Remediation Need at CSU, 2003

Early Assessment
Simple Program Overview

- Goals of EAP:
  - Provide an early signal to students about their college readiness
  - Collaborate with HS community
  - Provide 12th grade interventions

- Components of EAP:
  1. 11th grade testing (early assessment)
  2. Professional development for teachers
  3. Supplemental preparation for students
Early Assessment Program: Testing Component Detail
- 15 extra questions added to the 11th grade CST (math and English)
  - English EAP also requires an essay
- Although CST is mandatory, EAP participation is completely voluntary
- Composite scores computed based on subset of CST questions and augmented EAP items
- Scores translated into outcomes: exempt or not exempt from CSU placement exam(s)

Research Question
- How does participation in the Early Assessment Program affect the probability of requiring remedial coursework in college?
  - Examine this question separately for mathematics and English.
- Quantify the size of the effect.
  - By how much is a student’s probability of needing remediation lowered by participating in EAP?

Academic Preparation Literature
- Better academic preparation → higher rates of persistence and degree completion
- Student information and expectations
  - Person, Rosenbaum, & Deil-Amen (2006); Rosenbaum (2001); Venezia, Kirst, & Antonio (2003)
- K-12 alignment with higher education
  - Venezia et al. (2005); Martinez & Klopot (2005)
- Effect of college remediation
Theoretical Model

- Economic model is human capital
- Production Function
  - One of the inputs is academic preparation
  - The output examined here is success in college
- Theory predicts that better information about your college readiness improves academic preparation and thereby increases the probability of success in college (lower probability of remediation)

Data

- California Department of Education: matched CSUS applicants to CST scores and EAP participation and outcomes
- Additionally, data on EAP participation by all HS juniors in the state since program inception

<table>
<thead>
<tr>
<th>CSUS Enrollees by Year</th>
<th>Pre-EAP</th>
<th>Post-EAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proportion</strong></td>
<td>2003</td>
<td>2004</td>
</tr>
<tr>
<td>Male</td>
<td>0.450</td>
<td>0.396</td>
</tr>
<tr>
<td>White</td>
<td>0.406</td>
<td>0.393</td>
</tr>
<tr>
<td>Black</td>
<td>0.087</td>
<td>0.085</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.181</td>
<td>0.187</td>
</tr>
<tr>
<td>Asian</td>
<td>0.222</td>
<td>0.231</td>
</tr>
<tr>
<td>Other race/ethnicity</td>
<td>0.104</td>
<td>0.104</td>
</tr>
<tr>
<td>Parental Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mom - HS Grad</td>
<td>0.811</td>
<td>0.813</td>
</tr>
<tr>
<td>Mom - College Grad</td>
<td>0.271</td>
<td>0.267</td>
</tr>
<tr>
<td>Dad - HS Grad</td>
<td>0.814</td>
<td>0.803</td>
</tr>
<tr>
<td>Dad - College Grad</td>
<td>0.359</td>
<td>0.325</td>
</tr>
<tr>
<td>Math Proficient</td>
<td>0.516</td>
<td>0.541</td>
</tr>
<tr>
<td>English Proficient</td>
<td>0.421</td>
<td>0.420</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>2426</td>
<td>2329</td>
</tr>
</tbody>
</table>
Empirical Strategy

- Could simply compare outcomes of those who participate in EAP to those who do not
  - English EAP participants have a 9 percentage point lower probability of needing English remediation at CSUS than non-participants.
  - Math EAP participants have a 6 percentage point lower probability of needing math remediation at CSUS than non-participants.
- Better strategy utilizes Logistic Regression to control for differences between groups:
  - Logit used when dependent variable is binary.
  - Intuition: students in post-EAP years are the “treatment group”, while students in pre-EAP years are the “control group.”

Empirical Model

- Remediation need by first-time freshman \( i \) in subject \( s \) (binary variable \( Y_{is} \)) is a function of:
  - Individual characteristics, \( X_i \): (race, gender, academic performance measures, parental education)
  - Subject-specific EAP participation indicator
  - Model: \( Y_{is} = \beta X_i + \alpha \text{EAP}_i + \epsilon_{is} \)
  - Null Hypothesis: \( H_0: \alpha = 0 \)
  - Alternative Hypothesis: \( H_{A}: \alpha < 0 \)
Analysis & Interpreting Results

- Test our hypothesis by running a regression and examining the sign and statistical significance of the parameter $\alpha$.
- Marginal effects also indicate the size of the effect associated with each variable.
- More specifically, marginal effects from logistic regression provide the percentage point change in the probability of remediation associated with a particular variable, holding all other variables constant.

Marginal Effects on Probability of Remediation Need, by subject

<table>
<thead>
<tr>
<th>Variable</th>
<th>English $z$</th>
<th>Math $z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>-0.0151</td>
<td>-0.1970</td>
</tr>
<tr>
<td>Black</td>
<td>0.1906</td>
<td>0.2052</td>
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<tr>
<td>Hispanic</td>
<td>0.2196</td>
<td>0.1358</td>
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<tr>
<td>Asian</td>
<td>0.2827</td>
<td>0.1438</td>
</tr>
<tr>
<td>Other race</td>
<td>0.1967</td>
<td>0.1064</td>
</tr>
<tr>
<td>High school GPA</td>
<td>-0.0968</td>
<td>-0.1696</td>
</tr>
<tr>
<td>CST English score</td>
<td>-0.0074</td>
<td>-0.0180</td>
</tr>
<tr>
<td>Dad College Grad</td>
<td>-0.0562</td>
<td>-0.2887</td>
</tr>
<tr>
<td>Mom College Grad</td>
<td>-0.0662</td>
<td>-0.0600</td>
</tr>
<tr>
<td>Post EAP</td>
<td>0.0335</td>
<td>1.63</td>
</tr>
<tr>
<td>English EAP participation</td>
<td>-0.0528</td>
<td>-0.0275</td>
</tr>
<tr>
<td>Math EAP participation</td>
<td>-0.0272</td>
<td>-0.11</td>
</tr>
<tr>
<td>Predicted probability</td>
<td>0.0882</td>
<td>0.3252</td>
</tr>
</tbody>
</table>

Conclusions & Future Directions

- Analysis indicates that I can reject my null hypothesis.
- Evidence that EAP participation does reduce the probability that CSUS first-time freshmen require remediation.
- Policy makers should compare the benefit of modestly reduced remediation to the cost of the program.
- Future work examines how results change when attributes of students' high schools are added to the empirical analysis.
Figure 3: Paths to College Readiness or Remediation in English at California State University

- 11th grader takes mandatory California Standards Test (CST) in the spring
- Takes supplemental EAP English questions
- Matriculate at CSU?
  - Yes
  - No further action
  - Ready for college coursework at CSU without additional testing
  - Exempt
  - Placed into remediation
- Score < 25
- Score ≥ 25
- Exempt via SAT, ACT, or AP?
  - Yes
  - Take CSU English remediation placement exam
  - No
  - No further action
  - Exempt via SAT, ACT, or AP? *Exemption requires a score of 550 or above on SAT I verbal or a score of 680 on the SAT II writing test, a score of 24 or above on ACT English, or a score of 3, 4, or 5 on either the AP Language and Composition exam or the AP Literature and Composition exam.