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## Four-Year Degree and Employment Findings From a Randomized Controlled Trial of a One-Year Performance-Based Scholarship Program in Ohio

Alexander K. Mayer<sup>a</sup>, Reshma Patel<sup>b</sup>, and Melvin Gutierrez<sup>b</sup>

### ABSTRACT

A college degree is often viewed as a key step toward better employment and higher earnings. Many community college students, however, never graduate and cannot reap the financial benefits associated with a college degree. Although existing research suggests that financial aid interventions can modestly improve students' short-term academic outcomes, there is little rigorous evidence on the critical question of whether such interventions improve graduation rates or employment outcomes. This study helps to fill that gap using a randomized controlled trial involving over 2,000 community college students in Ohio. It focuses on a student population composed predominantly of low-income mothers. The study includes four years of post-random assignment data to examine the long-term impact of a performance-based scholarship program—financial aid that is contingent on academic performance—on degree receipt, employment, and earnings. The findings provide evidence that the one-year program made a lasting impact on students' credit accumulation—still evident after four years—and decreased the time it took students to earn a degree, but the study does not provide evidence of impacts on employment outcomes.

### KEYWORDS

higher education  
financial incentives  
college students

A college degree is often viewed as a key step toward better employment and higher earnings. Many students who invest their time and money in community colleges, however, never graduate and consequently cannot reap the financial benefits associated with a college degree. Among first-time students who entered community college during the 2003–2004 academic year, for example, roughly two thirds did not earn a degree or certificate within six years (U.S. Department of Education, 2011). Low-income students may find it particularly difficult to complete their education and earn a degree because going to college can require a substantial financial commitment relative to their total earnings. For some students, nearly 60% of household income is needed to cover the total cost of a two-year community college.<sup>1</sup> Many students use financial aid to help pay for college, but even so, financial need can still be a barrier to finishing school. Low-income students often work because of financial pressures,

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<sup>1</sup> This estimate is for students with families in the lowest quintile of income who are enrolled in two-year colleges in Ohio (National Center for Higher Education Management Systems Information Center, 2013).

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but students who reduce course enrollment in order to work more are less likely to graduate (Adelman, 2006).

Additional sources of financial aid for low-income students may be one solution to increase graduation rates, and studies that use observational data suggest that additional financial aid positively affects enrollment (Bettinger, 2010; Castleman & Long, 2013; Cornwell, Mustard, & Sridhar, 2006; Dynarski, 2003; Jackson, 2010; Kane, 2003), persistence (Bettinger, 2004), credit accumulation (Castleman & Long, 2013; Scott-Clayton, 2010), and ultimately degree receipt (Castleman & Long, 2013; Dynarski, 2005; Scott-Clayton, 2010). Several of these studies that use observational data (Bettinger 2004; Castleman & Long, 2013; Kane, 2003; Scott-Clayton, 2010) use regression discontinuity designs to provide a stronger foundation for causal claims, but none use randomized controlled trials.

In a randomized controlled trial, researchers randomly assign students either to a program group that is given the opportunity to receive additional financial aid, or to a control group not given the opportunity. Such a trial is the strongest design to establish causality, because random assignment ensures that no systematic factors determine whether students are offered the opportunity to receive additional financial aid.<sup>2</sup> Researchers have used randomized controlled trials to test some financial aid interventions. Compared with studies that use observational data, randomized controlled trials generally find more modest effects on average academic outcomes (Angrist, Lang, & Oreopoulos, 2009; Goldrick-Rab, Harris, Kelchen, & Benson, 2012; Leuven, Oosterbeek, & van der Klaauw, 2010). A large-scale demonstration project to evaluate performance-based scholarships—additional financial aid that is contingent on academic performance—called the Performance-Based Scholarship Demonstration (PBS Demonstration) also includes rigorous evaluations that have produced findings on short-term academic impacts (Cha & Patel, 2010; Miller, Binder, Harris, & Krause, 2011; Patel, Richburg-Hayes, De la Campa, & Rudd, 2013; Patel & Rudd, 2012; Patel & Valenzuela, 2013; Richburg-Hayes et al., 2009; Sommo et al., 2014). To date, however, there is little rigorous evidence that answers the critical questions of whether any form of financial aid for higher education can improve degree receipt, employment, and earnings.

The study described in this article provides insight into precisely those questions. It uses a randomized controlled trial involving over 2,000 community college students in Ohio, and it includes four years of post-random assignment data on academic and employment outcomes to examine the long-term impact of a performance-based scholarship program on degree receipt, employment, and earnings. Additionally, this study targeted low-income parents—predominantly low-income mothers—a population that may be especially vulnerable to academic challenges related to financial constraints (Richburg-Hayes et al., 2009).

## **The Intervention**

### ***Performance-Based Scholarship Programs***

Performance-based scholarships were first tested in a randomized controlled trial in Louisiana (Richburg-Hayes et al., 2009). Low-income parents at two New Orleans community colleges enrolled in a program that allowed them to earn up to \$1,000 per semester for two

semesters, provided that they maintained at least half-time enrollment and a “C” average or better. The evaluation found that the scholarships had positive effects on several outcomes, including students’ credit accumulation and semester-to-semester retention. Evidence of these effects persisted into the third and fourth semesters, when most students were no longer eligible for the scholarship. Just after the program ended, Hurricane Katrina struck the Gulf Coast region, causing severe destruction and temporarily shutting down the two colleges. Many students in the study moved away, and the devastation inflicted made it difficult to determine whether the program had long-term effects on graduation and employment outcomes (Richburg-Hayes et al., 2009).

