Developmental Education's Effect on Graduation and Labor Market Outcomes

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ABSTRACT: This study explores the effect of developmental courses on labor market outcomes and baccalaureate degree attainment using data from the Educational Longitudinal Study of 2002 (ELS:02; Ingels et al., 2014). Unlike previous research that only compares those needing developmental coursework to college peers who do not need coursework, this study is the first to examine outcomes of high school students who enroll in college through developmental classes and similar high school graduates who do not enroll in college. Employing inverse probability weighting, the findings of this study provide a counternarrative to current conversations about developmental courses. We offer some important evidence to suggest that developmental courses may have a more beneficial impact than many perceive.

Access to college through developmental education may have an effect when comparing students admitted via developmental education to similar students who did not attend college.

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Recent estimates suggest that almost half of all college students and nearly 70% of all community college students take developmental classes in college (Chen, 2016; Long & Boatman, 2013; Scott-Clayton, 2018). Political debate on developmental education often centers on the duplicative costs of such courses, stemming from the perception that the skills that students learn in developmental courses should have been gained prior to college (Crisp & Delgado, 2014). Much of the controversy also focuses on the effect that developmental education has on students. Although these programs may serve as a means of fostering student access and degree completion, critics of developmental education point to research that reveals possible negative academic, financial, and psychological effects of the courses (e.g., Scott-Clayton, 2012; Valentine, Konstantopoulos, & Goldrick-Rab, 2016).

Disparities in the students who most often qualify for developmental programs add an additional layer of challenge to the debate. Developmental education is pervasive across U.S. higher education, with first-generation, low-income, and students of color disproportionately represented in these courses (Chen, 2016; Crisp & Delgado, 2014), which is largely attributed to inequities in high school socioeconomic composition (Attewell, Heil, & Reisel, 2011; Engberg & Wolniak, 2014; Niu & Tienda, 2013). Even if developmental education offers the only avenue into college for some students, institutions' limited resources for developmental education, coupled with demands for higher rates of college completion, can be a powerful disincentive for serving underprepared students (Long & Boatman, 2013). Further, as the income and achievement gaps between high and low family incomes widen (Michelmore & Dynarski, 2016), any policies that limit college opportunities afforded by developmental education may exacerbate inequities and limit social mobility.

Research on outcomes associated with developmental education is nuanced at best, and outcomes are greatly influenced by students' background characteristics and precollege educational experiences (Long & Boatman, 2013). As students who require developmental classes are substantively different from those not requiring developmental classes, recent studies that employ experimental and quasiexperimental techniques offer the best insight into the effects of developmental education. For instance, because developmental course placement invariably relies on a test cut score, many studies use regression discontinuity (RD) to study students who score just above and below the cut score. In a meta-analysis of RD studies, Valentine et al. (2016) found predominantly negative effects of developmental course placement on three outcomes: passing college courses in the same subject as the developmental course, credits earned, and certificate or degree attainment. One limitation of RD methods, however, is such studies look only at students near the cut point and therefore do not consider the impact of developmental education on the least prepared students.

In a recent experimental approach, Logue, Watanabe-Rose, and Douglas (2016) focused on the effect of developmental math on academic performance. In exploring different conditions of math interventions at three CUNY (City University of New York) colleges, authors found that students who qualified for developmental education but who were assigned to college-level statistics without developmental classes performed better in the statistics course than their peers who completed developmental classes. This study also found developmental education in the form of corequisite workshops to be more efficacious than traditional

developmental courses as a prerequisite. Despite the rigorous methodological approaches employed by these studies, external validity is limited given their focus on single institutions, states, or subjects, and findings may not transfer widely.

Largely absent from literature on postsecondary developmental education are the long-term employment and earnings implications of these interventions. Martorell and McFarlin (2011) have examined earnings, along with a series of other educational outcomes, using RD to find that the earnings of students requiring developmental education were no different than college students who did not require developmental education. As with many of the other studies discussed, however, these findings have limited external validity and also overlook the notion that access to college through developmental education may have an effect when comparing students admitted via developmental education to similar students who did not attend college.

