Teachers and Charter Schools

Economics of Public and Social Issues

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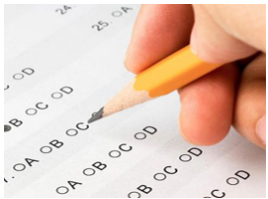
Plan for today

- What is the effect of (better) teachers on children's outcomes?
- What do we know about the effect of charter schools in the education system?

Effect of Teachers

Using Big Data to Study Teachers' Impacts

School district records	Tax records
2.5 million children; 18 million test scores	Earnings, College Attendance, Teen Birth
	

Reference: Chetty, Friedman, Rockoff: "Measuring the Impacts of Teachers I and II" AER 2014

Measuring Teacher Quality: Test-Score Based Metrics

- One prominent measure of teacher quality: teacher value-added
- How much does a teacher raise her/his students' test scores on average?

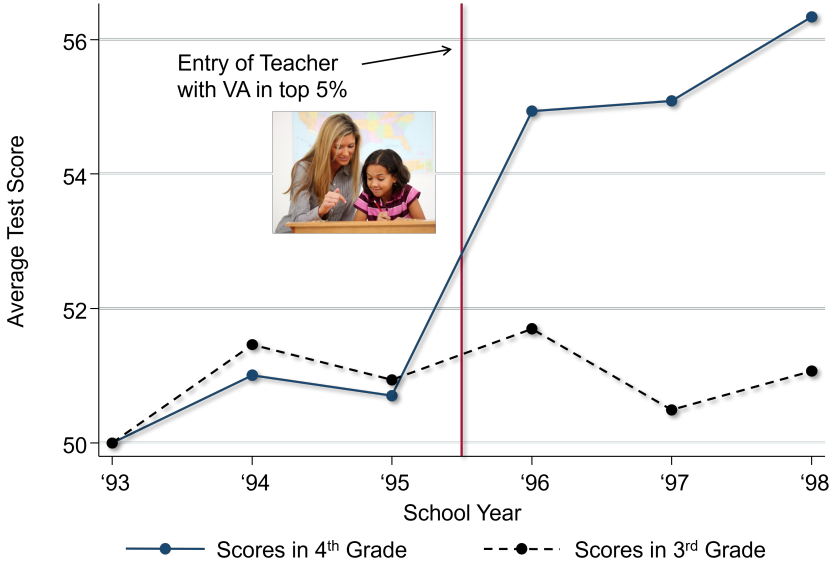
Debate About Teacher Value-Added Measures

- Controversial and highly politicized debate about using teacher value-added (VA) measures to evaluate teachers
- At its core, debate revolves around three statistical issues:
  1. Potential for bias in VA estimates
     - Do differences in test-score gains across teachers capture causal impacts of teachers or are they driven by student sorting?
  2. Lack of evidence on teachers' long-term impacts
     - Do teachers who raise test scores improve students' long-term outcomes or are they simply better at teaching to the test?
  3. Instability of VA estimates
     - Are estimates of teacher quality based on a few years of data too unstable to be useful for policy?