Later, six sites across the country, including the Ohio site examined here, launched evaluations of PBS programs as part of the PBS Demonstration (Patel et al., 2013). In Arizona, the program focused on academic supports to help Latino males, and offered both full-time and part-time scholarship awards. Students in the program could receive up to \$1,500 per semester for three semesters, including financial incentives to attend advising and tutoring and a requirement that students attend at least one group discussion session each semester (Patel & Valenzuela, 2013). In California, the program targeted low-income high school seniors and allowed students to use their scholarship at any accredited two-year or four-year institution in the United States. The study evaluated different scholarship types to examine how duration and amounts impacted student behavior (Patel et al., 2013). In Florida, a specific sequence of developmental math classes was seen as a roadblock to student success. Students in the program could earn up to \$600 each semester if they enrolled in and passed their next required course in the developmental sequence. (Sommo et al., 2014). In New Mexico, the program design encouraged traditional students to attempt and complete more than a full-time course load (15 credits) in order to graduate on time. Students could earn a total of \$1,000 per semester for four semesters (Miller et al., 2011). In New York, the program was designed to help nontraditional students stay in college, and encourage students to attend school over the summer. Students could earn up to \$1,300 per semester for two semesters (Patel & Rudd, 2012). In the Ohio program, the focus of this article, the program targeted low-income parents and offered both full-time and part-time scholarship awards to encourage students who could only attend part-time while also incentivizing full-time enrollment. Students could earn up to \$900 each semester (or \$600 at colleges on the quarter system) for two semesters (Cha & Patel, 2010).

These programs were each structured with two main goals: first, to make college more affordable for low-income students; and second, to structure the scholarship payments to provide incentives for behaviors associated with good academic progress. The key components of each scholarship program are:

1. **Performance-based scholarships:** Awards are paid if students meet basic conditions regarding enrollment and grades in college courses. They thus act as incentives, rewarding behavior associated with academic success.
2. **Current semester focus:** Scholarships are based on academic performance in the current semester, regardless of performance in previous semesters or high school performance. This feature is unlike merit-based aid in which students have to first qualify based on high school performance—for example, high school grade point average (GPA)—or grades from a previous college term.
3. **Paid directly to students:** Often scholarships are paid directly to institutions. In contrast, students in the performance-based scholarship program receive the money

directly and can use it to cover any expenses, including those that could derail continued attendance and success (for example, child care or transportation).

4. **Designed to supplement other financial aid:** Performance-based scholarships are meant to supplement Pell Grants and state aid to help meet the needs of low-income students. The intervention gives students more money to cover academic and living expenses, and can potentially reduce their dependency on loans.

Early, short-term findings from the programs show that diverse institutions with low-income student populations can implement performance-based scholarships. Students in almost all of the program groups were more likely than their control group counterparts to meet academic benchmarks established for the scholarships in one or more semesters. The programs were also found to positively impact students' credit accumulation but did not seem to have an effect on students returning to college in the following year. In some cases, performance-based scholarship programs decreased educational debt. These early, short-term findings suggest that the programs may produce longer-term impacts on outcomes such as those analyzed in this study.<sup>3</sup>

### ***The Ohio Performance-Based Scholarship Program***

The study described in this paper evaluates the performance-based scholarship program implemented in Ohio. In Ohio, the state legislature was interested in helping low-income students and was impressed by the short-term outcomes of the Louisiana study. The legislature developed a similar statewide program for low-income students, using surplus funds from the Temporary Aid to Needy Families (TANF) program.<sup>4</sup> The TANF Educational Awards Program (TEAP) was implemented statewide in the 2006–2007 school year as a one-year program and ended after that year when the surplus funds had been spent. In the 2008–2009 academic year, the program was reintroduced at three colleges within the context of a randomized controlled trial in the PBS Demonstration to provide rigorous evidence about the program's impact. The Ohio Department of Job and Family Services (ODJFS) funded the scholarship using flexible TANF dollars, and the Ohio Board of Regents (OBR) administered the program through its division of State Grants and Scholarships.

The Ohio program was implemented at Lorain County Community College, Owens Community College, and Sinclair Community College, covering three of Ohio's four geographic corners. In northeast Ohio's small city of Elyria, Lorain enrolled over 11,000 students in fall 2008, when the PBS Ohio program started.<sup>5</sup> Owens was almost twice the size of Lorain, with 21,000 students in fall 2008, and is located in northwest Ohio, serving students in Toledo and neighboring Michigan. Sinclair, located in the south near Dayton, served over 19,000 students in fall 2008. Estimates of average unmet financial need at these colleges (\$5,400 at Lorain; \$6,984 at Sinclair; and \$7,929

at Owens) also suggested that a scholarship program could be beneficial.<sup>6</sup> Across these three colleges, 2,285 students participated in the study. About 60% were randomly assigned to the program group and about 40% were randomly assigned to the control group.<sup>7</sup>

The study population in Ohio was made up mostly of low-income students who were also mothers, with a large majority receiving government benefits such as TANF and food stamps.<sup>8</sup> This population was also generally older and half of the students were also employed. Like many low-income students, the students in this study had additional responsibilities such as work obligations. As parents, however, they were often juggling child care responsibilities as well. Qualitative research has also suggested that low-income women often face substantial obstacles to completion, including balancing child care, work, other family responsibilities, and health problems (Richburg-Hayes et al., 2009). The TANF funding made low-income mothers a prominent population for the Ohio program. State administrators believed that low-income parents were likely to stay in Ohio after graduating from college, so the use of TANF funds fit naturally with the state's strategic plan of producing more college graduates who would remain in the state (Fingerhut, 2008).

The Ohio scholarship program aligned with the general characteristics of programs in the PBS Demonstration. The Ohio scholarships were contingent upon meeting academic benchmarks in the current term, they were paid directly to students, and they were designed to supplement other aid. The program offered a scholarship for two consecutive semesters at Lorain and Owens, and three consecutive quarters at Sinclair.<sup>9</sup> Students were given a full-time award of \$900 per semester or \$600 per quarter for achieving a "C" or better in 12 or more credits; or a part-time award of \$450 per semester or \$300 per quarter for achieving a "C" or better in 6 to 11 credits. At each institution, regardless of the semester or quarter system, students were eligible for a maximum award of \$1,800 over the entire program duration. The differential award that depended on attendance level was designed to be more flexible for this population, and to allow students to attend part time and still earn part of the scholarship.

