Right-sizing the Classroom

Making the Most of Great Teachers

#TeacherAccess

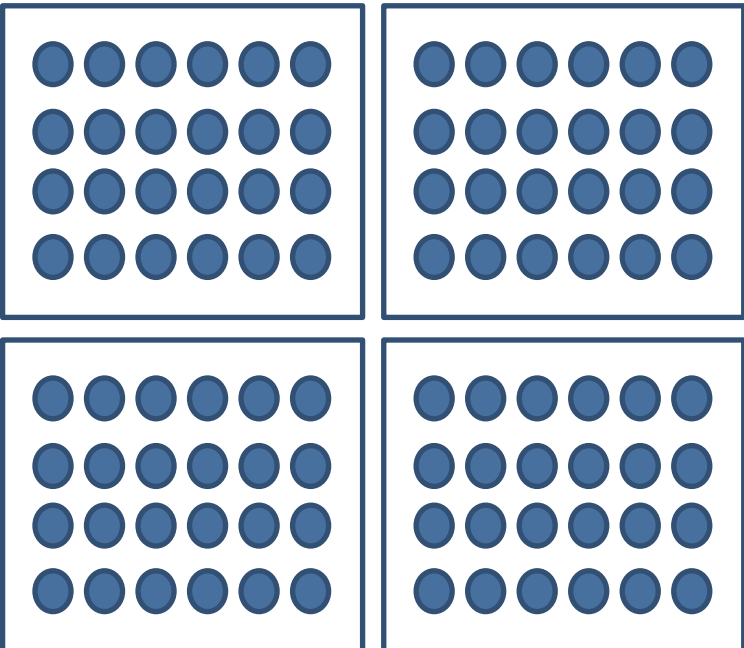Michael Hansen

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American Institutes for Research / CALDER
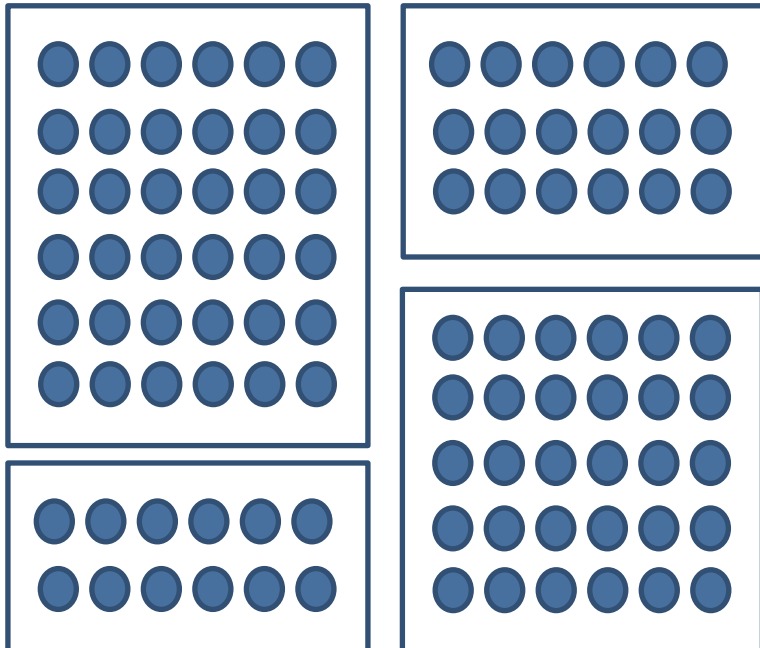
What if…we tried playing to our strengths in schools?

Typical method

Class-size shifting

Prior research tilts toward teachers

Teacher Quality

- Large impacts on students across multiple contexts
  - Significant results across subjects and grades, though sizes vary

- Good teacher = extra ¼ to ½ year of learning

Class Size

- Small impacts, that are near zero in some contexts
  - Largest in lower grades, initial exposure

- Equivalent impact of 10 to 20 student reduction in class size

Sources: Hanushek and Rivkin, 2010; Nye, et al., 2004; Whitehurst and Chingos, 2011.

