Does Remediation Work for All Students? How Remedial and Developmental Courses Affect Students With Different Levels of Academic Preparation

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ABSTRACT

Each year, thousands of American students enter postsecondary institutions unprepared for college-level work and so are placed in remedial or developmental courses. Several recent studies have examined the effects of such remediation programs by comparing students just above and below the placement cutoff to provide a causal estimate of the effects of taking the courses. However, such studies focus exclusively on students who need just one or two remediation classes, and the estimates should not be extrapolated to students with more severe academic weaknesses. This study builds on this past research to examine the impact of such courses on students at multiple points of the preparation distribution. Using longitudinal data from the state of Tennessee, we are able to isolate the effects of placement into varying levels of mathematics courses for students attending four- and two-year public colleges and universities. This is possible due to the state's multi-tiered system in which students could be assigned into remedial, developmental, or college-level courses. This more refined level of examination allows for a deeper analysis into the effects of remediation on a diverse set of students. We employ regression discontinuity (RD) techniques to provide causal estimates of the effects placement on a number of student outcomes. The results suggest that remedial and developmental courses do differ in impact by level of student preparation. Students on the margin of needing remediation experience the largest negative effects on credit accumulation and degree completion, especially for those attending community colleges. Students placed into the lowest level of remedial courses also experience negative, albeit smaller, effects from being placed in a lower level course. However, the difference in college credits completed disappears by the end of year three. Students in the middle range of developmental courses appear to not experience negative or positive effects on outcomes.

Remediation in Higher Education

→ Lack of academic preparation is a significant barrier to college success – *How should we address this problem?*

→ Nationally **approx. 40%** of 1st year students are placed into college remediation (**55-60%** at CCs)

→ The bulk of remediation is provided at non-selective publics colleges & universities, the point of entry for **80%** of 4yr students and **99%** of 2yr students

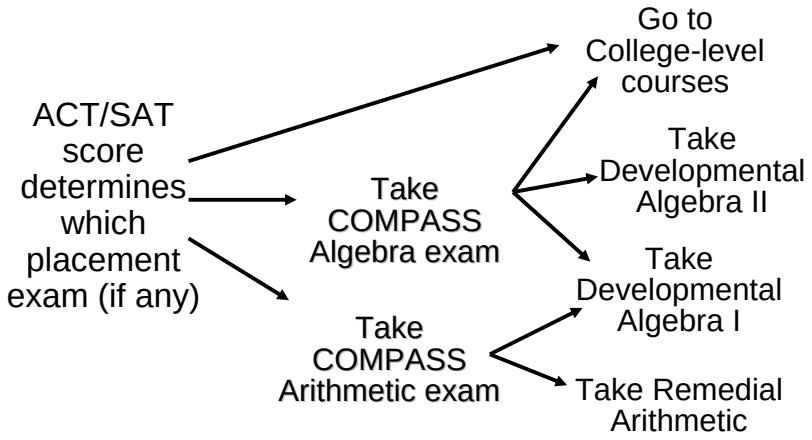
→ The remediation placement exam taken once arriving on campus has become the **key gatekeeper** to a college-level education (often a surprise to students)

Does Remediation improve the outcomes of underprepared students?

- **Previous Literature**
  - OHIO: Reduces likelihood of drop out and increases likelihood of degree completion (Bettinger & Long, 2008)
  - FLORIDA: Might promote early persistence, but it does not necessarily help students make long-term progress toward a degree (Calcagno and Long, 2008)
  - TEXAS: Little effect on a wide range of educational and labor market outcomes (Martorell & McFarlin, 2008)
- Previous studies focus on students on the *margin* of needing remediation -- they do not investigate the effects of remediation on students who are **extremely** under-prepared (i.e. don't have an appropriate control group)
- Do the effects vary for students at ***different*** levels?

Remediation in Tennessee

State policy governs who takes the placement exam
Multiple cutoffs and changes in placement policy over time



How does remediation influence the outcomes of students at different ability/preparation levels?