Conceptual Framework

This study of developmental education is framed by theories of human, social, and cultural capital. Human capital theory suggests that individuals accumulate productive capacities (e.g., knowledge, skills) through investments in education, which can be exchanged for increased earnings, power, and status (Becker, 1993). Students decide to enroll in college by comparing expected benefits (monetary and nonmonetary) with expected costs (costs of attendance and foregone earnings). Sociologists argue that decisions about educational investments are made within unique social contexts which are often closely related to socioeconomic backgrounds. The enduring beliefs, attitudes, perceptions, and values acquired from the immediate environment, or the habitus (Bourdieu & Passerson, 1977), defines and delimits educational options and alternatives based on social and cultural capital (Perna, 2006). Social capital is an individual's access to information and support acquired through interactions within their social networks (Coleman, 1988). Cultural capital is an individual's cultural knowledge, language skills, and credentials, derived largely from parents' class status (Bourdieu & Passerson, 1977).

Purpose of Study

In addition to comparing students who participate in developmental education to those who do not, as defined by any participation in developmental coursework, this study is the first to also compare those who have access to college through developmental education to students who have not attended college. This strategy allows for investigation into the implications of developmental education and its role in providing educational opportunities to underprepared students. Thus, two research questions guide the study:

1. Compared to students who do not attend college, do those who enroll in college and require developmental education differ from matched peers who do not enroll in college by earnings and employment status 8 years after high school graduation?
2. Among college students, do those enrolling in developmental classes have different labor market and educational outcomes than those who do not?

Methods

This study uses the National Center for Education Statistics' Educational Longitudinal Study of 2002 data (ELS:2002; Ingels et al., 2014), which follows a nationally representative sample of tenth graders in 2002 through high school and postsecondary education and into the workforce. The initial survey and first follow up (collected in 2004), provide rich precollege data on student background, student achievement, and high school context. The third follow up, collected in 2012, 10 years after the initial data collection, provides information on an array of college variables, including college attendance, participation in developmental education, and postsecondary persistence and attainment rates, along with labor market experiences. To date, no other national study provides this wealth of information and supplies data to follow students from high school into the labor market.

Decisions about educational investments are made within unique social contexts which are often closely related to socioeconomic backgrounds.

Using these data to analyze the effects of developmental education on the labor market outcomes of interest, we employed inverse probability weighting, a quasiexperimental methodological technique used to infer causality by reducing selection bias, or inherently different characteristics, between different groups. For instance, simply comparing the postgraduate outcomes of students who do and do not participate in developmental education would likely result in clear differences due the characteristics correlated with participation in developmental education, such as socioeconomic status.

To create comparable groups, we first summarized all background characteristics that predict students' participation in developmental coursework, referred to as the "treatment" based on the conceptual framework. Covariates were then combined into a single variable called the propensity score (Rosenbaum & Rubin, 1983), which reflects the probability of an individual receiving treatment given specific characteristics (Ho, Imai, King, & Stuart, 2007). Propensity scores then allowed the use of regression analysis to predict and compare outcome variables for treatment and control groups while accounting for initial differential background characteristics between the two groups.

Inverse probability weighting has several advantages over traditional propensity score matching methods. Employing inverse probability weighting allows the researcher to run different analyses by simply adding the weights to the regression equation. Thus, each empirical model will vary depending on the outcome variable, but all models will include the calculated inverse probability weights. Second, using an inverse probability weighting approach allows researchers to maintain a large sample size, which results in high external validity. Third, inverse probability weighting requires models to be run in a two-step procedure, therefore providing doubly robust estimations of treatment effects.

Variables

Treatment variables. This study is focused on the effects of developmental education, as defined by students taking developmental coursework in college in reading, writing, and math. We examined the overall effects of taking any developmental course, as well as each developmental subject as a separate treatment.

