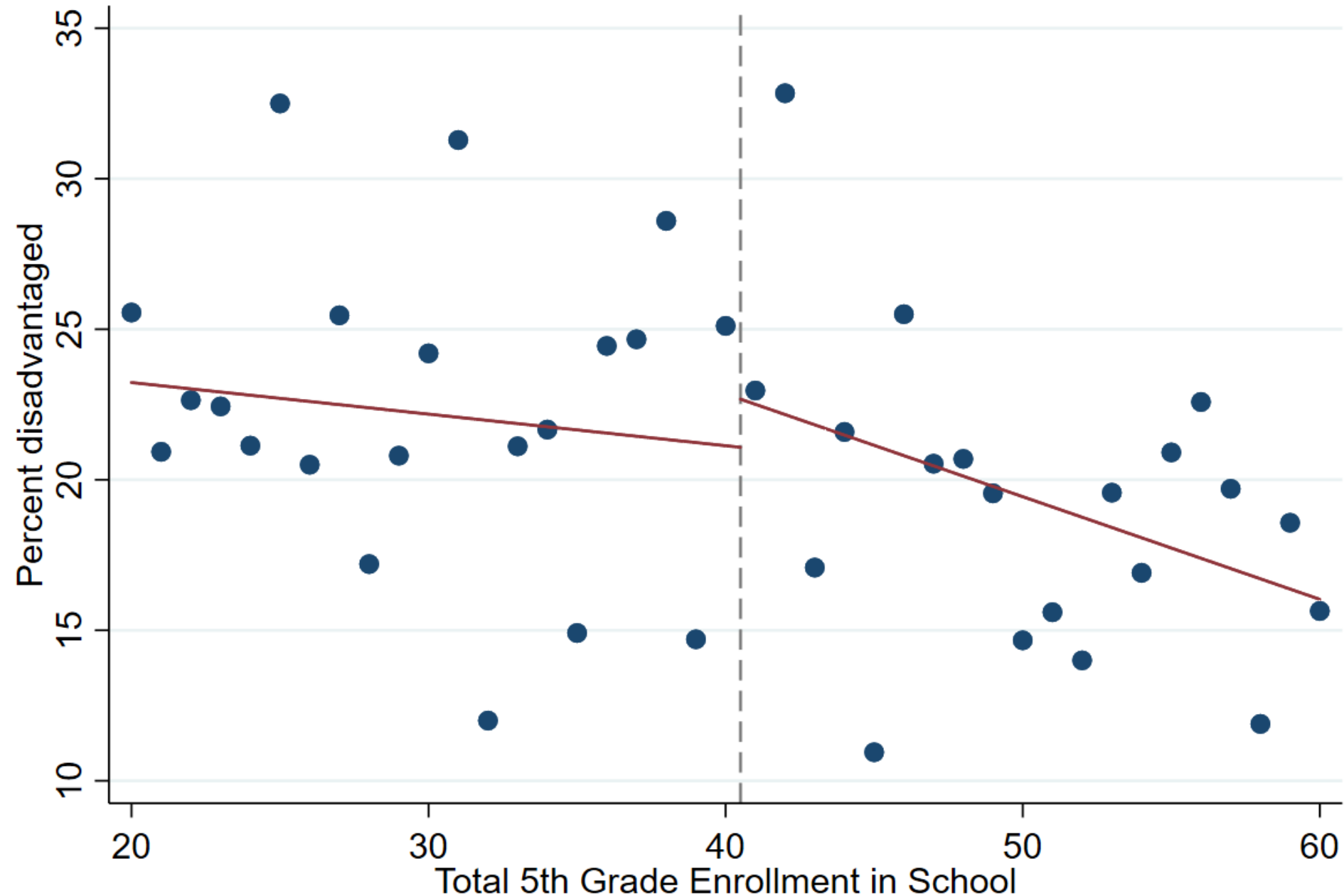
# Interactive Prototype for Regression Discontinuity Design Lesson

