

Impact of Transportation Supports on Students' Academic Outcomes: A Quasi-Experimental Study of the U-Pass at Rio Hondo College

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EXECUTIVE SUMMARY

For many students, transportation presents a barrier to college completion. In 2020–21, the average commuter student could expect to spend nearly one-fifth of their total living expenses on transportation costs.¹ Transportation programs have the potential to offer students some relief—and help them reach college graduation—yet more rigorous research on these programs' benefits is needed.

This brief provides results from a quasi-experimental study on the impact of transportation supports on short- and longer-term academic outcomes for community college students at Rio Hondo College. Established in 2016 as a partnership between the Los Angeles County Metropolitan Transportation Agency (LA Metro) and participating area colleges and universities, including Rio Hondo College, the Universal College Student Transit Pass (U-Pass) provides college students with deeply discounted transit fares.

Findings from this study suggest that transportation supports like U-Pass offer a promising strategy for increasing the likelihood that students will:

- remain enrolled one semester and one year later;
- complete a greater number of credits; and,
- earn a credential.

While more research on similar programs is needed, these findings suggest that free- and reduced-cost transit fares could play a critical role in helping students earn college credentials.

INTRODUCTION

Transportation is a barrier to college completion for many of today's college students. Nationwide, more than four in five college students live off-campus, either with their parents or in off-campus housing.² For these students, accessing transportation to get to and from campus can be prohibitively expensive. While public transportation is often more affordable than owning a car and paying for parking, students may still have difficulty affording transit fees, especially the upfront costs of monthly or semesterly transit passes. In 2020–21, the average commuter student could expect to spend nearly one-fifth of their total living expenses on transportation costs.³

Transportation is especially crucial for community college students, nearly all of whom commute. While 28% of community colleges nationwide offer on-campus housing, only 1% of community college students reside on campus.⁴ Community college students are also less likely to earn a college credential, making the need to reduce their barriers to college completion at community colleges especially urgent. Only two in five first-time college students at public two-year colleges earn a postsecondary degree or credential of any kind within six years.⁵ The completion rate is even lower among Hispanic students (36% earn a credential within six years) and Black students (28%).⁶ The problem with low completion rates is not one of student motivation or aptitude, but rather a consequence of structural and financial barriers, coupled with limited supports for those students most likely to enroll at community colleges.⁷

Reducing barriers to success at community colleges is also vital given the role they serve in higher education. Indeed, community colleges serve as the entry point to higher education for approximately two out of five college students.⁸ Public community colleges offer a lower-cost, open-access gateway to a four-year degree, while also giving students the opportunity to earn shorter-term credentials that have demonstrated value in the labor market.⁹ They also serve large pluralities of Hispanic and Black students, and students who are the first in their families to attend colleges. In Fall 2019, 53% of Hispanic undergraduates and 43% of Black undergraduates were enrolled at community colleges.¹⁰ Additionally, approximately one-third of community college students are first-generation college students.¹¹ Furthermore, about one in four dependent students at community college (dependent students are generally 18–24 years of age and receive support from their parents for college) had family incomes of less than \$20,000.¹² Meanwhile, half of independent students (generally students 25 years of age and older who support themselves) were enrolled at community colleges.¹³

For community college students, transportation-support programs could offer a critical lifeline to earning a college credential. These free- or reduced-fare programs give students reliable, more affordable access to public transportation. Nevertheless, more rigorous evidence on the extent to which transportation-related supports can improve student academic outcomes is needed. Without evidence, it is unclear to what extent colleges and policymakers should invest in these programs.

This brief contributes to the evidence base on the impacts of transportation-support programs by examining the impact of the U-Pass administered through Rio Hondo College, a community college in Los Angeles. We begin by describing the U-Pass. We then offer insight on the relationship between the U-Pass and students' course completion, credit accumulation, semester-to-semester retention, and credential attainment. Results from this study suggest that efforts to subsidize students' transportation options are significantly and positively associated with students' educational outcomes.

THE UNIVERSAL COLLEGE STUDENT TRANSIT PASS AT RIO HONDO COLLEGE

Rio Hondo College is a commuter college situated within the southeast section of Los Angeles County that serves multiple communities, including El Monte, Whittier, South El Monte, Pico Rivera, Santa Fe Springs, and Los Nietos. According to the National Center for Education Statistics, more than 19,000 students were enrolled as of Fall 2019; the student body is predominantly Hispanic (81% of students), and 89% receive financial aid, inclusive of the Pell Grant.¹⁴

In 2016, Rio Hondo College was one of several Los Angeles area colleges and universities partnering with LA Metro to offer the U-Pass, providing college students with deeply discounted transit fares.¹⁵ Participating colleges administer the program and individually determine student eligibility criteria and other program regulations. At Rio Hondo College, the U-Pass is part of GO RIO, the college's broader student transit program; as of fall 2021, all enrolled students—regardless of the number of units—are eligible for the program as are students enrolled in non-credit classes.¹⁶

Between Fall 2016 and Spring 2019, 3,686 Rio Hondo students who were enrolled in credit-bearing academic programs received a U-Pass, representing 8.9% of total student enrollment during this time period. After 2016–17, the initial academic year in which the U-Pass was offered, the number of students receiving a U-Pass declined, though take-up continued to be higher during fall terms.¹⁷ Of all students receiving a U-Pass at some point between Fall 2016 and Spring 2019, the majority (2,791) received their first pass during their initial fall term.¹⁸ We therefore focus our analysis on students who first appear in our database in a fall term. The receipt of a U-Pass in the first fall term where a student appears is the “treatment” being assessed.

ANALYTIC SAMPLE AND STUDY DESIGN

Our study sample comprises 28,463 unduplicated Rio Hondo College students enrolled in one of three fall terms (Fall 2016, Fall 2017, and Fall 2018) whose retention and completion outcomes were followed through Spring 2019.¹⁹ Among these three cohorts of fall students, approximately one in 10 (2,791/28,463) received a U-Pass.

