



Does Remediation Work for All Students?

How the Effects of Postsecondary Remedial and Developmental Courses Vary by Level of Academic Preparation

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Each year, thousands of American students enter postsecondary institutions unprepared for college-level work and are subsequently placed in remedial or developmental courses. Several recent studies have examined the impact of these courses on student outcomes but have focused exclusively on students who need just one or two classes. This Brief summarizes a study that addresses the impact of remedial and developmental courses on students with a range of levels of preparedness. Using longitudinal data from Tennessee, we estimate the effects of placement into varying levels of mathematics, reading, and writing courses for students attending public two- and four-year colleges and universities. This is possible due to the state's multi-tiered system in which students—based on their scores on the untimed, computer-adaptive COMPASS® placement test (developed by ACT, Inc.)—could be assigned into one of four levels of mathematics courses (college level, upper developmental, lower developmental,

and remedial) and one of three levels of reading and writing courses (college level, developmental, and remedial). In Tennessee, developmental courses refer to those courses just below college level, while remedial courses contain lower-level material intended for students who are very underprepared. Using a regression discontinuity (RD) research design, we provide causal estimates of the effects of placement on a number of short-, medium-, and long-term student outcomes, including persistence, degree completion, and the number of total and college-level credits completed. Results of the study suggest that remedial and developmental courses do differ in their impact by level of student preparation.

Data and Empirical Framework

Data

The Tennessee Higher Education Commission (THEC) and the Tennessee Board of Regents (TBR) provided the student-level data necessary for this study; these organizations collect basic enrollment information and transcript data for each student for any term the student is actively enrolled at a Tennessee public institution. Information is also available on demographic characteristics, high school background, and test scores, as well as assignment into remedial, developmental, or college-level courses. In the fall of 2000, there were nine public universities, two special purpose institutes, 13 two-year institutions, and 27 technology centers in Tennessee that served nearly 200,000 students. We observe students term-by-term from fall 2000 to spring 2003 (three years) and eventual degree completion after six years (additional data has been requested to extend the analysis). The sample is

restricted to undergraduates beginning at a public two-year or four-year college in Tennessee in fall 2000 who also took a COMPASS exam in mathematics, reading, or writing.

Methods

The study uses a regression discontinuity (RD) research design to tease out the causal effects of being placed into a remedial or developmental course in Tennessee. The RD design compares outcomes for students whose COMPASS scores fall just above and below the cutoff for placement. The analysis assumes that, other than placement into a higher- or lower-level course, students immediately on either side of the cutoff are equal in expectation. This allows us to compare the enrollment patterns of students assigned to remedial or developmental courses with those of students assigned to the next highest level course. The analysis provides an unbiased estimate of the causal impact of being placed into the lower level for students on the margin of passing out of the course.

Due to imperfect compliance with the statewide cutoff policy, the discontinuity in assignment to remedial classes is considered “fuzzy,” in that some students who were assigned to remediation did not receive it, and some who were not assigned subsequently enrolled in remedial classes. To address the research question in light of this fuzzy discontinuity, we adopt an instrumental variables (IV) strategy and a two-stage least-squares estimation, treating *assignment* to developmental or remedial courses as the instrument for actual *enrollment* in these courses. This approach provides an estimate of the local average treatment effect (LATE) for students who complied with their assignment to remediation based on the Tennessee cutoff policy.

Summary of Results

Our results, which are discussed in detail in the full paper, suggest that remedial and developmental courses produce different outcomes for students at varying levels of preparedness. For higher-ability

students in mathematics, being assigned to the upper-level developmental course (Developmental Algebra II) rather than the college-level course suggests negative effects on long-term college persistence and degree completion. And by the end of their third year, such students earned 6.4 fewer college-level credits than their peers who placed directly into college-level mathematics. For students in the middle of the mathematics distribution, assignment into the lower-level developmental course (Developmental Algebra I) rather than the upper-level developmental course (Developmental Algebra II) appears to make no statistically significant difference in students’ persistence rates or eventual degree completion. For students at the low end of preparation for mathematics, the effects of being placed in a lower-level course were small. Students who placed into the lowest level math course (Remedial Math) did slightly worse than their peers who were assigned to the next highest course, as they earned 3.0 fewer college-level credits than their peers by the end of their third year. Thus, in mathematics, the largest negative effects are found for students on the margins of needing any developmental education; at the other end of the academic ability spectrum, the effects are much smaller.

In reading, students assigned to the developmental course earned 7.0 fewer college-level credits by the end of their third year than their peers who were assigned directly to the college-level course. This difference in credit accumulation does not, however, appear to impact severely degree completion, as assignment to the developmental course is found to have only a slightly negative effect on degree completion within six years. At the low end of reading preparation, we find that placement into the remedial course rather than the higher-level developmental course had an effect only on the number of college-level credits a student completed by the end of the third year (4.6 fewer) and on eventual degree completion at the two-year colleges. Much like in mathematics, the magnitude of these effects in reading is smaller at the lower end of the academic spectrum than at the higher end.