Math Test Scores with Linear Best Fit Line



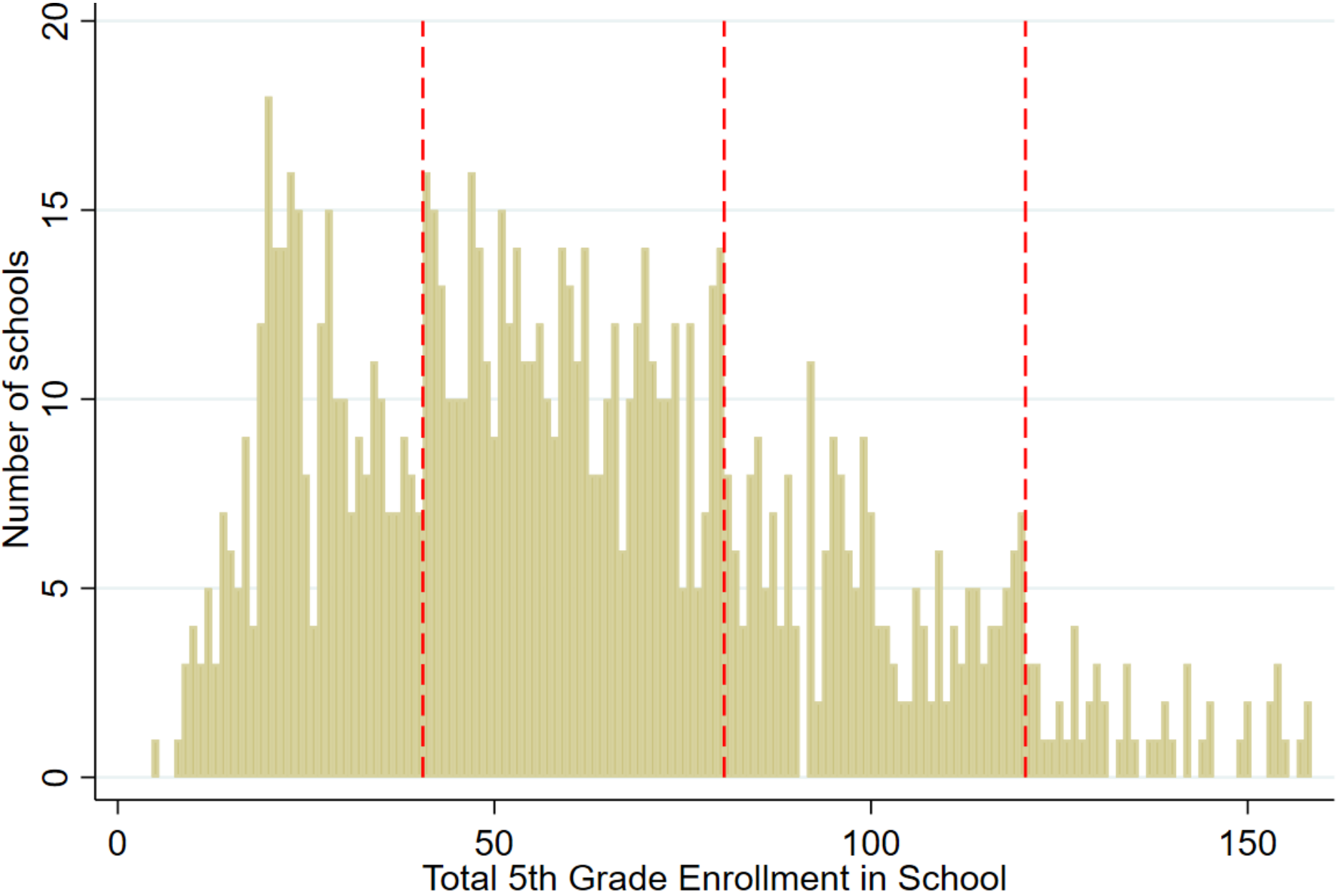
# Interactive Prototype for Regression Discontinuity Design Lesson