Students who participated in the program could earn any combination of part-time award, full-time award, or no award over the duration of the program. Students were paid only once per term, at the end of each semester or quarter, to avoid interference with their eligibility for public benefits, since almost 70% of the sample was receiving some sort of public benefits. As a result, students received regular reminders about the scholarship throughout the semester or quarter by e-mail and postcard. These reminders were designed to be positive, informative, and regular, and to keep the scholarship at the forefront of students' minds.

## ***The Theory of Change***

The program in Ohio was developed in collaboration between the state of Ohio and the research team. The study described here was designed to discover whether a scholarship-only program could lead to positive outcomes for students.<sup>10</sup> The scholarship opportunity and the reminders about the scholarship were designed to increase students' financial aid and to influence behaviors that might lead to improvements in student outcomes. The scholarships' contingent payments on academic benchmarks were designed to provide incentives, to motivate students to attempt and earn more credits, and to enroll full time. The additional funds were also intended to relieve some of the financial stresses facing low-income parents and to provide financial assistance for their education. In order to meet the scholarship benchmark, students might have greater motivation to complete more classes or to study more or better, work less, or pay for child care so that they could focus more on their studies. The promise and receipt of additional funds might also relieve some of the financial stresses facing low-income parents, and the additional funds might also help students to enroll in more classes in subsequent semesters. Positive messages and occasional interaction with the scholarship coordinator might boost students' confidence or simply remind them of the requirements to get the award. The cumulative effect of these changes could then help students earn more credits, earn more degrees, and ultimately improve labor market outcomes such as employment and earnings.

## **Research Design**

### ***Research Questions***

The study was designed to answer five main research questions:

1. Did the program impact students' financial aid receipt?
2. Did the program improve students' academic motivation or study behaviors, such as attendance, study habits, and employment?
3. Did the program improve students' academic progress, as measured by outcomes such as persistence, credits attempted, and credit accumulation?
4. Did the program increase the number of students who completed college, as measured by whether students earned a certificate or degree?
5. Did the program improve students' employment outcomes, such as employment status and earnings?

### ***Methods***

This study uses a randomized controlled trial to estimate the impact of the intervention and answer the previous research questions. The estimates are intent-to-treat estimates—the estimated effect of being offered the opportunity to participate in the scholarship program—calculated by comparing the average outcomes of all students randomly assigned to the program group with the average outcomes of all students randomly assigned to the control group. The study is designed to estimate the impact of the program as a whole, rather than

to disentangle the effects of the scholarship from the effects of the reminders or scholarship coordinators at the colleges.<sup>11</sup>

Using internal financial aid databases, the colleges identified eligible first-time and continuing students, and invited them by e-mail or letter to on-campus information sessions. At these information sessions, students learned about the program and the potential changes in their financial aid packages if they were to join the study and be assigned to the program group. After the session, interested students gave their written informed consent to participate, filled out a Baseline Information Form (BIF) (detailed below), and supplied their contact information. Finally, the 2,285 students who completed the process were randomly assigned.<sup>12</sup>

## ***Data and Measures***

### ***Demographics***

Student data were collected from several sources. Students provided demographic data through a Baseline Information Form (BIF), which was administered prior to random assignment. The BIF data include information such as age, gender, race/ethnicity, marital status, number and age of children, education, employment, and motivation, all measured through a survey. The BIF data also included personally identifiable data that were used to match students to their academic and financial records. Financial information to describe the students at the time of random assignment was collected from Free Application for Federal Student Aid (FAFSA) data provided by the Ohio Board of Regents (OBR). FAFSA and BIF data are used to assess recruitment, describe the sample, and compare students in the program and control groups on observable characteristics.

### ***Financial Aid***

Financial aid records provided by each of the partner institutions are used to assess whether students in the program group received more financial aid through the scholarship program, compared with students in the control group. Financial aid is measured by federal and state grants, private scholarships (including the Performance-Based Scholarship funds), work-study funds, and loans that the students received during their respective academic terms.

### ***Academic Behaviors and Motivation***

Students in both the program and control groups were also surveyed during either the second or third semester or quarter of the program for each cohort.<sup>13</sup> The survey covered a range of factors hypothesized to mediate the impact of the program on student outcomes, and asked students about their attendance, study habits, employment, and motivation. Students assigned to the program group were also asked about their experiences in the program. The survey items are used to measure behaviors identified in the theory of change.



In order to assess study habits, students were asked a series of related questions on the survey. The survey also asked students about their motivation to complete their course load. Motivation was assessed using eight questions that were aggregated into a relative autonomy index (RAI). The RAI is an overall measure of motivation that ranges from  $-18$  to  $18$ , with higher values representing greater autonomous or personally driven motivation. The tabled measures are calculations based on responses to the questions and possible responses shown in the Appendix.

### ***Academic Outcomes***

OBR provided student transcript data, used for the analysis of academic outcomes: persistence, measured by enrollment in each term; credits attempted, measured by the total number of credits students could earn in the courses in which they registered; and credit accumulation for all public Ohio colleges, measured by the total number of credits students earned. OBR also provided data on certificates and degrees earned by students for all public Ohio colleges, to measure college completion. In addition, National Student Clearinghouse (NSC) data were obtained to provide additional information on institutions not covered by the OBR. The NSC data provide enrollment records collected from nearly all colleges in the United States. The enrollment outcomes observed in the NSC data are included when measuring persistence. Hence, for this study, a student who does not appear in these data is coded as not enrolled in college, rather than as attriting from the study.<sup>14</sup> It follows that for the outcomes considered here, such as credits attempted and credits earned, students who did not enroll are coded as attempting zero credits and earning zero credits. Less than 1% of the sample was found to be enrolled at institutions not covered by the OBR data source for these outcomes. Consequently, the sample size reported for the full study is the same sample size for each year of follow-up.

### ***Employment Outcomes***

Finally, employment data were obtained from the Ohio Department of Job and Family Services (ODJFS) and are used to measure employment status, quarterly earnings, and cumulative earnings. Any reported earnings in a given time frame are used to determine employment status, and all unique earnings were used to create aggregate earnings.