Our study explores the following questions:

- What are the characteristics of students who receive a U-Pass, and how do they differ from students who do not receive a U-Pass?
- Is receipt of the U-Pass associated with greater success in terms of course completion, credit accumulation, semester-to-semester retention, and credential completion?

To assess the relationship between U-Pass receipt and students' academic outcomes, Propensity Score Matching (PSM) was used to generate a matched comparison group of students that is statistically similar to the treatment group (students receiving the U-Pass) along a set of observable characteristics. PSM is a quasi-experimental design methodology that is commonly used to account for systematic differences between students who received the “treatment” and those who did not, thereby reducing the potential bias in the estimates of the impact of treatment on student outcomes.²⁰

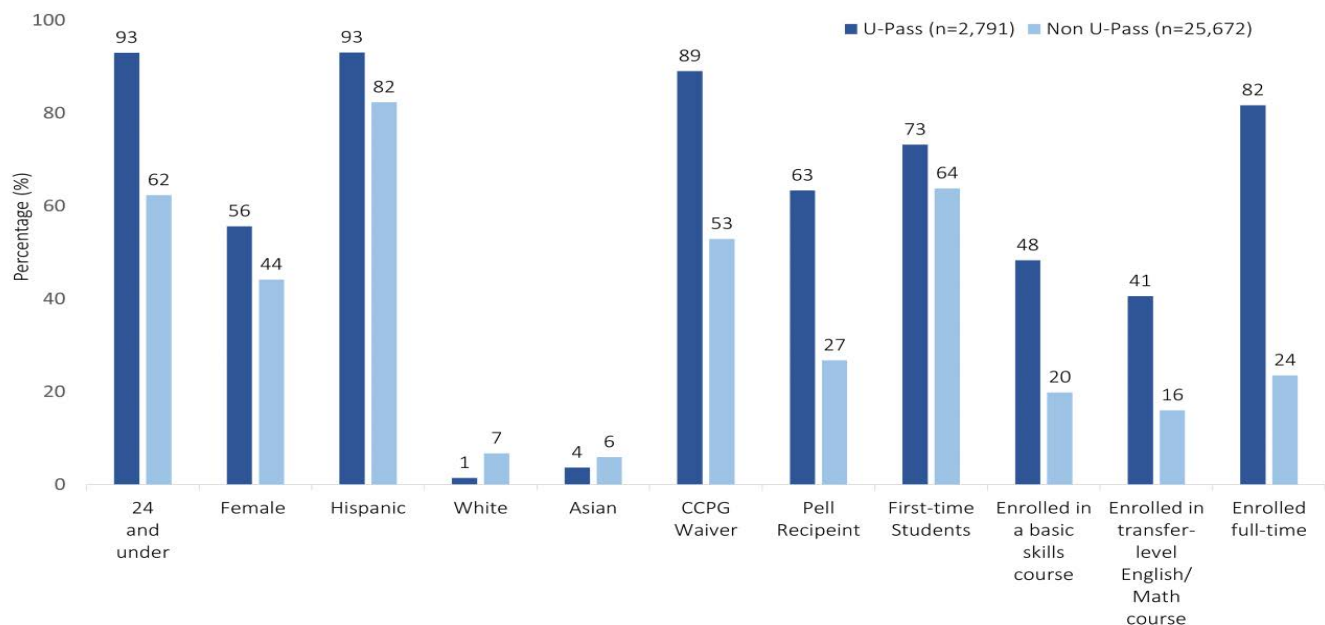
Matching can be a robust technique when combined with a comprehensive set of observed characteristics theorized to affect both receipt of treatment and the outcome(s) of interest. However, PSM cannot control for unobserved differences between treatment and comparison groups.

For example, students who take the time and effort to secure a U-Pass may be highly resourced individuals who have access to guidance and supports that will also help them complete their college degree. By only matching on observed characteristics, differences between the two groups could remain and lead to overstating or understating the impacts of the treatment. Results should therefore be interpreted as associations as opposed to causal estimates. The [Technical Appendix](#) provides more detailed information about the PSM process, including baseline equivalence statistics for predictors used in PSM models.

CHARACTERISTICS OF STUDENTS RECEIVING THE U-PASS

As previously noted, this analysis focuses on Rio Hondo College students who were enrolled in one of three fall terms (Fall 2016, Fall 2017, and Fall 2018). Students who first received the U-Pass in a fall term were notably different from students who did not receive the U-Pass (Figure 1). A greater proportion of U-Pass students were female, younger than 25 years old, and Hispanic (overwhelmingly so), whereas non-U-Pass students were more likely to be non-Hispanic White or non-Hispanic Asian. Further, U-Pass students were more likely to have received financial aid (Pell Grant or California College Promise Grant waiver) and were more likely to be first-time students.

Figure 1: Student Demographics and First-term Academic Characteristics of Fall Students Who Received the U-Pass



Source: Rio Hondo Administrative Records

Notes: All differences displayed in Figure 1 are statistically significant ($p < .05$). First-time students are defined as those with six or fewer previously earned credits as of the beginning of the first term they appear in the dataset. CCPG is the California College Promise Grant.

Academically, U-Pass students were also different from non-U-Pass students, which can be attributed in part to the greater likelihood that U-Pass students were first-time students.²¹ U-Pass students were more than twice as likely to enroll in a basic skills course and were nearly three times as likely to enroll in transfer-level math or English courses. U-Pass students were also more likely to be enrolled full-time (12 or more credits). On average, U-Pass students attempted 12.8 credits in their initial term in our dataset, compared to 7.5 credits for non-U-Pass students. This is likely the result of U-Pass program requirements; during the time frame of this study, in order to receive the U-Pass between 2016 and 2019, students needed to be enrolled in at least nine credits.