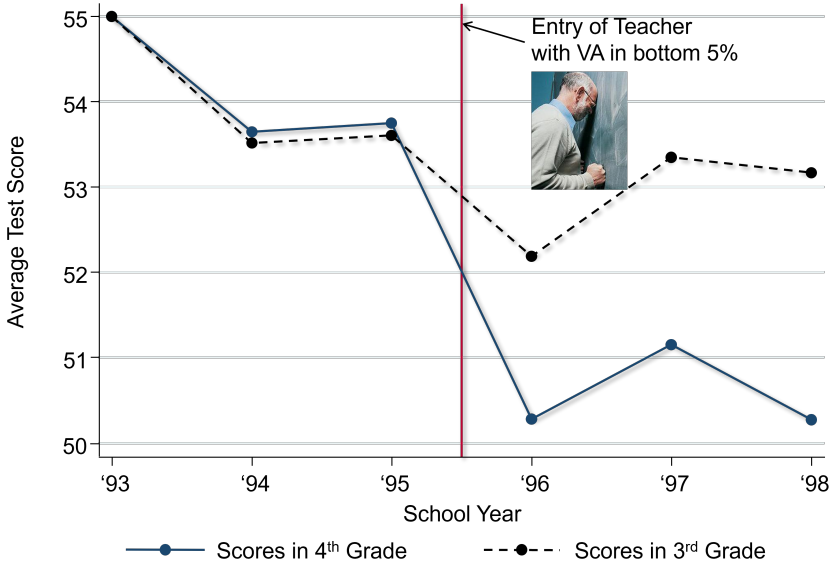
Measuring the Impacts of Teachers

- Ideal experiment to answer these questions: randomly assign students to teachers with different value-added
- Test whether those with high value-added teachers have higher test scores and earnings
- Chetty and co-authors use a quasi-experimental approximation to this experiment
  - Exploit the fact that there is a lot of turnover in teachers across school years
  - When high VA teachers arrive at new schools, do scores go up?
  - Methodology: event-study designs

A Quasi-Experiment: Entry of High Value-Added Teacher



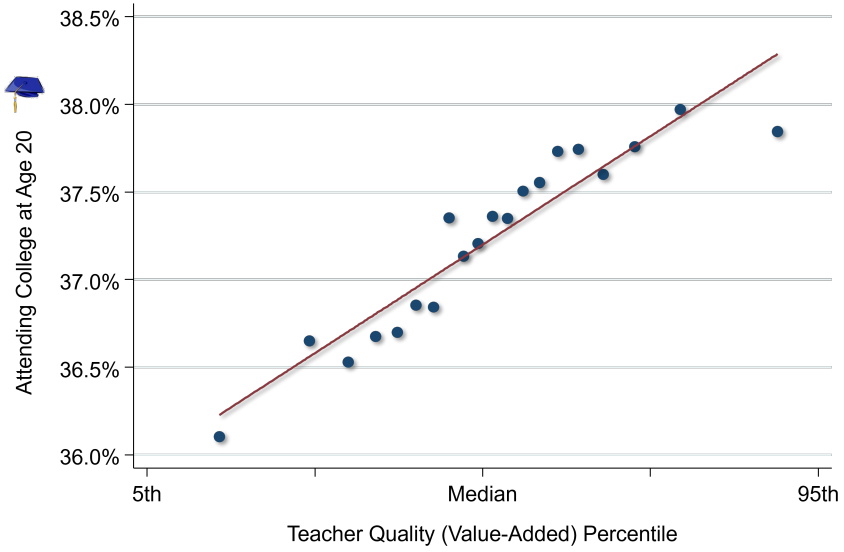
A Quasi-Experiment: Entry of Low Value-Added Teacher



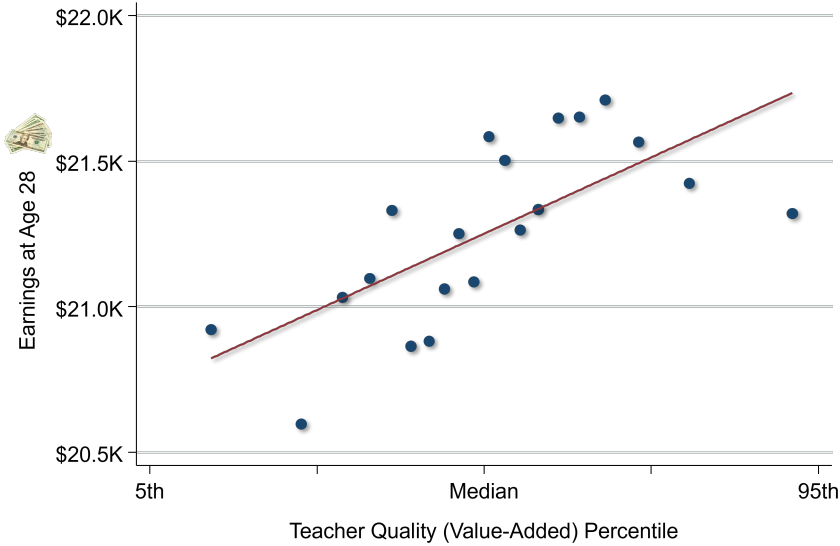
Lesson 1: VA Estimates Are Unbiased Measures of Teacher Effectiveness