### ***Characteristics of the Sample***

Table 1 shows that the majority of the sample members, who were nearly all parents, were single mothers and that they were generally older students (the average age was about 30), with more than one child. Most students had earned a high school diploma or a General Educational Development (GED) certificate more than five years before entering the study (69%). About 55% of the students were White, 30% were Black, and 9% were Hispanic. Nearly 70% of the students had someone in their household

**Table 1.** Selected characteristics of sample members at baseline.

Characteristic	Full sample	Program group	Control group	Difference	Standard error
Female (%)	86.4	86.6	86.2	0.4	1.45
Unmarried (%)	78.8	78.5	79.3	−0.8	1.78
Parent (%)	99.7	99.7	99.8	−0.1	0.22
More than one child (%)	59.0	58.7	59.4	−0.7	2.09
Single mother (%)	66.6	66.3	67.0	−0.7	2.01
Average age	29.9	29.9	29.9	0.0	0.34
Race/ethnicity <sup>a</sup> (%)					
White	54.6	55.5	53.2	2.3	2.12
Black	31.4	30.3	33.0	−2.7	1.95
Hispanic	8.6	8.1	9.4	−1.3	1.18
Asian or Pacific Islander	0.6	0.6	0.7	0.0	0.34
Other	4.8	5.5	3.7	1.8*	0.91
Household receiving any government benefits <sup>b</sup> (%)	68.5	67.7	69.7	−2.1	2.01
Currently employed (%)	48.8	47.6	50.6	−3.0	2.14
Date of high school graduation/GED certificate receipt (%)					
During the past 5 years	25.3	25.2	25.3	−0.1	1.85
More than 5 years ago	68.8	68.6	69.1	−0.6	1.96
Missing <sup>c</sup>	6.0	6.2	5.5	0.7	1.00
Average Adjusted Gross Income (\$)	10,317	10,530	9,999	531	383
Sample size	2,285	1,359	926		

Notes. A two-tailed *t*-test was applied to differences between research groups. Statistical significance levels are indicated as: \*\*\* = 1%; \*\* = 5%; \* = 10%.

To analyze whether baseline characteristics jointly predicted research group status, a likelihood ratio test was performed. This yielded a *p*-value of 0.98.

Distributions may not add to 100% because of rounding.

Missing values are only included in variable distributions for characteristics with more than 5% of the sample missing.

<sup>a</sup>Respondents who said they are Hispanic and chose a race are included only in the Hispanic category. Respondents who said they are not Hispanic and chose more than one race are considered multiracial. These respondents, combined with those who said they are American Indian/Alaskan Native or another race/ethnicity, are included in "Other."

<sup>b</sup>Benefits include unemployment/dislocated worker benefits, Supplemental Security Income or disability, cash assistance or welfare, food stamps, and Section 8 or public housing.

<sup>c</sup>Missing includes students who did not graduate from high school and students who did not provide a graduation date.

Sources: MDRC calculations using Baseline Information Form and Free Application for Federal Student Aid data.

receiving some government benefits. About half of the students were employed at the time of random assignment, and 60% of those employed reported that they worked 20 hours per week or more (not shown in table). On average, students had an adjusted gross income of just over \$10,000 per year.

The fourth column in Table 1 reports differences between the program and control groups on average baseline characteristics and shows that the groups look essentially the same on the measured attributes: there is only one difference between the groups that is statistically significant,<sup>15</sup> and a likelihood ratio test used to test whether baseline characteristics jointly predicted research group status yields a *p*-value of 0.98.

## Results

The performance-based scholarship program in Ohio was designed to increase students' financial aid, alter students' attitudes about education, and provide positive incentives to

change their academic behavior, with the ultimate goal of improving their academic and employment outcomes. The randomized design used for this study provides strong, reliable estimates of the program's impact on each of these categories of outcomes.

### ***Program Implementation***

In general, the program was implemented as designed. MDRC staff visited each of the colleges once in spring 2009 and observed that site staff were tracking students' performance and disbursing awards according to the program model. Moreover, MDRC examined the transcripts of a random sample of program students to make sure that site staff had accurately tracked students' performance and disbursed payments to students.<sup>16</sup> Additionally, the colleges successfully communicated with students about the program in six reminders over the duration of the program.

### ***Estimated Impacts on Financial Aid***

Students were paid money from the scholarships they earned in addition to any financial aid they had already been awarded.<sup>17</sup> During the first year of the program, the 2008–2009 academic year, Ohio offered relatively generous need-based financial aid to community college students, and the Ohio College Opportunity Grant (OCOG) was the main vehicle for that aid. The maximum Pell Grant—the primary federal source of financial aid—was \$4,731, and the maximum OCOG grant was \$2,496. The actual amounts of the need-based awards that a student received were affected by the student's cost of attendance (COA), Expected Family Contribution (EFC), and enrollment status (full time or part time). A student's COA includes estimates for costs related to, for example, tuition, fees, books, transportation, and living expenses.<sup>18</sup> In the 2009–2010 academic year, however, the amount available in Ohio for need-based financial aid declined precipitously. The OCOG program was restructured and received a smaller allocation after severe budget constraints in 2009, and OCOG eligibility for community college students was terminated. The first cohort of the program was unaffected by this change during the program's duration (but would lose their OCOG after the program ended). Later cohorts saw their OCOG awards eliminated during the program, and the performance-based scholarship represented a larger proportion of their financial aid packages.