Outcome variables. The three outcomes for this study were earnings, employment, and baccalaureate degree attainment, all of which are measured 8 years after high school graduation. Earnings, a continuous variable, reflected an individual's annual earnings. Because unemployed individuals would have zero income and might bias the results if developmental education affects the likelihood of having zero income, we ran models two ways: excluding those with zero income and including those with zero income. The second outcome variable, employment, is binary and indicated whether an individual was employed or not, excluding those unemployed and not looking for work from the sample. Our final measure is a binary variable indicating the completion of a baccalaureate degree.

Covariates. Covariates were selected based on prior research showing their effect on both the treatment assignment and the outcome variable (Ho et al., 2007), which, in the present study, were assignment to developmental coursework and labor market outcomes, respectively. Covariates were selected from five categories: demographics, habitus, human capital, social capital, and cultural capital (see Appendix A and Appendix B). All covariates were measured in high school, prior to participation in

CONTINUED ON PAGE 12

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the developmental education treatment. The first set of covariates included student demographic information: sex, race, socioeconomic status, a composite of family income, parental education, and parental occupation prestige. The second set of covariates captured a student's academic ability and preparation in high school that would be likely predictors of developmental education participation, including high school GPA, highest math course taken in high school, and reading and math achievement test scores. The conceptual framework was applied to guide the last sets of covariates in the first-stage propensity model. Measures of human capital, included average number of hours spent working and average number of hours per week spent studying. Variables selected to capture a student's individual habitus were the student's highest level of education they expect to complete and the education they think they need for their expected job at age 30. Second, the included composite variable captures social capital based on the involvement of a student's parent in the community and at school. Lastly, cultural capital is represented by a composite variable indicating social class and family resources; its components include having access to newspapers, magazines, computers, internet, books, and outside entertainment (i.e., concerts, plays, movies).

Data Analysis

Data analysis for this study included three major design steps prior to the empirical analysis. First, we estimated the probability of treatment by calculating the propensity score for each individual using the covariates. Although covariates do not need to be statistically significant to be included in the model, treated and control groups were balanced on the covariates, indicating that they had equivalent background characteristics.

The propensity score equation is a logit model that predicts the probability of an individual receiving the developmental education treatment:

$$\text{logit (developmental} = 1) = \beta_0 + \beta_1(x_i) + \beta_2(x_i) + \ldots \beta_k(x_{ki})$$

For this model, *i* represents the value of an individual in the predictor equation. The model's outcome variable, *developmental*, indicates the probability of a student participating in developmental classes. Covariates can be added to the model, with effects represented by the β regression coefficients.

After propensities were calculated, we calculated weights based on the inverse probabilities of the propensity scores. This analysis is concerned with calculating the average treatment effect on the treated (ATT), focusing specifically on the effects of the treatment for those who received treatment (Caliendo & Kopeinig, 2008). By using inverse propensity score weighting, we were able to create comparable groups that control for inherent differences between

Table 1

The Effect of Any Developmental Coursework on Earnings: Developmental College Students Compared with High School Graduates and Nondevelopmental College Students

Student Cohorts	All College		4-yr College		Community College	
	All observations	Salary greater than zero	All observations	Salary greater than zero	All observations	Salary greater than zero
Developmental students compared with HS graduates who did not go to college						
All students	6758.96 ***	4835.82 ***	9669.12 ***	6905.18 ***	3979.33 ***	2501.53 ***
URMs	4978.82 ***	3499.48 ***	7266.13 ***	4824.55 ***	3191.12 ***	2119.60 ***
Low SES	6001.38 ***	5073.54 ***	7388.06 ***	7848.74 ***	5000.07 ***	3592.72 ***
High SES	7913.38 ***	4421.62 **	10978.21 ***	6115.61 **	4795.19 *	2477.40***
No BA/BS	3307.08 ***	3509.38 ***	2786.99 ***	4440.93 ***	3579.65 ***	3117.05 ***
Developmental students compared with non-developmental college students						
All students	559.50	163.74	1218.01	629.25	-106.27	-299.22
URMs	-387.10	-393.43	623.05	-679.95	618.80	170.41
Low SES	965.46	800.45	2440.00	1602.39	-34.89	121.06
High SES	1132.79	523.04	2111.34 *	1660.60	-703.20	-1924.22
BA/BS	1095.62	222.96	1614.27	465.13	-1055.87	-1103.05