- Students assigned to higher value-added teachers have higher test scores
  - Being assigned to a teacher who is predicted to raise test scores by 10 percentiles increases a given student's score by $\sim$ 10 percentiles
  - Differences in VA measures largely capture *causal effects* of teachers, not differences in types of students they are assigned (selection)

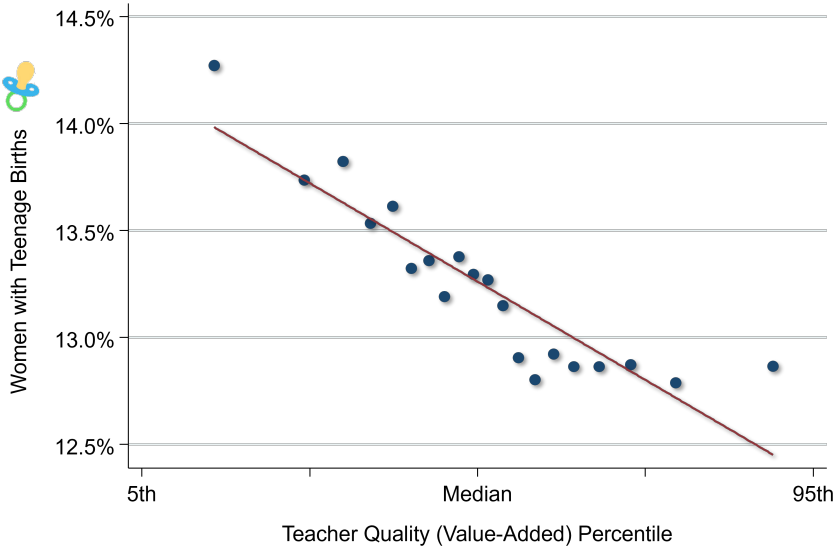
Effect of Teacher Quality on College Attendance Rates



Effect of Teacher Quality on Earnings



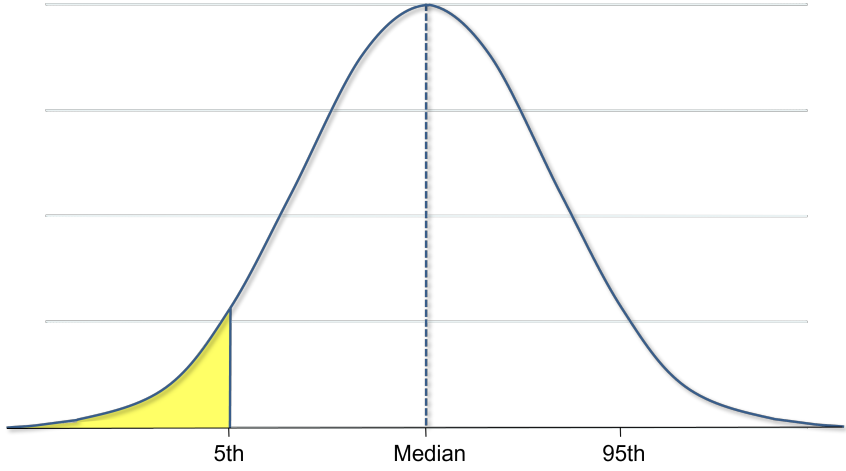
Effect of Teacher Quality on Teenage Birth Rates



