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Forging a path to college persistence: An experimental evaluation of the Detroit Promise Path program

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A pre-registered analysis plan is available here: https://osf.io/n3c9d.

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Abstract

Detroit students who obtain a college degree overcome many obstacles to do so. This paper reports the results of a randomized evaluation of a program meant to provide support to low-income community college students. The Detroit Promise Path (DPP) program was designed to complement an existing College Promise scholarship, providing students with coaching, summer engagement, and financial incentives. The evaluation found that students offered the program enrolled in more semesters and earned more credits compared with those offered the scholarship alone. However, at the three-year mark, there were no discernable impacts on degrees earned. This paper examines systemic barriers to degree completion and offers lessons for the design of interventions to increase equity in postsecondary attainment.

Keywords: community college coaching, high-need students, persistence, randomized trial

Living in the poorest, most segregated city in the United States, Detroit students who obtain a college degree overcome many obstacles to do so (Farley, Steeh, Krysan, Jackson, & Reeves, 1994; Logan & Stults, 2011). Economic and population decline due to deindustrialization and racist policies have reshaped the city over the past half century (Boyle, 2001; Darden, Hill, Thomas, & Thomas, 1987); as a result of these historical processes and structures, Detroit has one of the highest rates of concentrated poverty in the U.S., with 69 percent of households living below poverty (United Way, 2021). Concentrated poverty makes it more difficult for people to be upwardly mobile, and Detroit is one of the least economically mobile cities for children, ranking 46th out of the 50 largest U.S. commuting zones (Chetty, Hendren, Kline, & Saez, 2014).

Educational attainment offers a promising path out of poverty, yet rates of higher education among Detroit residents are low. Only 17 percent of young people 25-34 years old hold a bachelor's degree, half the national average of 35 percent (U.S. Census Bureau, 2017). Overall, about one-third of working-age Detroiters are not participating in the labor force (Holzer & Rivera, 2019). In recent years, about half of Detroit high school graduates enrolled in postsecondary education and enrollment rates are on the rise (Brockman, Chong, Camo-Biogradlija, & Jacob, 2021). Yet despite these optimistic trends, many Detroit college enrollees fall off-track from graduation and few eventually earn degrees.

The Detroit Promise scholarship was launched in 2013 to help more of the city's high school graduates enroll in college. It is available to all high school graduates who live in the city of Detroit, and students may use the scholarship to attend any college in the greater Detroit area. In 2016, MDRC and the Detroit Regional Chamber partnered to create the Detroit Promise Path (DPP), an evidence-based student services program designed to help more students eligible for

the Detroit Promise enroll and persist in community college, accumulate credits, graduate, and potentially transfer to a four-year program. At the heart of DPP are campus coaches who help students acclimate to college, proactively reach out to them with help and reminders about tasks and deadlines, and offer a sympathetic ear to young people who may be grappling with personal challenges—all with the goal of keeping them in school and on track to graduate.

This paper presents findings from a randomized controlled trial evaluation of the DPP student support program at five Detroit community colleges. It is important to note that the program group is offered the new program on top of the existing Detroit Promise scholarship; the control group students in this study continued to receive scholarship dollars. This is not an evaluation of College Promise scholarships. Rather, the evaluation examines the efficacy of integrating multicomponent student support services on top of an existing College Promise scholarship.

The evaluation found that the intervention was implemented with mostly high fidelity across the participating colleges. A survey of participating students indicated that a high proportion of respondents rated the program as valuable or highly valuable. Yet, despite these promising findings, many students continued to face significant obstacles to enrollment and persistence. Only about 62 percent of students offered the full DPP program enrolled in courses in the fall semester that they applied for a Promise scholarship. Of these enrolled students, a third dropped out after only one year. Students most often identified nonacademic barriers such as financial issues as the reason they left school. More students in the DPP program stayed enrolled in school, both during the traditional academic year and over the summer, and students offered the DPP program earned more credits compared with students who were offered the Promise

scholarship alone. At the three-year mark, however, there was no evidence of an impact on degrees earned.

This paper offers lessons for the design of future interventions that aim to increase equity in postsecondary attainment. It is clear that promoting college access is not enough. Programs must also tackle challenges that prevent students from staying in school and graduating. Students self-report that they are most often derailed in their progress by issues outside of college. For high-need student populations, much more than typical campus-based support is required. The Detroit Promise scholarship, combined with the Detroit Promise Path program supports, is a step toward helping students stay in school. But there is still more to be done to help them get to graduation, too.

Background

Detroit City and Educational Context

Higher education attainment in Detroit must be viewed against the backdrop of concentrated urban poverty and racial segregation owing to a long history of deindustrialization and racist policies and structures (Boyle, 2001; Darden et al., 1987). Detroit is America's most segregated city, with a history of housing and educational policies that exacerbated income inequality (Harrison, 2017; Logan & Stults, 2011). Throughout the post-war era, economic and population decline in Detroit have resulted in disinvestment in public institutions, including public schools. The consequences included chronic school budget deficits and perpetual political battles over educational reforms, significantly barring sustained efforts to adequately support or improve public education (Mirel, 1998).

These historic trends continued into more recent years as well. Following the Great Recession, Detroit faced a series of financial hardships: the city was under emergency financial

management, and later filed for bankruptcy, and the Detroit public school district was also under "state takeover" for 15 years (Pitchford, 2019). During this time Detroit saw unemployment, foreclosures and deficits rise, leading to a loss of population in the city and school district, and the closure of around 200 district schools (Steele, 2020; Sugrue, 2014). While the city of Detroit and the Detroit Public School Community District (DPSCD) have stabilized in recent years, the turmoil students in this study experienced during their K-12 years could have ripple effects throughout their college experience.

Lack of access to transportation is another structural barrier facing Detroit students: access to educational and vocational opportunities in the Detroit region is heavily dependent on access to a vehicle, as residents consistently oppose tax increases to invest in a regional transit system (Grengs, 2010; Witsil & Lawrence, 2016). Detroit's chronic absenteeism rate for K-12 students is the highest in the country and transportation may be one contributing factor, with crime, a large geographic area, and low temperatures all impacting parents' willingness to use public transit (Singer, Cook, Lenhoff, & Pogodzinski, 2019). At the postsecondary level, four out of the five regional community colleges are located outside of Detroit, and Detroit students spend over an hour, on average, commuting via public transit (Table 1).

Recent trends in educational attainment for Detroit graduates reveal the impact of the structural barriers students face. Even though about half of all high school graduates pursue higher education, most are not adequately prepared for success in college (Brockman et al., 2021). Using college entrance exam performance as a measure of college preparation, only 11 percent of Detroit high school graduates from the classes of 2016 and 2017, peers of the students in this study, earned a "college-ready" score as defined by local institutions of higher education. [1] College persistence is low and the vast majority of students never earn degrees. Among recent

high school graduates who first enrolled at two-year institutions, just 1 percent had earned a degree by the end of their second year, a number that rises to only 10 percent after six years. The degree attainment rate for students who enrolled at four-year institutions was higher (35 percent), but still well below the state average (63 percent).

Several of the barriers Detroit students face are challenges for community college students nationally. Despite serving many more students who need additional support and guidance to succeed, community colleges in the U.S. typically receive less funding relative to what four-year colleges receive—a basic inequity in college funding benefiting better prepared, higher-income students (Baum, Kurose, & McPherson, 2013; Community College Research Center, 2022). Community college students must also grapple with many institutional issues, including lack of sufficient advising and counseling staff, high rates of contingent or adjunct faculty teaching introductory courses, and a confusing array of requirements and paperwork for financial aid and course selection (Dougherty, Lahr, & Morest, 2017; Feldman, 2017; Juszkiewicz, 2020).

Other systemic issues may present additional barriers. For example, research shows that Black students and students from low-income households (again, the majority of Detroit Promise scholarship recipients), are more likely than White students to be selected for Free Application for Federal Student Aid (FAFSA) verification, an often difficult process in which students may experience delays in receiving Pell grants, or may lose out on a semester of financial aid altogether (Holzman & Hanson, 2020; Page, Castleman, & Meyer, 2020). Community college students are also referred to remedial courses at high rates, delaying their expected time of graduation (Chen, 2016; National Center for Education Statistics, 2018). They are commonly working while in school, meaning they cannot always prioritize studying (Velez, Bentz, &

Arbeit, 2018). For students from low-income households, the need to work is especially acute, as financial aid may cover tuition and fees but not textbooks and other educational costs. Nor does it cover the cost of transportation back and forth to school, child care, food, or other necessities (Baum, 2016; Ma & Pender, 2021) .

Black students often face additional hurdles, such as self-doubt, a reduced sense of belonging, stereotyping by faculty or other students, and both subtle and overt racism. These challenges can be further amplified for students who are coming from predominantly Black schools in Detroit to predominantly White colleges in the suburbs (Harper & Simmons, 2019; Owens, Lacey, Rawls, & Holbert-Quince, 2010). Some of the colleges in this study were predominantly Black institutions and some were predominantly White institutions. And because community college students often spend little time on campus outside of class—they are unlikely to live on campus, participate in clubs, or play on school sports teams—their social connection to the school can be more tenuous, further reducing their sense of belonging in the campus community (Deil-Amen, 2011; Strayhorn, 2012).

Reversing these trends for Detroit students will require both systemic and institutional changes, however the need for these such changes is not always apparent as Detroit high school graduates are often among the minority of students at their local community colleges. Detroit students also differ considerably from their community college classmates. Unlike Detroit high school graduates, the majority of their community college classmates come from the suburban neighborhoods surrounding the city, where the colleges themselves are located. Compared to their suburban peers, Detroit students enter community college less prepared and with fewer resources.

Table 1 summarizes the demographic and educational background of students in the study sample (both program and control group students), and those of their Detroit high school graduate peers and community college classmates. The study sample was representative of Detroit high school graduates in most respects. Compared with their community college classmates, however, students in the study were more likely to be Black (83 percent of the study sample compared to 19 percent of their community college peers), and from low-income families (90 percent compared to 48 percent). The median income of residents in the study samples' census blocks was roughly half that in the neighborhoods of other community college students ($31,137 compared to $66,757), as was the share of residents with at least a bachelor's degree (13 percent compared to 32 percent).