Note: ***$p < .001$, **$p < .01$, *$p < .05$

Unstandardized coefficient represents the premium associated with college remediation in dollars.

Propensity score analysis uses inverse probability weighting. Trim the dataset when probability of treatment is less than .01 and greater than .99.

All observations include those who have a salary of 0.

treatment and control groups, thus isolating the effects of participation in developmental education as a predictor of labor market and educational outcomes across groups.

Comparison Groups

We utilized two different comparison groups for analyses. Because we employed inverse probability weighting, one can conceptualize that the groups were, in essence, matched on the covariates with the treated (developmental) group. One set of models compared those who did not attend college to those who did by enrolling in any developmental class. It is important to note that we used this group to examine developmental education as an access point or intervention given to underprepared students. Without developmental education, these students may not have access to higher education.

The second set of comparisons examines students who participated in developmental education versus college students who did not. This is the common comparison group used in previous research by which researchers seek to explore the effects of developmental students compared with their nondevelopmental college peers.

Results

For both sets of comparisons, the overall effects of developmental education on all students in the sample are presented (full results, with *N*s rounded to the nearest 10, available from authors). We also tested the heterogeneity of developmental education effects by running models for different subgroups. These models examined the type of college students attend, along with individual characteristics including socioeconomic status (SES) and underrepresented minorities (URMs [underrepresented minorities], African American, Hispanic, and Native American). Finally, we explored how developmental course subject areas (reading, writing, and math) affect outcomes, with each subject area treated as a separate treatment.

Developmental Education and Earnings

First, we examined the effect of developmental education on earnings (see Table 1, page 12). The top panel compared developmental students with students who did not attend college. With only one exception, high SES students attending community colleges, developmental education participation positively affected earnings at a statistically significant level. Relative to high school graduates who did not attend college, students who accessed college through developmental courses earned, on average, approximately $4,800 to $6,800 more (zero salaries removed, and all observations included, respectively). Developmental students at four-year colleges had a greater salary boost than those at community colleges. Relative to those who did not attend college, those who had access to four-year colleges through developmental education earned approximately $7,000 to $10,000 more than high school graduates who did not attend college. At community colleges, the differential was between $2,500 and $4,000.

Across the subgroups, there were similar earnings patterns with some nontrivial differences. When compared with URMs who did not attend college, the developmental education premium was somewhat smaller across the different models. Among all URMs, the effect of developmental education was between $3,500 and $5,000. At four-year institutions, the premium ranged between approximately $4,800 and $7,300. The effect was smaller at community colleges, falling between $2,100 and $3,200.

Developmental education appears to have provided an important earnings boost of $3,600 to $7,800 for those from low SES families. In many cases, this effect was larger than that for those from high SES backgrounds. Perhaps most compelling was the effect of developmental education for low-income students at community colleges. When we restricted our sample to those from low SES

CONTINUED ON PAGE 14

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families, enrolling in any developmental community college course resulted in a $3,600 to $5,000 increase in earnings, compared to the premium of $2,500 and $4,800 for the high SES sample.

We also compared those who did not attend college to those who accessed college through developmental education but did not earn a degree. Although the earnings premium was smaller than the full sample model, students who accessed college through developmental education but did not complete a degree earned statistically significantly more--ranging between $2,800 and $4,400--than those who did not attend college.

Researchers also compared college students who enrolled in developmental courses to college students who did not (see bottom panel of Table 1, page 12). When comparing college students who enrolled in developmental education with those who did not, we found little or no penalty for developmental education on postcollege earnings among college matriculants, even when the sample was restricted to only those who had earned a baccalaureate degree.