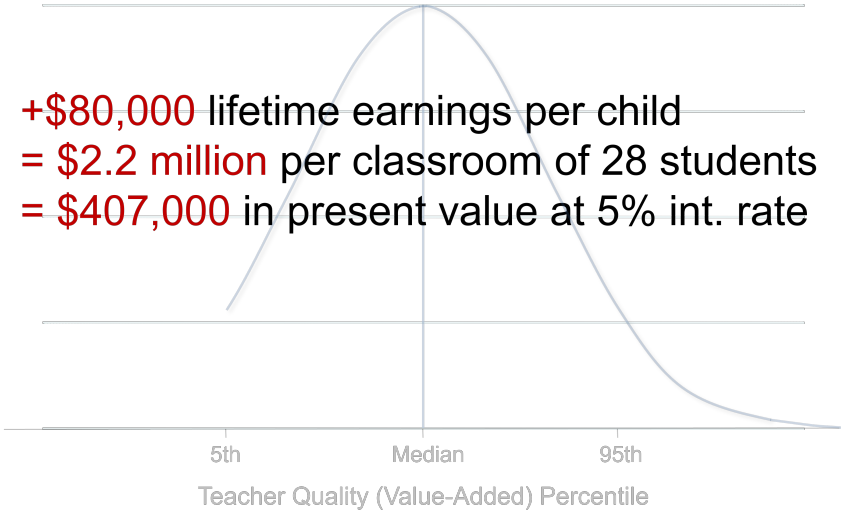
Lesson 2: VA Estimates Based on Test Scores Predict Teachers' Long-Term Impacts

- Assigning a student to a higher value-added teacher raises not just test scores but long-term outcomes
  - Teachers who generate high test scores are not just "teaching to the test"

The Value of Improving Teacher Quality



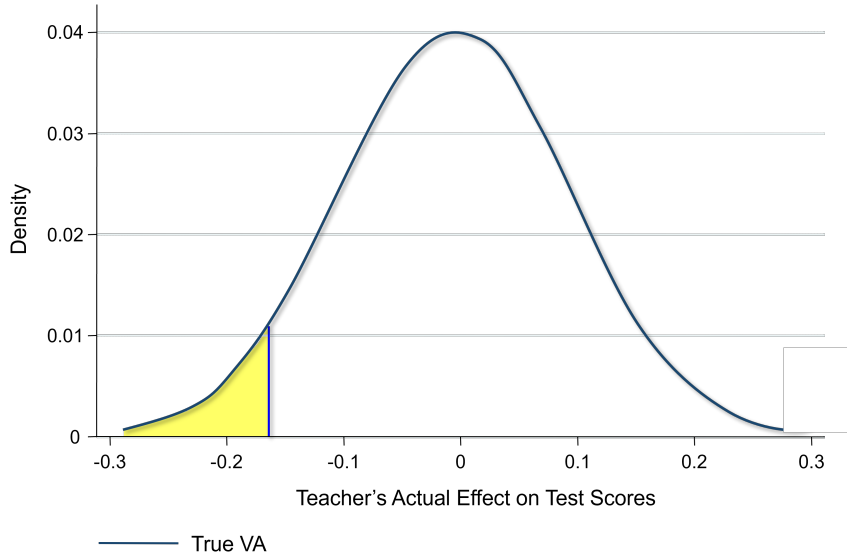
The Value of Improving Teacher Quality



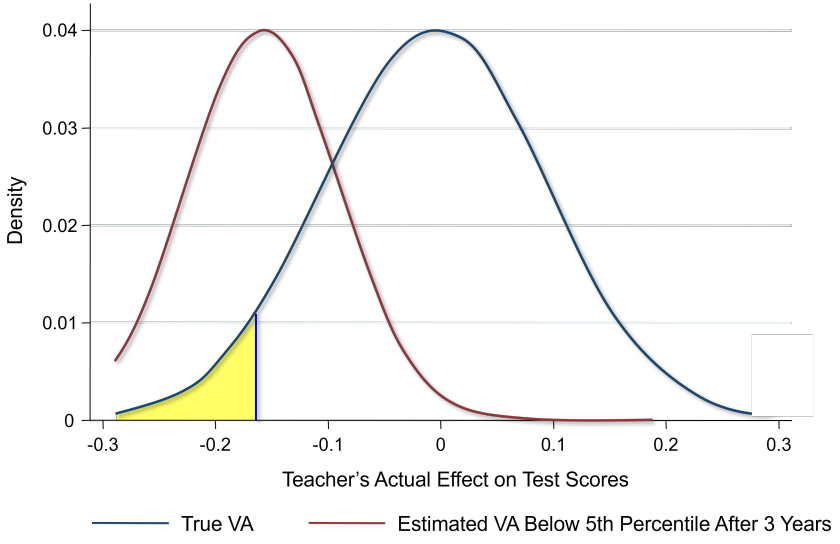
Reliability of Teacher Value-Added Estimates

- Previous calculation overstates feasible gain because we do not observe each teacher's value-added perfectly
- In practice, we usually have performance data for just a couple of years before we need to make personnel decisions
  - VA estimates based on a couple of classes are statistically imprecise
  - Teachers who happen to have students who do well by chance will get a high VA score
- Does this estimation error in VA reduce gains from previous exercise?