Table 2 shows financial aid outcomes for the program year for all students and demonstrates that the program effectively increased financial aid receipt for students in the program group. The first row of the first panel of Table 2 shows that a large majority of students received financial aid during their first academic year in the study—about 95% of students in each of the groups. The second row, however, shows that during this same year, 73.8% of program group students also received a performance-based scholarship, while students in the control group were not eligible

**Table 2.** Impacts on financial assistance during the first academic year.

Outcome	Program group	Control group	Difference	Standard error
First Academic Year				
Received any financial assistance (%)	95.5	94.8	0.7	0.90
Received performance-based scholarship <sup>a</sup>	73.8	−0.1	73.9***	1.43
Received loans	58.3	57.8	0.5	1.96
Received Pell Grant	90.9	91.2	−0.2	1.18
Received any other grants <sup>b</sup>	73.0	73.2	−0.2	1.81
Average financial assistance received (\$)	7,947	7,445	502***	185
Performance-based scholarship <sup>a</sup>	765	−1	766***	20
Federal loans	2,853	3,187	−334***	120
Pell Grant	3,395	3,336	59	74
Other grants <sup>b</sup>	934	923	11	36
Sample size (total = 2,285)	1,359	926		

Notes. A two-tailed *t*-test was applied to differences between research groups. Statistical significance levels are indicated as: \*\*\* = 1%; \*\* = 5%; \* = 10%.

Estimates are adjusted by cohort and campus.

Rounding may cause slight discrepancies in sums and differences.

Federal work study awards are excluded from the figures above due to unavailability of data.

<sup>a</sup>The estimate of −\$1 for students in the control group is due to regression adjustments. Only program group students received performance-based scholarship awards during the program period.

<sup>b</sup>Includes all grants and scholarships excluding Pell and performance-based scholarship awards.

Source: MDRC calculations using financial aid data provided by Lorain County Community College, Owens Community College, and Sinclair Community College.

for the scholarship and consequently did not receive it. The remainder of the first panel shows that approximately equal percentages of students in the program group and control groups received loans, Pell Grants, and other grants.

The second panel of Table 2 shows the average aid amounts that students received for each type of aid. The first row of the second panel of Table 2 shows that on average, program group students received an estimated \$7,947 in total financial aid, while students in the control group received an estimated \$7,445: the estimated impact of the program on the average amount of financial aid package is \$502, statistically significant at the 0.01 level. The second and third rows of the same panel show how the program appears to have caused this difference. The second row shows that students in the program group are estimated to have received an additional \$766 from the scholarship, while the third row shows that students in the program group took out less money in loans, an estimated reduction of \$334. This loan reduction was in part a result of a reduction in unsubsidized loans, which are less advantageous to students. While students are in school, the government pays the interest on subsidized loans, but not unsubsidized loans. Students in the program group reduced their unsubsidized loans by an estimated average of \$147 (not shown). The scholarship was not specifically geared to reduce loans, but the reduction in educational debt may be an added benefit for students in the long run.

### **Estimated Impacts on Attitudes and Behaviors for Academic Success**

The opportunity for additional aid was hypothesized to motivate students academically, promote behaviors believed to help students graduate, such as enrolling full time and studying more in order to meet the academic benchmarks, and instill confidence in students' ability

**Table 3.** Survey responses: Educational experiences.

Characteristic	Number of observations	Program group	Control group	Difference	Standard error
For the most recent exam, final project, or paper:					
Number of hours studied	1,838	8.2	8.4	−0.3	0.48
Did not seek help (%)	1,841	52.3	49.1	3.1	2.37
Prepared adequately (%)					
Did not prepare adequately	1,841	1.8	3.1	−1.3*	0.72
Prepared a little	1,841	2.8	2.9	−0.2	0.79
Prepared somewhat	1,841	23.0	24.2	−1.3	2.01
Prepared quite a bit	1,841	46.3	47.5	−1.2	2.37
Prepared extremely well	1,841	26.2	22.3	3.9*	2.05
Motivation to complete coursework (RAI) <sup>a</sup> (average)	1,841	3.9	3.9	−0.1	0.17
Ever asked instructor to reconsider a grade (%)	1,841	29.7	26.1	3.5*	2.14
Sample size	1,841	1,096	745		

Notes. A two-tailed *t*-test was applied to differences between research groups. Statistical significance levels are indicated as: \*\*\* = 1%; \*\* = 5%; \* = 10%.

Estimates are adjusted by cohort and campus.

Distributions may not add to 100% because of rounding.

<sup>a</sup>Motivation to complete coursework is defined using the Relative Autonomy Index (RAI), which has a range of −18 to 18. A higher value represents greater autonomous motivation. The RAI is calculated as a weighted average:  $RAI = \text{External}^*(-2) + \text{Introjected}^*(-1) + \text{Identified}^*(1) + \text{Integrated}^*(2)$ .

Source: MDRC calculations using the performance-based scholarship survey.

to succeed. The award was also intended to reduce students' financial stress and increase the amount of time they could dedicate to schoolwork and studying by providing financial aid that could reduce the need to work. Table 3 shows results of the survey that was fielded to measure student attitudes and changes in behavior related to these hypotheses. In all, 1,096 students in the program group and 745 students in the control group completed the survey.<sup>19</sup>

In general, the survey results suggest that the program did not substantially change students' attitudes and behaviors, but may have done so to a modest degree. The first row of Table 3 shows that students in the program group did not report spending more time studying for their most recent exam or assignment than their control group counterparts: Students in the program group reported an average of 8.2 hours, compared with 8.4 hours in the control group, a difference that is not statistically significant.<sup>20</sup> Table 3, however, also shows that the program may have helped students feel more prepared for exams or assignments and increased their confidence: 26.2% of students in the program group felt they prepared extremely well compared with 22.3% of students in the control group, a 3.9 percentage point difference—significant at the 10% level.