Prior Literature: Increasing Community College Retention and Success

To better support students and increase graduation rates, college retention has long been the focus of research and policy. Multiple experimental studies have shown that approaches such as enhanced advising and financial incentives can have positive, modest effects (Bettinger & Baker, 2014; Mayer, Patel, & Gutierrez, 2016; Scrivener & Coghlan, 2011). The set of existing studies most closely related to this paper investigate whether multifaceted interventions support students' progress towards degrees.

The Opening Doors community college program provided students at two community colleges in Ohio with access to counselors with relatively low caseloads with whom they met twice per semester to resolve personal and academic challenges (Scrivener & Weiss, 2009). Participants also received a small stipend, delivered in installments to incentivize engagement in counseling. The program did not significantly increase the average cumulative credits earned and generated a modest effect on enrollment which dissipated once the two-semester program ended.

Bettinger and Baker (2014) found that students randomly assigned to two semesters of support from an Inside Track coach had higher persistence and degree completion rates. Unlike the DPP evaluation, however, the program in that study did not focus on low-income or community college students. Stay the Course is a comprehensive case-management intervention that offers Texas community college students access to emergency financial assistance and a trained social service provider who offered coaching, mentoring, and referral services. An evaluation of the program found no discernable impacts on college outcomes for the full sample of students, but found increased enrollment and associate degree completion for women (Evans, Kearney, Perry, & Sullivan, 2020).

Evaluations of programs that combine multiple evidence-based components and provide services to students for a longer period of time have shown larger effects (Barr & Castleman, 2021; Carrell & Sacerdote, 2017; Dawson, Kearney, & Sullivan, 2020; Page, Kehoe, Castleman, & Sahadewo, 2019; Rolston, Copson, & Gardiner, 2017; Weiss & Bloom, 2022). One Million Degrees serves first-time, low-income (Pell-eligible or Chicago STAR eligible) community college students in the Chicago metro area with at least one year of college remaining and a GPA over 2.0. The multifaceted program provides access to monthly coaching; an annual $1,000 performance-based stipend as well as access to $250 for enrichment grants; tutoring services, a required component for students earning below a C in any course; monthly skill-building workshops; and professional mentors who provide coaching, job shadowing, and networking support. The program shows promising early results, with a recent study finding large intent-to-treat impacts on college enrollment (7 to 9 percentage points), full-time enrollment (13 percentage points), persistence to a second term (11 percent increase), and full-time persistence (16 percent increase) (Bertrand, Hallberg, Hofmeister, Morgan, & Shirey, 2019).

The Valley Initiative for Development and Advancement (VIDA) is a community-based organization to support unemployed and other low-income adults in the Texas' Lower Rio Grande Valley in obtaining certificates and degrees. Program participants receive financial support—after financial aid and Pell Grants—for tuition, books, and other needs, and are required to enroll full-time in certificate, associates, or bachelor's degree programs; attend mandatory weekly group and individual counseling sessions; participate in a 16-week, accelerated, full-time basic skills program if needed in order to pass college entrance exams. The three-year impacts of VIDA are promising: a 9 percentage point increase in college credential completion, as well as meaningful increases in enrollment duration (2 months), credit accumulation (6 credits), and associate or higher degree completion (7 percentage points) (Rolston, Copson, Buron, & Dastrup, 2021).

The comprehensive Accelerated Study in Associate Programs (ASAP) at the City University of New York (CUNY) provides comprehensive support for up to three years for full-time, low-income students (Pell eligible or below 200 percent of the federal poverty line) with fewer than 12 credits earned. ASAP offers a wide variety of elements, including enhanced advising, tutoring, blocked or linked first-year courses, a first-semester seminar to build study skills, waivers for any tuition or fees not covered by needs-based financial aid (only used by a small portion of students), a MetroCard, and free use of textbooks. An evaluation of CUNY ASAP found that this three-year program nearly doubled associate's degree completion rates (40 percent versus 22 percent), and after six years the effect was still 10 percentage points (Scrivener et al., 2015; Weiss, Ratledge, Sommo, & Gupta, 2019). A replication study of ASAP in the Ohio community college context found similarly large impacts on degree completion (11 percentage points, a 140 percent increase) (Sommo, Cullinan, Manno, Blake, & Alonzo, 2018).

Successful comprehensive programs tend to offer a suite of complementary components to support students academically, personally, financially and (in some programs) professionally. The multifaceted nature of programs like One Million Degrees, VIDA, and ASAP mean that it is difficult to know which elements of the program are essential or most effective. Although providing such a wide range of student supports is not low cost, in the case of ASAP, for example, cost-benefit analyses justify the substantial investments required given improvements in cost-per-degree (Weiss et al., 2019).

Detroit Promise Path Program Model

College access and attainment has been a priority for Michigan state leadership across several administrations; Detroit is one of 15 Promise Zones established in Michigan since 2007. The Promise Zones started as public-private partnerships aimed at ensuring a tuition-free path to community college. The Detroit Promise was launched in 2013 as the Detroit Scholarship Fund, to help more of the city's high school graduates enroll in college. A last-dollar scholarship, Detroit Promise covers any gaps between financial aid and tuition and fees that students may face. Like most College Promise scholarships, the Detroit Promise is geographically specific: it is available to all high school graduates who live in the city of Detroit, and it does not have merit-based eligibility criteria. Students may use their scholarship to attend any community college in the greater Detroit area.

The Detroit Scholarship Fund operated for three years as a scholarship-only program. In the scholarship's early years, Chamber staff members observed that while the scholarship seemed to help high school graduates enroll in college initially, large proportions of recipients were dropping out of college before their second year. Staff developed the idea of the Detroit Promise Path to address this issue.

DPP was designed to meet students' needs beyond tuition alone by adding three evidence-based student supports to the existing Detroit Promise scholarship. First, the heart of DPP is its campus coaching component. Students begin meeting with a coach in the late summer before their first semester of college. Coaches undertake an intensive, proactive, and holistic coaching model, using case management in which students consistently see and build a relationship with the same coach throughout their time in college. Coaches meet with students twice per month, ideally in an in-person, one-on-one setting. Rather than waiting for students to come to them, coaches use proactive outreach using multiple modes to speak with students, including in-person, telephone/video chat, and text messages. Complementing traditional academic advising on campus, coaches' holistic approach includes many topics outside of traditional advising, such as time management, study skills, career pathways, building self-confidence, grappling with racism, and dealing with support (or lack thereof) for education from family and friends.

Second, students are offered a financial incentive to attend coaching meetings: a monthly gift card that is refilled with $50 each month they meet with their coach. The money helps students pay for expenses not covered by financial aid. The $50 was originally tied to the cost of a monthly bus pass ($48 at the start of the study) though students may use it for any expense. The goal is twofold: to incentivize participation in coaching and to alleviate some financial stress.

Third, DPP lasts for the full three years of the Promise scholarship, including summer semesters, when students are encouraged to enroll in classes (paid for by the scholarship) or engage in a citywide summer jobs program. Students do not lose the scholarship if they drop below full-time; however, they are encouraged to attend full time, and in the summer, whenever

possible. Finally, DPP program operation is supported by a management information system that coaches use to track coaching participation and for outreach via email, phone, and text messages.

While DPP shares many features of previously studied interventions, it differs in a few key ways. It does not include any components inside the classroom—for instance, no changes to pedagogy, no required tutoring, and no changes to developmental/remedial education. Notably, unlike many multifaceted community college programs evaluated in other prior studies, management of the DPP program took place outside of the colleges. While some coaches were college employees, most were employees of the Detroit Promise and were supervised by the Chamber, which administered the scholarship. This is a function of how the Detroit Promise scholarship operated prior to the creation of DPP. There are pros and cons to this approach. One example is that students are receiving a consistent experience and are able to connect with staff and students across campuses–valuable for students who might attend more than one college, as about 15 percent of students in the study did. On the other hand, coaches who are not college employees are more reliant on other staff and on-campus referrals to resolve issues–for instance, they cannot see students' financial aid status, so they cannot proactively investigate issues for FAFSA completion or verification.

Enrollment requirements were another important variation. Many multifaceted support programs require full-time enrollment, and students must be enrolled full-time to be eligible for all the benefits of the program. In DPP, students are directed to enroll full-time (12 credits every fall and spring), but do not lose the scholarship or program benefits if they drop below full-time. This aspect of the program was purposeful: program staff designed the program to include as many students as possible, and didn't want to risk students leaving the program if they could not attend full-time in a given semester. The summer enrollment messaging also differed from other

programs; while most programs focus only on continuous college enrollment, DPP asks students to undertake either summer coursework or a summer jobs program (Weiss & Bloom, 2022). The goal is to maintain a connection to program staff while also acknowledging that some students need to work in the summer.

DPP Program Delivery and Student Participation

To examine the implementation of DPP across the five participating colleges, we conducted interviews and focus groups with program staff and students, an online survey with students, and an analysis of DPP program participation data from the management information system (MIS). These qualitative data sources gathered information about students' experiences in college and with the DPP program, as well as barriers they faced in continuing their education. The MDRC Institutional Review Board (IRB) approved our research plan.

Overall, DPP was implemented with high quality and with high fidelity to the model at four of the five colleges. The contrast between the services that students participating in DPP received and what students in the control group received was meaningful at most colleges in most semesters. At one college, the program operation differed considerably as a result of staff turnover and a lack of support for the program from senior leadership at the college. We first discuss program implementation and fidelity for the four colleges where fidelity was high, and then describe implementation variations.

Coaches reached out to students assigned to the program group by emails, text messages, and phone calls to inform them of the new program, schedule in-person meetings, and to remind students about completing key steps like registering for classes, or completing the FAFSA. More than 90 percent of students responded to outreach from coaches in the first semester. Students were directed to meet with their coach one-on-one twice per month in the first semester of

college, and in any semester thereafter if they were struggling academically or personally. Most enrolled students met with their coach five or more times per semester, on average. While slightly below the twice-per-month requirement, the consistent connection with the coaches shows a high level of engagement in the program among enrolled students. Figure 1 shows student participation in coaching, derived from MIS data.