Developmental Education and Unemployment

Although the effects revealed in this study were modest, developmental education appeared to significantly positively affect employment status when we compared developmental students to those who did not attend college. Odds ratios analysis showed a statistically significant effect of developmental education participation on unemployment (see Table 2). Keep in mind that odds ratios less than one indicated a negative relationship; odds ratios greater than one indicated a positive relationship. Results comparing developmental college students to those who did not attend college are presented in the table's top panel. When looking at all students, relative to those who did not attend college, college students who enrolled in any developmental courses were approximately 30 percentage points more likely to be employed. URM students were also approximately 30 percentage points more likely to be employed if they took any developmental courses while in college.

When we restricted the analysis to developmental education students attending four-year colleges, compared to those who did not attend college, low SES students were 42 percentage points more likely to be employed. Likewise, community college students who enrolled in any developmental course were 36 percentage points more likely to be employed than those who did not attend college. There was a similar statistically significant positive effect across all community college subgroups.

The bottom panel of Table 2 presents the results of the models comparing developmental college students with nondevelopmental college students. As with earnings models restricted to only college students, there was no evidence that developmental education affects employment status. In other words, after accounting for selection by controlling for covariates in our full models, we found no employment status penalty for developmental education, regardless of subgroup or where the student attended college.

Developmental Education Subject and Labor Market Outcomes

We also explored how developmental course subjects differentially affect labor market outcomes. Similar to the analyses of any developmental course enrollment, findings showed that developmental course enrollment positively affected earnings when compared to no college attendance across subject areas (see top panel of Table 3, page 15). In particular, the math premium was quite large, ranging between $5,200 (salary greater than zero) and $7,100 (all observations) for students who enrolled in developmental math courses rather than not attending college at all. Across all three subjects, developmental course enrollment reduced the likelihood of being unemployed, and the effects are quite similar ranging from 29 percentage points (mathematics) to 33 percentage points (writing).

Comparing students who enrolled in developmental education to students who did not enroll in these classes, data revealed few statistically significant differences in earnings and unemployment (see bottom panel of Table 3). In the models of all students, those enrolled in developmental math earned approximately $1,160 more than those college students who did not enroll in developmental math but rather enrolled directly in entry-level courses. No other developmental subjects had a statistically significant effect on earnings. Likewise, developmental subject enrollment had no statistically significant effect on earnings when developmental students were compared with nondevelopmental college students.

Developmental Education and Baccalaureate Degree Attainment

Results of the baccalaureate degree attainment model (8 years after high school graduation) are presented in Table 4 on page 15. There were no negative effects of developmental education on baccalaureate degree attainment. The only exception was those who started at a community college. Students who started at a community college and who participated in developmental education were 1.67 times as likely

Table 2

The Effect of Any Developmental Coursework on Employment Status: Developmental College Students Compared with High School Graduates and Nondevelopmental College Students (significant values only)

Student Cohorts	All College	4-yr College	Community College
Developmental students compared with HS graduates who did not go to college			
All students	0.698 *		0.639 ***
URMs	0.711 *		0.696 ***
Low SES		0.579 *	0.644 ***
High SES		***	0.418 ***
Developmental students compared with nondevelopmental college students			
All students			
URMs			
Low SES			
High SES			

Note: ***$p < .001$, **$p < .01$, *$p < .05$

Propensity score analysis uses inverse probability weighting. Trim the dataset when probability of treatment is less than .01 and greater than .99.

Odds ratios provided when statistically significant

An odds ratio less than one indicates a negative effect.