Data & Methods

- **North Carolina data**
  - Grades 5 and 8; Math, Reading and Science test scores
  - Four years of data

- **Focus specifically on schools where students can be reallocated across teachers**
  - Approximately 90% of NC students are in such schools

- **In 2010/11 target year:**
  - Document current patterns of sorting occurring in NC
  - Simulate classroom assignments that could arise under strategic assignment; calculate student learning gains and access to effective teachers

Target Year Current Assignments

Table 2. Snapshot of Observed Class Size Assignment in North Carolina						
	Grade 5			Grade 8		
	Math	Reading	Science	Math	Reading	Science
Average class-size deviation within school	2.738	3.073	1.743	5.587	5.689	3.816
Within-school correlation of expected teacher performance and class size	0.045	0.086	0.050	0.022	0.012	0.025

Access Gap Apparent in Data

Table 2 (cont'd). Snapshot of Observed Class Size Assignment in North Carolina						
	Grade 5			Grade 8		
	Math	Reading	Science	Math	Reading	Science
Proportion of students assigned to top-quartile teachers	0.258	0.287	0.237	0.251	0.244	0.254
Proportion of FRL students assigned to top-quartile teachers	0.235	0.260	0.217	0.232	0.243	0.226

Note – Strategically assigning students only remediates within-school gaps, not across-school gaps