In interviews and focus groups, nearly all students said that coaching was the most important component of the DPP program, and students' assessment of their coaches' support was also almost universally positive. Students regularly used words such as "helpful," "generous," "caring," and "motivational" to describe their coaches. Coaches were also praised for going above and beyond to help students resolve non-academic challenges. Students appreciated that the coaches understood their experiences, often because the coaches came from similar socioeconomic backgrounds and were from the city of Detroit. Students also noted the value of having coaches who had attended the same community colleges where they coached. One student said the DPP coach was "the best African American educational role model I have had the pleasure to be introduced to."

The financial incentive to attend coaching meetings was also implemented as planned. Students automatically received $50 on a refillable gift card each month, contingent on meeting with coaches as directed. The monthly incentive represented a unique aspect of DPP: researchers could not identify an analogous program at any of the participating colleges.

The summer engagement component of DPP was implemented as designed. Each spring, coaches dedicated meeting times to map out summer plans with their students. Coaches recommended taking summer courses, or suggest alternatives such as participating in the local summer jobs program, Grow Detroit's Young Talent. Not all students followed through on their

plans, however, and many students who chose to participate in the jobs program reported having difficulty getting through the application process.

The final DPP program component, the MIS, was implemented with high fidelity to the model. Coaches used the MIS daily as a case management tool to schedule and document meetings with their students, track key activities like FAFSA completion and enrollment in the upcoming semester, make notes about follow-up items, and communicate with students using a two-way text messaging application. An important element of the MIS is that it not only allowed staff to track who they had spoken with; it also allowed staff to identify students they had not spoken with, facilitating targeted outreach.

Implementation Variations

The implementation of three program components—financial incentives, encouragement to enroll in summer courses, and the use of the MIS—closely resembled the program model across all five colleges. The coaching component, however, varied over time and by college. When the COVID-19 pandemic shutdown began in Detroit, the study's second cohort of students ($N = 644$) were in their sixth semester of the three-year study period. Twenty-seven percent of study students in this cohort were still enrolled in the spring 2020 semester. Students at all colleges who were engaged with the program at the start of the COVID-19 pandemic in March 2020 transitioned from meeting with their coaches in-person to meeting over the phone or video chat. Scheduling for virtual coaching used the same system as the in-person meetings and participation rates remained steady in spring 2020.

At one college, the coaching component departed from the original model after the first year, and ultimately, college leadership and the Chamber decided to move the program entirely off campus. Beginning in 2017, DPP students at this college met with coaches in various

community locations or by video chat. The lack of support from college leadership presented a number of issues for the program at this college that worsened over time. These included a diminished ability to solve financial aid issues, a lack of access to student data such as enrollment, and coaches' inability to meet with students on campus, among other issues. As a result, the coaching component at this college differed greatly compared to the other colleges and did not adhere to the program model. On average, program students at this college attended fewer coaching sessions than those at other colleges.

The service contrast following the shift to an off-campus version of the program is unclear. The study team was unable to gather the same types of data to assess the control condition at this college after 2017. Notably, this college enrolled the second-largest number of students in the study. We return to the possible implications of how the DPP program was implemented at this college in the section on DPP impacts.

Data and Empirical Methods

Data and Measures

We evaluated the DPP program's impact on progress towards a degree, as measured by enrollment status and total credits earned; and completion of a degree, measured by attainment of a certificate or degree. Data on students' program group statuses and coaching session attendance were linked to Michigan Education Data Center (MEDC) data on students' K-12 and postsecondary education records. These data include all Michigan students in public and charter schools; our data therefore include all public school records of college enrollment, credit accumulation, and degree attainment for students eligible for the Detroit Promise scholarship. The statewide scope of the data mean we can follow our study sample at all Michigan public postsecondary institutions, not just the five participating community colleges.

The MEDC data include a rich set of student background characteristics including: gender; race/ethnicity; special education, limited English proficient, and economic disadvantage status; standardized college entrance exam scores (ACT, SAT); 8th grade mathematics and reading standardized assessment scores; indicators for moving schools in high school; and 12th grade attendance rate. We also summarized the characteristics of students' high schools in 12th grade, including for each school: the demographic characteristics of the students served, school district, charter status, location (in Detroit or in Detroit's suburbs), total student enrollment, average test scores, and four-year high school graduation rate. We used students' last recorded census block in 12th grade to generate measures of their neighborhoods, including: median household income, and the share of residents who had a bachelor's degree or higher, received public assistance, and who identified with different racial/ethnic groups. We calculated the distance, drive time, and public transit time from students' home census block to each study college using geocoding software and the Google Distance Matrix and HERE APIs (Google, 2022; HERE, 2022; Picard, 2019; Weber & Péclat, 2022).

To measure students' progress towards a degree, we observed their enrollment status in each fall and spring semester of the three-year study period (six total terms). We also observed credits accumulated, both overall and by term. Finally, to measure completion of a degree, we observed students' attainment of a certificate or degree, including both associates' and bachelor's degrees. We also explored the DPP program's effects on summer enrollment, enrollment intensity, and progress in developmental education courses. We observed summer enrollment each of the three summer terms during the study period. We identified students as enrolling full-time if they attempted 12 or more credits within a term. Finally, using course-level information,

we identified whether students attempted and passed any developmental education courses each term.

Sample Selection and Baseline Equivalence

All students who were eligible for the Detroit Promise scholarship were also eligible for the new DPP program. Students were randomly assigned to either a program group ($N = 829$), in which campus coaches made contact with students and students were eligible for the additional financial incentives; or a control group ($N = 439$), in which students continued to receive their Promise scholarships and regular college services, but did not receive outreach from coaches, messaging, or monthly financial incentives. Students were notified of the DPP program and study and were given the option to decline to participate; no students chose to decline the program and study.[2] At the time that they completed the scholarship application and joined the study, students were asked which of the five participating community colleges they would be attending. Students were then randomly assigned to the program and control groups within each college. Following random assignment into the program group, coaches cold called students, inviting them to the new program and asking them to schedule their first one-on-one meeting.

The evaluation included two cohorts of Detroit Promise scholarship applicants, the high school graduating classes of 2016 and 2017. Completing the scholarship application process included registering for college. Therefore, it was expected that most students would be enrolled in college in Semester 1, although students had up to three semesters after high school graduation to take up the scholarship. However, only 60 percent of program group students enrolled in courses in Semester 1, a figure that rose to 76 percent as of Semester 6. Our qualitative findings suggest that FAFSA issues was the most common reason for delayed enrollment, especially for

students who were flagged for FAFSA verification and were not able to resolve their application before the semester began.

A total of 1,268 students were in the study. Among the original participants, 10 students (6 program and 4 control group students) could not be matched to any educational records, either K-12 or postsecondary, and so were removed from the sample. The low rates of overall and differential attrition, 0.8 percent and 0.2 percent, respectively, were not a likely source of bias in the impact findings.

Table 2 presents descriptive data on the study sample at baseline, including demographics and characteristics of their educational experiences in high school (9th through 12th grade). About 60 percent of the participants were women and 97 percent of students identified as people of color, primarily as Black. Students' educational experiences during 9th through12th grade were similar across research groups: 90 percent were identified as economically disadvantaged, 12 percent were identified for special education, and 12 percent were identified as limited English proficient. Students in both groups attended, on average, 89 percent of the school days during their 12th grade year. Students' performance on the ACT, SAT, and 8th-grade standardized assessments was similar across research groups. Table 2 demonstrates that the random assignment procedure yielded two groups that were not statistically different on any of the baseline measures.

Empirical Strategy: Intent-to-treat effects

Because the DPP program was administered using random assignment, simple difference of mean outcomes for the program and control groups is an unbiased estimator of the average effect of the program. We estimated the intent-to-treat (ITT) effect using an ordinary least squares (OLS) model of the general form:

$$Y_i = \alpha + \beta_o T_i + \sum_{1}^{k} \beta_k X_{ki} + \sum_{m=1}^{m=9} \gamma_m S_{mi} + \varepsilon_i$$

where Y_i represents an outcome for student i; T_i is an indicator for assignment to the DPP program (0 for control group students and 1 for program group students); X_{ki} is a vector of baseline student covariates; S_{mi} indicates students' random assignment block, where block is defined by a unique college and random assignment date; and ε_i is a heteroskedastic robust random error term. To increase the precision of the impact estimator, we included the following student covariates in the impact model: standardized college entrance exam score (ACT, SAT), gender, race/ethnicity, interaction between gender and race/ethnicity, and college. No demographic data were missing. Missing test scores were imputed to the mean and a missing indicator variable was included in the model.

Take-up and Treatment-on-treated effects

The study examines the effect of offering students the chance to participate in DPP, knowing that some of them would not take advantage of this offer. In many intent-to-treat analyses, some program group members do not receive program services. In this study, however, the proportion of program group members who did not receive program services (24 percent) was higher than expected. Two reasons likely explain this. First, all Detroit Promise scholarship applicants were randomly assigned, regardless of their interest in the additional DPP services. A benefit of this "opt-out" approach is that the study results are generalizable to nearly all Detroit Promise scholarship applicants, not just to a subset who expressed interest in the DPP program. The second reason for high attrition relates to the timing of study enrollment. Random assignment occurred during the summer before school started. Many students signed up for the program when they had registered for college, but had not yet enrolled in classes. Although some

initial outreach from coaches began over the summer, the bulk of the program was delivered once the academic year began.

As a result of these two elements of the study design, a relatively high proportion of program group members (24 percent) did not interact with the program. These students' outcomes were not counted as attritors; instead, their outcomes were all reported in the analyses as zeroes, as they were not enrolled or accumulating credits. These zeroes draw the overall outcomes downward in both the program group and the control group. Although the bulk of the program was delivered during the school year, our results showed that DPP induced students to enroll who would not have otherwise enrolled in any college (see Table 3). Given this, we focused on the results for the sample of students who were offered an opportunity to participate in DPP and on the intent-to-treat effects.

Heterogeneity of treatment effects

To statistically test for differential impacts, we estimated the effect of DPP separately for several student subgroups and then tested whether the amount of variation in the effects across groups was greater than expected due to chance alone. The subgroup impacts we explored included: college, study cohort, gender, and a risk index score. Since there was little variation in students' identified racial/ethnic groups, it was not valuable to estimate differences in the DPP program's effect along this dimension. All subgroup analyses are considered exploratory (Schochet, 2008), with limited statistical power to detect differential effects.

