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Title:

Help or Hindrance? The Effects of College Remediation on Academic and Labor Market Outcomes

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Abstract Body

Background/context:

Many new college students arrive on campus lacking the preparation to successfully pursue postsecondary education. A recent study shows that only one-third of high school graduates possess the minimum qualifications for a four-year college (Greene and Foster, 2003). This widespread phenomenon is seen as a key reason why large numbers of college students, particularly those from disadvantaged backgrounds, drop out (Venezia et al., 2003). Given the sizable earnings premium associated with college attainment (Kane and Rouse, 1995), understanding how to help under-prepared students complete college is an important question for economists and policymakers.

Remediation is the most common approach used by colleges to assist students who possess weak academic skills. Remedial – also known as developmental – education consists of courses and other services (such as tutoring) that are designed to foster skills generally acquired in high school. It is a central feature of American higher education. Among freshman entering college in the fall of 2000, nearly 30 percent participated in remediation. Remediation is even more common at two-year (or community) colleges, with 42 percent of entering freshman taking a remedial course (NCES, 2003).

Despite the prevalence of remediation, substantial controversy surrounds its use. Supporters contend that it helps poorly-prepared students succeed in college by allowing them a chance to catch up to their peers. According to this view, under-prepared students are better served in remedial courses than they would be floundering in college-level courses (Lazarick, 1997). In contrast, opponents argue that any benefits of remediation are outweighed by its high cost. Estimates from a decade ago suggest public colleges spent \$1 billion per year on remediation (Breneman and Haarlow, 1997), and some even argue that the costs are higher (Steinberg, 1998). Worries about cost partly explain why some states have cut funding for remediation programs (Bettinger and Long, 2007).

The disagreements over college remediation also fit into the debate in labor economics about policies to improve the human capital of low-skilled individuals. One side argues that little can be done to increase human capital of low-ability individuals once they reach a certain age (Carneiro and Heckman, 2003). According to this view, “skills beget skills” and effective interventions must therefore occur very early in life. Others maintain that some “second chance” programs (especially those aimed at individuals from disadvantaged backgrounds) have been successful even though the interventions did not take place at a young age (Krueger, 2003). Since college remediation is an important example of a later-life intervention, understanding whether remediation actually helps students develop economically valuable skills is informative about which view of human capital formation is more accurate.

Currently, there is considerable uncertainty surrounding the effectiveness of remediation. Assessing the impact of remediation is difficult because remediated students would likely have worse outcomes than non-remediated students in the absence of the program. Three recent papers in the economics literature seriously address this challenge, but the evidence remains mixed. Bettinger and Long (2007) and Jepsen (2006) generally find positive effects of remediation on college persistence and attainment. However, using a sample of Florida community college students and a research design similar to that used in this paper, Calcagno and Long (2008) finds little consistent evidence that remediation has positive effects.

Purpose/objective/research question/focus of study:

This paper presents new evidence on the effect of remediation using a large longitudinal dataset of Texas students. We study the effect of being in any remediation, regardless of subject, and also investigate the effect of remediation in different subjects. In particular, we examine whether remediation in math improves student outcomes. We examine both academic and labor market outcomes. The administrative records that comprise our data contain rich information on several measures of student success in college such as academic credit hours, years of college completed, and degree attainment. In addition, we examine the impact of remediation on labor market earnings using Unemployment Insurance (UI) earnings records. Studying the labor market effects of remediation is important because it allows us to directly test whether remediation helps students become economically successful. To the best of our knowledge, no other study has examined the labor market effects of college remediation.

Setting:

This study uses data on Texas college students who first enrolled between 1992 and 2000. Students in two- and four-year colleges are included although results are presented separately for each type of institution. Our study examines the impact of remediation on Texas college students who entered college in the 1990's. Texas is a good state to study the effect of remediation because it is a populous state (only California has more students enrolled in public colleges, NCES, 2007) that is diverse in terms of economic status, ethnicity and geography. Moreover, Texas has a large number of public two- and four-year institutions that are distributed throughout the entire state.

