Cheating on National Exams in Indonesia
How big is the problem?

Emilie Berkhout, Menno Pradhan, Rahmawati, Daniel Suryadarma and Arya Swarnata
RISE Annual Conference
June 2019
Anecdotal evidence of widespread cheating

Indonesian Ombudsman Finds Cheating Practice in National Exam

Indonesian schools
More cheating, or else!

Scandals in the classroom

Students get high scores by cheating

Fedina S. Sundaryani
The Jakarta Post
The national exam is important for admissions

National Exam aims to measure student achievement...

• Determines acceptance into junior secondary school, senior secondary school, and university
• Condition for graduation (until 2016)

... and school quality

• Percentage of students who pass the exam
  ➔ Pressure for schools to have 100% pass rate
Why is cheating a problem?

1. Cheating makes it impossible to assess the learning outcomes of the education system

2. Students do not need to study and teachers do not need to teach to pass the exam

But how big is the problem?
We exploit a national policy against cheating

- The Government of Indonesia (GoI) took several measures to fight cheating in junior secondary schools since 2015

<table>
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<tbody>
<tr>
<td>• Identify cheating based on answer patterns</td>
<td></td>
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<tr>
<td>• All schools</td>
<td>• Eliminate traditional cheating practices</td>
</tr>
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<td></td>
<td>• Phased in</td>
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</table>
GoI generates the integrity score by school

- Index range 0-100
- Higher value → higher integrity → less cheating
- < 70 → sufficient evidence for substantial cheating
- 34% of schools had a score below 70 in 2015
The integrity score has a negative correlation with exam scores.
CBT offers students and teachers fewer opportunities to cheat

- Students get questions directly from server
- Test questions are different and in different order for each student
- Printing companies cannot leak answer sheets
- Teachers and principals cannot coach students
- Students cannot copy answers
CBT is rolled out over time in junior high schools

- Schools/district governments apply to GoI with interest in implementing CBT
- GoI approves if school meets criteria (access to computers, electricity and internet)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Schools</th>
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<tbody>
<tr>
<td>2015</td>
<td>39 schools</td>
</tr>
<tr>
<td>2016</td>
<td>874 schools</td>
</tr>
<tr>
<td>2017</td>
<td>8,724 schools</td>
</tr>
<tr>
<td>2018</td>
<td>17,015 schools</td>
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47% using CBT
Schools that implement CBT later have lower scores and larger drop in test scores.
We predict grade manipulation using administrative data on all schools

CBT limits cheating

• CBT implemented in phases
• Compare PBT score in previous year with CBT score

The Integrity Score correlates with the drop in exam scores

• Correlate the 2016 integrity score with the drop in scores for 2017 CBT schools

Predict the exam score without cheating for PBT schools

• Predict out of sample using integrity score and PBT exam score
The integrity score correlates with the drop in scores.

PBT Score 2016

CBT Score 2017

1) LOWESS fit; 2) Observations are 7,169 schools switched to CBT in 2017
We predict non-cheating scores for PBT schools

- Schools with higher integrity select into CBT → Cheating might be larger in population

<table>
<thead>
<tr>
<th></th>
<th>CBT exam score</th>
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<tbody>
<tr>
<td></td>
<td>Coefficient</td>
</tr>
<tr>
<td>PBT exam score</td>
<td>0.200 (0.059)</td>
</tr>
<tr>
<td>Integrity score</td>
<td>-0.045 (0.056)</td>
</tr>
<tr>
<td>Exam * Integrity</td>
<td>0.007 (0.001)</td>
</tr>
<tr>
<td>Constant</td>
<td>12.270 (4.527)</td>
</tr>
</tbody>
</table>

Mean CBT exam score 51.94

Province dummies YES

R² 0.71

Observations 7,169

Limitations
- School-level data
- Compare across cohorts
Low integrity schools increase scores with 42%

<table>
<thead>
<tr>
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<th>Exam on Paper</th>
<th>Exam on Computer</th>
<th>Drop in Scores</th>
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<tbody>
<tr>
<td>All Schools</td>
<td>57.0</td>
<td>48.2</td>
<td>8.8 (18.3%)</td>
</tr>
<tr>
<td>Low Integrity (Integrity &lt; 70)</td>
<td>68.7</td>
<td>46.1</td>
<td>22.6 (49.0%)</td>
</tr>
<tr>
<td>High Integrity (Integrity &gt;= 80)</td>
<td>51.9</td>
<td>48.7</td>
<td>3.2 (6.6%)</td>
</tr>
</tbody>
</table>

DiD estimator = 22.6 – 3.2 = 19.4 (42.1%)

Note:
- Computer-based exam scores in 2017 predicted for PBT schools
- 25% of schools had an integrity score below 70, while 53% had an integrity score equal to or above 80
Conclusion: Cheating is substantial

• 34% of junior high schools have an integrity score below 70
• Low integrity schools increase exam scores with 42%

Other studies used similar algorithms to identify cheating in Chicago and South Italy
• Jacob and Levitt (2003) find cheating practices in 4-5% of elementary school classrooms in Chicago
• Angrist, Battistin and Mezzogiorno (2017) find evidence for score manipulation in 14% of primary school exams in South Italy

Cheating at this scale adds to the learning crisis
• The national exam results do not measure learning
• It demotivates students to learn and teachers to teach

Future Research: Does learning increase after implementation of CBT?
Thank You

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