The risk index measured students' likelihood of college success in the absence of the DPP program. To compute index scores, we followed the procedure outlined by Abadie, Chingos, and West (2018). We avoided the potential limitations of full sample endogenous stratification by estimating the predicted probabilities with data from prior cohorts of Detroit

high school graduates. Using data on the five high school graduating classes from 2011-2015, we estimated the relationship between our confirmatory outcome variables (enrollment, credit accumulation, and degree attainment three years after high school graduation) and a rich set of student, school, and neighborhood covariates.[3] After estimating a separate model predicting each outcome using the sample of students from prior graduating cohorts, we computed the predicted probabilities (i.e., index scores) for each student in the study sample using the coefficients from the regression for each outcome. Then, we broke the index scores into three groups—representing a lower, middle, and higher likelihood of achieving the outcome—and used students' group statuses to separately estimate the DPP effect for students with different observed probabilities of college success.

Accounting for Multiple Hypothesis Testing

When testing for estimated impacts on several different outcomes, it is important to account for the fact that the probability of detecting at least one statistically significant impact merely by chance (i.e., a Type I error) increases with the number of outcomes considered (Schochet, 2008). To attenuate the risk of drawing inappropriate conclusions based on false positives, we first identified and pre-registered a small set of confirmatory outcomes: enrollment, total credits earned, and degree completion. Following the Benjamini and Hochberg (1995) procedure, we also adjusted the critical *p* values used to determine the statistical significance of our confirmatory outcomes (adjusted *p* values in Appendix Table 1).

Empirical Results

DPP Program Impacts on Three-Year Academic Outcomes

Over the three years of the program, DPP helped students in the program group make more progress in higher education compared with students in the control group. The program had

positive effects on the average numbers of semesters students enrolled in college and the average number of credits they earned (Table 3). On average, DPP students enrolled for 2.5 semesters, compared with 2.2 semesters for control group students, a 17 percent increase ($p = 0.003$). Program group students also earned significantly more credits than the control group students, on average—19.4 credits compared with 16.1 credits, respectively, a 20 percent increase—for an estimated impact of 3.3 credits. The DPP program did not, however, lead to additional credential completion at the three-year mark: 7.3 percent of the program group earned a degree or certificate compared with 6.9 percent of the control group. The estimated effect on credential attainment (0.4 percentage points) is neither practically meaningful nor statistically distinguishable from 0.

DPP helped more students enroll and persist in college. Figure 2 presents enrollment by semester for each study group during the three-year study period. In the first semester, 60 percent of the program group students enrolled in college. During that same semester, 55 percent of control group students enrolled in college. The 4.8 percentage point difference in first-semester enrollment represents the estimated impact on "summer melt" ($p = 0.094$). In Semesters 2 and 3, the estimated impact grew to 7.7 and 9.2 percentage points, respectively, with a smaller estimated effect beginning in Semester 4. At the three-year mark, 29 percent of the program group and 23 percent of the control group were still enrolled in college. The estimated 5.3 percentage point difference ($p = 0.039$) implies that the DPP program helped more students stay engaged with college longer, a first step towards making academic progress.

As is typical of postsecondary evaluations, enrollment dropped steadily over time. There was a substantial drop between the second and third semesters of about 18 percentage points for both research groups: Program group enrollment dropped from 58 percent to 41 percent, and

control group enrollment dropped from 50 to 32 percent. For 96 percent of the study sample, this time period represents the transition period between the end of students' first spring semester and the start of their second fall semester (in other words, the start of the second academic year). Such drop-offs during this time frame are quite common (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; Pretlow, Jackson, & Bryan, 2022). Some of the reasons identified in the research include financial aid issues in a new FAFSA year, students leaving school to work, students losing motivation or a connection to the college during the summer, and students experiencing adverse life events that prevented reenrollment (Bailey et al., 2016; Bailey, Jaggars, & Jenkins, 2015; Feldman, 2017). In an attempt to stave off some of these issues, the DPP program model included a component that encouraged students to continue to make progress toward their goals over the summer. The program successfully increased summer enrollment in this period and maintained the enrollment impact from Semester 2 to Semester 3. However, since both research groups saw a sizeable drop in this time frame, it suggests that there is more to be done to help students through this transition.

Looking at a distribution of the number of semesters enrolled provides additional insights. As shown in Table 3, 64.4 percent of the control group enrolled in 0, 1, or 2 semesters compared with 57.8 percent of the program group. In other words, the program induced an additional 6.6 percent of the program group students to enroll in 3 or more semesters. In fact, the largest increase is seen in enrolling in 5 or 6 semesters (6.1 percentage points, $p = 0.010$). Also of note, the program caused 5.6 percent of students who would not have enrolled in college at all to enroll in at least one term. For many students, this meant an investment of time and money that did not ultimately lead to graduation, and so whether to consider this outcome beneficial depends the value of attending some college without earning a degree.

DPP increased cumulative credits earned throughout the three-year study period. Figure 3 shows the cumulative total credits earned (in both pre-college-level developmental courses and college-level courses combined) during Semesters 1 through 6, and the estimated impact on cumulative total credits earned within each semester. Notably, the estimated impact of DPP on credit accrual within each semester was similar, and program students continued to gain more credits than control group students even in Semesters 5 and 6. At the end of three years, the program group was ahead by 3.3 credits ($p = 0.007$), on average, representing a 20 percent increase over the control group average of 16.1 credits.

This impact is meaningful, as credit accumulation is an important indicator of academic progress. At the same time, the overall level of credits earned by both groups after three years was quite low. If students consistently enrolled in college for three years, their expected average credits earned should range from 36 credits (for part-time students) to over 60 credits (for full-time students). By contrast, program group students earned, on average, just 19 credits in three years. The relatively low levels of average credits earned in this study reflects the large number of students who never enrolled in college (roughly 26 percent) or dropped out after 1 or 2 semesters (about 33 percent).

After three years, there was not a substantial effect on graduation. As shown in Table 3, after three years (or six semesters), 7.3 percent of the program group earned any degree or certificate compared with 6.9 percent of the control group, for a difference of 0.4 percentage points ($p = 0.780$) that was not statistically significant or practically meaningful. Most of the credentials earned were associate degrees, with the remainder largely comprised of certificates. Finally, a small portion of both research groups attended four-year institutions—between 2

percent to 10 percent, depending on the semester—with no discernable differences between the research groups.

Exploratory Impacts on Additional Outcomes

DPP nearly doubled the proportion of students enrolling in summer courses during the first program summer (that is, the summer between Semesters 2 and 3).[4] Among the program group, 14.8 percent enrolled in courses in the first summer term, compared with 8.5 percent of the control group, for an estimated impact of 6.3 percentage points ($p = 0.000$; full results available upon request). As mentioned, coaches encouraged students to continue to make progress toward their goals over the summer, either by enrolling in summer courses or by participating in a local summer jobs program called Grow Detroit's Young Talent. As shown in Table 4, cumulatively across all summer terms, 37 percent of the program group enrolled in summer courses compared with 23 percent of the control group, for an estimated impact of 13.5 percentage points ($p = 0.036$). During this period, program group members also earned 1.8 credits, on average, compared with 1.3 credits in the control group, with the estimated difference of 0.47 credits ($p = 0.048$) representing about 14 percent of the total impact on cumulative credits earned.

DPP induced more students to enroll full-time throughout the full three years. Estimated impacts across the six semesters of the study ranged from 3.7 to 7.1 percentage points (Table 4). The Detroit Promise scholarship–which both research groups were eligible to receive–had a nominal full-time enrollment requirement, giving both research groups an incentive to enroll full time. (Recall that students were told to enroll full-time, but they did not lose their scholarship if they dropped below full-time status.) While the additional components of the DPP program were

not tied to full-time enrollment, the combination of coaching support and additional resources made full-time more salient and feasible for a portion of students.

Many community college students are referred to developmental education courses. Among students in the study who enrolled in college, 69 percent took at least one developmental education course. Program group students attempted 23 percent more developmental education credits and earned 17 percent more developmental education credits than the control group, for a cumulative increase of 0.35 more developmental education credits earned ($p = 0.084$) compared to the control group average of 2.1 developmental education credits (Table 4). Notably, the DPP program's effect on development education credits attempted was not limited to early semesters; the DPP program appeared to increase credits attempted in Semesters 2 through 6 (results by semester available upon request). Though the DPP program did not include supports specifically related to developmental education, coaches counseled students about course selection in general and may have discussed the timing of developmental education course-taking. Our finding suggest that continuing to counsel and support students in development education well beyond their initial terms may be a beneficial program component.

Differences in DPP Program Effects by Student Subgroups

The findings so far represent the overall average effect of DPP on students' academic progress and completion. As part of an exploratory analysis, Figures 4 and 5 present DPP's effects on cumulative credits and credentials earned for various subgroups of students (full results in Appendix Tables 2 and 3). Subgroups included college, study cohort, gender, and students' likelihood of college success in the absence of the DPP program—we turn to college in the next paragraph. (Since there was little variation in students' identified racial/ethnic groups, it was not valuable to estimate differences in the DPP program's effect along this dimension.) The

final subgroup analysis examined differences in DPP program's effect for students with different predicted probabilities of earning credits and credentials. DPP appears effective at increasing credits earned for all subgroups examined. As it was for the overall sample, there is no evidence of a discernable effect for any of the student subgroups on earning a credential.

Differences in DPP's effects by college are of interest given the variation in program implementation. The small sample sizes at College 2 through College 5 mean that the estimates presented here are imprecise (see Appendix Tables 2 and 3). However, the amount of variation in the college-specific effect estimates on both outcomes is substantial enough to consider that it may represent real differences in the effectiveness of the program across the colleges. With respect to credits earned, three colleges had positive effect estimates ($p = 0.050$, $p = 0.000$, and $p = 0.032$), one had an effect near zero ($p = 0.853$), and one college had a negative effect estimate ($p = 0.182$). The college with the negative effect estimate is the college that struggled with program implementation and had lower levels of program participation. Two colleges had positive estimated effects on credentials earned: impacts of 5.1 percentage points and 4.6 percentage points ($p = 0.023$ and $p = 0.022$). These effects were particularly notable given the lack of evidence of a discernable effect on degrees in the full sample. At the remaining colleges, one estimated effect was near zero and two were negative, though none of these were statistically different from zero ($p = 0.739$, $p = 0.324$, $p = 0.172$).