During this period, Texas law required all students pursuing academic degrees to enter remediation if they could not demonstrate college readiness. This policy, known as the Texas Academic Skills Program (TASP), stipulated that college readiness could be shown by passing the statewide TASP test or one of the state-approved alternative tests. Students could also meet the TASP requirements if they did sufficiently well on the state's high school exit exam, the SAT or the ACT. In our sample, about 10 percent of degree-seeking, entering freshman were identified as being exempt from the TASP requirements.

Population/Participants/Subjects:

In this paper we will examine students who first entered college between the 1991-92 and 1999-2000 school years, and did so as first-year students. We exclude earlier years because the data from this period do not appear to be complete. Later years are excluded to allow a sufficiently long follow-up period; for each student in our data, we are able to track their academic progress for 6 academic years. Students were included in the sample if they: (1) were not exempt from the TASP and who took the placement exam, (2) have non-missing data for date of birth and ethnicity, (3) were pursuing academic degrees when first enrolled, and (4) took the placement exam by the end of their first semester. We exclude students who were not pursuing a degree because the TASP requirements do not apply to them, although we find similar results when these students are included. The rationale for the final restriction is that it allows us to focus on remediation taken early on (within the first year) during a student's college career, when it is most likely to have an impact on academic outcomes. Throughout this paper we refer to "four-year" and "two-year" students based on the type of school they initially attended even though transferring from one type of institution to the other is fairly common (and in fact is an outcome that we will examine).

Our final sample has about 250,000 two-year college students and 200,000 four-year college students.

Intervention/Program/Practice:

The intervention examined in this paper is college remediation. “Remedial education” is an umbrella term that describes services provided by postsecondary institutions to help under-prepared students succeed in college. Remediation in its most common form consists of coursework that mirrors a college-preparatory curriculum in reading, writing, and mathematics. In addition to covering less-advanced material, remedial courses generally do not confer degree-counting credits and are often taught by different instructors than the ones who teach college-level – also known as “academic” – courses. Less formal types of instruction such as tutoring and supervised self-study are also used. However, these services are typically supplemental and offered in conjunction with coursework.*

Assignment to remediation is mainly determined by performance on placement test, although more individualized means such as referral from an advisor are also used. States vary widely in the rules governing assignment to remediation. Some states (such as Ohio, and as of 2003, Texas) grant institutions considerable latitude in setting passing scores and even in the actual examinations used to make remedial placements. Other states (such as Florida and prior to 2003, Texas) use a statewide test and passing standard.

Although our data do not contain information on particular instructional techniques, we briefly describe the predominant methods to provide a sense of what occurs in a remedial course. The most common method is the so-called “skills and drills” approach (Grubb and Kalman, 1994), which emphasizes basic skills (such as grammar and vocabulary) and builds up to more complex skills (such as reading for meaning). Alternatively, in “student-centered” approaches, instructors mold the curriculum to match what the students in a particular class hope to get out of attending college (Grubb et al., 1999). Finally, remedial strategies differ in breadth. Some have a narrow focus on academic skills, while others take a more holistic approach and also foster non-cognitive competencies such as social skills (Boylan, 1995).

Since students can be in remediation for potentially multiple subjects, we produce some results where the intervention or treatment is remediation in *any* subject. We also present results where we examine the effect of math and reading remediation separately. Math remediation is more common than reading or writing remediation, with 35 percent of students at two-year colleges in math remediation compared to 11 and 8 percent for reading and writing remediation, respectively.