Percent disadvantaged with Linear Best Fit Line



# Interactive Prototype for Regression Discontinuity Design Lesson

Number of Schools



# RDD Interactive Lesson: The Causal Effect of Class Size

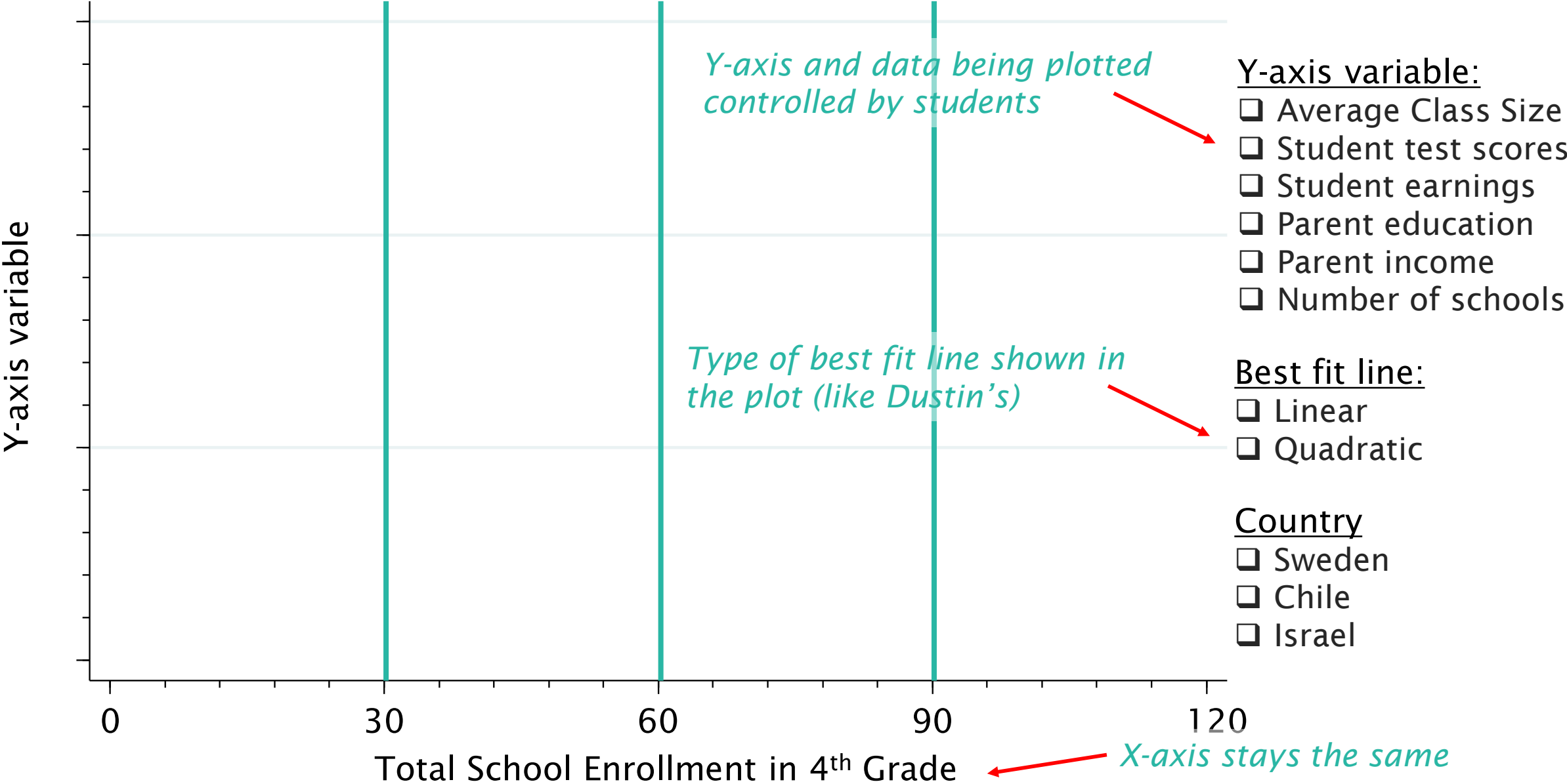
- Inspiration comes from work with Dustin Tingley in 2019 for his EdX class, using [the National Merit Scholarship](#) RD example
- In that course, an interactive scatter plot tool was developed where students can change the best fit line from linear to quadratic to assess functional form
- Here, we build on that idea, but in the context of class size and with a different learning objective in mind
- The key learning objective for RD: *students can assess via simple graphical analyses whether the identification assumption needed for regression discontinuity design is plausibly satisfied in the data*
- In order for this to work, students need to be able to change what is being plotted along the y-axis

# Regression Discontinuity Using Class Size Cutoffs: Sweden

- Sweden imposes a maximum class size of 30 students
  - School that has 31 students in a given grade will therefore have two classes, one with 16 and the other with 15 students
  - School that has 30 students may have one class of 30 students
- Ec 50 approach: don't theorize about RD → Instead, dig right into the data
- Explore the following in these Swedish data:
  - *Actual* class sizes (students per class),
  - Student outcomes (test scores, earnings),
  - Student, parent, and school characteristics, and
  - Number of schools