Table 3

The Effect of Developmental Subject on Earnings and Unemployment: Developmental College Students Compared with High School Graduates and Nondevelopmental College Students

Student Cohorts	Earnings (in dollars)		Unemployment (odds ratios for stat. sign. Variables)
	All Observations	Salary greater than zero	
Developmental students compared with HS graduates who did not go to college			
Reading	4796.13 ***	3698.01 ***	0.701 *
Writing	5629.65 ***	4441.70 ***	0.673 *
Mathematics	7138.53 ***	5231.28 **	0.709 *
Developmental students compared with nondevelopmental college students			
Reading	52.30	-343.00	
Writing	914.25	-1.65	
Mathematics	1159.84 *	811.36	

Note: ***$p < .001$, **$p < .01$, *$p < .05$

Unstandardized coefficient represents the premium associated with college remediation in dollars.

Propensity score analysis uses inverse probability weighting. Trim the dataset when probability of treatment is less than .01 and greater than .99.

All observations includes those who have a salary of 0.

Odds ratios provided when statistically significant

An odds ratio less than one indicates a negative effect.

Perhaps more important are the findings related to social mobility and developmental education. Access to college through developmental coursework appears to have important benefits. Unlike previous research that only compares students needing developmental education to college peers who do not, this study is the first of its kind to look at outcomes of students who take developmental classes and similar high school graduates who do not enroll in college. This approach highlights the opportunity provided by developmental coursework and the positive effect participation in developmental education has on earnings and employment status.

What these findings tell us is that developmental education as an intervention and gateway to college has the potential to provide upward mobility. Regardless of downstream outcomes, such as degree attainment, underprepared student labor market outcomes are improved by going to college by taking developmental courses rather than not going to college at all. Consider that approximately 40% of those who went to college in our study completed a baccalaureate degree (63% for those who started at a four-year college and 20% for those who started at a community college). If developmental education does not hurt one's chances to complete a degree but improves labor market outcomes, it seems that developmental education serves a broader social good.

CONTINUED ON PAGE 16

as their nondevelopmental education community college peers to earn a baccalaureate degree.

It also did not appear that the developmental course subject (reading, writing, and mathematics) has effects on the likelihood of graduating (see bottom panel of Table 4). Across all three subjects at both institution types, with the exception of one positive effect (developmental writing at four-year colleges), there was no effect of each of the developmental course subjects on baccalaureate degree attainment.

Discussion

The findings of this study provide an important counter-narrative to current conversations about developmental education. They also offer some important evidence to suggest that developmental education may not be as harmful as many perceive. Students who enter postsecondary institutions via developmental education appear to have similar labor market outcomes and likelihood of earning a baccalaureate degree as their more thoroughly prepared college peers. Even developmental students who start at a community college are as likely as nondevelopmental community college students to earn a bachelor's degree.

Table 4

The Effect of Developmental Courses on Baccalaureate Degree Attainment: Developmental College Students Compared with Nondevelopmental College Students (significant values only)

Student Cohorts	All College	4-yr College	Community College
Student subgroups			
All students			
URMs			1.665 **
Low SES			
High SES			
Developmental course subject			
Reading			
Writing	1.145 *		
Mathematics			

Note: ***$p < .001$, **$p < .01$, *$p < .05$

Propensity score analysis uses inverse probability weighting.

Odds ratios provided when statistically significant.

Odds ratios greater than one indicates a positive effect.

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Our findings around developmental math seem particularly important given that so many students enter college unprepared for college-level math. We find that gaining basic math skills through developmental coursework translates into higher earnings. At the same time, developmental math does not affect degree attainment or employment status. Perhaps concerns associated with having the high number of students in developmental math are inflated.

This paper also raises important questions about the purposes of developmental coursework and college. Although the importance of degree attainment should not have less importance in policy discussions, all educators and policy makers should recognize that developmental education in college is an important investment in human capital regardless of whether developmental students complete a degree. Taken another way, one of the primary purposes of college attendance is to earn a degree. However, many would also argue that simply educating students and giving them basic skills to better position themselves in the workforce is also important. As fiscal concerns are discussed, perhaps these findings may suggest that investing in developmental education has public benefits to society. Students seem to benefit personally from enrolling in postsecondary education through developmental education, and their productivity in the labor market would likely result in greater economic benefits to society.