IMPACT OF THE U-PASS ON STUDENTS' ACADEMIC OUTCOMES

To assess the impact of U-Pass receipt, PSM was used to generate a matched comparison group of students that is statistically similar to the treatment group (students receiving the U-Pass) along a set of observable characteristics, after which academic outcomes for treatment students versus the matched comparison students were compared.²² Several of the academic outcomes we analyzed—credit accumulation after the first semester and first year, credit completion rate, and term-to-term and year-to-year retention rates—are shorter-term progress measures strongly associated with positive longer-term academic outcomes like credential attainment.²³ Credential attainment is also examined, although this outcome is considered preliminary given the inability to follow all students in the sample for more than one year.

When we examine these outcomes, we see a positive association between student success and U-Pass receipt (Table 1). Specifically, for all outcomes, the average treatment effect on the treated, or ATT—which represents the percentage point difference in outcome between U-Pass recipients and a matched comparison group of students—is substantively meaningful as well as statistically significant at $p < .05$.

Table 1: Impact Analysis Results Summary

Outcome	Treatment Group (%)	Comparison Group (%)	ATT	P-value
One-semester retention	89.4	84.3	5.1	0.00
Earned 12 or more credits at end of first semester	37.9	34.3	3.6	0.01
Earned 24 or more credits at end of first year	27.3	23.8	3.5	0.01
First semester credit completion rate	70.1	67.5	2.6	0.02
Credential attainment (certificates or associate degrees)	15.3	13.1	2.2	0.04
Degree attainment (associate degrees only)	13.9	11.2	2.7	0.01
One-year retention	72.3	67.3	5.0	0.00

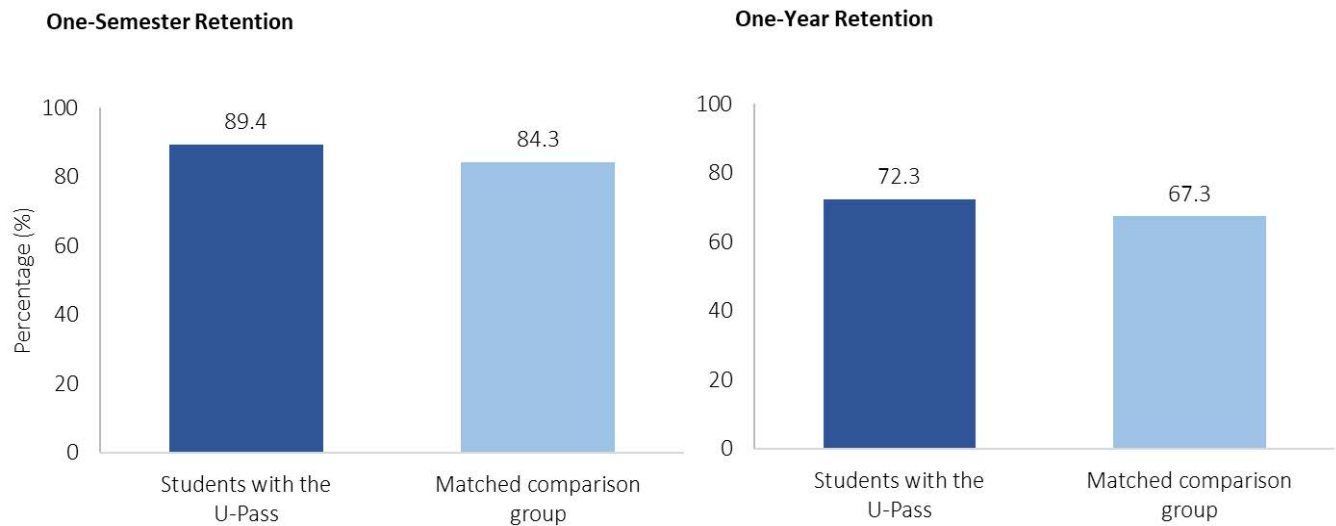
Source: Rio Hondo Administrative Records

Notes: Average treatment effect on the treated (ATT) represents the percentage point difference in outcome between U-Pass recipients and a matched comparison group of students. For all outcomes, ATT were substantively meaningful as well as statistically significant at $p < .05$. The credit completion rate is defined as the proportion of credits attempted that were earned in a specific term. Analysis of one-year retention is restricted to students who could be observed one year following their initial fall term. For all outcomes except one-year retention, the Ns for the treatment group and comparison group are 2,758, respectively. For one-year retention, the N for each group is 2,016.

RETENTION

Students who received the U-Pass in their initial term also had higher one-semester and one-year retention rates than students in the matched comparison group of students (Figure 2). Specifically, students in the treatment group were five percentage points more likely than the statistically matched comparison group to be enrolled in the subsequent semester (89% v. 84%), and five percentage points more likely to be enrolled one year later in the subsequent fall semester (72% v. 67%).

Figure 2: Percentage of Students Who Remained Enrolled One Semester and One Year Later



Source: Rio Hondo Administrative Records

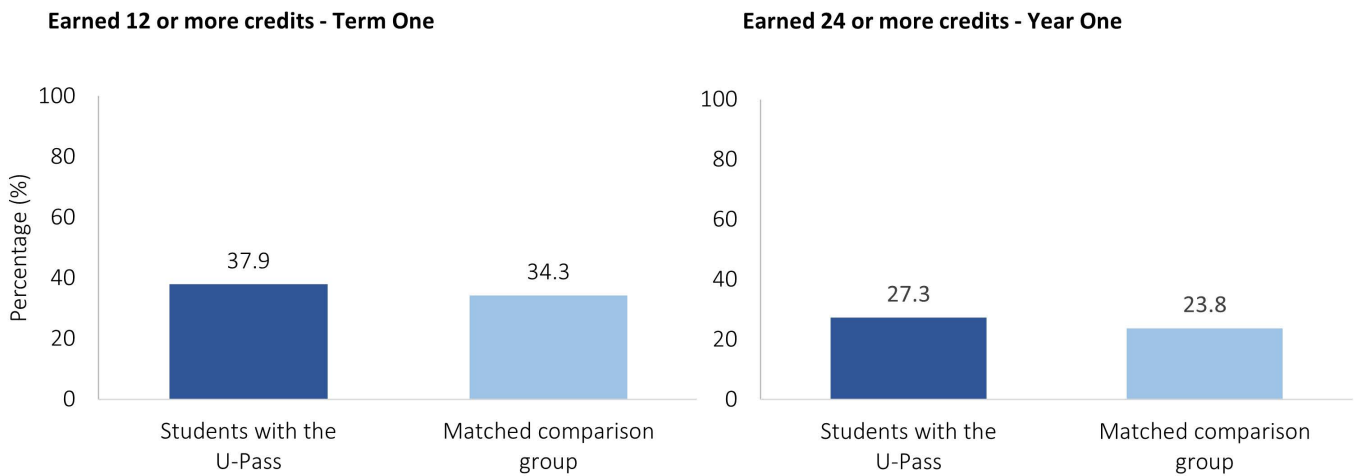
Notes: Average treatment effect on the treated (ATT) represents the percentage point difference in outcome between U-Pass recipients and a matched comparison group of students. For all outcomes, ATT were substantively meaningful as well as statistically significant at $p < .05$. Analysis of one-year retention is restricted to students who could be observed one year following their initial fall term. For one-semester retention, Ns for the treatment group and comparison group are 2,758, respectively. For one-year retention, the N for each group is 2,016.