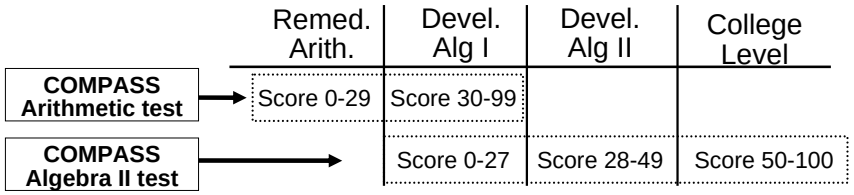
Multiple cutoffs → Investigate the effects of different types of remediation for students of different abilities

Data: TN Public Higher Education System

- Student level-data from THEC & TBR
- Tracks students over 6 years
- 24 institutions (13 two-yr, 11 four-yr)
- Sample: Students who began in fall 2000 and took a COMPASS math exam

Regression Discontinuity

- ***Goal:*** Isolate the effects of placement into varying levels of mathematics courses
- ***RD Intuition:*** Students just above and below the cut-off are nearly the same → Compare their outcomes



Regression Discontinuity

- Fuzzy" discontinuity- Use IV estimation, treating "intent-to-treat" as the instrument
- **First stage:** Linear probability model of whether assigned to remediation based on COMPASS score :

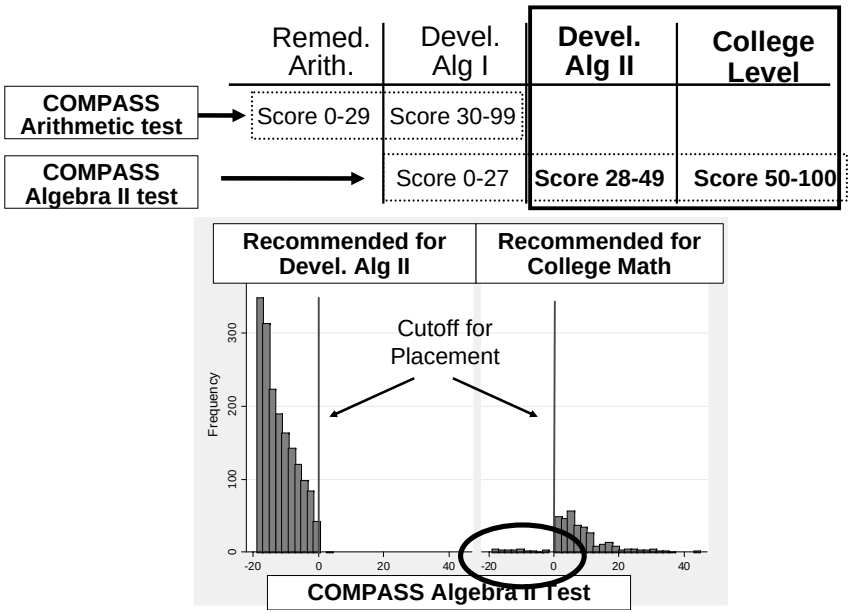
$$REM_i = \gamma_0 + \gamma_1(ASSIGN_i) + \gamma_2(SCORE_i) + \lambda(X_i) + \delta_i$$

- **Second stage:** Use estimate from (1) to estimate the causal effect of remediation on outcome Y_i:

