School Quality in California Under Common Core Standards

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March 15, 2018
This research uses confidential data from the California Department of Education. Please do not cite or disseminate.

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305E150006 the Regents of the University of California. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education, or of the agencies providing data.
Outline

Motivation

Data

Methodology

Results
School Quality

- School quality matters, but difficult to measure
- CA accountability increases importance of knowing true school quality
- Value added (VA) increasingly used to estimate school quality
- VA affects long-term outcomes, such as wages (Chetty, Friedman and Rockoff, 2014b)
Prior Literature

- Teacher quality (Rockoff, 2004; Rivkin, Hanushek and Kain, 2005; Kane, Rockoff and Staiger, 2008; Jacob, Lefgren and Sims, 2010)
- Random assignment (Kane and Staiger, 2008; Carrell and West, 2010; Glazerman and Protik, 2015)
- School quality (Jennings et al., 2015; Deming et al., 2016; Dobbie and Fryer Jr, 2016; Allensworth et al., 2017; Abdulkadiroglu et al., 2017; Hubbard, 2017)
- Lotteries (Abdulkadiroğlu et al., 2011; Deming, 2011; Dobbie and Fryer Jr, 2011; Deming et al., 2014; Deming, 2014; Dobbie and Fryer Jr, 2015; Angrist et al., 2016; Cohodes, 2016; Angrist et al., 2017)
Question

1. How much variation is there in school quality?
2. Does high school VA correlate with better college outcomes?
This Paper

1. Estimates 11th grade value added for CA public schools
2. Calculates the variation in school quality
3. Examines the correlation between school VA and college outcomes
Outline

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CA Data

- Test scores
  - 2008-2013 11th grade cohorts
  - Current and prior test scores
  - Demographic characteristics
- California Community Colleges
  - Enrollment
- California State Universities
  - Application, acceptance, and enrollment
  - Remediation
  - Major
  - Courses and GPA
### Table: VA and Outcome Summary Statistics

<table>
<thead>
<tr>
<th>Outcome</th>
<th>VA Sample</th>
<th>CSU Enrolled Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled in a CA Community College</td>
<td>.359 [0.48]</td>
<td></td>
</tr>
<tr>
<td>Applied to a CSU</td>
<td>.328 [0.47]</td>
<td></td>
</tr>
<tr>
<td>Applied to Multiple CSU Campuses</td>
<td>.259 [0.438]</td>
<td></td>
</tr>
<tr>
<td>Accepted to a CSU</td>
<td>.275 [0.446]</td>
<td></td>
</tr>
<tr>
<td>Enrolled in a CSU</td>
<td>.153 [0.36]</td>
<td></td>
</tr>
<tr>
<td>Enrolled at a CCC/CSU</td>
<td>.423 [0.494]</td>
<td></td>
</tr>
<tr>
<td>CSU English Remediation</td>
<td>.287 [0.452]</td>
<td></td>
</tr>
<tr>
<td>CSU Math Remediation</td>
<td>.252 [0.434]</td>
<td></td>
</tr>
<tr>
<td>CSU STEM Major</td>
<td>.431 [0.495]</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1,396,580</td>
<td>213,531</td>
</tr>
</tbody>
</table>
Outline

Motivation

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Methodology

Results
Empirical Strategy

Methodology Following value added methodology developed in Chetty, Friedman and Rockoff (2014a)

Identifying Assumptions

1. Conditional on prior test scores and demographics:
   - School quality is uncorrelated with student performance
   - Common shocks are uncorrelated across years
   - Selection on observables (Kane and Staiger, 2008; Deming, 2014)

2. Unobservable determinants of college readiness are uncorrelated with school VA
School Value Added

- What contributes to school value added?
  - Teacher quality
  - Curriculum
  - Administration
  - Counselors
  - Culture
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Grade 11 ELA VA

Figure: School Value Added Distribution

- Teacher VA s.d.: Chetty, Friedman and Rockoff (2014a) = 0.098, Kane and Staiger (2008) = 0.171
- School VA s.d.: Deming (2014) = 0.054, Angrist et al. (2017) = 0.2
## Application & Enrollment Outcomes