Students Gain in Simulated Classrooms
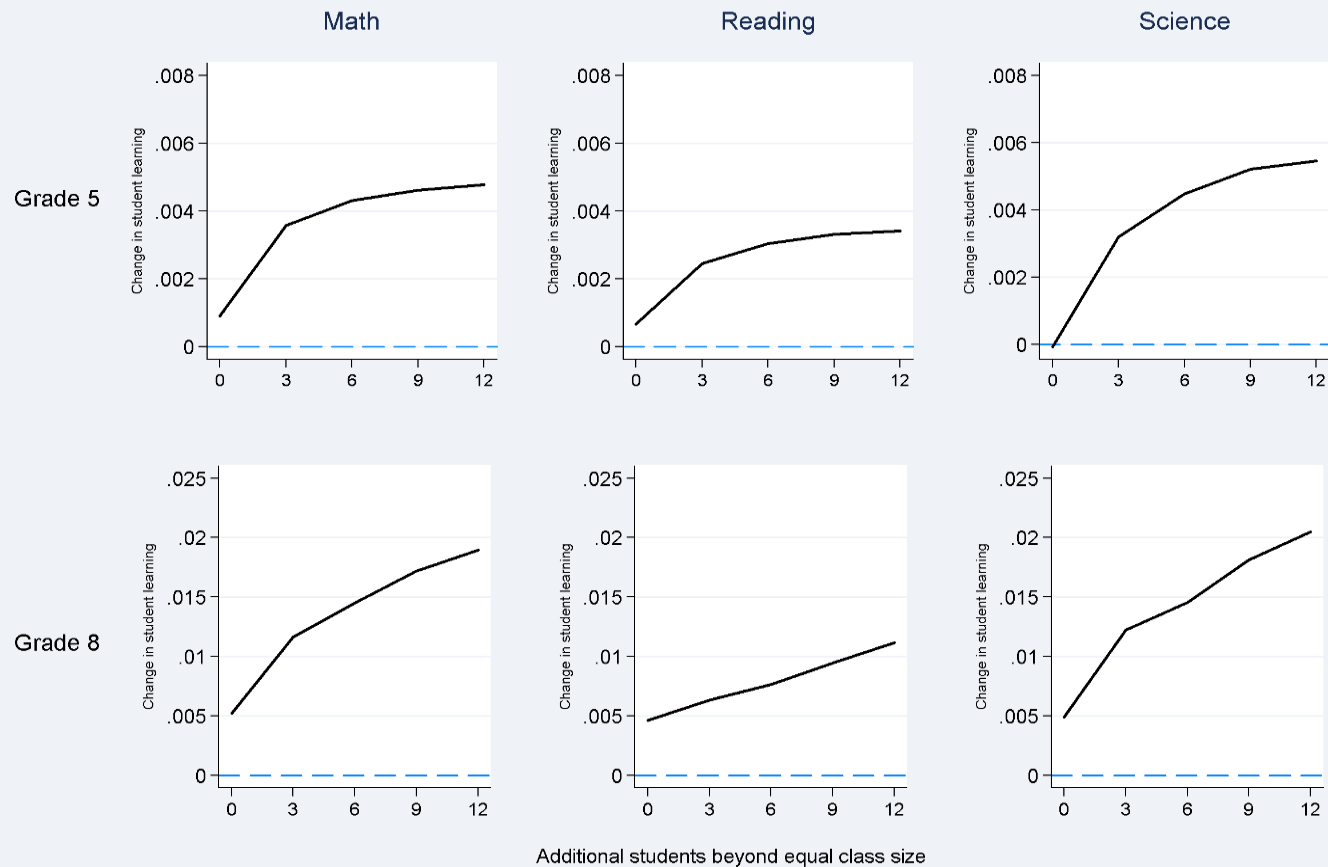
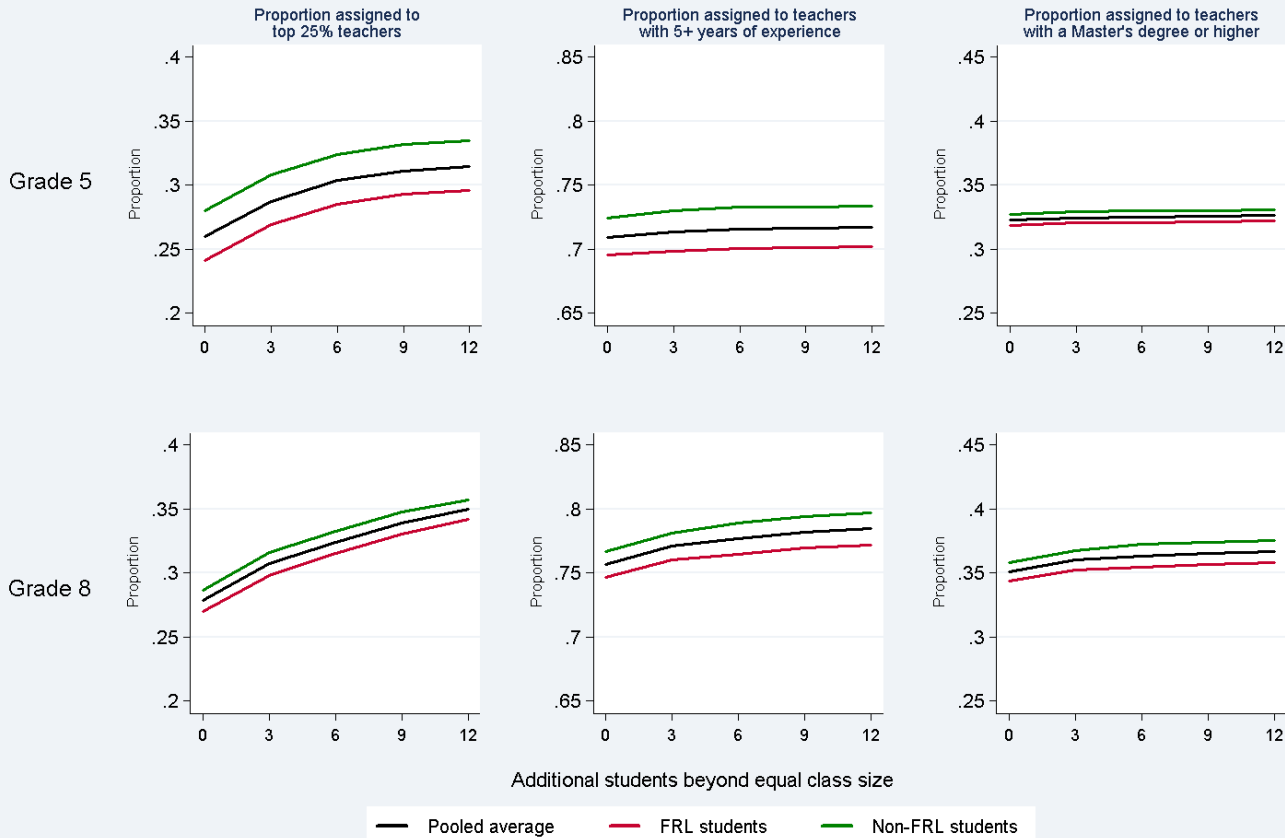Additional students beyond equal class size