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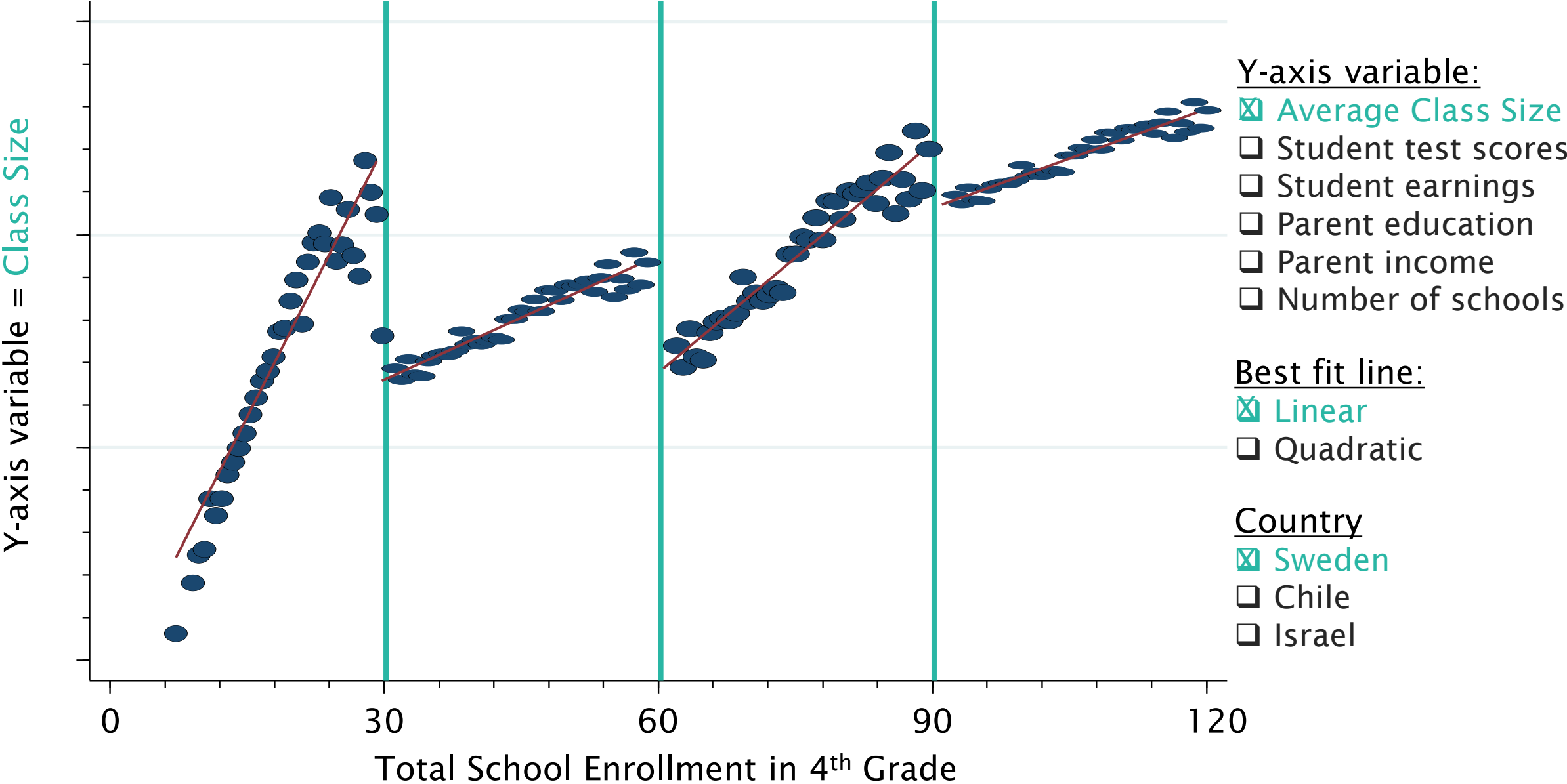
X-axis (running variable) stays the same across skews, Y-axis controlled interactively





