The Effects of School Turnaround Strategies in Massachusetts

John P. Papay
Brown University

April 2017

School “turnaround” approaches

- Recent emphasis on approaches to improve underperforming schools dramatically and rapidly
  - NCLB
  - School Improvement Grants (especially $3.5 billion via ARRA beginning in 2010)
    - Transformation = replace principal and implement reforms in a School Improvement Plan
    - Turnaround = replace principal and >50% of school staff
    - Restart = charter conversion or external manager
    - Closure
  - Related (and often overlapping) state activity
School “turnaround” approaches

- Whether such approaches can improve student outcomes is critical for policymakers to understand, but evidence is mixed.

- National study of SIG program found null effects
  - *Obama administration spent billions to fix failing schools, and it didn’t work* – Washington Post 2017
  - *The $7 billion school improvement grant program: Greatest failure in the history of the US Department of Education?* – Smarick 2017

- State studies have found more mixed evidence

School improvement in MA

- Massachusetts is one of the nation’s highest performing school systems

- In 2010, legislature passed legislation to improve failing schools

- MA DESE sought to identify the most “stuck” schools – lowest performing and least improving – for intervention as Level 4 schools
  - Required to implement an improvement strategy
  - Eligible for SIG funding
  - Provided an array of other supports
Identifying Level 4 schools

- Credible causal inferences enabled because of how the policy was implemented

- In March 2010, MA DESE:
  - Identified all 645 Title I schools in Corrective Action, Restructuring, or Improvement status
  - Identified the lowest performing 10% of these schools
  - Of these 65 schools, created movement indicators
    - Bottom half on movement labeled Level 4
  - Thus, there is a sharp cutoff for Level 4 eligibility

The current study

- (1) What is the effect of being identified as a Level 4 school on student performance?

- (2) What can we say about why this effect occurred?

- Data from 2006 through 2014
  - Student achievement and demographic data
  - Focus on students in grades 3-8
  - Focus here on math (very similar results in ELA)
Central approach: Intuition

- Difference-in-differences/time-series design
  - Look for change in school performance over time in Level 4 schools, but not in other schools.

![Graph showing difference-in-differences/time-series design](image)

Central approach: Intuition

- Regression discontinuity design
  - Disruption in trend on either side of an exogenous cut-point

![Graph showing regression discontinuity design](image)
Key Findings

Level 4 schools tend to serve low-income, minority, low-performing students
Large, positive effects of Level 4 status

DD: Effects consistent across models

<table>
<thead>
<tr>
<th>Preferred model</th>
<th>Effect in 2011</th>
<th>Effect in 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.126 **</td>
<td>0.290 ***</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
<td>(0.073)</td>
</tr>
<tr>
<td></td>
<td>[p=0.008]</td>
<td>[p&lt;0.001]</td>
</tr>
</tbody>
</table>

Year effects  
School effects   
Student controls

Note: ~, \(p<0.10\); *, \(p<0.05\); **, \(p<0.01\); ***, \(p<0.001\)

For comparison, this is about the effect of reducing class size by 30% in elementary school.

This is about 1/3 of the income-based test-score gap.
RDD: no difference in 2010

RDD: large effect in 2011 (1st year)
RDD: larger effect by 2014 (4th year)

Average gain: 2010 to 2014
Mechanisms

Changes in teacher effectiveness

- Two means by which teacher quality can improve in these schools:
  - Schools replaced ineffective teachers with new, more effective teachers, AND/OR
  - Existing teachers improved their performance

- Estimate standard value-added model before and after.

- Make two central comparisons
  - Teachers who move INTO or OUT OF a Level 4 school (before)
  - Teachers who STAY in Level 4 school (before vs. after)
Changes in teacher effectiveness

- Schools are replacing less effective teachers with more effective ones

<table>
<thead>
<tr>
<th>Teacher Level Fixed Effect</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Move Out (Pre-Level 4)</td>
<td>-0.239</td>
</tr>
<tr>
<td>Move In (Pre-Level 4)</td>
<td>-0.028</td>
</tr>
<tr>
<td>Difference</td>
<td>0.211</td>
</tr>
</tbody>
</table>

- Teachers in these schools improve substantially

<table>
<thead>
<tr>
<th>Teacher Level Fixed Effect</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stayer (Pre-Level 4)</td>
<td>-0.143</td>
</tr>
<tr>
<td>Stayer (Post-Level 4)</td>
<td>0.023</td>
</tr>
<tr>
<td>Difference</td>
<td>0.166</td>
</tr>
</tbody>
</table>

Conclusion and implications

- Being identified as a Level 4 school improved student outcomes significantly and substantially in the first year, on average

- AND, it changed schools’ performance trajectories
  - By 2014, being identified as a Level 4 school had improved student outcomes by ~0.40 to 0.50 SD.

- These results are consistent using two very different sources of identifying variation:
  - Within school over time (DD)
  - Across schools in same time period (RDD)
Conclusion and implications

- **Constellation of factors seems to be important for success**
  - Whole package included improvement strategy, support, and accountability

- **Teacher effectiveness in these schools changed substantially**
  - Teachers who left had quite low value-added
  - Teachers who entered (from the district) had somewhat above average value-added in other schools
  - Teachers who remained in Level 4 schools improved substantially

- **This serves as proof of concept that rapid and sustained improvement is possible**
  - Effects are larger than in other contexts, suggesting that something about the MA approach worked better

- **Suggests that:**
  - Schools made wise human capital decisions that made a real difference
  - School context matters substantially for teacher effectiveness
Thank You

Questions/Comments
john_papay@brown.edu