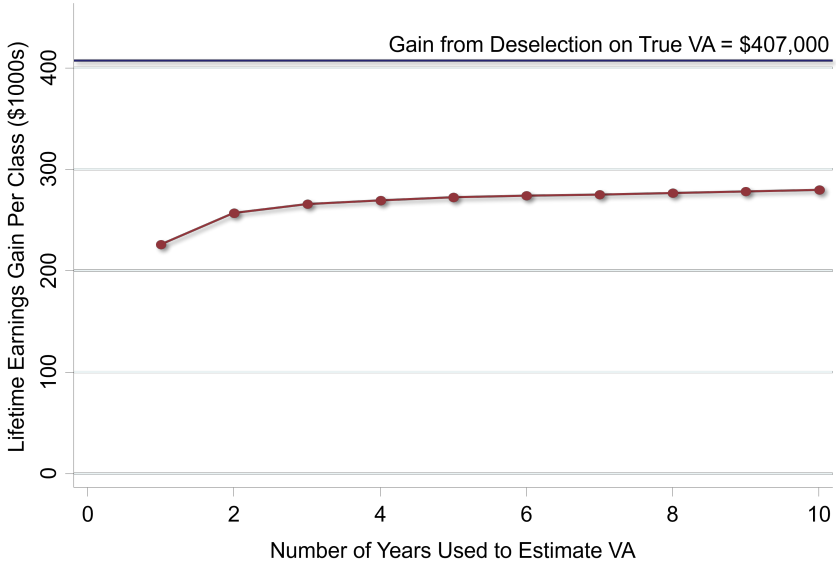
Selecting Teachers on the Basis of Value-Added Estimates



Selecting Teachers on the Basis of Value-Added Estimates



Earnings Gain from Teacher Replacement Based on Estimated VA



Lesson 3: VA Estimates Based on a Few Years of Data Are Sufficiently Reliable to Generate Large Gains on Average

- VA estimates do fluctuate depend upon which students teachers get
- But even taking this into account, gains from replacing teacher with estimated VA in bottom 5% with teacher of average quality is $250,000
  - Less than $400,000 gain we'd achieve if there were no measurement error in VA, but still substantial

Relevance of Findings to Current Policy Debate

- Most school districts in the U.S. do not use any performance metrics to evaluate teachers
  - In many districts, 98%+ of teachers get tenure within 3 years
  - Pay set purely based on experience, not performance
- New evidence on VA metrics has sparked interest in changing this system and finding ways to recruit and retain best teachers more effectively

Summary: Improving Public Schools

- New data show that changing public schools in certain specific ways can have large long-term returns
- Reducing class size can be very valuable
  - But critical to hire highly effective new teachers when doing so
- There are large, measurable differences in teacher quality,
  - We should do more to attract and retain top teachers in public schools (not just using value-added metrics but also other tools)

Marked-Based Solutions: Charter Schools

Market-Based Solutions to Improving Education

- Alternative approach to improving education: leverage market forces
- Permit school choice $\rightarrow$ best schools will attract more students and other schools will improve their performance to stay in business
- Two ways we currently take such an approach in the U.S.
  1. Charter schools: schools that are publicly funded but independent of public school system
  2. Vouchers that students can use for private schools instead of their local public school

Do Charter Schools Work?

- **Question**: are private schools/charter schools better than public schools?
- Cannot simply compare outcomes at charters and public schools
  - Charters tend to be concentrated in lower-income, urban areas $\rightarrow$ outcomes worse on average

Do Charter Schools Work?