**Table 4.** Impacts on academic outcomes during first four academic years.

Outcome	Program group	Control group	Difference	Standard error
Full-time completion <sup>a</sup> (%)				
Term 1	33.2	26.3	7.0***	1.94
Term 2	28.8	18.3	10.5***	1.80
Ever registered (%)				
First year	96.9	95.9	1.1	0.78
Second year	68.8	66.6	2.3	1.97
Third year	48.8	50.2	−1.5	2.12
Fourth year	34.7	33.4	1.3	2.00
Credits attempted <sup>b</sup>				
First year	21.5	20.6	0.9**	0.40
Second year	13.4	12.5	0.9*	0.50
Third year	8.8	8.7	0.1	0.47
Fourth year	5.6	5.5	0.1	0.40
Cumulative credits attempted after four years	49.3	47.3	2.0	1.35
Credits earned <sup>b</sup>				
First year	15.9	14.2	1.7***	0.43
Second year	9.6	8.9	0.7	0.44
Third year	6.4	6.4	0.1	0.41
Fourth year	3.9	4.0	0.0	0.33
Cumulative credits earned after four years	35.8	33.4	2.5*	1.25
Sample size (total = 2,285)	1,359	926		

Notes. A two-tailed *t*-test was applied to differences between research groups. Statistical significance levels are indicated as: \*\*\* = 1%; \*\* = 5%; \* = 10%.

Estimates are adjusted by cohort and campus.

Rounding may cause slight discrepancies in sums and differences.

<sup>a</sup>Full-time completion is defined as earning 12 or more credits at the institution of enrollment. Term refers to fall or spring at semester institutions and fall, winter, or spring at quarter institutions. Third quarter outcomes are not shown for Sinclair students.

<sup>b</sup>Quarter institutions have three quarters per academic year, while semester institutions have two semesters. To adjust for inflation due to the additional term at quarter institutions, credits attempted and earned at quarter institutions are multiplied by two thirds.

Source: MDRC calculations from the Ohio Board of Regents transcript data from all public Ohio institutions.

The survey also asked students about their motivation to complete their course load, using several questions that were aggregated into a relative autonomy index (RAI). Research suggests that greater autonomous motivation leads to improved outcomes such as achievement (Ratelle, Guay, Vallerand, Larose, & Senecal, 2007). The fourth row of Table 3 shows that students in both groups had similar levels of RAI (an average of 3.9 in each group), suggesting the program did not increase motivation during the program year. It also does not appear to have negatively affected motivation, a potential concern related to performance-based payments (Deci, Koestner, & Ryan, 2001).<sup>21</sup>

Finally, the last row of Table 3 suggests that the scholarship program may have caused students to be attentive to their grades because earning the scholarships depended on these grades. Table 3 shows that 29.7% of students in the program group requested that instructors reconsider a grade, while only 26.1% of students in the control group did so, a difference of 3.5 percentage points and significant at the 10% level. It is possible that more students in the program group were simply making these

requests as an easy way to improve their grades. The survey data, however, show that less than 2% of program group students said that they took easier classes to meet the GPA requirements.

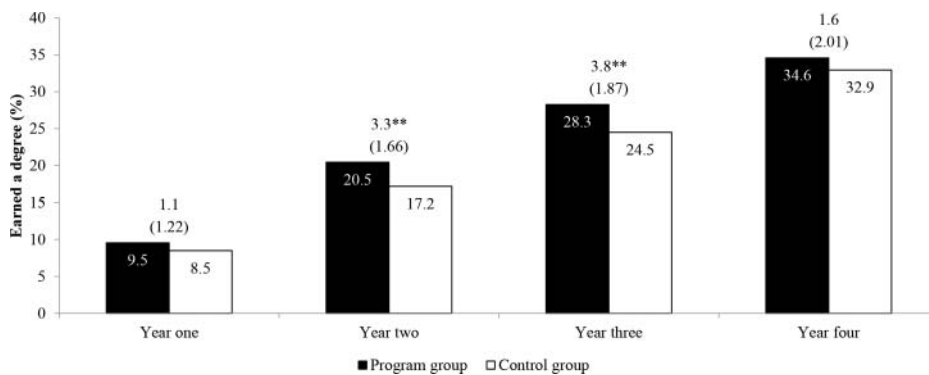
### ***Estimated Impacts on Academic Progress***

A key goal of the program was to improve students' academic achievement. Table 4 provides strong evidence that the program did have an effect on important academic outcomes. The first panel of Table 4 shows that the program had a relatively large, statistically significant effect on the percentage of students who earned a full-time course load of credits (12 credits or more) in both the first and second semesters or quarters of the program, indicators of the likelihood of completion found in previous research (Adelman, 2006).<sup>22</sup> In the first semester or quarter of the program, the estimated impact on the percentage of students who earned full-time credits is 7.0 percentage points, and in the second semester or quarter, the estimated impact grew to 10.5 percentage points. These estimates suggest that students may have responded positively to the differential scholarship structure and the added financial incentive to earn full-time credits, and that scholarship payments may have helped students afford more classes in the second semester or quarter.

The second panel of Table 4 shows registration rates for each group for each year of the study. Consistent with previous research on performance-based scholarships, the program does not appear to have had an impact on registration in the first year or on persistence in subsequent years. In the first year, more than 95% of students in both groups registered for classes, with no statistically significant differences between the groups. During all follow-up years, both program and control group students enrolled at essentially equal rates. By the fourth year, only 34.7% of program group students and 33.4% of control group students were still registering for classes.

In contrast, the third panel of Table 4 shows that despite enrolling at nearly equal rates, students in the program group took more classes than students in the control group. In the first year, students in the program group attempted an average of 21.5 credits, compared with an average of 20.6 credits in the control group—a difference of 0.9 credits that is statistically significant at the 5% level. In the second year, program group students attempted 0.9 credits more than their control group counterparts, a difference significant at the 10% level. In the third and fourth years, however, students in the program group only attempted an average of 0.1 credits more than the control group, a difference that is not statistically significant. These results suggest that the program was successful in motivating students to attempt more credits during program semesters and that students modified their behavior in the short term. Results from the survey support this finding. In the program group, 72.9% of respondents indicated that the scholarship encouraged them to take more or continue taking classes.