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Students per Class with Linear Best Fit Line



# Take aways

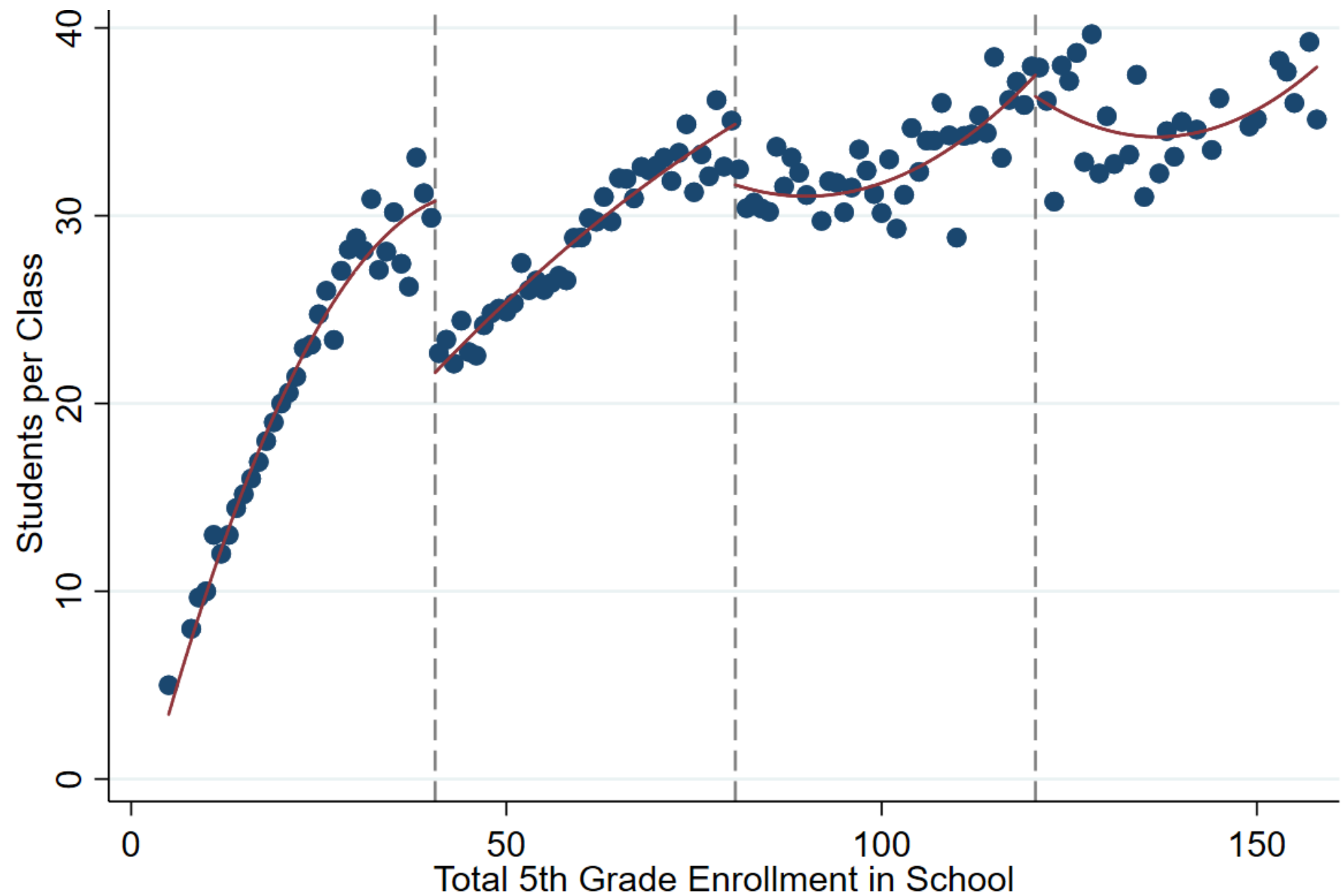
- Every quasi-experimental approach requires an “identification assumption” to make it as good as an experiment
- For this **regression discontinuity design**, the key assumption is that *no other determinants of student test scores jump discontinuously at cutoff*:
  - Suppose everything else (parents, students’ abilities, etc.) changes continuously (smoothly) with size of the school
  - Then only discrete change at the max size cutoff is class size
  - This makes groups just above and just below the cutoff comparable → like an experimental comparison
- We validate this assumption graphically:
  - Counts of the number of schools vs. total school enrollment
  - RD graphs of predetermined student, parent, and school characteristics vs. total school enrollment