In writing, we find that students at the top part of the ability distribution experienced negative effects from placement in the developmental course rather

than in the college-level course. For example, by the end of the third year, such students earned 5.2 fewer college-level credits than their peers who were assigned to the college-level course. However, we find positive effects for students placed in the lowest level course (Remedial Writing) in comparison to the next highest course. At the end of the third year, students assigned to remedial writing earned 4.0 *more total credits* and only 0.4 fewer college-level credits than their peers assigned to the developmental course. Such students were also more likely to be enrolled in college in their third consecutive year and more likely to earn a degree than their peers assigned to the upper-level course. In summary, writing remediation appears to have had a positive effect on students with very low levels of preparation.

We also investigate the apparent effects of being assigned to developmental or remedial courses on students' grades in their first college-level course, although these results are not causal. For students assigned to take Developmental Algebra II, slightly over half subsequently took their first college-level mathematics course in the second semester of their first year. We find no statistically significant differences in students' grades in their first college-level mathematics or reading courses in comparison to students who placed into the college-level courses immediately. It appears that students assigned to remedial or developmental writing, however, ultimately did perform better in their first college-level composition course than students assigned to the next highest level course. Students in the most need of remedial writing completed their first college-level composition course with a GPA that was 0.54 points higher than their peers who enrolled directly in a college-level composition course. This is not a large jump (the average effect being equivalent to moving from a C to a C+), but it is a statistically significant effect. Yet it is important to recognize that we cannot conclude that the remedial or developmental courses were the cause of the better performance in the first college-level course. It could be the case that students with the characteristics to persevere through remedial programs have traits that would also make them successful in later courses. Still, it is interesting to note the higher level of achievement for students once deemed unprepared for college.

Conclusion and Implications

The effects of college remediation on credit accumulation, persistence, and graduation are of great interest to college administrators, policy-makers, and taxpayers. In this study, we add to the existing literature by exploring remediation in a new context and for students with differing levels of prior academic ability. We find that effects on student credit accumulation do differ for students on the margins of needing remedial courses. Over time, students taking developmental and remedial mathematics courses accumulate fewer total college-level credits than their peers who take the next highest level of mathematics courses. By the end of the third year, students at the upper end of developmental mathematics earned roughly six fewer college-level credits than their peers who placed immediately into college-level courses, and students at the lower end of remediation earned three fewer college-level credits. In the early years, however, we do not detect any observable differences in college persistence, although the effects appear to differ based on the type of institution a student attended (two- versus four-year institutions). In writing, we find positive effects for those placed in the lower-level remedial course relative to those placed in the higher-level developmental course. For example, students in remedial writing persisted through college and attained a degree at higher rates than their peers in the next highest level course. It may be that the skills obtained through remedial writing courses are so fundamental to success in other courses that the acquisition of these skills resulted in improved academic performance and persistence in the long term. Students who took the remedial writing course also received higher grades in their first college-level writing course, perhaps suggesting that some remedial courses may indeed be helpful in preparing students for college-level work, although this part of the analysis is not definitive.

Our analysis suggests that the effects of remediation are far more nuanced than previously thought. Recent rigorous research has given us mixed, mostly negative estimates of the effects of developmental courses, but until now, analysis has been limited to students needing only one or two classes. As we

have shown, it appears that the effects of providing below-college-level courses varies according to the student's level of preparation: While developmental courses for students at the margin of needing any remediation have mostly negative effects, the impact of such courses for students with lower levels of preparation can be positive or have much smaller effects. In essence, remedial and developmental courses help or hinder students differently depending on their levels of academic preparedness. Therefore, states and schools need not treat remediation as a singular policy but instead should consider it as an intervention that might vary in its impact according to student needs.

The results present an interesting puzzle about why remedial and developmental courses have different effects by student ability. Understanding the reasons for these differences could provide insight into how to make developmental and remedial courses more effective. It may also be the case that remediation is not needed for as many students as are currently placed. Our results suggest the need for more careful consideration of how to measure which students truly need below-college-level help.

Colleges and universities should also consider focusing their efforts on helping students assigned to remedial courses to make continued progress toward their degrees. While taking remedial courses may not have large effects on short-term persistence, it does affect the number of college-level credits a student has earned by the end of the third year. This may be one the reasons why students in need of remediation obtain degrees at rates lower than their peers. It is thus important to consider ways in which students can complete their remedial requirements, yet not be deterred from taking additional college-level courses. It is also important to understand why some students pass their first college-level course after taking a developmental or remedial course while others do not. Answers to these questions could help to better identify strategies to improve remediation programs.

These findings are particularly relevant for Tennessee today, as the state recently redesigned their remedial

courses with the hope of improving effectiveness. During the 2008–09 academic year, the state began piloting redesigns of their instructional approaches with the goal of allowing students to spend less time in remedial courses. In these pilot programs, students complete their remedial coursework in modules outside of or in tandem with their college-level courses. These modules require much less time and money on the part of the student and are designed to pinpoint instruction to only those skills the student needs. Given that our findings suggest that the traditional mode of delivery of developmental courses did not have large positive effects on outcomes for students on the margins of developmental or remedial placement, except at the lowest level of writing, these more focused reform efforts may be a promising solution.

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