Developmental Education Program Effect Analysis: A Within-State Difference-in-Differences Approach

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AIR 2011 Annual Conference
Toronto, ON
May 2011
Developmental Education

- Designed to prepare students with weak academic skills for college-level coursework
- In some colleges, two-thirds of community college students are referred
- Many do not get through their referred sequence
- Failure to enroll in and failure to pass each course in the sequence: two fundamental problems that community colleges must solve
Achieving the Dream

• Multiyear national initiative to help community college students succeed

• Focus on closing achievement gaps for low-income students and students of color

• Referral, enrollment, and completion of both remedial courses and “gateway” courses

• Five colleges in Virginia participated at the onset
ATD Implementation

• Each ATD institution makes an effort to enhance academic support to developmental students

• Strategies may include adoption of new curricula for developmental education courses, pedagogical training, or more intensive advising

• Developmental education is the primary focus of ATD implementation

• Black box analysis of implementation through developmental referral
Timing of Implementation

• Round 1 schools were scheduled for implementation in 2005-06, Round 2 schools in 2006-07, etc.

• However, full implementation may have occurred later than scheduled.

• Sample contains only students in Round 1 schools, using the 2004-05 and 2007-08 cohorts.
VCCS Data

• 24,374 students in 2004 cohort, 28,236 students in the 2007 cohort

• Variable indicates whether student attended an ATD college or not

• Among those referred to developmental, does being in an ATD college after implementation help improve outcomes?
Outcomes

• Enrollment in a gateway course within two years
• Received some college credits within two years
• Persistence into the next term
• Persistence into the next year
Difference-in-Differences

• Control group: those who were never enrolled in an ATD college

• Treated group: those who were in an ATD college after interventions

• ATD and non-ATD students are largely similar in characteristics
  – Balanced sample analysis
Difference-in-Differences

\[ y_i = \beta_0 + \beta_1 ATD_i + \beta_2 After_i + \beta_3 (ATD_i \times After_i) + X_i \beta_4 + v_i \]

• This gives us a general picture of the effect of ATD interventions on outcomes

• Samples consist of students in all VA colleges, among those who were referred to some level of developmental education
All Referred Students

- $\beta_3$ is consistently positive, but not statistically significant for math sample

- Among those referred to reading, larger $\beta_3$ coefficients across outcomes
  - Almost three percentage points more likely to earn college credits (10% stat. sig.)
Transfer-Seeking Students

• Students who have academic intent and prefer to transfer to four-year college

• Among those referred to math, 5.5 percentage point increase in college-level algebra enrollment (1% stat. sig.)

• Among those referred to reading, 3 percentage point increase in college credit attainment (10% stat. sig.)
Balanced Sample

• Do these results hold when we create a balanced sample of ATD and non-ATD students?

• Used propensity scores to match ATD and non-ATD students 1:1

• Results indicate that results are largely similar for both math and reading students

• Even with a balanced 50/50 sample of like students, results hold
By Math Referral Level

- In VA, three distinct levels of math referral
- Does ATD implementation have a larger effect on those at the bottom or top level of math referral?
- At what level do we see larger effects of being in an ATD college after implementation?
By Math Referral Level

• Among lowest level, no statistically significant effects; coefficients are small

• Among highest level of math referral, college algebra enrollment increased by 20 percentage points (1% stat. sig.)
  – Next term persistence increased by about 8 percentage points (5% stat. sig.)
Falsification Tests

• First test: sample of students who were never referred to developmental education
  – Being in an ATD college in later cohort has no effect on outcomes

• Second test: sample of students who were not in ATD colleges
  – Being in the later cohort and referred to developmental education has no effect on outcomes
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CCRC funders include: Alfred P. Sloan Foundation, Lumina Foundation for Education, The Ford Foundation, National Science Foundation (NSF), Bill & Melinda Gates Foundation and Institute of Education Sciences of the U.S. Department of Education