# Data

- Data could be real or simulated to match real data
- The following graphs are drawn using real data from Israel, where the maximum class size is 45 students rather than 30
- In Israel, there is a spike in the number of schools with total fifth grade enrollment of 46 students, casting doubt on the identification assumption
- In contrast, in Sweden, there is no such spike so the RDD identification assumption is more plausible

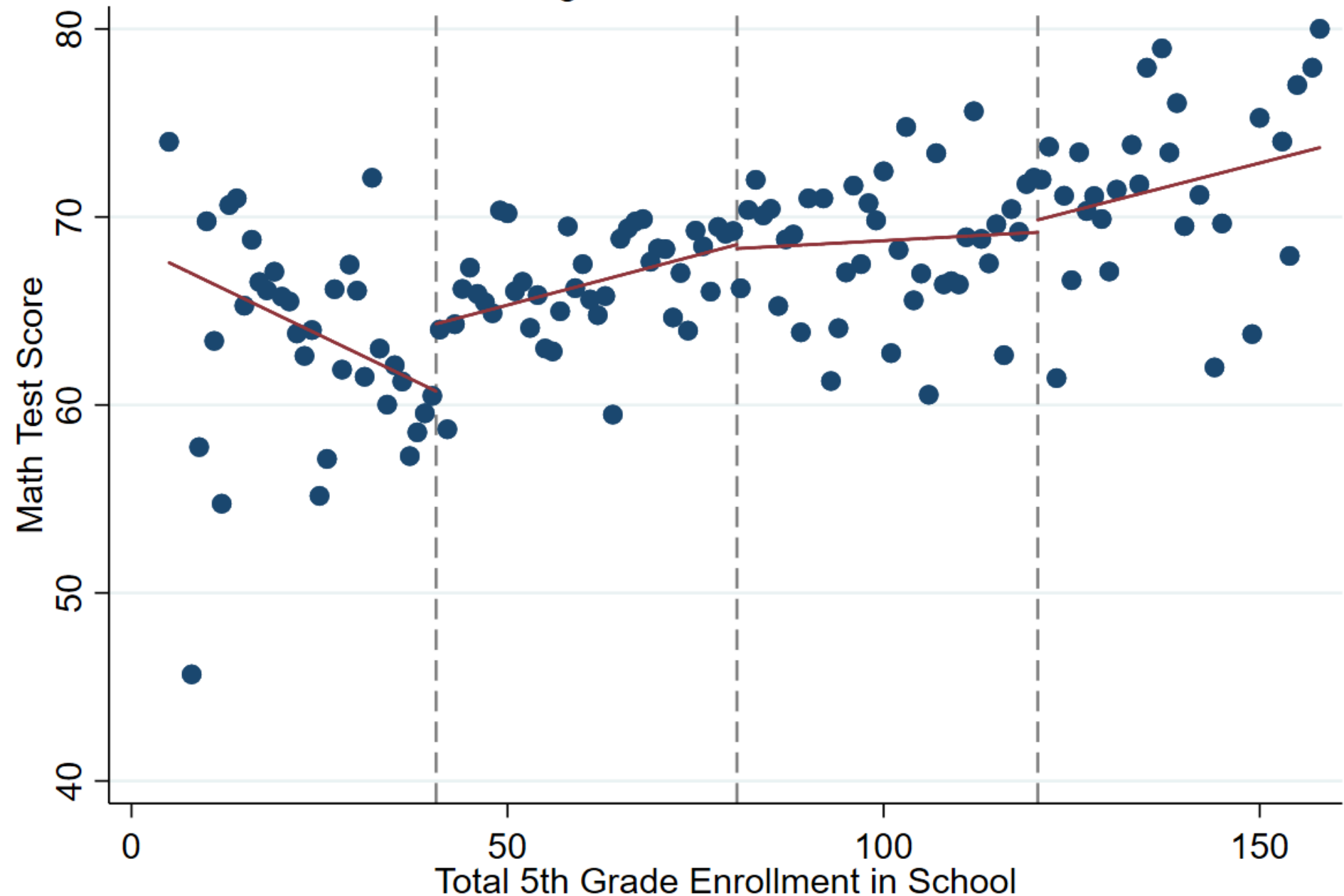
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Students per Class with Quadratic Best Fit Line