CREDIT COMPLETION RATE AND CREDIT ACCUMULATION

Research suggests that completing a substantial number of college-level credits in the first year is strongly associated with program completion.²⁴ Therefore, in addition to retention, we examined the credit completion rate—the proportion of attempted credits that are completed—as well as credit accumulation.

Students with the U-Pass successfully earned 70% of the credits they attempted in their initial semester, compared to a 67.5% credit completion rate for the group of statistically matched non-U-Pass recipients. Students with the U-Pass were also significantly more likely than students in the matched comparison group to earn 12 or more credits by the end of the first semester and to earn 24 or more credits at the end of the first year (Figure 3).

Figure 3: Percentage of Students Who Remained Enrolled One Semester and One Year Later



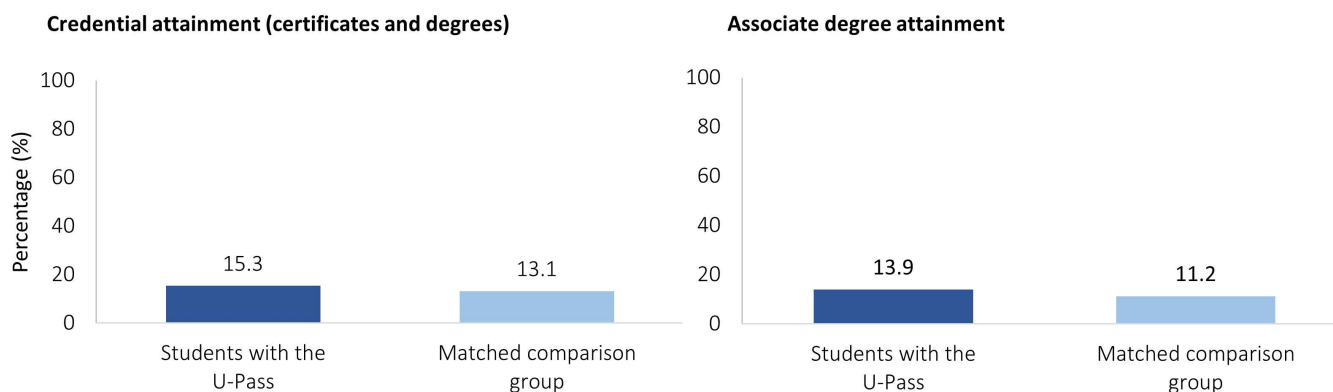
Source: Rio Hondo Administrative Records

Notes: Average treatment effect on the treated (ATT) represents the percentage point difference in outcome between U-Pass recipients and a matched comparison group of students. For all outcomes, ATT were substantively meaningful as well as statistically significant at $p < .05$. For both outcomes, N s for the treatment group and comparison group are 2,758, respectively.

CREDENTIAL ATTAINMENT

Finally, the PSM analysis for credential attainment suggests that students who received the U-Pass in the first semester were significantly more likely than their peers to have earned a credential during the study period. While the credential attainment rate for students in the matched comparison group was 13.1%, it was 15.3% for students with the U-Pass (Figure 4). This represents a 17% increase in credential attainment for U-Pass recipients over non-recipients. Further, associate degree attainment rates were three percentage points higher among students with the U-Pass compared to students in a matched comparison group (14% v. 11%), representing a 27% gain in the likelihood of earning an associate degree.

Figure 3: Percentage of Students Who Remained Enrolled One Semester and One Year Later



Source: Rio Hondo Administrative Records

Notes: Credential attainment and associate degree attainment rates are limited to the study period. For both outcomes, Ns for the treatment group and comparison group are 2,758, respectively. Average treatment effect on the treated (ATT) represents the percentage point difference in outcome between U-Pass recipients and a matched comparison group of students. For all outcomes, ATT were substantively meaningful as well as statistically significant at $p < .05$.

IMPACTS OF THE U-PASS CONSISTENT ACROSS STUDENT CHARACTERISTICS

In addition to assessing the impact of U-Pass receipt for all students, we examined outcomes for different groups of students to explore variation and equity implications. As previously noted, and displayed in Figure 1, students who received the U-Pass at Rio Hondo College were overwhelmingly Hispanic (93%), aged 24 or younger (93%), and received some form of financial aid (89%). In other words, overall results can be interpreted as the benefits of the U-Pass for a predominantly Hispanic and low-income group of students. However, there is more variation to explore among U-Pass recipients in terms of gender (56% female v. 44% male), academic preparedness (48% enrolled in a basic skills course v. 52% not enrolled), and enrollment status (82% enrolled full-time v. 18% part-time).