Research Design:

This study uses a regression discontinuity (RD) research design (Imbens and Lemieux, 2007). Our regression discontinuity (RD) research strategy exploits the fact that during the time period of the study, Texas used placement test score results to assign students to remediation. Consistent with this policy, we find clear evidence that students who barely failed this exam were more likely to be in remediation than were students who passed. This can be seen in Figure 1. The vertical axis is the fraction of students in remediation for at least one section. the

* In our sample, 90 percent of students in remediation for math during their first year were in course-based remediation and 4 percent were in a combination of course-based and informal remediation. Informal remediation is more common at four-year colleges (22 percent for math) and for reading and writing (16 and 15 percent, respectively, at four-year colleges).

horizontal axis is the placement exam test score, rescaled so that it is equal to zero at the passing cutoff. The open circles represent the fraction of students in remediation at a particular test score level, and the curve is the fitted value of a regression of a remediation indicator variable and a flexible polynomial in the placement test score. There is a clear discontinuity in the probability of remediation at the placement cutoff. This discontinuity generates exogenous variation in the probability of remediation, and is used to generate instrumental variables (IV) estimates of the effect of remediation.

Data Collection and Analysis:

This paper uses data from the Texas Schools Microdata Panel (TSMP). The TSMP is a collection of administrative records from the state agencies that oversee K-12 public schools, public postsecondary institutions, and the state's Unemployment Insurance system. Linkages across data files can be made on the basis of an individual's encrypted social security number, which enables researchers to construct longitudinal data files.

Most of the data we use comes from Texas Higher Education Coordinating Board (THECB), which oversees public postsecondary education in Texas. Public colleges and universities in Texas are required to submit student-level reports to the THECB on an annual or semester basis. These reports contain information on each student enrolled at a particular institution including participation in remediation, credit hours attempted, and receipt of degrees and certificates. Note that we do not observe completed credits, which will be lower than attempted credits when students receive a failing grade in a course (credits in courses that a student drops before receiving a grade are not included in the THECB's measure of attempted credits). The TSMP has all student-level data collected by the THECB from 1990 through 2005.

Information on TASP test scores comes from the database of exam results provided by the contractor the Coordinating Board used to administer the exam. This data file contains a record of every test attempt taken since the inception of the testing program in 1989. It includes the scale score received on each section of the test as well as the administration date, which enable us to determine the student's performance relative to the passing standard and identify the scores received on the *initial* attempt.

The primary independent variable of interest in this study is whether a student was in remediation. In Texas, students can be in remediation for different (and possibly multiple) subjects. In this paper we focus on whether a student is in remediation for any subject. However, we also present results where the "treatment" is defined as remediation for math or remediation for reading. Because some students take the TASP exam after beginning their first semester, our definition of treatment status includes remediation in the student's first or second semester.

The THECB data files allow us to construct detailed measures describing a student's success in college. We examine four types of academic outcomes. The first is the number of academic credits a student attempts. We consider total credits attempted in six years. In addition, we also analyze the number of academic credits attempted during the first year in order to determine whether remediation crowds out degree-counting credits during the first year. Second, we examine whether a student initially enrolling in a two-year college "transfers up" to a four-year college and conversely, whether a student initially attending a four-year school "transfers down" to a two-year college. These measures are based on the type of school we last observe a student attending. Finally, we examine measures of college attainment. One is the student's highest grade completed. A second is whether a student receives an academic degree, defined for

two-year college students as earning a Bachelor's or an Associate's degree and as earning a Bachelor's degree for four-year college students.

We also examine the effect of remediation on earnings. These analyses use administrative earnings records from the Texas Workforce Commission (TWC), which oversees the state's Unemployment Insurance (UI) system. Covered employers are required to submit reports to the TWC with information on total earnings paid out to employees in each quarter. Although not all employment in Texas is covered in the TWC data (for instance, military service members), independent estimates suggest the vast majority of workers are covered by the state's Unemployment Insurance system (Stevens, 2002; King and Schexnayder, 1999). The analyses we will conduct examine total earnings received in the 5th, 6th and 7th year after a student first enrolls in college, where annual earnings are converted to year 2000 dollars.