Additional students beyond equal class size on the x-axis is determined separately within each grade and school, so total class size for the largest classes may vary across the sample.
Changes in student learning on the y-axis is measured in student standard deviation units, and averaged across all students in schools and classrooms where class-size shifting is possible.

Results are particularly strong in 8th grade

- **Moving 6 students is nearly 2 weeks in 8th grade math and science**
  - Roughly equivalent to current levels of class size deviations observed
  - Equivalent to removing bottom 5% of teachers, without removing them!

- **Maximum gains for 5th grade are roughly equal to 2 days**

- **Why the difference?**
  - Past performance more reliable predictor in 8th grade
  - Self-contained vs. single-subject assignments

Access Gaps Still Persist

Additional students beyond equal class size on the x-axis is determined separately within each grade and school, so total class size for the largest classes may vary across the sample. The proportion measures describe the proportion of students assigned to teachers with the given characteristics. These proportions are calculated across all students, and on FRL and non-FRL student subgroups.

Willingness, Compensation

- Teacher / parent surveys suggest some support
  - 83% of teachers choose money over smaller classes
  - 73% of parents choose top teacher over smaller classes

- How to reward teachers, so this isn't a punishment?
  - Non-monetary – aides, status, removing out-of-classroom work
  - Monetary – bonuses using money from savings due to fewer remedial instructors, or lowering pay for leading smaller classes

Conclusion

- **Efficient** – Class-size shifting can make educationally significant improvements in student learning, esp. 8th grade
  - Caveats: assuming linear class size, performance invariant to mixing classes

- **No change in equity** – No relative improvement in student access to effective teachers

- Feasibility issues
  - Laws, policies, collective bargaining agreements may need to change
  - Could disrupt dynamic among workforce

Recommendations

- **This paper is NOT:**
  - Prescribing how classes should be assigned
  - Suggesting that all schools should adopt at the highest levels of sorting

- **However, I do recommend:**
  - Shifting focus of class assignments to prioritize learning
  - Experimenting with different levels of sorting where conditions allow
  - Compensating teachers fairly, or even generously, for extra work

Two Noteworthy Points

1. Deviations in class size will reflect differences in expected performance

   – If teachers are expected to be equal, no advantage to moving students

2. In theory, strong and weak teachers can be defined according to schools' preferred measures

   – Due to lack of other performance data, I base these results on value-added estimates

Estimated Parameters Based on Prior Years

Table 2. Estimated Class-size Effects and Teacher Value-added Variation						
	Grade 5			Grade 8		
	Math	Reading	Science	Math	Reading	Science
Class size	-0.0052***	-0.0020***	-0.0047***	-0.0035***	0.0000	-0.0024***
	(0.0005)	(0.0005)	(0.0005)	(0.0002)	(0.0003)	(0.0003)
Standard deviation of EB-adjusted teacher FE	0.1513	0.0801	0.1927	0.1333	0.0612	0.1500

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