Algebra I Assessment
and
Student Performance in Principles of Economics
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Do SAT Math Scores Predict Performance on the Assessment?
- Distribution of SAT Math scores by pass (top) and fail (bottom)

Do SAT Math Scores and the Assessment Predict Performance on the Final Exam?
- OLS regression of Final Exam on Assessment Performance and SAT Math scores
  - Students in Performance Groups 1-3 score between 10 and 15 points higher on the Final Exam than students that fail, significant at 10%.
  - The 1st Algebra I Assessment opportunity and SAT Math have little predictive power in determining students’ performance on the Final Exam.
    - A 1% increase in the SAT is predicted to improve final exam score by 1%, significant at 1%.
    - A 1% point increase in the 1st Algebra I Assessment predicted to improve final exam score by .02%, significant at 10%.

Results
- 11.6% of 1361 students failed
- On average, it took a student 1.59 times to pass.
- On average students took longer to pass (significant at 1%) with no significant difference in failure rates.
- Students from private schools took longer to pass (significant at 5%) with no significant difference in failure rate.
- Upper-classmen had a much higher failure rate.
- On average, women took longer to pass (significant at 1%) with no significant difference in failure rates.

Motivation
- Incoming freshmen do not have the Algebra I skills to be successful in economics. This slows the pace of the class and compromises rigor.

Fall 2012 Algebra I Assessment
- Administered to 1361 incoming freshmen in Principles of Economics.
- Assessment counts towards 10% of course grade.
  - First opportunity during the first week of class.
  - Each subsequent opportunity given every 2 weeks.
  - Format:
    - 20 questions covering Arithmetic, Algebra, Geometry, and Graphing.
    - No multiple choice questions.
    - Calculators not allowed.
    - To show mastery, students must score an 80%.

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Comparison to Past Research
  - All are significant.
  - ACT Math and math quiz scores were similar.
  - Quantitative skills are multifaceted.
  - Our results are different perhaps due to test format and disallowing use of calculators.

Conclusions
- SAT (or ACT) Math do not seem to pick up on the math skills needed for Principles of Economics.
- A basic test of math ability is important to test for readiness to study economics.
- Calculator use on the SAT Math test may be masking mathematical ability.
- The multiple choice format of the SAT Math test may be masking mathematical ability.

Final Exam?
- Difference in allowance of calculators.
- Difference in test format.
- SAT Math is not adequately testing students on the basic math skills needed for Principles of Economics.
- Both the SAT Math and Algebra I Assessment cover the same material, so why the difference in predictive power?

Comparison of Algebra I Assessment scores from Spring 2012 and Spring 2013
- Spring 2012 - no calculator use allowed (green line-mean, black line-cut off to pass)
- Spring 2013 - calculator use allowed (green line-mean, black line-cut off to pass)

Preliminary Results of the Effect of Calculator Use on Assessment Scores
- Calculator use does impact performance on the Algebra I Assessment.

SAT Math scores are not a strong predictor of performance on the assessment overall but do predict performance on the first assessment opportunity.

Students have four optional opportunities to pass: PG1 - passed on 1st attempt, PG2 - passed on 2nd attempt, PG3 - passed on 3rd attempt, PG4 - passed on 4th attempt, PG5 - failed all attempts.

<table>
<thead>
<tr>
<th>PERFORMANCE GROUP</th>
<th>TOTAL IN GROUP</th>
<th>SHARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG1 - passed on 1st attempt</td>
<td>662</td>
<td>48.6%</td>
</tr>
<tr>
<td>PG2 - passed on 2nd attempt</td>
<td>417</td>
<td>30.6%</td>
</tr>
<tr>
<td>PG3 - passed on 3rd attempt</td>
<td>81</td>
<td>6.0%</td>
</tr>
<tr>
<td>PG4 - passed on 4th attempt</td>
<td>45</td>
<td>3.3%</td>
</tr>
<tr>
<td>PG5 - failed all attempts</td>
<td>156</td>
<td>11.5%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1361</td>
<td>100%</td>
</tr>
</tbody>
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