- Several recent studies estimate effects of charter schools on students' outcomes by exploiting lotteries for admission
  - Charter schools often have more applicants than seats use lotteries to assign seats
  - Comparing outcomes of winners vs. losers identifies causal effects

References:

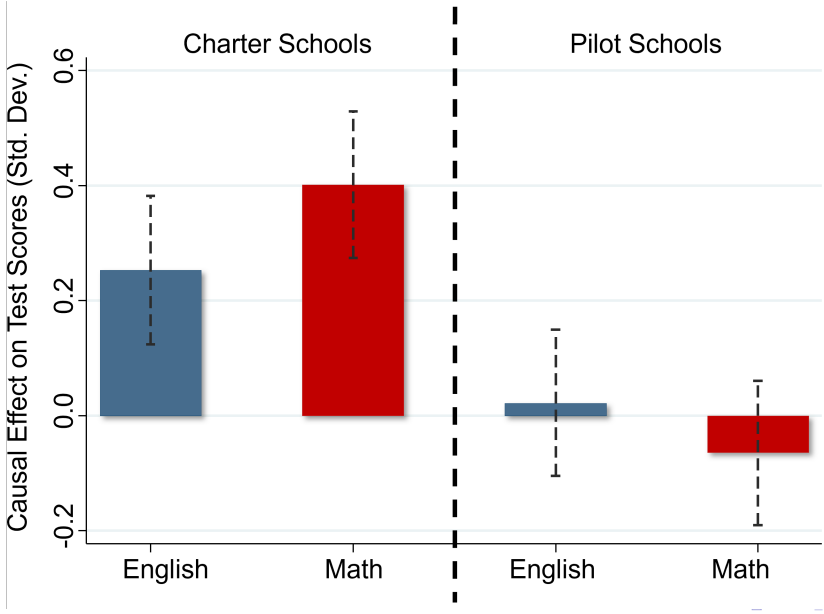
Abdulkadiroğlu, Angrist, Dynarski, Kane, Pathak. "Accountability and Flexibility in Public Schools: Evidence from Boston's Charters and Pilots." QJE 2011.

Chabrier, Cohodes, Oreopoulous. "What Can We Learn From Charter School Lotteries?" JEP 2016

Effects of Boston Area Charter Schools

- Abdulkadiroglu et al. (2011): compare effects of charter schools and pilot schools in Boston
  - Charter schools are exempt from all public school regulations
  - Pilot schools are like charters but covered by Boston Public School regulations and teachers union contracts
  - Both are financed by payments from students' home district: tax payments transferred to charter/pilot school

Effects of Boston Charter and Pilot Schools on Test Scores



Effects of Boston Area Charter Schools

- Subsequent study by Angrist et al. (2013) shows that Boston charters have significant effects on college attendance rates
- Lesson: charters generate positive effects on average; pilots are no better than public schools
- Suggests that the flexibility obtained by relaxing public school restrictions (e.g., on teacher hiring) is a key driver of positive impacts

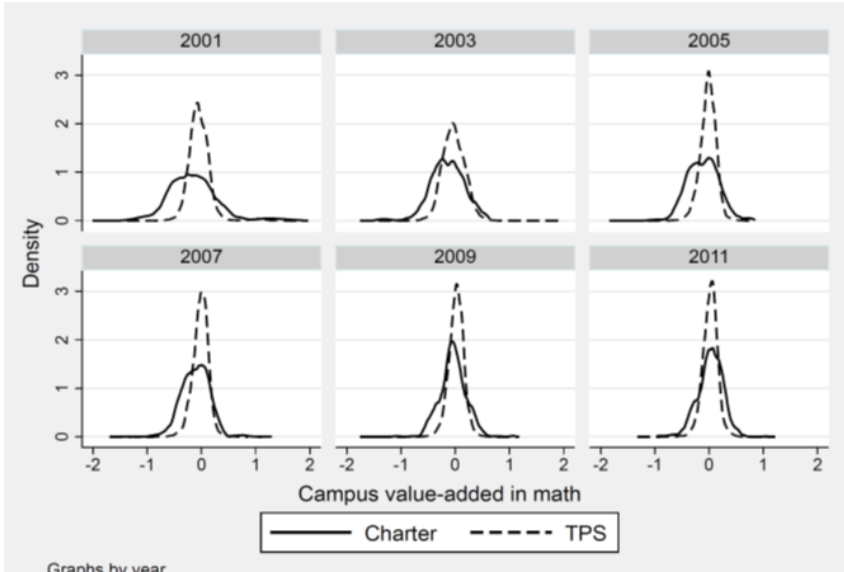
Effects of Charter Schools: Summary

- Chabrier et al. (2016) summarize literature on charter schools
  - Small positive mean effects on test scores on average
  - In general, "no excuses" schools (extra hours, discipline, academic focus) tend to have positive impacts

