

Class size and achievement.  
A Regression Discontinuity Design based on  
Maimonides' rule.  
Angrist and Lavy (1999)

Gabor Kezdi

CEU

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# The research question

- Does smaller class size lead to better achievements?
  - ▶ many believe yes (schoolteachers, The Bill & Melinda Gates Foundation)
  - ▶ certainly true in extreme comparisons
  - ▶ but how about marginal improvements?
- Non-experimental studies show negative correlation of class size and achievements
  - ▶ but selection into smaller classes is surely nonrandom
  - ▶ because people believe in causal relationships
  - ▶ but all may be a self-fulfilling delusion

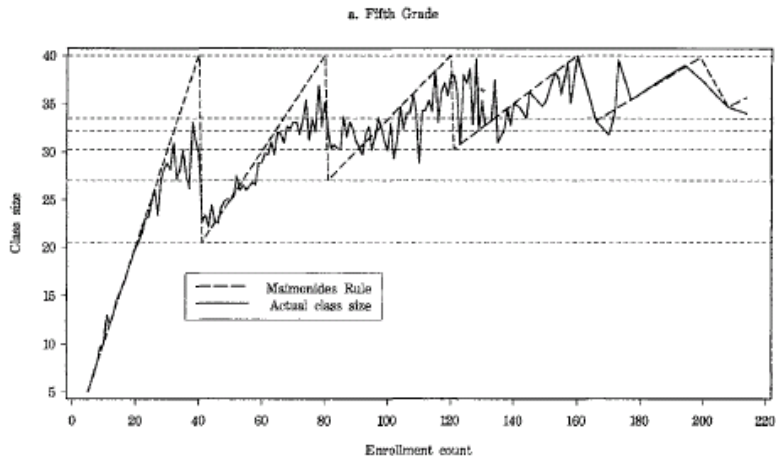
# Angrist-Lavy (1999)

- The Maimonides Rule
  - ▶ Rabbi from the 12th century
  - ▶ one teacher can deal with 25 students at maximum
  - ▶ one classroom can hold 40 students at maximum (but then teacher needs an assistant)
  - ▶ the rule is based on an interpretation of the Talmud
- Israel have used the 40 student rule since 1969
- Discontinuity in "treatment"
  - ▶ if 40 students enrolled, maximum class size is 40
  - ▶ if 41 students enrolled, maximum class size is 20.5 on average
  - ▶ if 80 students enrolled, maximum class size is 40
  - ▶ if 81 students enrolled, maximum class size is 27 on average
  - ▶ etc.

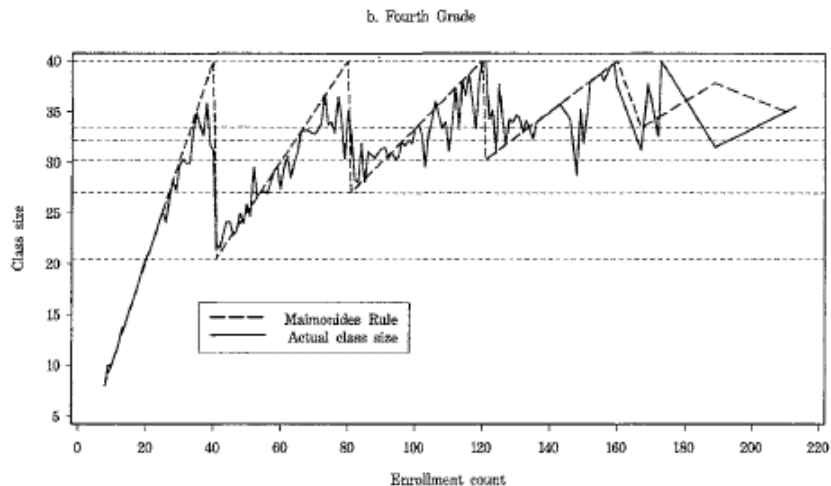
$$classsize_{\max} = \frac{enrolled}{int(\frac{enrolled-1}{40}) + 1}$$

# Compliance

Rule is observed and it effects actual class size  
(data from early 1990's)

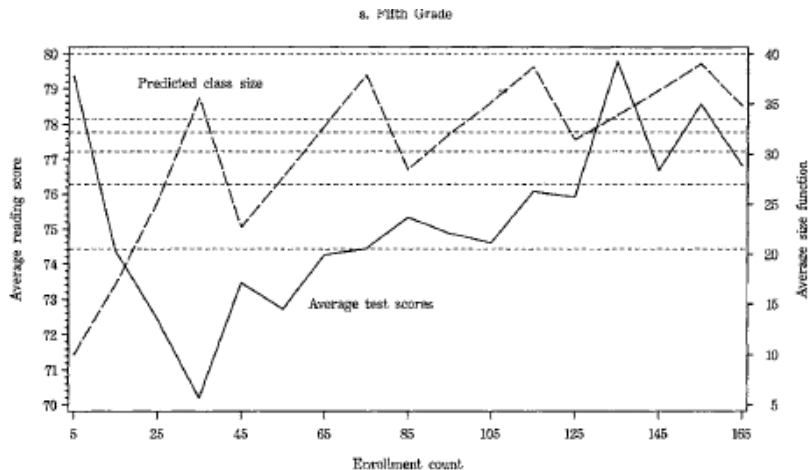


## Compliance, cont.



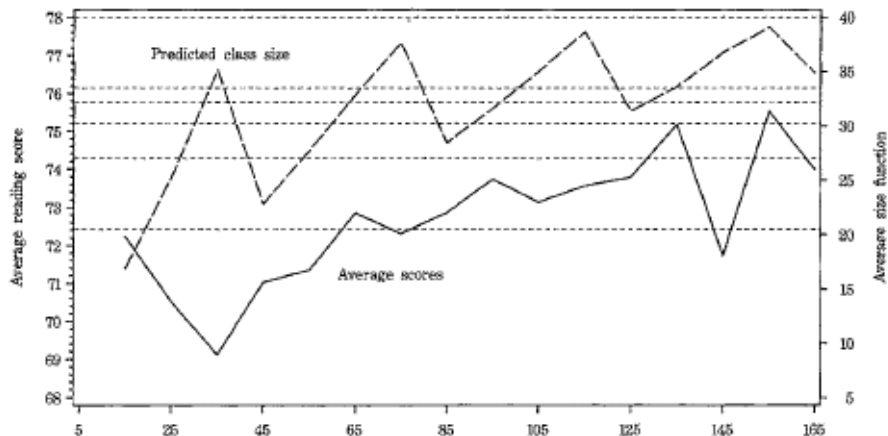
# Results

Outcome variable: standardized reading and math tests (mean of the two)



# Results, cont.

b. Fourth Grade



## Results, cont.

- How to translate effects into units of class size?
  - ▶ the effect of 1 additional student on average achievement
- Instrumental variable estimation (IV)
  - ▶ LHS variable: test score
  - ▶ RHS variable: class size
  - ▶ IV: maximum class size as implied by Maimonides' rule applied to given enrollment
- IV results when sample constrained to  $\pm 5$  discontinuity sample
  - ▶ grade 5, reading: -0.5 (to be compared to and average of 75)
  - ▶ grade 5, math: -0.4 (to be compared to and average of 68)
  - ▶ grade 4, reading and math: no significant results
- Effects are modest
  - ▶ reducing class size by 5 students leads to increased scores by 0 to 3 per cent