Costs

To calculate DPP's costs, we collected annual budget data from program leaders. The analysis included direct costs (administration, staffing, monthly financial incentives, etc.) and indirect and technical assistance costs. Using the ingredients method, we calculated a program cost per student in the program group, using a ranged estimate for indirect costs in which the

lower bound assumes no indirect costs and upper bound is calculated using IPEDS data for costs of instruction, academic services, etc. In addition, we conducted a cost effectiveness analysis using the primary outcome of interest at the three-year mark, graduation.

We estimated DPP's direct costs at $648 per program group student per year (including students who did not enroll).[5] The direct costs include staff salaries and monthly student financial incentives. At this cost, the program helped more students persist in college and earn more credits. By enabling students to earn more credits, the program added indirect costs of an additional $366 per program group student per year, which from the college perspective was at least partially offset by the increased revenue associated with students taking additional courses. However, because DPP did not lead to more degrees earned at the three-year mark, it was not cost-effective for improving degree receipt.

Discussion

College promise programs and other placed-based college access interventions have grown in popularity in recent years (Leigh & González Canché, 2021). DPP built evidence-based student supports into an existing College Promise scholarship program, showing that these programs can be leveraged to help students stay in school and earn more credits. Since the time of the evaluation, the DPP program has been scaled up to serve more students. As of 2018, DPP serves all incoming students at four of the five Detroit-area community colleges that participated in the study.

Over the three years of the study, the DPP program helped students in the program group enroll in more semesters and earn more credits compared with those offered the scholarship alone. Notably, program group students were more likely to enroll and earned more credits in each of the six semesters of the study. The DPP program also supported students in enrolling

continuously and at a higher intensity. Program group students were more likely to enroll in college full-time and they were substantially more like to enroll and earn credits during summer terms. These are all valuable improvements. At the three-year mark, however, there was no evidence of an increase in degrees earned.

Programs that produce large improvements in college graduation rates have been identified, but they are rare. DPP's impacts on enrollment patterns and credit accumulation compare favorably to those from randomized controlled trials of similar programs (Dawson et al., 2020; Weiss & Bloom, 2022; Weiss, Somers, & Hill, 2022). For instance, the 3.3 credit increase in cumulative credits earned by DPP program students is larger than most of the impacts observed in a review of 20 years of MDRC's randomized controlled trials of community college interventions (Weiss & Bloom, 2022; Weiss et al., 2022).

For most students, the additional progress that DPP helped them to make was not enough to lead to a degree. Program group students earned, on average, 19 credits over the course of the three-year study period. Thus, although their improvement relative to the control group was meaningful, few students obtained the 60 required credits to earn an associate's degree. A similar narrative describes DPP's impacts on cumulative terms enrolled: though the program provided meaningful support, more was needed to address the substantial barriers that Detroit students continued to face.

One element of DPP may explain the positive impacts on credit accumulation without a corresponding impact on graduation rates. While the Detroit Promise scholarship encourages students to enroll in college full time, students don't lose their scholarship if they drop below full-time status. As our results show, students frequently enrolled part-time over the course of the study, making it very difficult to graduate within two or three years, even though they continued

to accrue college credits. Instituting a full-time enrollment requirement has clear downsides. Many students have competing priorities such as work and child care. Serving only full-time students would certainly help improve the time it takes to earn a degree within the program, but doing so would cut out many of the highest-need students who stand to benefit the most from the program. For this reason, the Detroit Promise scholarship's staff chose not to enforce a full-time requirement. Programs seeking to learn from this study may want to weigh the relative benefits and drawbacks of encouraging rather than enforcing full-time enrollment.

Another significant issue that merits further research and experimentation is improving spring-to-fall persistence. In the DPP student population, as in many community colleges across the country, enrollment rates dropped precipitously from one academic year to the next. While the DPP program had a positive impact on students' likelihood of staying in school, the overall retention rates remained quite low. There is more to understand about the confluence of factors—from financial aid issues to academic under-preparedness to social disengagement from college life over the summer or "summer melt"—that might inform stronger interventions that could help students stay enrolled. While there has been some research into summer melt between high school and college, the continued issue in subsequent college years merits further investigation. In addition, there may be policy changes that can help Detroit Promise students—and all students in Detroit—stay in school.

Those seeking to learn from this evaluation might also consider how to help DPP students who take developmental education courses. Many students who enter community colleges are required to take developmental education courses before enrolling in college-level courses (Jaggars & Stacey, 2014). Over two-thirds of the college enrollees in this study took at least one developmental education course. These courses slow students' time to degrees and prevent them

from building momentum early on (Bailey, Jeong, & Cho, 2010; Ganga, Mazzariello, & Edgecombe, 2018). Finding from this study showed that DPP supported students in attempting and earning development education courses in every term during the three-year study, suggesting that advising and academic supports specific to development education can benefit students well beyond their initial semesters in college.

A final question is how to help Detroit Promise students who do not enroll in school. About one-third of students who signed up for the Detroit Promise scholarship and entered the study in summer 2016 and summer 2017 did not enroll in college the following fall semester. Interviews with students, as well as reports from DPP staff, identified one common roadblock for these students: financial concerns. Even with the Promise scholarship in place, students often experienced issues with either FAFSA completion or FAFSA verification that made them unable to enroll in courses or caused them to be dropped from courses due to nonpayment. As noted earlier, research has shown that Black students are more likely than White students to be selected for FAFSA verification, as are students from low-income households compared with students from higher-income households. DPP coaches saw FAFSA completion and verification as the greatest systemic issue for students. Many students also reported that they could not afford other expenses not covered by financial aid, such as transportation, rent, or child care, and opted to work instead of attending school. Financial aid issues were also seen as a significant driver of "summer melt," in which students who intended to enroll in college in the fall semester disengaged during the summer and did not enroll after all. Other issues typically associated with summer melt, such as losing interest in college, or changes in circumstance, such as joining the military or moving away, were rare compared with financial struggles, coaches said.

In closing, our qualitative findings underline an important consideration for both the DPP program and for other college-access programs in Detroit. Students highly valued the assistance from DPP and their relationships with their coaches. Yet they continued to face great barriers to success, including financial uncertainty, inadequate academic preparation for college-level work, high rates of enrollment in developmental education coursework, unreliable transportation to school, and competing responsibilities at school and at home, among other challenges. A large segment of the respondents also reported working more than part time, which affected their ability to take courses and make progress toward a degree. Structural barriers, most notably the lack of reliable, organized regional transit, also had an impact on students' continued enrollment. Many of these issues will require collaboration across policy domains to effect meaningful change. For high-need student populations, much more than typical campus-based support is required, and stakeholders must therefore take an expansive view of the systemic changes needed to dramatically improve community college graduation rates.

Endnotes

[1] Authors' calculations using data from the Michigan Department of Education. Several Metro Detroit colleges set an SAT score of 1060 and an ACT of 21 as a rule-of-thumb for assessing college readiness and determining eligibility for scholarship opportunities.

[2] It is possible that some students, upon reading the informed consent language in the application, chose not to complete the application at all. The study team did not have a way to measure this. Anecdotally, program staff did not believe this was an issue.

[3] The model to compute risk index scores included the following student covariates: gender; race/ethnicity; special education, limited English proficient, and economic disadvantage status; interaction between gender and race/ethnicity; standardized college entrance exam scores (ACT, SAT); 8th grade mathematics and reading standardized assessment scores; interactions of each test score variable with, separately, gender and economic disadvantage; a quadratic term for each test score variable; indicators for moving schools in high school; and 12th grade attendance rate. The measures of school characteristics included: whether the school was in the Detroit school district, a charter school, and located in Detroit (versus the surrounding suburbs); the proportion of the student population that was economically disadvantaged, receiving special education, limited English proficient, and identified with different racial/ethnic groups; the average college entrance exam scores (ACT, SAT); the school's four-year high school graduation rate; and the size of the student body. Finally, measures of census block characteristics included: proximity to the five study colleges measured by the average distance, drive time, and time on public transit; median household income; and the share of residents who had a BA degree or higher, received public assistance, and who identified with different racial/ethnic groups.

[4] Taking a closer look at the summer enrollment findings by calendar year (full results available upon request), it is apparent that the control group began enrolling in summer courses at higher levels in summer 2018. This is likely because of a change in federal policy to reinstate year-round Pell (also known as Summer Pell) in the 2017-18 academic year. Since much of DPP's early summer impacts were due to messaging that summer tuition was covered by the Detroit Promise scholarship, analogous messaging about year-round Pell covering tuition costs sent by the colleges to all students likely contributed to the higher control group summer enrollment rates later in the study.

[5] Using the ingredients method, the study calculated a program cost per student in the program group. The study team collected annual budget data from program leaders to calculate the program's direct costs (administration, staffing, monthly financial incentives, etc.). To calculate indirect costs, we used a ranged estimate in which the lower bound assumes no indirect costs and upper bound is calculated using IPEDS data for costs of instruction, academic services, etc. In addition, we conducted a cost effectiveness analysis using the primary outcome of interest at the three-year mark, degree attainment.