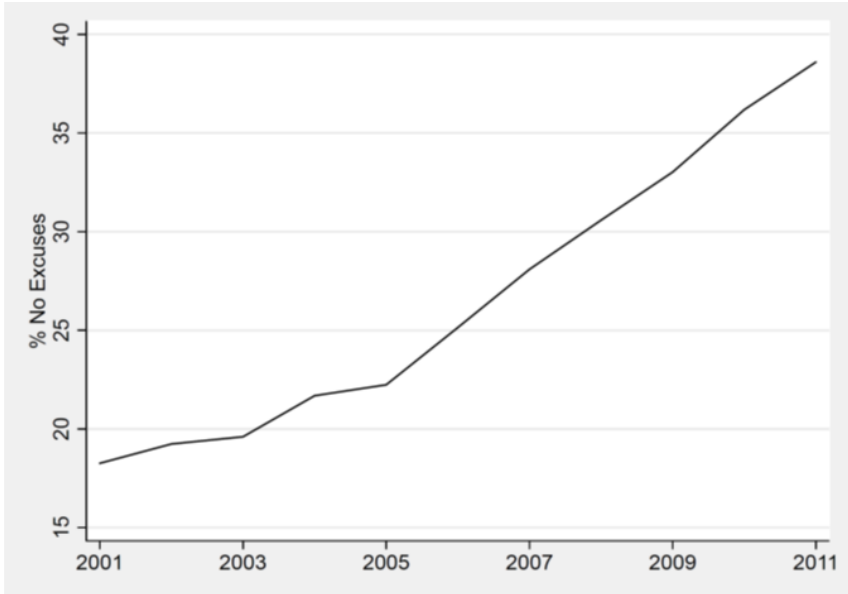
Market Competition and Charter Schools

- Does market discipline lead to growth of better schools and improvement in performance over time?
- Baude, Casey, Hanushek, and Rivkin (2014) study how quality of charter schools in Texas changed over time

Distribution of School Math Value-Added by Year: Texas Charters vs. Public Schools



Market Share of "No Excuses" Charter Schools in Texas



Market Competition and Charter Schools

- Charter school market is evolving in a positive direction
  - Better schools gaining enrollment over time
  - But still a number of relatively low-performing schools, even many years after system began

Limitations of Market Competition

- Three limitations of relying purely on private market competition
  1. Markets may function poorly when quality is not well observed
     - Difficult to gauge value-added, especially when outcomes (e.g. college, earnings) are realized 10+ years after treatment

Limitations of Market Competition

- Three limitations of relying purely on private market competition
  2. Cream skimming of students and teachers
     - Private schools have an incentive to reject less qualified applicants
     - Can exacerbate inequality by leaving less qualified students behind in schools with fewer resources and weaker peers

Limitations of Market Competition

- Three limitations of relying purely on private market competition
  3. Parents may not make well-informed choices
     - Hastings, Kane, and Staiger (2007) study introduction of school choice in Charlotte, NC in 2002
     - Low income parents are much less likely to choose schools with high test scores than high income parents
     - School choice can *amplify* achievement gaps

Improving Primary Education: Summary

- We now have simple, empirically proven ways to improve primary education
  - Solutions range across political spectrum: more resources to reduce class size in public schools to expansion of "no excuses" charter schools
- Which approach is better: government or market based?
  - Current constraints in public school system (local property tax funding base, regulations on teacher hiring) limit its effectiveness
  - But unregulated market system likely to deliver highly variable outcomes
- Best system may be a hybrid that preserves flexibility within schools while offering uniform quality and resources across schools