Our dataset also includes a number of background and other baseline characteristics. These include basic demographic characteristics such as gender, race/ethnicity and date of birth. Finally, for about two-thirds of our sample, we also have information available from high school records on economically disadvantaged status (mainly receipt of free or reduced lunch) as well as the distance of their high school from the college they attend.

Findings/Results:

Our results provide little indication that students benefit from remediation. For a wide range of academic outcomes, and across a variety of subgroups, the estimated effects of remediation are small in magnitude and statistically insignificant. As can be seen in Figure 2 there is no difference in the fraction earning a college degree for students just above and below the remediation placement cutoff, despite the large difference in the probability of remediation. If anything, we find some evidence that remediation might worsen the outcomes of some students. We also find no evidence that remediation confers longer run economic benefits in the form of higher earnings, although these estimates are somewhat imprecise.

Conclusions:

These results have several important implications. First, it suggests that the marginal Texas student does not benefit from mandatory remediation despite the substantial financial cost of the program. Thus our findings support recent Texas policies that limit state funding for developmental education. At a minimum, our results suggest that remediation is not an effective policy for students scoring close to the passing cutoff, and that an appropriate policy might be to lower the passing standard (which would reduce the number of students in remediation). Alternatively, the current passing standard may be set too low if it targets students who are so under-prepared that they receive little benefit from the program. Second, our results are consistent with the view that "second-chance", later-life interventions are ineffective for improving human capital. In particular, we find no indication that remediated students have better labor market outcomes than comparable non-remediated students. Third, the absence of an effect of remediation suggests that peer ability, which is much lower in remedial courses, is not an important determinant of success in college. This may be because classroom peers are less important than peers in other college settings (Sacerdote, 2001; Carrell et al., 2007). It might also be because there are other positive educational benefits of remediation that offset the negative effects associated with lower peer quality.

Appendixes

Appendix A. References

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Appendix B. Tables and Figures

Figure 1. Fraction In Remediation for at Least 1 Subject by Placement Exam Score

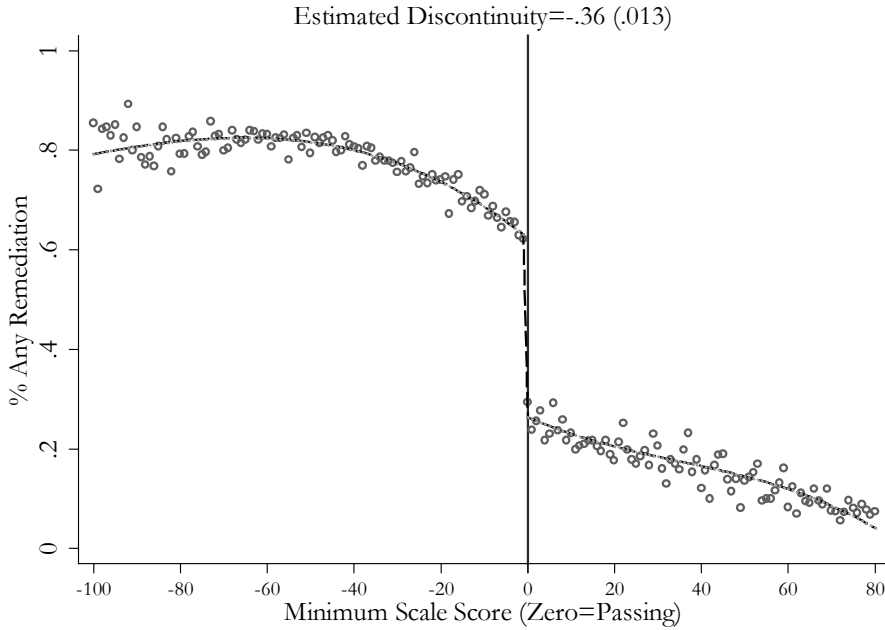


Figure 2. Fraction Graduating Within 6 Years by Placement Exam Score