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Table 1. Comparison of DPP students with Detroit high school graduates and community college students

Characteristic (proportion, mean)	DPP study sample	Detroit high school graduates	Detroit community college students
Student demographics			
Women	0.59	0.55	0.51
Black	0.83	0.86	0.19
Hispanic	0.12	0.08	0.04
White	0.03	0.04	0.72
Other races	0.02	0.02	0.05
Educational experiences in 9th–12th grade			
Identified as economically disadvantaged in 9th–12th grade	0.90	0.92	0.48
Identified for special education in 9th–12th grade	0.12	0.12	0.11
Identified as limited English proficient in 9th–12th grade	0.12	0.10	0.12
Attended a charter school in 12th grade	0.38	0.32	0.06
Attended a suburban school (outside Detroit) in 12th grade	0.01	0.31	0.95
Attended a Detroit district school (DPSCD) in 12th grade	0.53	0.41	0.03
Attendance rate in 12th grade	0.89	0.88	0.95
8th-grade composite test z-score	-0.52	-0.44	-0.09
College ready test score (ACT≥21, SAT≥1060)	0.04	0.11	0.31
ACT score	15.4	16.0	18.9
SAT score	827	857	964
Schools attended in 12th grade			
Eligible for free or reduced-price lunch	0.75	0.74	0.37
Black	0.83	0.81	0.19
Hispanic	0.11	0.09	0.04
White	0.04	0.08	0.69
Other races	0.01	0.02	0.05
4-year cohort graduation rate	0.82	0.79	0.91
Percent enrolling in postsecondary education	0.31	0.30	0.45
Neighborhoods in 12th grade			
Black	0.76	0.78	0.14
Hispanic	0.10	0.08	0.04
White	0.14	0.12	0.76
Other races	0.04	0.04	0.07
BA degree or higher	0.13	0.12	0.32
Median household income	$31,137	$30,668	$66,757
Receiving public assistance	0.06	0.06	0.03
Drive time to all study colleges (average)	24.44	24.38	24.57
Transit time to all study colleges (average)	67.93	67.69	68.71
Postsecondary outcomes three years after high school graduation			
Any postsecondary enrollment	0.74	0.48	1.00
Number of terms enrolled (maximum 9)	3.66	4.09	5.13
Credits earned	26.66	37.99	44.45
Any credential earned	0.10	0.03	0.11
Summer terms enrolled (maximum 3)	0.43	0.51	0.84
Terms enrolled full-time (maximum 9)	1.45	2.58	2.38
Any developmental education courses attempted	0.69	0.42	0.45
Number of developmental education courses passed	3.23	1.98	2.09
Sample sizes	1,258	10,463	21,422

Note: Any postsecondary enrollment measured for all students. Other postsecondary outcomes measured only for students who enrolled except developmental education measures which are also conditional on taking any such courses. “College ready test scores” refers to the proportion of students with a score of 21 or higher on the ACT or a score of 1060 or higher on the SAT.

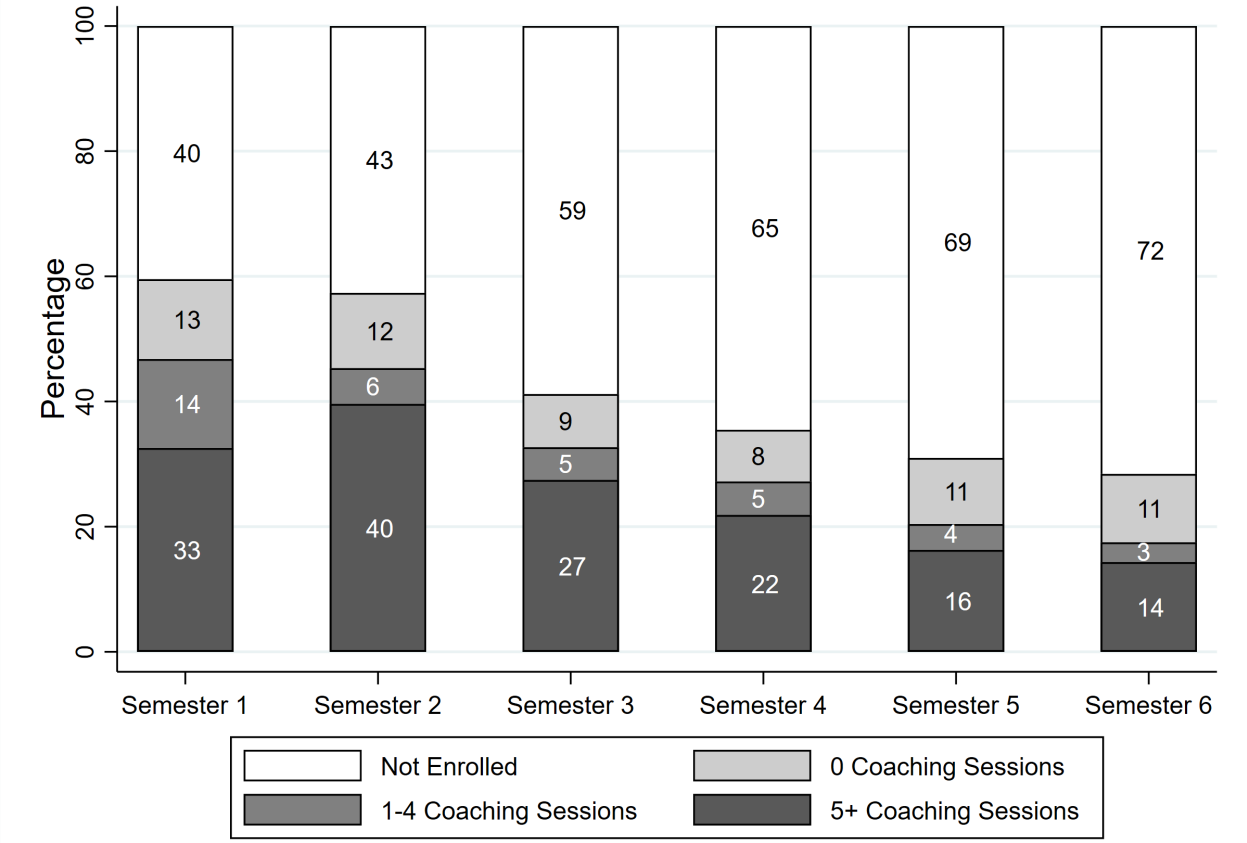
Table 2. Summary statistics and baseline equivalence

Characteristic (proportion, mean)	Program group	Control group	Difference	Effect size
Gender, Race/ethnicity (*N*=1,258)				
Women	0.59	0.60	-0.01	-0.03
Black students	0.83	0.84	-0.01	-0.04
Hispanic students	0.13	0.11	0.02	0.06
White students	0.03	0.03	0.00	0.01
Students identifying as other races	0.02	0.02	-0.01	-0.04
Educational experiences in 9th–12th grade				
Identified as economically disadvantaged in 9th–12th grade (*N*=1,224)	0.90	0.90	0.00	0.01
Identified for special education in 9th–12th grade (*N*=1,224)	0.12	0.12	0.00	0.00
Identified as limited English proficient in 9th–12th grade (*N*=1,224)	0.12	0.12	0.01	0.02
Attendance rate in 12th grade (*N*=1,218)	0.89	0.89	0.00	-0.04
8th-grade composite test score (*N*=1,147)	-0.54	-0.48	-0.06	-0.10
ACT score (*N*=547)	15.3	15.6	-0.3	-0.10
SAT score (*N*=579)	829.4	822.5	6.9	0.06
College of intended enrollment, site of random assignment				
College 1 (*N*=570)	0.45	0.46	0.00	-0.01
College 2 (*N*=149)	0.12	0.12	0.00	0.00
College 3 (*N*=183)	0.14	0.15	0.00	-0.01
College 4 (*N*=103)	0.08	0.08	0.00	0.00
College 5 (*N*=253)	0.20	0.20	0.01	0.02
Sample sizes	823	435		

Source: MEDC educational records

Notes: Table shows the means in the program and control groups adjusted for varying random assignment ratios.
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

Figure 1. Program students' coaching sessions attendance rates



Source: Data from MEDC educational records and the DPP management information system

Notes: Only coaching sessions attended by program group students during semesters in which they were enrolled in college are shown above. Coaching sessions for students who enrolled at colleges other than the ones they identified on their Detroit Promise scholarship applications are not included. The sample for this figure is the 823 program group students. For the purposes of this table, enrollment is defined as being enrolled at the college of random assignment only.

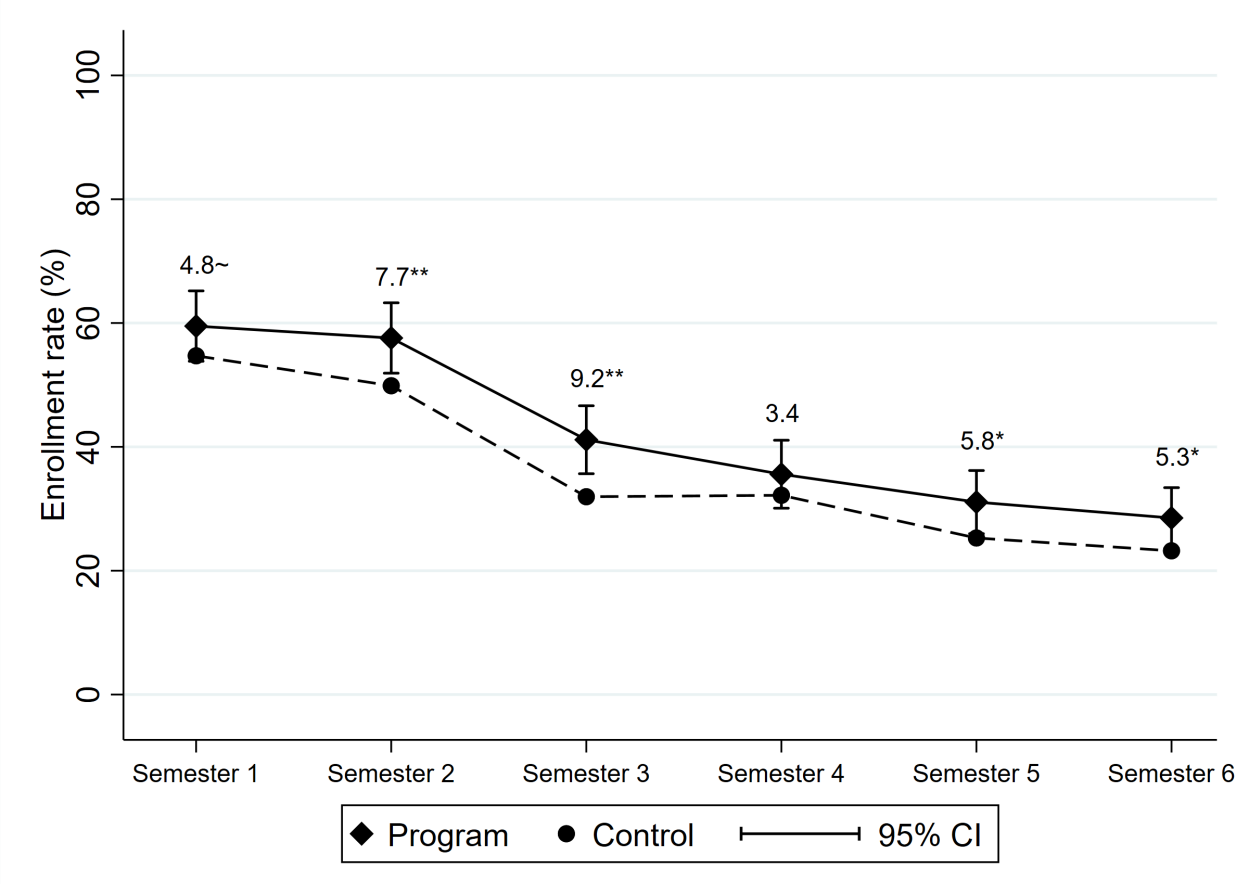
Table 3. Intent-to-treat effects on three-year academic outcomes