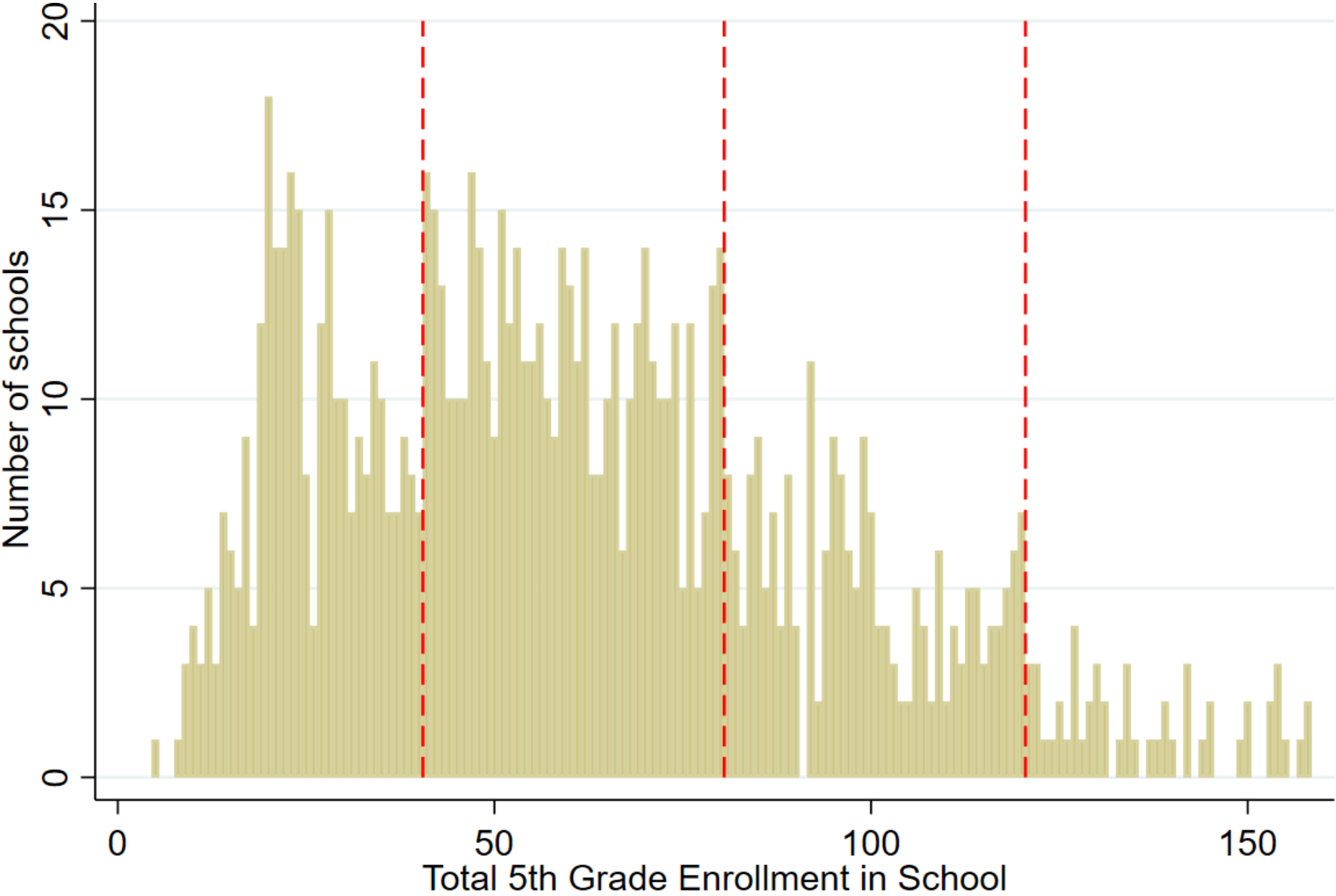
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Math Test Scores with Linear Best Fit Line



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Number of Schools



# Conclusion

- Conclude lesson by asking students to explain whether the RDD identification assumption is plausibly satisfied in the data
- The answer will depend on what country they examine