Mathematics Course Taking Among California 12th Grade Students

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Just Equations Conference—The Mathematics of Opportunity
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Background on Project

- A partnership with California Department of Education and all three public postsecondary systems (California State University, Community Colleges, and the University of California) to evaluate college and career readiness among California youth
- Tracking students from K-12 into and through postsecondary destinations
- Addressing disparities by student characteristics and by institutional types
- A close examination of students’ high school course taking, particularly Mathematics and English
Research Questions

- What college and/or career preparatory math coursework are California seniors enrolling in?
- How do these 12th grade course enrollment patterns differ by student race/ethnicity and socioeconomic status?
- Do these 12th grade course enrollment patterns differ for CSU applicants compared to all high school students?

Data

Population: 12th graders enrolled in a California public high school in 2015-2016

California Department of Education
California Longitudinal Pupil Achievement Data System (CALPADS)
  - Course-taking histories
  - Demographic information (race/ethnicity, socioeconomic disadvantage)

California State University
  - Student-level application data (Summer 2016-Fall 2017)
# 12th Grade Math Course Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Out of all 12th graders</th>
<th>Out of those who take Any Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Math</td>
<td>75.5%</td>
<td></td>
</tr>
<tr>
<td>Approved Math</td>
<td>64.0%</td>
<td>84.8%</td>
</tr>
<tr>
<td>Conditionally Ready</td>
<td>59.4%</td>
<td>78.6%</td>
</tr>
<tr>
<td>Algebra II</td>
<td>15.4%</td>
<td>20.4%</td>
</tr>
<tr>
<td>AP and IB</td>
<td>21.8%</td>
<td>28.8%</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td><strong>364,585</strong></td>
<td><strong>275,305</strong></td>
</tr>
</tbody>
</table>

A higher proportion of CSU applicants enroll in rigorous math courses in 12th grade as compared to all CA students.

**KEY FINDING**
Differences in 12th grade math course-taking between all 12th graders and CSU applicants

Substantial disparities in 12th grade math course-taking by student background characteristics: race/ethnicity and socioeconomic status

KEY FINDING
Differences in 12th grade math course-taking by student race/ethnicity
Differences in 12th grade math course-taking by student socioeconomic status

Differences in 12th grade math course-taking by student socioeconomic status

Differences in 12th grade math course-taking by student socioeconomic status

Preliminary, Please Do Not Cite Without Authors' Permission
Substantial disparities exist in the most advanced math course taking (AP and IB) by student background characteristics: race/ethnicity and socioeconomic background

KEY FINDING

Differences in 12th grade math course-taking by student race/ethnicity
Differences in 12th grade math course-taking by student socioeconomic status

<table>
<thead>
<tr>
<th></th>
<th>All Students</th>
<th>SED</th>
<th>Not SED</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th grade math</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>taken</td>
<td>24.5%</td>
<td>25.1%</td>
<td>23.8%</td>
</tr>
<tr>
<td>AP and IB</td>
<td>11.5%</td>
<td>8.6%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Conditionally Ready</td>
<td>4.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approved Math</td>
<td>25.1%</td>
<td>15.8%</td>
<td>28.5%</td>
</tr>
<tr>
<td>Any Math</td>
<td>15.8%</td>
<td>25.1%</td>
<td></td>
</tr>
<tr>
<td>No Math</td>
<td>21.8%</td>
<td>4.4%</td>
<td></td>
</tr>
</tbody>
</table>

Substantial variation in 12th grade math course taking among CSU applicants by CSU campus

KEY FINDING
Percent of CSU applicants taking Algebra II in 12th grade (by CSU campus)

- San Luis Obispo: 2.3%
- San Jose: 6.7%
- Pomona: 7.1%
- San Diego: 7.8%
- San Francisco: 8.5%
- Long Beach: 8.5%
- Fullerton: 9.2%
- Sanoma: 11.2%
- Maritime Academy: 11.2%
- Northridge: 11.3%
- Monterey Bay: 12.5%
- Fresno: 12.7%
- Humboldt: 13.1%
- Sacramento: 14.0%
- East Bay: 14.2%
- Channel Islands: 14.3%
- Chico: 14.5%
- Los Angeles: 14.5%
- San Marcos: 15.4%
- San Bernardino: 16.7%
- Bakersfield: 17.0%
- San Luis Obispo: 18.1%
- Stanislaus: 18.5%

Next Steps

- Explore patterns of course-taking by school characteristics
- Explore the impact of course-taking on postsecondary outcomes
  - College entry
  - College performance
  - College completion
Thank you!

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4th Year QR RATIONALE

1. ASCSU: “In an era where people are increasingly concerned with quantitative literacy, strong quantitative reasoning skills form a foundation for future success in college and careers. Success of incoming students is maximized when students have had continued exposure to mathematics/quantitative reasoning. Since it has been demonstrated that mathematics skills decline with lack of practice, it is important that students continue practicing and developing quantitative abilities throughout their academic careers.” http://www.calstate.edu/acadsen/Records/Resolutions/2015-2016/documents/3244.shtml

2. In 2014, over 40% of US states required a fourth year of mathematics for admission for their public university system, over 60% of states require 3 years for high school and 9 states require 4 years of math for a high school diploma. https://www.calstate.edu/AcadSen/Records/Reports/documents/QRTF.FinalReport.KSSF.pdf


5. “Of all pre-college curricula, the highest level of mathematics one studies in secondary school has the strongest continuing influence on bachelor's degree completion. Finishing a course beyond the level of Algebra 2 (for example, trigonometry or pre-calculus) more than doubles the odds that a student who enters postsecondary education will complete a bachelor's degree.” Adelman, C. (1999) (http://www.ed.gov/pubs/Toolbox/toolbox.html )