The fourth panel of Table 4 shows that the positive estimate for credits attempted is associated with a positive estimate for credits earned. On average, students in the program group earned more credits compared with students in the control group. In the first year, students in the program group earned an average of 15.9 credits,



**Figure 1.** Certificate or degree attainment after four years. A two-tailed *t* test was applied to differences between research groups. Statistical significance levels are indicated as: \*\*\*=1%; \*\*=5%; \*=10%. Standard errors are shown in parentheses. Estimates are adjusted by cohort and campus. Rounding may cause slight discrepancies in sums and differences. *Sources:* MDRC calculations using Ohio Board of Regents and National Student Clearinghouse degree data.

compared with an average of 14.2 credits in the control group—an estimated impact of 1.7 credits, or a nearly 12% increase, statistically significant at the 1% level. Furthermore, the estimated impact on credits earned is larger than that on credits attempted in the first year, suggesting that students in the program group may have also been doing better in classes and not just taking more classes. In the second year of the study, after the scholarship ended, program group students earned an average of 0.7 credits more than control group students, but the difference is not statistically significant. In the third and fourth years, both groups earned the same number of credits on average. Although differences after the first year are not individually statistically significant, the last row of [Table 4](#) shows that after four years of follow-up the estimated impact of the program increased to 2.5 credits — a cumulative difference that is statistically significant at the 10% level. These results suggest that despite the modest effects measured by the survey, the program did change student behavior: more program than control group students met full-time credit benchmarks and program students earned more credits overall.

### Estimated Impacts on Completion

The program also appears to have produced short-term impacts on degree completion, possibly accelerating the time it took students to earn degrees. [Figure 1](#) shows the percentages of students in the program and control groups who had earned degrees at the end of each follow-up year. Less than 10% of students in both groups earned a certificate or degree in the first year. In the second year of the study, however, 20.5% of students in the program group had done so, compared with 17.2% of students in the control group—an estimated impact of 3.3 percentage points, significant at the 5% level. By the end of the third year, 28.3% of students in the program group had earned a certificate or degree compared with 24.5% in the



**Table 5.** Impacts on employment and earnings.

Outcome	Program group	Control group	Difference	Standard error
Employed (%)				
Year 1	62.1	64.5	−2.5	2.06
Year 2	65.6	64.9	0.7	2.03
Year 3	69.0	65.9	3.1	1.99
Year 4	70.5	71.0	−0.4	1.94
Ever employed during fiscal quarters 2–20 (%)	87.0	88.3	−1.3	1.41
Quarters employed, fiscal quarters 2–20 (%)	56.2	55.9	0.3	1.55
Earnings from unemployment insurance-covered jobs (\$)				
Year 1	6,073	6,496	−423	354
Year 2	7,776	7,751	26	431
Year 3	9,851	9,425	426	513
Year 4	11,710	11,645	65	578
Total earnings, fiscal quarters 2–20 (\$)	45,474	45,557	−82	1,995
Sample size (total = 2,285)	1,359	926		

Notes. A two-tailed *t*-test was applied to differences between research groups. Statistical significance levels are indicated as: \*\*\* = 1%; \*\* = 5%; \* = 10%.

Estimates are adjusted by cohort and campus.

Rounding may cause slight discrepancies in sums and differences.

Employment and earnings estimates do not include the fiscal quarter during which students were randomly assigned.

Source: MDRC calculations using administrative records from the Ohio Department of Job and Family Services.

control group—a difference of 3.8 percentage points, also significant at the 5% level. But by the end of the fourth year, evidence of an impact disappears; the graduation rate in the control group increased more than the graduation rate in the program group. In the program group, 34.6% of students had earned a degree compared with 32.9% of students in the control group—a difference of 1.6 percentage points that is not statistically significant.<sup>23</sup>

Although the results do not provide evidence of a long-term impact on degree completion, the estimated impacts on credit accumulation after four years show that the program's impacts on students' academic outcomes remained evident even three years after the program ended; further, they suggest that the program may have helped students in the program group earn a credential more quickly than students in the control group.

### **Estimated Impacts on Employment Outcomes**

As discussed earlier, the program also aimed to reduce students' need to work in the short term, while in school. In the long term, the program aimed to improve earnings and employment outcomes by helping students earn degrees and enter the workforce earlier and more prepared. Table 5 shows measures of student employment during and after the program.

Table 5 shows that students in the program and control groups were employed at similar rates and earned similar amounts throughout the four years of follow-up. During the first year after random assignment, for example, 62.1% of students in the program group were employed, compared with 64.5% of students in the control group.<sup>24</sup> The 2.5 percentage point

difference is not statistically significant. This result also holds when measured by the percentage of students who were ever employed during the follow-up period and the total number of fiscal quarters students were employed during the follow-up period.<sup>25</sup> Table 5 also does not provide evidence that the program positively impacted earnings: Students in the program and control groups generally earn similar amounts during all the follow-up years.

There is limited evidence, however, that the program may have helped students reduce employment during the program year. Table 5 shows that the average earnings for students in the first-year program group with jobs covered by unemployment insurance were \$6,073, compared with \$6,496 in the control group, a reduction of \$423 that is not statistically significant. When this same estimate is calculated including regression adjustments for earnings and employment from the three years prior to random assignment as covariates (not shown), the estimate increases to a reduction of \$540, significant at the 10% level. This may provide some support for the hypothesis that the program helped students reduce employment during the program year. Regression adjustments do not substantially alter the statistical significance of estimates for other years of follow-up.

The null findings on longer term employment outcomes are unsurprising given the lack of detectable impacts on degree-receipt after four years. These results also align with recent research that suggests that detectable impacts on such employment outcomes may be too much to expect for educational programs of this nature that last for relatively short durations and do not produce exceptionally large academic impacts (Weiss et al., 2014).

## Discussion

Overall, this study helps fill an important gap in the literature on financial aid programs and their long-term effectiveness. It uses a randomized controlled trial with over 2,000 students to evaluate an important financial aid program, and it includes four years of post-random assignment longitudinal data on degree receipt, employment, and earnings. The results are promising, and some of the limitations of the data, discussed below, also provide opportunities for future research.