	Program group		Control group		Estimated effects			Sample
Outcome	Mean	SD	Mean	SD	Difference	SE	*p* value	size
Average number of terms enrolled	**2.534**	**2.158**	**2.172**	**2.088**	**0.362****	**0.122**	**0.003**	**1,258**
Categorical								
0	0.243	0.429	0.299	0.458	-0.056*	0.026	0.032	1,258
1-2	0.335	0.472	0.345	0.476	-0.010	0.028	0.733	1,258
3-4	0.171	0.378	0.166	0.372	0.005	0.022	0.818	1,258
5-6	0.252	0.433	0.191	0.393	0.061*	0.024	0.010	1,258
Total credits earned	**19.411**	**23.125**	**16.095**	**21.004**	**3.316****	**1.225**	**0.007**	**1,258**
Earned a degree	**0.073**	**0.260**	**0.069**	**0.254**	**0.004**	**0.015**	**0.780**	**1,258**
Highest degree earned								
Associate's degree	0.055	0.230	0.041	0.199	0.014	0.012	0.240	1,258
Bachelor's degree	0.001	0.035	0.000	0.000	0.001	0.001	0.326	1,258

Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio.
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

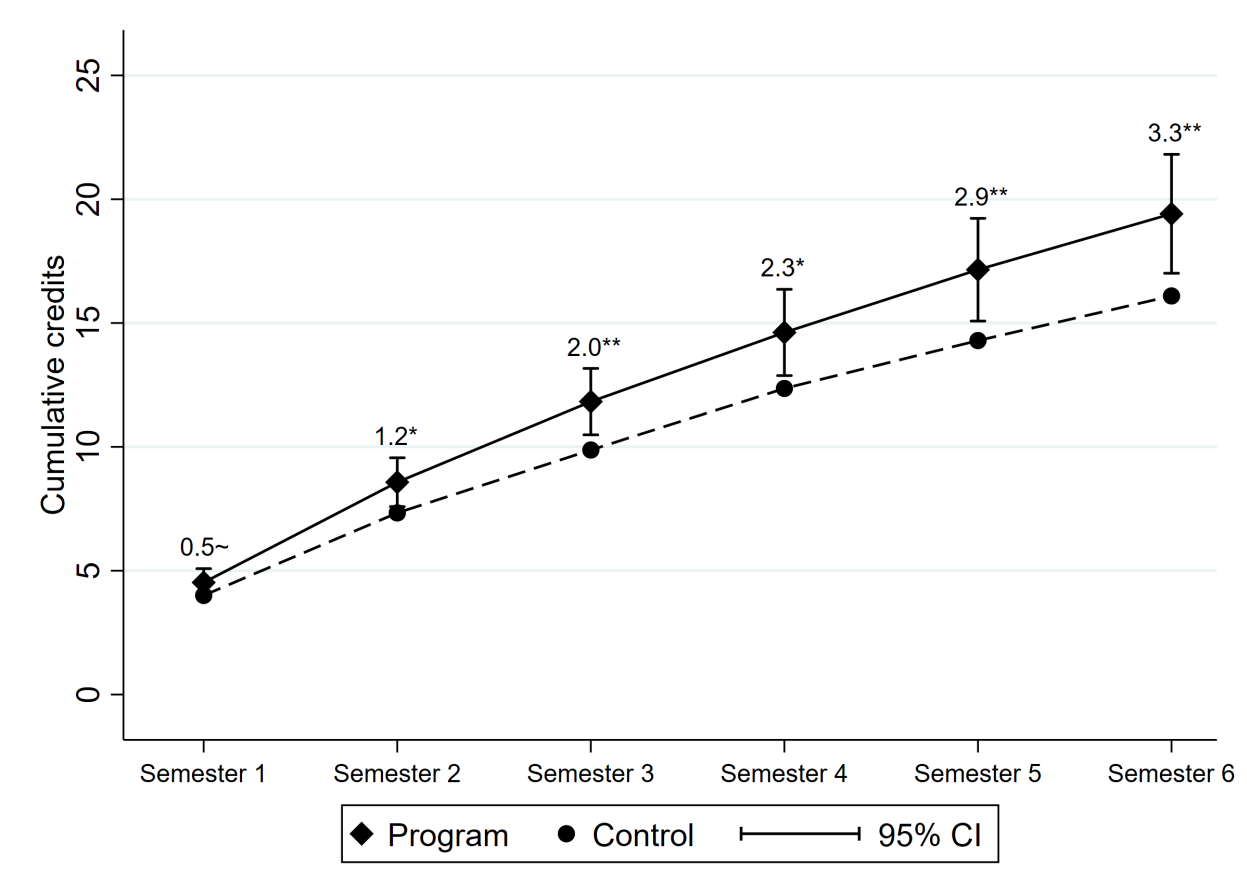
Figure 2. College enrollment rates by semester



Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio. Total sample size is 1,258 students (program group = 823, control group = 435).
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

Figure 3. Cumulative credits earned by semester



Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio. Total sample size is 1,258 students (program group = 823, control group = 435).
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

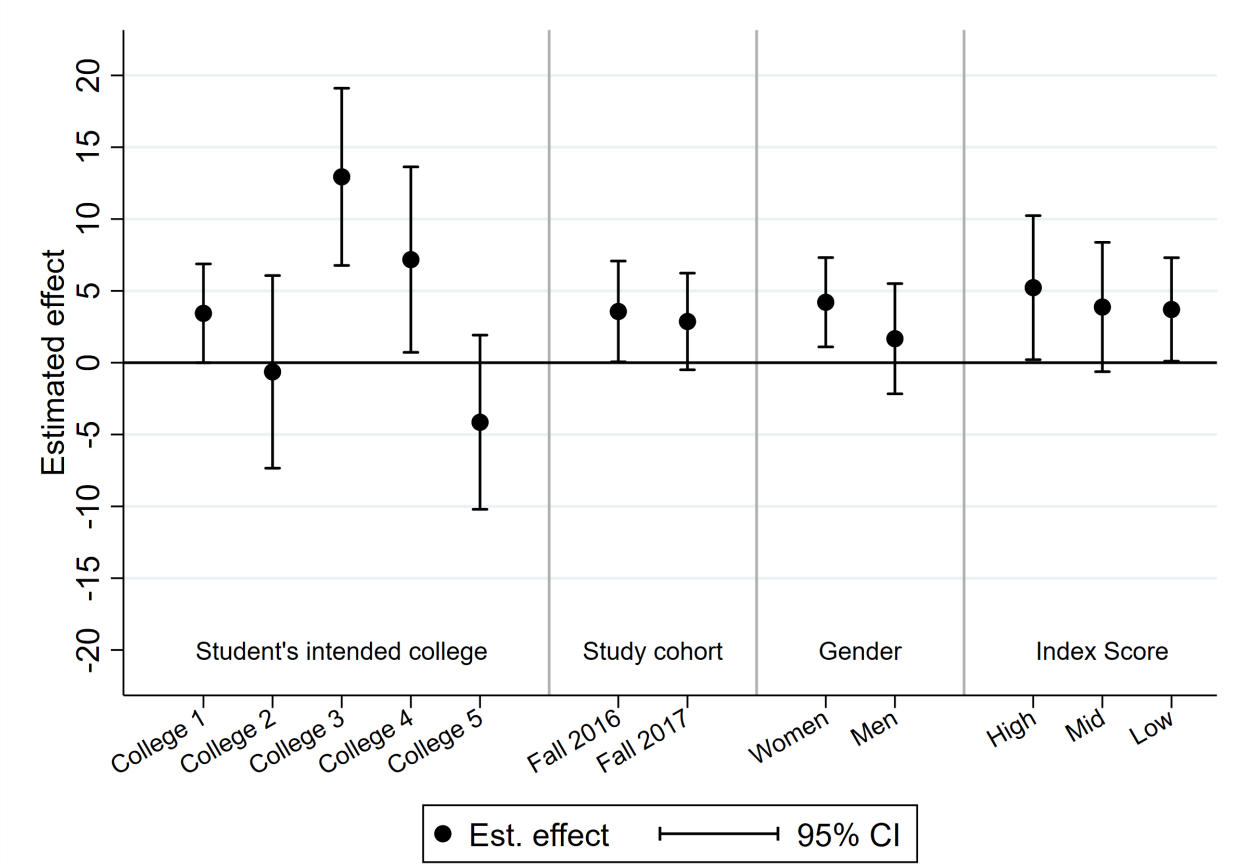
Table 4. Exploratory intent-to-treat effects on three-year outcomes