For each of these student characteristics, it appears that U-Pass receipt is correlated with positive academic outcomes for students regardless of gender, enrollment status, or academic preparation as indicated by basic skills course enrollment. For instance, part-time students who received the U-Pass were 5.2 percentage points more likely than part-time students who did not receive the U-Pass to be retained in the next semester; similarly, full-time students who received the U-Pass were 4.1 percentage points more likely than full-time students who did not receive the U-Pass (Table 2). Put differently, with few exceptions, there are positive treatment effects associated with U-Pass receipt across outcomes for all student groups. Moreover, these treatment effects are statistically comparable along the student dimensions of focus (e.g., the treatment effects among men are statistically comparable to the treatment effects among women).²⁵

Table 2: Percentage Point Difference in Outcomes Between U-Pass Recipients and Non-Recipients, by Student Characteristics

Outcome	Gender		First-Term Academic Characteristics			
	Female	Male	Basic Skills Enrollment	No Basic Skills	Full-Time	Part-Time
One-semester retention	+2.8	+5.7	+4.6	+4.8	+4.1	+5.2
One-year retention	+6.1	+6.7	+7.9	+7.9	+5.8	+7.5
Earned 12 or more credits are end of first year	+6.1	+5.7	+7.4	+7.4	<i>+0.7</i>	
Earned 24 or more credits at end of first year	+4.7	+4.3	+5.5	+5.5	+2.1	<i>+0.3</i>
First semester credit completion rate	+3.5	+3.4	+3.7	+3.7	+1.7	<i>+2.1</i>
Credential attainment (certificates or associate degrees)	<i>+0.3</i>	<i>+1.1</i>	-0.2	+2.3	<i>+0.7</i>	<i>+1.6</i>
Degree attainment (associate degrees only)	<i>+0.8</i>	<i>+1.7</i>	<i>-0.4</i>	+3.6	+1.4	<i>+1.0</i>

Source: Rio Hondo Administrative Records

Notes: *Italicized* coefficients are not statistically significant at $p < .05$ for any given subgroup. **Bold** coefficients represent statistically significant differences in treatment effect between groups. The credit completion rate is defined as the proportion of credits attempted that were earned in a specific term. Analysis of one-year retention is restricted to students who could be observed one year following their initial fall term. Coefficients in table are based on regression models that include the same controls as included in our PSM models, and in which the student characteristic of interest (e.g., gender) is fully interacted with all other covariates; the interaction term between U-Pass receipt and the characteristic of interest (e.g., U-Pass receipt * gender) is examined to determine statistical significance of the difference between student groups in the relationship between U-Pass receipt and academic outcomes.

EXPANDING STUDENT ACCESS TO PUBLIC TRANSIT

A N A D V O C A C Y W I N

In May 2021, after months of sustained pressure from advocates, the LA Metro Board of Directors approved a pilot program to make Metro buses and trains free for community college students.²⁶ The pilot began in August 2021. Beginning in January 2022, buses and trains will be free for all low-income riders.

Rise, a student-led nonprofit organization dedicated to college affordability and a Hope Center partner, led student advocates to fight for this change. In summer 2020, Rise launched a campaign for free public transportation for college students in Los Angeles. The campaign was led by two students who experienced homelessness while in college. It also drew upon prior Hope Center research demonstrating that transportation is a barrier to earning a college degree.

Over the course of Rise's campaign, 500 students shared their stories about struggling to afford transportation with LA Metro. In addition, several students testified about their experiences with transportation during LA Metro hearings.

Here are a few of these students' stories, as told to Rise:

Gillian struggles to get to and from her Rio Hondo classes. She doesn't have a car and commuting by bus takes more than an hour. If buses are delayed, she is late to class. While driving to campus would be quicker and more reliable, buying a car is not financially feasible for Gillian. Her parents take out loans just to cover her tuition, and she cannot handle the added expense of a car payment, car insurance, or gas.

Since the pandemic began, Colin has struggled to earn enough money to get to and from class and work. Early in the pandemic, Colin's hours at work were cut to just eight hours a week. When Colin tried to secure a new job with better hours, doing so was tough. He was stuck in a lose-lose situation; without a job, Colin couldn't afford transportation, but without transportation, Colin couldn't secure a job. At a breaking point, Colin nearly stopped out of college.

Free ridership on LA Metro will allow students like Gillian and Colin to direct their finances and energy towards college completion where it might not have been otherwise possible. It will offer students much-needed financial relief and consistent access to transportation.

CONCLUSION AND RECOMMENDATIONS

Although colleges and metropolitan transit authorities are increasingly considering reduced transit options for students, very little evidence exists to demonstrate the impact of transportation solutions on student enrollment, persistence, and/or completion rates. Evidence from programs such as the City University of New York’s Accelerated Study in Associate Program suggest that transit subsidies, when combined with other efforts to provide comprehensive advising supports to students, can be extremely successful at improving retention and completion outcomes for students; however, to date there is very limited evidence on the specific benefits of transportation subsidies.²⁷

Findings from this report help to fill this evidence gap and suggest that reduced public transit fares can be an effective strategy to support students and improve academic outcomes—specifically credit momentum, retention rates, and credential attainment rates. Results from this study further suggest that the reduced public transit fares are correlated with positive academic outcomes for students regardless of gender, enrollment status, or academic preparation. Of note, students enrolled part-time appear to benefit similarly to full-time students from the U-Pass in terms of their academic outcomes, suggesting that college policies regarding discounted transportation options should not be limited to full-time students. As institutions implement “college promise” initiatives and states consider free community college programs, transit subsidies should be considered as a critical support for students to succeed.