Limitations

Although the implemented matching model is comprehensive, some important unobservables may remain. For instance, this study is limited to the developmental enrollment behaviors of students, thus overlooking student performance on developmental indicators, and possible noncompliance to recommendations for developmental education participation, which may confound findings. Further, we expect variation in campuses' effectiveness in successfully remediating students, a variable that is not accounted for in the present model. We also offer some caution on our use of self-reported developmental course enrollments and salary variables. Although the averages within our sample resemble national averages, bias may be introduced through misreports given the relative sensitivity of these measures. However, despite the limitations, we believe our use of quasi-experimental methods provides a suitable alternative in the absence of random assignment and we believe the external validity of our approach extends previous single institution quasi-experimental studies that have high internal validity but limited external validity.

Implications for Policy and Practice

Findings also suggest that college opportunity and social mobility can be increased by encouraging more relatively underprepared students to access college through developmental coursework. Outreach efforts that communicate to students the techniques provided to get them college-ready may expand access to college. In addition, many four-year campuses hide the fact that they offer developmental coursework. It seems that open enrollment institutions may reframe these efforts and provide information to prospective students about ways they assist in getting them prepared to do college work. Keep in mind we are not encouraging an expansion of developmental education to include students who are ready for college work. Our findings simply suggest that it may be wise for colleges to reach out to students who may be underprepared but can prove they will benefit from developmental education. Colleges and universities might consider sending teams to local high schools in the region to meet with students identified as underprepared and communicate both the challenges and benefits of enrolling in college via developmental education programs.

Policymakers and campus leaders should make investments in improving developmental education rather than limiting access to these courses.

Another argument against providing support for underprepared students in college posits that the skills students acquire in developmental coursework should have been learned prior to college. Some suggest that developmental education essentially costs the public twice, as students are repeating coursework and concepts that they should have learned in high school. Although this argument may have merit, this study provides evidence to suggest that the investment in developmental education may be worth it. Ensuring that students have basic skills and abilities appears to payoff. Our study suggests policymakers should encourage colleges and universities to make developmental education more accessible to students.,

All this is not to say that developmental education is not without its costs. Although some students may be able to use federal financial aid to cover developmental courses, many have to pay for them out of pocket. In addition, students have a maximum Pell Grant amount that can become problematic if students need to take multiple developmental courses. These costs, in addition to time spent not working, present real challenges for students. Yet, study analyses show that remedial courses can provide a critical access point to college that results in positive long-term economic and educational outcomes for students; this finding serves as a compelling justification for these courses. Given the benefits reflected in the data, perhaps policymakers can explore how to fund these courses and the students who participate in them. Current efforts to accelerate developmental courses and to provide better placement appear to hold some promise in reducing student costs. Our findings suggest that policymakers and campus leaders should make investments in improving developmental education rather than limiting access to these courses. For example, local civic groups, businesses, and campus administrators could be approached to develop scholarships specifically earmarked to fund underprepared students in noncredit, remedial, and/or developmental courses.

Conclusion

Despite the widespread participation in developmental education among postsecondary students, the economic value and implications of these courses have been deeply debated across scholarly literature on the topic. Critics have been particularly attentive to the duplicative costs of providing coursework on topics that should have been covered at the secondary level. Yet, our findings suggest that policymakers and college officials should proceed with caution when making policies that limit access to developmental education. This study suggests that offering underprepared students a way into college through developmental education leads to important educational and economic outcomes, positively affecting labor market outcomes and social mobility for those who otherwise may not have access. Although providing developmental education courses may require short-term financial investment from institutions and taxpayers, the long-term economic benefits of increasing student participation in college, especially among students traditionally underrepresented in higher education, far outweighs these costs.

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Offering underprepared students a way into college through developmental education leads to important educational and economic outcomes, positiviely affecting labor market outcomes and social mobility.

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