	Program group		Control group		Estimated effects			Sample
Outcome	Mean	SD	Mean	SD	Difference	SE	*p*-val.	size
Summer enrollment								
Enrolled	0.365	0.738	0.230	0.532	0.135***	0.036	0.000	1,258
Credits attempted	2.227	4.935	1.570	4.146	0.657*	0.260	0.012	1,258
Credits earned	1.776	4.353	1.313	3.811	0.463*	0.234	0.048	1,258
Full-time enrollment								
Semester 1	0.292	0.456	0.221	0.415	0.071**	0.025	0.004	1,258
Semester 2	0.255	0.436	0.200	0.400	0.055*	0.024	0.022	1,258
Semester 3	0.194	0.395	0.140	0.348	0.054*	0.021	0.012	1,258
Semester 4	0.162	0.368	0.131	0.338	0.031	0.020	0.132	1,258
Semester 5	0.131	0.338	0.083	0.276	0.048**	0.018	0.006	1,258
Semester 6	0.120	0.324	0.083	0.276	0.037*	0.017	0.032	1,258
Developmental education								
Credits attempted	3.384	4.538	2.761	3.741	0.623**	0.236	0.009	1,258
Credits earned	2.372	3.835	2.025	3.200	0.347~	0.201	0.084	1,258

Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio.
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

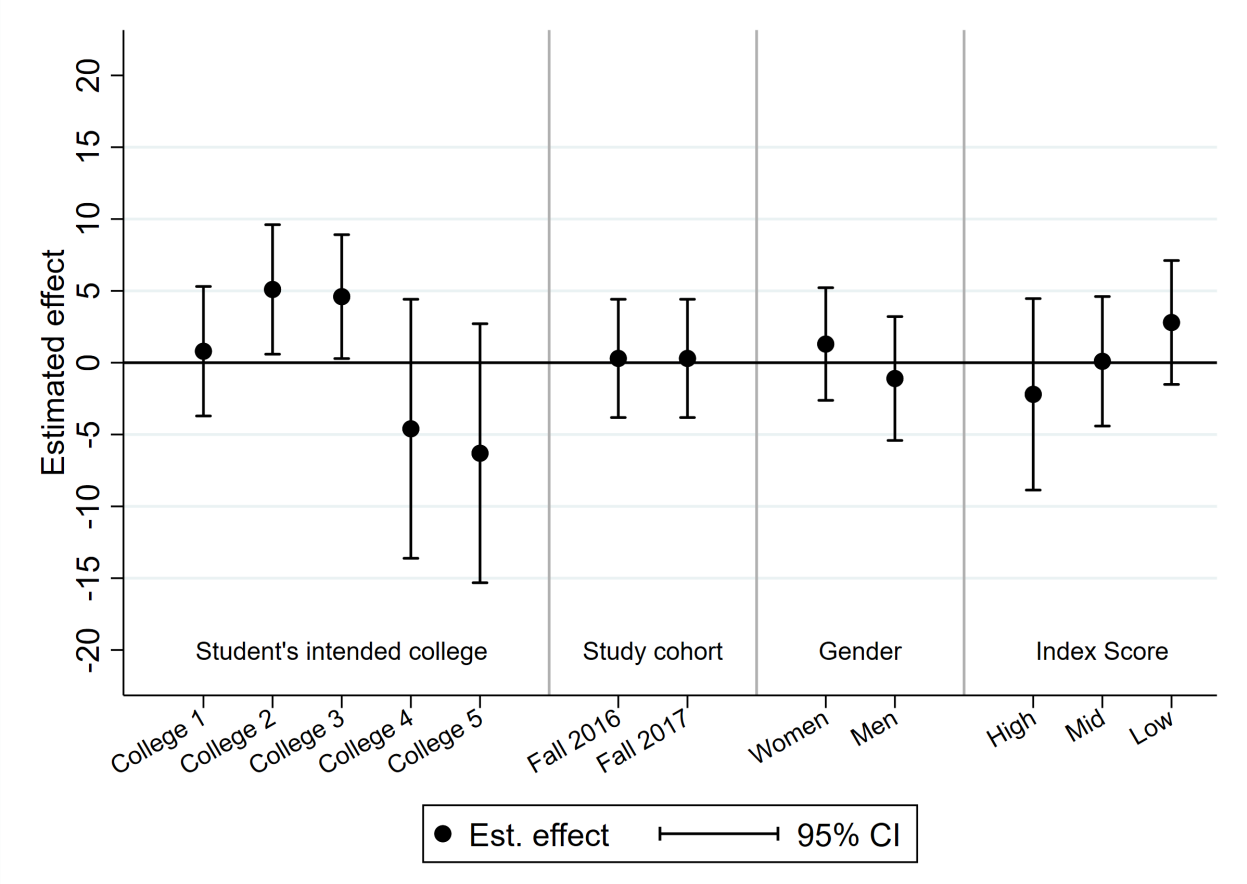
Figure 4. Cumulative credits earned after three years, by subgroup



Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio. CI=confidence interval. Total sample size is 1,258 students (program group = 823, control group = 435).

Figure 5. Credentials earned after three years, by subgroup



Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio. CI=confidence interval. Total sample size is 1,258 students (program group = 823, control group = 435).

Appendix Table 1. Intent-to-treat effects on three-year academic outcomes, by semester

	Program group		Control group		Estimated effects				
Outcome	Mean	SD	Mean	SD	Difference	SE	*p* value	Adjusted *p* value	Sample size
Average number of terms enrolled	**2.534**	**2.158**	**2.172**	**2.088**	**0.362****	**0.122**	**0.003**	**0.009**	**1,258**
Enrollment in each term									
Semester 1	0.595	0.491	0.547	0.498	0.048~	0.029	0.094		1,258
Semester 2	0.576	0.495	0.499	0.501	0.077**	0.029	0.008		1,258
Semester 3	0.412	0.492	0.320	0.467	0.092**	0.028	0.001		1,258
Semester 4	0.356	0.479	0.322	0.468	0.034	0.028	0.221		1,258
Semester 5	0.311	0.463	0.253	0.435	0.058*	0.026	0.025		1,258
Semester 6	0.285	0.451	0.232	0.423	0.053*	0.025	0.039		1,258
Total credits earned	**19.411**	**23.125**	**16.095**	**21.004**	**3.316****	**1.225**	**0.007**	**0.011**	**1,258**
Cumulative credits earned by term									
Semester 1	4.525	5.173	4.003	4.921	0.522~	0.285	0.067		1,258
Semester 2	8.574	9.234	7.334	8.672	1.240*	0.503	0.014		1,258
Semester 3	11.828	12.851	9.875	11.812	1.953**	0.684	0.004		1,258
Semester 4	14.620	16.584	12.361	15.330	2.259*	0.889	0.011		1,258
Semester 5	17.154	19.861	14.294	18.193	2.860**	1.058	0.007		1,258
Semester 6	19.411	23.125	16.095	21.004	3.316**	1.225	0.007		1,258
Earned a degree (%)	**0.073**	**0.260**	**0.069**	**0.254**	**0.004**	**0.015**	**0.780**	**0.780**	**1,258**
Highest degree earned									
Associate's degree	0.055	0.230	0.041	0.199	0.014	0.012	0.240		1,258
Bachelor's degree	0.001	0.035	0.000	0.000	0.001	0.001	0.326		1,258

Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio.
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

Appendix Table 2. Cumulative credits earned after three years, by subgroup

		Program group		Control group		Estimated effects			
Subgroup	Sample size	Mean	SD	Mean	SD	Difference	SE	*p* value	*p* value for diff effects
Study college									0.001
College 1	570	17.797	23.299	14.358	19.375	3.439~	1.754	0.050	
College 2	149	15.026	22.795	15.663	21.574	-0.637	3.421	0.853	
College 3	183	26.099	22.768	13.161	20.317	12.938***	3.147	0.000	
College 4	103	18.120	22.107	10.943	14.695	7.177*	3.294	0.032	
College 5	253	20.966	23.533	25.110	24.908	-4.144	3.093	0.182	
Sample size	1258								
Study cohort									0.424
Fall 2016	583	20.494	23.293	16.926	20.961	3.568*	1.790	0.047	
Fall 2017	641	18.260	23.124	15.389	20.684	2.871~	1.716	0.095	
Sample size	1224								
Gender									
Women	510	17.284	23.332	15.613	20.228	1.671	1.957	0.394	0.293
Men	748	21.036	22.836	16.827	22.167	4.209**	1.587	0.008	
Sample size	1258								
Risk index									0.869
Highest scores	419	30.834	25.304	25.610	24.201	5.224*	2.558	0.042	
Middle scores	419	18.586	22.251	14.710	18.680	3.876~	2.296	0.092	
Lowest scores	420	11.673	17.919	7.966	15.342	3.707*	1.838	0.044	
Sample size	1258								

Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio.
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1

Appendix Table 3. Credentials earned after three years, by subgroup

		Program group		Control group		Estimated effects			*p* value for diff effects
Subgroup	Sample size	Mean	SD	Mean	SD	Difference	SE	*p* value	
Study college									0.062
College 1	570	0.077	0.270	0.069	0.253	0.008	0.023	0.739	
College 2	149	0.051	0.222	0.000	0.000	0.051*	0.023	0.031	
College 3	183	0.046	0.200	0.000	0.000	0.046*	0.022	0.034	
College 4	103	0.011	0.121	0.057	0.236	-0.046	0.046	0.324	
College 5	253	0.108	0.322	0.171	0.379	-0.063	0.046	0.172	
Sample size	1258								
Study cohort									0.564
Fall 2016	583	0.064	0.246	0.061	0.240	0.003	0.021	0.885	
Fall 2017	641	0.077	0.275	0.074	0.263	0.003	0.021	0.880	
Sample size	1224								
Gender									0.399
Women	510	0.062	0.281	0.073	0.260	-0.011	0.022	0.611	
Men	748	0.077	0.225	0.064	0.245	0.013	0.020	0.522	
Sample size	1258								
Risk index									0.396
Highest scores	419	0.095	0.308	0.117	0.323	-0.022	0.034	0.520	
Middle scores	419	0.056	0.221	0.055	0.229	0.001	0.023	0.977	
Lowest scores	420	0.062	0.241	0.034	0.183	0.028	0.022	0.217	
Sample size	1258								

Source: Source: MEDC educational records

Notes: Estimates are adjusted by site, study cohort, race, gender, interaction between race and gender, college entrance exams, and an indicator for imputed college entrance exam scores. Missing values for entrance exam scores were mean-imputed. Standard errors are heteroskedastic robust. Weights are calculated to make the effective (weighted) random assignment ratio the same in all random assignment blocks. The effective random assignment ratio is equal to the full sample's random assignment ratio.
*** p<0.001, ** p<0.01, * p<0.05, ~ p<0.1