In addition to reducing the financial costs associated with transportation to college, future efforts must ensure that students are aware of transit subsidies available to them and must address other barriers associated with public transit that students face. Prior to the coronavirus pandemic, Rio Hondo College received a planning grant from The Kresge Foundation to convene the Facilitating Alternative Solutions for Student Transportation Consortium (FASST), a group combining transit agency, city, and county representatives with Rio Hondo College students. In 2020, as part of this effort, Rio Hondo College conducted a student survey and two student focus groups to further explore students’ declining use of public transportation to and from the college as well as their awareness and use of subsidized transit opportunities offered through the college’s GO RIO program.²⁸

Survey results indicated that nearly one-third of students were unfamiliar with the GO RIO program.²⁹ Feedback from student focus groups indicated that Rio Hondo College should develop a wide range of marketing and awareness campaigns, using email, text messaging, college websites, and student portals to increase student awareness. Students also felt that access to GO RIO should be integrated into existing processes they must complete, such as applying for admission and financial aid or obtaining their college ID, and that the program should be touted by key staff and faculty.

Focus group participants also identified three key shortcomings of public transportation: frequency of buses, travel time to campus (increased due to the number of stops and/or the number of necessary transfers), and lack of late-night and weekend service. As Rio Hondo College prepares to welcome students back to campus in Fall 2021, these data are being used to proactively communicate with students about GO RIO, encourage take up, and engage with transit providers on how best to support students.

While this study was conducted prior to the campus closures and remote learning conditions stemming from the pandemic, the results will be important moving forward as community colleges grapple with decreased enrollment and strive to provide transportation and other supports to students as they return to in-person classes. Specifically, colleges should consider using pandemic relief funds, including funds allocated through the Higher Education Emergency Relief Fund, to support students' transportation needs. Notably, as of fall 2021, all students enrolled in credit and non-credit classes at Rio Hondo College can receive a Fareless Transit U-Pass from LA Metro (see earlier call out box, "An Advocacy Win").

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FUNDER DISCLOSURE

The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of our funders.

ABOUT THE ADVANCING STUDENT TRANSPORTATION SOLUTIONS PROJECT

This report is part of The Hope Center's Advancing Student Transportation Solutions project, funded by The Kresge Foundation and the Heckscher Foundation for Children. Using data collected in Los Angeles and New York City, the project will build a rigorous body of evidence on the efficacy of transportation supports. For the latest project news, visit the [project webpage](#).

ABOUT THE HOPE CENTER

[The Hope Center for College, Community, and Justice](#) at Temple University is redefining what it means to be a student-ready college, with a national movement centering #RealCollege students' basic needs. Food, affordable housing, transportation, childcare, and mental health are central conditions for learning. Without those needs being met, too many students leave college in debt and/or without a degree.

For information about The Hope Center's technical assistance services, visit hope4college.com/realcollege-technical-assistance/. For media inquiries, contact Director of Communications Deirdre Childress Hopkins, at deirdre.hopkins@temple.edu.

ABOUT DVP-PRAXIS LTD

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TECHNICAL APPENDIX: PROPENSITY SCORE MATCHING AND IMPACT ANALYSIS

Rio Hondo College provided administrative data for this study for students enrolled from Fall 2016 to Spring 2019, including information on student demographics such as gender, race and ethnicity, and financial aid receipt, as well as academic data including term-specific credits attempted and completed, grade point averages, and credential attainment information. Rio Hondo College also provided a record of the academic terms in which students activated a new U-Pass TAP ID.

To examine the impact of receiving the U-Pass, the evaluation team conducted propensity score matching (PSM) to generate a comparison group similar to the treatment group along a set of observable background characteristics theorized to affect the likelihood of receiving treatment. Rosenbaum and Rubin (1983) introduced the propensity score approach to matching and described it as “the conditional probability of assignment to a particular treatment given a vector of observed covariates.”³⁰ In other words, the propensity score reflects the probability of receiving treatment based on a set of observable background characteristics. PSM is a popular approach for accounting for observable factors that may influence the receipt of treatment, and thus confound impact analysis.

While randomized control trials generate treatment and comparison groups that are expected to differ only in their treatment condition, observational studies face the issue of selection bias, in which receipt of treatment may be the result of meaningful observed and unobserved differences between the treatment and comparison groups.³¹

Balancing on propensity scores is a common way to account for systematic differences between treated and untreated cases, thereby reducing the potential bias in the estimates of the impact of treatment on individual outcomes. PSM uses a set of variables that may have influenced the receipt of treatment to create propensity scores, reflecting the probability of receiving treatment, for both the treated and untreated cases. The subjects are then matched on their propensity scores, and untreated cases with propensity scores similar to those in the treatment group form the matched comparison group.

PSM cannot control for unobserved differences between treatment and comparison groups and results should therefore be interpreted as associations as opposed causal estimates. For example, students who elect to take the time and effort to secure a U-Pass might possess other qualities that would lead them to succeed in college. Despite this limitation, PSM is a robust technique when combined with a comprehensive set of observed characteristics theorized to affect both receipt of treatment and the outcome(s) of interest. As detailed below, in this study we were able to control for a rich set of student characteristics, including student demographics, enrollment characteristics, and proxies for academic preparation and financial need. Those needs being met, too many students leave college in debt and/or without a degree.

The evaluation team conducted separate PSM analyses for each outcome. For each outcome, impact is measured by estimating the average treatment effect on the treated (ATT), which is the average difference in the outcome between the treated and matched comparison groups. As Zeidenberg, Cho, and Jenkins (2010) explained, “The ATT is the average effect of the treatment on the sort of person who participates in the program.”³² In other words, the ATT is the difference in outcome between two groups that have similar probabilities of receiving the treatment (based on the set of observed covariates used to generate the propensity score).

The evaluation team used the `teffects psmatch` command in Stata to conduct PSM and estimate the ATT. `teffects psmatch` accounts for the fact that propensity scores are estimated rather than known when calculating standard errors, and thus estimates ATT more precisely.