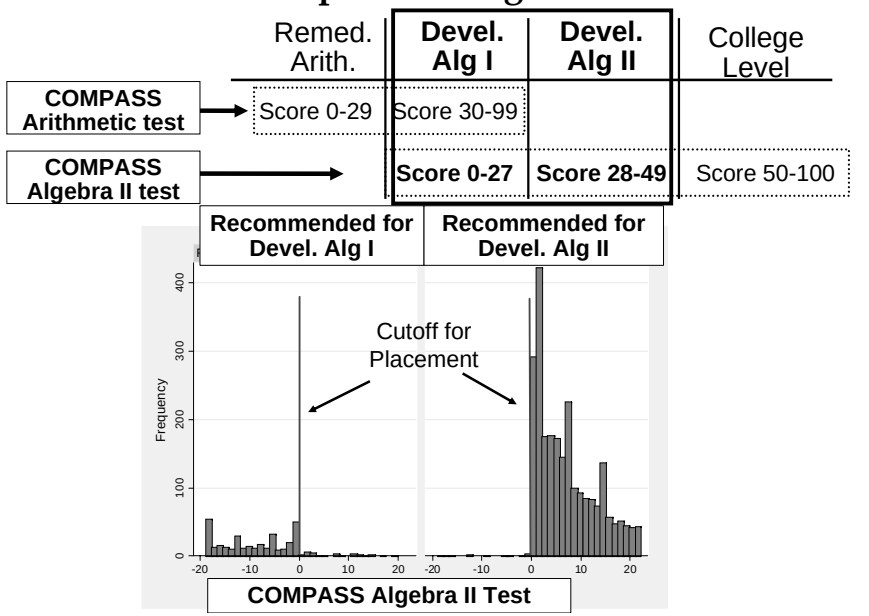
$$Y_i = \beta_0 + \beta_1(\widehat{REM}_i) + \beta_2(SCORE_i) + \delta(X_i) + \varepsilon_i$$

- **Controls (X):** race, sex, age, HS GPA, financial aid (need, merit, no aid), institution
- **Bandwidth selection:** Imbens & Lemiux (2008)

RD #1: Developmental Algebra II vs. College-level Math

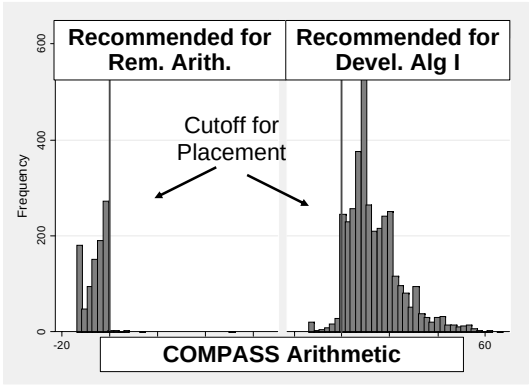


RD #2: Developmental Algebra I vs. Developmental Algebra II



RD #3: Remedial Arithmetic vs. Developmental Algebra I

	Remed. Arith.	Devel. Alg I	Devel. Alg II	College Level
COMPASS Arithmetic test	Score 0-29	Score 30-99		
COMPASS Algebra II test		Score 0-27	Score 28-49	Score 50-100



Results Summary

	RD#1 (Algebra II vs. College Level)	RD#2 (Algebra I vs. Algebra II)	RD#3 (Arithmetic vs. Algebra I)
EARLY PERSISTENCE (1 YEAR)			
Cumulative Credits	*No stat diff*	NEGATIVE (at CCs)	**POSITIVE**
College Credits	NEGATIVE	NEGATIVE	NEGATIVE
Stopout	*No stat diff*	*No stat diff*	*No stat diff*
MEDIUM TERM PERSISTENCE (3 YEARS)			
Cumulative Credits	NEGATIVE (esp. CCs)	*No stat diff*	NEGATIVE
College Credits	NEGATIVE (only at CCs)	*No stat diff*	No stat diff
LONGER TERM PERSISTENCE			
Stopout within 5 yrs	*No stat diff*	*No stat diff*	POSITIVE
Degree Completion	NEGATIVE (esp. CCs)	*No stat diff*	NEGATIVE (esp. CCs)

Summary of the Results

	Remed. Arith.	Devel. Alg I	Devel. Alg II	College Level
COMPASS Arithmetic test	Score 0-29	Score 30-99		
COMPASS Algebra II test		Score 0-27	Score 28-49	Score 50-100

- For higher-ability students, being assigned to the lower course suggests negative effects on early persistence, degree completion, and credits accumulated
- For students in the middle, remediation was found to have few positive or negative effects
- For students in lowest end of the distribution, assignment into the lower level course suggests negative effects on degree completion (though smaller than those found for the higher-ability students)

Implications and Next Steps

- It is important to determine how remediation affects students of ***all*** ability levels – Could the courses help students in need of multiple courses?

→Results suggest the effects do differ by ability

- Continuing Research
  - Investigate additional outcomes (more on credit accumulation, course GPA, look longer term)
  - Examine effects using ACT as a placement tool