## Limitations

The data collected for this study are extensive, but have some limitations. The transcript data provide key measures of academic progress, but lack measures of students' high school outcomes, such as high school GPA. Data limitations also prevented researchers from identifying first-time versus continuing students and calculating term GPA after random assignment. The employment data provide rich longitudinal measures, but do not include additional details, such as the types of jobs students held. Given the random assignment methodology, there is no reason to expect that students in the program group differed from students in the control group on any of these measures prior to the study, although analyses of post-assignment outcomes such as college GPA and additional employment details would be interesting for future research. The survey data also lack questions related to some of the mediating variables hypothesized in the theory of change, such as the financial stress students experience and confidence.

## Implications

When interpreting the results reported here, it is important to emphasize that the performance-based scholarship program in Ohio lasted for only one year. The scholarship payment itself provided less than 10% of the average total financial aid received by students in the program group during that year. Yet the evidence suggests that this relatively modest program helped students graduate faster and earn more credits—impacts that were evident three years after the program ended.

This study also provides evidence about the relationship of the program's impacts to the hypothesized mechanisms identified in the theory of change. The strongest evidence from this study suggests that the scholarships helped more students advance toward their degrees by incentivizing them to attempt and earn more credits during the program and by providing additional financial aid. The scholarship structure also successfully incentivized full-time credit accumulation by an estimated 10 percentage points after two semesters or quarters. Students in the program group reduced their reliance on loans on average, including unsubsidized loans for which interest accrues even while students remain in school. The survey findings, on the other hand, provide little evidence that the program changed students' motivation toward college or their study habits, although it may have increased some students' attentiveness to their grades and possibly helped some work less during the program year.

The estimates reported here generally align with existing research that does find positive impacts due to other financial aid programs. Castleman & Long (2013), for example, examine the effect of the need-based Florida Student Access Grant (FSAG) on access, persistence, and graduation and find that an additional \$1,000 in grant aid eligibility per year increased credit accumulation by an estimated 2.3 credits after four years, and increased bachelor's degree receipt by 4 percentage points after seven years. Research on other PBS programs suggests that scholarship programs of varying designs generally produce modest, positive impacts on short-term academic outcomes (Patel et al., 2013). Many of these programs offer scholarships of greater amounts or include additional services. They are often designed for different low-income populations, however, and it is difficult to disentangle the effects of different aspects of the scholarship programs—such as the amount or duration—from other aspects, or tell whether different programs may be more or less effective for different student populations.

The Ohio performance-based scholarship program marks the first opportunity to follow students for four years after random assignment and to analyze both graduation and employment outcomes. The low-income parents in this study also faced challenges of caring for children while pursuing their academic studies and helping to support a family. Their odds of graduating were low to begin with: only a third of the students in the control group earned a credential within four years, even though some of the students had started college prior to the start of the study. Low graduation rates, moreover, remain a pressing problem in community colleges across the country, especially for low-income students, and rigorous evidence about the long-term impacts of most community college programs is still relatively rare.

This study provides an important example of how a state used existing funds to help low-income students improve their academic outcomes, and the findings have policy implications for other states and organizations looking for ways to help students make greater progress toward college completion. Scholarship providers and

states that increase the amount of financial aid offered for college can build on the key features of the Ohio model when designing their programs: (a) scholarship payments that are contingent on key academic benchmarks tied to student success; (b) scholarships that are tied to performance in the current semester, regardless of performance in previous semesters or high school performance; (c) payments that are made directly to students; and (d) payments that are made on top of existing financial aid awards.

Most important, these findings show that many students who struggle to complete college can make greater progress toward completion when given additional support. Policymakers and stakeholders should be encouraged to experiment with new programs, and to look for new funds to help community college students. Although the Ohio program lasted for only one year and provided a relatively modest scholarship award, future programs and evaluation studies can make important contributions by incorporating rigorous research designs, studying longer duration performance-based scholarship programs or larger scholarship awards, and examining the impacts on students' long-term financial outcomes and graduation rates.

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## Appendix: Survey Questions for Items Presented in Table 3

In the first 3 questions shown in Table 3, “THIS exam, final project, or final paper” refers to the most recent exam, final project, or final paper since random assignment for the respondent. This question was B12a.

B12b. Thinking about THIS exam, final project, or final paper approximately how many hours did you study for it or work on the assignment? Please enter the number of hours.

\_\_\_\_\_ hours [RANGE = 0–68] **[DROP DOWN BOX]**

B12e. Thinking about THIS exam, final paper, or final project did you seek help from a tutor, instructor, other students in the class, or people who are not students in the class?

*(Please select all that apply.)*

1. Tutor
2. Instructor
3. Other students in the class
4. People not in the class
5. No one

B12g. Thinking about THIS exam, final paper, or final project, how adequately do you feel you prepared for it? If “1” means you did not adequately prepare at all, and “5” means you prepared for it extremely well, where would you place yourself?

1. Did not adequately prepare at all
2. Prepared a little
3. Prepared somewhat

4. Prepared quite a bit  
(Please select one.)
5. Prepared extremely well

B12h. Thinking about all of the courses you ever enrolled in since [RA\_DATE] (whether you completed the course or not), did you ever ask an instructor or teaching assistant to reconsider a grade or an assignment or exam?

*(Please select one.)*

1. Yes
2. No

#### Motivation Questions

D11

If I do my class assignments, it's because I would feel guilty if I did not.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true

D12

If I do my class assignments, it's because I want to better understand my studies.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true

D13

I follow advice on how to do well in my courses because it will help me become a better student.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true

D14

If I attend class regularly, it's because I want to get a good grade.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true

D15

If I turn in a class assignment on time, it's because it makes me happy to be on time.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true

D16

If I raise my hand in class, it's because I want to receive a good participation grade.

*(Please select one.)*

1. Not at all true
- 2.
- 3.



4. Somewhat true
- 5.
- 6.
7. Very true

D17

If I turn in a class assignment on time, it's because I want people to think that I am a good student.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true

D18

If I attend class often it's because I enjoy learning.

*(Please select one.)*

1. Not at all true
- 2.
- 3.
4. Somewhat true
- 5.
- 6.
7. Very true