COVARIATES USED FOR PSM

The analytic sample comprises Rio Hondo College students who first appear in the data in one of three fall terms (Fall 2016, Fall 2017, and Fall 2018). For each PSM model, the treatment group consisted of students who received the U-Pass in the first fall term in which they appear in our dataset, while the matched comparison group was drawn from the pool of fall-start students who did not receive the treatment. The comparison group pool was restricted to students who attempted three or more credits in their first term as all students in the treatment group were enrolled in at least three credits. The covariates used in the PSM models included demographic and other background variables that could influence the likelihood of receiving the treatment. The variables are:

- age at the beginning of the first term;
- gender;
- ethnicity (Hispanic/Non-Hispanic);
- previous credits earned;
- enrollment in basic skills course in first term;
- enrollment in a transfer level math or English course in first term;
- number of credits attempted in first term;
- financial aid (Pell/CCPG) receipt during first term; and
- first academic term.³³

BASELINE EQUIVALENCE AND POST-ESTIMATION REGRESSION

The PSM approach to generating a matched comparison group enabled the evaluation to meet standards of rigor for non-experimental research studies as defined by the Institute of Education Sciences What Works Clearinghouse (WWC).³⁴ PSM is a quasi-experimental design methodology that can meet WWC standards with reservations.

Tables A1 and A2 provide baseline equivalence statistics for the treatment group and matched comparison group in our analyses. Because the year-to-year retention student sample differs from the sample used for all other outcomes (a smaller sample restricted to students who could be followed to the subsequent year), we present baseline statistics corresponding to analyses of one-semester retention, credit accumulation, credit completion rate, and credential completion in Table A1, and we present baseline statistics for year-to-year retention in Table A2.

Table A1: Baseline Equivalence for One-Semester Retention, Credit Accumulation, Credit Completion Rate, and Credential Completion

	Unmatched Comparison Pool (n=23,142)	Matched Comparison Group (n=2,758)	Treatment Group (n=2,758)	P-value	Standardized Difference after Matching
Age at beginning of first term	24.53	20.13	20.03	0.43	-0.022
Age at beginning of first term (squared)	660.59	430.21	423.09	0.43	-0.021
Gender (female)	0.48	0.55	0.56	0.30	0.034
Hispanic	0.84	0.93	0.93	0.56	0.037
Enrolled in basic skills course in first term	0.22	0.47	0.48	0.29	0.034
Credits at beginning of first term	14.15	9.78	9.63	0.77	-0.008
Credits at beginning of first term (squared)	719.26	477.29	456.00	0.57	-0.015
Received financial aid in first term	0.58	0.90	0.89	0.17	-0.073
First enrolled: Fall 2017	0.21	0.22	0.21	0.53	-0.025
First enrolled: Fall 2018	0.19	0.26	0.27	0.56	0.021
Credits attempted in first term	8.09	12.83	12.80	0.69	-0.011
Enrolled in a gateway English or Math course in first term	0.18	0.41	0.41	0.72	-0.012

Source: Rio Hondo Administrative Records

Table A2: Baseline Equivalence for One-Year Retention

	Unmatched Comparison Pool (n=18,758)	Matched Comparison Group (n=2,016)	Treatment Group (n=2,016)	P-value	Standardized Difference after Matching
Age at beginning of first term	24.65	20.50	20.38	0.48	-0.023
Age at beginning of first term (squared)	664.74	452.67	439.54	0.27	-0.035
Gender (female)	0.48	0.55	0.57	0.17	0.052
Hispanic	0.84	0.92	0.93	0.11	0.115
Enrolled in basic skills course in first term	0.21	0.46	0.46	0.90	0.005
Credits at beginning of first term	16.54	12.89	12.82	0.92	-0.003
Credits at beginning of first term (squared)	844.03	679.66	618.37	0.28	-0.034
Received financial aid in first term	0.57	0.86	0.87	0.40	0.047
First enrolled: Fall 2017	0.26	0.29	0.29	0.76	-0.013
Credits attempted in first term	7.93	12.66	12.66	0.99	0.000
Enrolled in a gateway English or Math course in first term	0.16	0.37	0.36	0.56	-0.023

Source: Rio Hondo Administrative Records

As shown in these tables, the treatment and matched comparison groups were balanced on almost all variables used in the PSM models, as evidenced by a standardized difference between treatment and matched comparison group of less than .05. For models of one-semester retention, credit accumulation, credit completion rate, and credential completion, one PSM predictor variable—receipt of financial aid in students’ first term—was not sufficiently balanced according to WWC standards (standardized difference of .073); for models of one-year retention, two PSM predictor variables—gender and Hispanic/non-Hispanic identity—were not sufficiently balanced (standardized differences of .052 and .115, respectively). In these instances, post-estimation regression analyses were conducted to account for the imbalance on these variables.³⁵ In Table A3, we report our main ATT results alongside results deriving from these post-estimation regressions; as demonstrated in these tables, results from post-estimation regressions are substantively identical to our main ATT results.

Table A3: Post-Estimate Average Treatment Effect on the Treated

Outcome	ATT	P-value	ATT (Regression- Adjusted Estimate)	P-value (Regression- Adjusted Estimate)
One semester retention	0.051	0.00	0.052	0.00
One-year retention	0.050	0.00	0.048	0.00
Earned 12 or more credits at end of first semester	0.036	0.01	0.036	0.02
Earned 24 or more credits at end of first year	0.035	0.01	0.035	0.01
First semester credit completion rate	0.026	0.02	0.025	0.02
Credential attainment (certificates or associate degrees)	0.022	0.04	0.022	0.04
Degree attainment (associate degrees only)	0.027	0.01	0.027	0.01

Source: Rio Hondo Administrative Records

Notes: Average treatment effect on the treated (ATT) represents the percentage point difference in outcome between U-Pass recipients and a matched comparison group of students.

Notes and References

¹ College Board. (2021). [2020–21 low and moderate budgets for developing student expense budgets](#).

² U.S. Department of Education. (2019). [Profile of undergraduate students: Attendance, distance and remedial education, degree program and field of study, demographics, financial aid, financial literacy, employment, and military status: 2015–16](#). Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.

³ College Board, 2021.

⁴ American Association of Community Colleges (AACC). (2021). [Fast facts 2021](#). U.S. Department of Education, 2019.

⁵ Causey, J., Huie, F., Lang, R., Ryu, M., & Shapiro, D. (2020, December). [Completing college 2020: A national view of student completion rates for 2014 entering cohort \(Signature report 19\)](#). Herndon, VA: National Student Clearinghouse Research Center.