**Table:** College Outcomes on 11th Grade ELA Value Added

<table>
<thead>
<tr>
<th></th>
<th>(1) CCC Enrolled</th>
<th>(2) CSU Applied</th>
<th>(3) CSU Applied &gt; 1</th>
<th>(4) CSU Accepted</th>
<th>(5) CSU Enrolled</th>
<th>(6) CCC/CSU Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Added</td>
<td>.00605**</td>
<td>.0272***</td>
<td>.0253***</td>
<td>.0199***</td>
<td>.00843***</td>
<td>.011***</td>
</tr>
<tr>
<td></td>
<td>(.0027)</td>
<td>(.00279)</td>
<td>(.00267)</td>
<td>(.0023)</td>
<td>(.00154)</td>
<td>(.0025)</td>
</tr>
<tr>
<td>Observations</td>
<td>1,147,386</td>
<td>1,392,675</td>
<td>1,392,675</td>
<td>1,392,675</td>
<td>1,392,675</td>
<td>1,392,675</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.0223</td>
<td>.132</td>
<td>.0923</td>
<td>.139</td>
<td>.0495</td>
<td>.102</td>
</tr>
</tbody>
</table>
### Table: CSU Outcomes on 11th Grade ELA Value Added

<table>
<thead>
<tr>
<th></th>
<th>(1) CSU Eng. Rem.</th>
<th>(2) CSU Math Rem.</th>
<th>(3) CSU STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Added</td>
<td>-0.014***</td>
<td>-0.0155***</td>
<td>-0.0021</td>
</tr>
<tr>
<td></td>
<td>(.00273)</td>
<td>(.00302)</td>
<td>(.00183)</td>
</tr>
<tr>
<td>Observations</td>
<td>213,060</td>
<td>213,060</td>
<td>167,089</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.245</td>
<td>.211</td>
<td>.0294</td>
</tr>
</tbody>
</table>
Value Added and Average Test Scores

Figure: School Average Test Score vs. 11th Grade ELA Value Added

(a) 8th Grade

(b) 11th Grade
## Specification and Falsification Tests

**Table:** Student Scores on 11th Grade ELA Value Added

<table>
<thead>
<tr>
<th></th>
<th>ELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>11th Grade Score</td>
<td>1.02***</td>
</tr>
<tr>
<td></td>
<td>(.00905)</td>
</tr>
<tr>
<td></td>
<td>[1.01, 1.04]</td>
</tr>
<tr>
<td>6th Grade Score</td>
<td>.0174***</td>
</tr>
<tr>
<td></td>
<td>(.00502)</td>
</tr>
<tr>
<td></td>
<td>[.00759, .0273]</td>
</tr>
</tbody>
</table>
Conclusions

- There is substantial variation in school quality.
  - A one standard deviation increase in school value added increases the average test score of students by 0.114 standard deviations.

- Value added is significantly correlated with college outcomes. A one standard deviation increase in school value added
  - increases CSU application by 8%
  - increases CSU acceptance by 7%
  - increases college enrollment by 6%.
  - reduces English remediation by 5%.
Investigating the relationship between school value added and individual college readiness
  ▶ Course taking
  ▶ A-G requirements

Link to NSC data
Thanks!

- California Department of Education
  - Jonathan Isler
  - Sean Kaviani
  - Eric Zilbert
- University of California, Davis
  - Sherrie Reed
  - John Daniels
  - K. A. Kramer

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Specification

\[
Z_{istc11} = \alpha + \delta_{ELA8} \cdot Z_{iELA8} + \delta_{Math6} \cdot Z_{iMath6} \\
+ \beta X_{i11} + \gamma_t + \mu_{stc} + \theta_{stc} + \epsilon_{istc11} \\
\text{Residual} = \nu_{istc11} (1)
\]

\[
y_{is} = \alpha + \phi \cdot \mu_{stc} + \delta_{ELA8} \cdot Z_{iELA8} + \delta_{Math6} \cdot Z_{iMath6} + \beta X_{i11} + \gamma_t + \eta_{is} (2)
\]

\[z_{istcg} = \text{Grade } g \text{ Subject } c \text{ Test Score}\]

\[X_{i11} = \text{11th Grade Demographic Characteristics}\]

\[\gamma_t = \text{Year Fixed Effects}\]

\[\mu_{stc} = \text{School Value Added}\]

\[y_{is} = \text{College Outcomes}\]