⁶ Causey., Huie, Lang, Ryu, & Shapiro, December 2020.

⁷ Roble, J. (2017). [Poverty fact sheet: Financial barriers to college completion](#). Madison, WI: Institute for Research on Poverty, University of Wisconsin–Madison.

⁸ AACC, 2021.

⁹ Valentine, J. L., & Clay, J. R. (2019). [Non-degree credentials provide value for adults in the labor market](#). DVP-PRAXIS LTD.

¹⁰ AACC, 2021.

¹¹ AACC, 2021.

¹² Community College Research Center. (2021). [Community college FAQs](#).

¹³ Community College Research Center, 2021.

¹⁴ Race and ethnicity of students: 81% Hispanic, 6% White Non-Hispanic, 6% Asian, 2% Black or African American, 1% Multi-Ethnicity, and 5% did not report their race or ethnic identity. National Center for Education Statistics. (2020). [College navigator](#). Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.

¹⁵ The U-Pass is administered through the Los Angeles County Metropolitan Transportation Authority (LA Metro). Participating schools are billed at \$0.75 per boarding. Student costs and boarding rates vary by college depending on each college's fare subsidy. See: LA Metro. (2021). [U-Pass program](#).

¹⁶ Rio Hondo College launched the GO RIO program in 2006 in partnership with regional transit agencies and bus companies to increase use of mass transit/public transportation, reduce mobile source emissions, reduce traffic and parking demands on campus, and to encourage full-time enrollment. The GO RIO program was extended in 2016 with a new partnership with LA Metro. U-Pass stickers are available, currently by appointment, at the school's Admissions and Records Photo ID window. See <https://www.riohondo.edu/gcr/go-rio-news/>.

¹⁷ Students may have multiple U-Pass TAP IDs in the same term for different reasons including loss or renewal. For this study, treatment is based on the term in which students first received the U-Pass.

¹⁸ Using term-level data from Fall 2016 to Spring 2019, we classify students' start terms based on their first appearance in the data across this subset of terms. Our student sample is inclusive of first-time and previously enrolled students.

¹⁹ Analysis is based on student-level administrative data provided by Rio Hondo College's Institutional Research and Planning Office for all students enrolled from Fall 2016 to Spring 2019. The analytic sample is based on enrollment headcount and is exclusive of students in non-credit bearing programs and dual enrollment students.

²⁰ Rosenbaum, P. R., & Rubin, D. B. (1983). [The central role of the propensity score in observational studies for causal effects](#). *Biometrika*, 70(1), 41–55; Guo, S., & Fraser, M. (2010). [Propensity score analysis: Statistical methods and applications](#). Los Angeles: Sage Publications; Austin, P. C. (2011). [An introduction to propensity score methods for reducing the effect of confounding in observational studies](#). *Multivariate Behavioral Research*, 46(3), 399–424.

²¹ Seventy-three percent of students who received the U-Pass were first-time students.

²²The control group was further restricted to students who attempted at least three credits in their first term to align with the treatment group.

²³Belfield, C., Jenkins, D., & Fink, J. (2019, July 20). [*Early momentum metrics: Leading indicators for community college improvement*](#). [Research Brief.] Community College Research Center.

²⁴Belfield, Jenkins, & Fink, 2019.

²⁵As shown in Table 2, men appear to benefit significantly more from U-Pass receipt in terms of one-semester retention (a 5.7 percentage point increase for men compared to a 2.8 percentage point increase for women), however across all other outcomes there are no significant differences in treatment effects by gender. In addition, benefits of U-Pass receipt in terms of credential attainment are concentrated among students who are more academically prepared and are less apparent for students enrolled in basic skills courses; however, this finding may be an artifact of the relatively short timeframe of the study period and the assumption that students in basic skills courses will need more time to complete.

²⁶CBS Los Angeles. (2021, May 28). [*LA Metro approves fare-less rides for low income riders*](#).

²⁷Gupta, H. (2017). [*The power of fully supporting community college students: The effects of the City University of New York's Accelerated Study in Associate Programs after six years*](#). MDRC.

²⁸Castañeda-Calleros, R. (2020, September). [*Students' insights chart path to transit solutions*](#). [Blog post].

²⁹DVP-PRAXIS provided support to Rio Hondo College in developing their survey instrument and focus group guide and analyzed the focus group data.

³⁰Rosenbaum & Rubin, 1983.

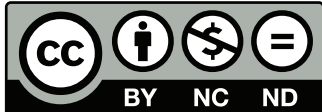
³¹Austin, 2011; Rosenbaum & Rubin, 1983.

³²Zeidenberg, M., Cho, S. W., & Jenkins, D. (2010). [*Washington State's Integrated Basic Education and Skills Training program \(I-BEST\): New evidence of effectiveness*](#). [CCRC Working Paper No. 20]. Teachers College, Columbia University.

³³In supplementary models, we included a more comprehensive set of racial/ethnic categories (Hispanic, White, Asian, Black). These models returned substantively identical results, but were less balanced overall on baseline characteristics, likely given the relatively small proportion of students in these other racial categories. Given that most students receiving the U-Pass are Hispanic (93%), our preferred models included a simple indicator of Hispanic versus non-Hispanic ethnicity.

³⁴Institute of Education Sciences, What Works Clearinghouse. (n.d.). [*WWC standards brief for baseline equivalence*](#).

³⁵In order to meet WWC's Standards with Reservations, baseline equivalence must be demonstrated for all PSM predictor variables. According to WWC, variables are considered balanced if the standardized difference between treatment group and matched comparison group is less than .05. If the standardized difference is between .05 and .25, WWC's standards will still be met as long as post-estimation regressions (i.e., a regression on the matched sample) controlling for the predictor variable of interest is conducted. See: What Works Clearinghouse. (2020). [*What Works Clearinghouse standards handbook, Version 4.1*](#). Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.



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