

Work-Based Learning and Occupational Coursework in the California Community Colleges

**Final Report to the California Community College
Chancellor's Advisory Committee on
Work-Based Learning and Employment Services**

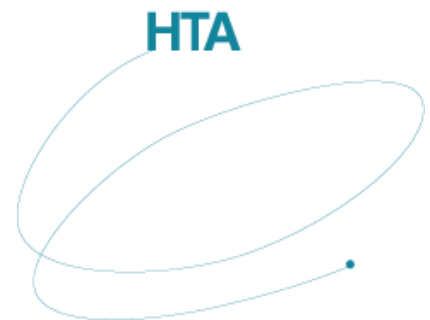
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EXECUTIVE SUMMARY

In this study we assess the influence of work-based learning—internships, extended job shadowing, apprenticeships and cooperative work experience—on the education and earnings outcomes of graduates from California Community Colleges. Work-based learning is an instructional strategy that integrates classroom study with planned and supervised experiences in the workplace to enhance learning. We principally compare three types of community college graduates:

- **Coop graduates:** Coop graduates are those who were enrolled in at least one cooperative-work experience course during their academic career. This group includes all Coop participants regardless of whether they participated in occupational courses. These graduates are the central proxy for assessing the influence of work-based learning.
- **Occupational-Only graduates:** Occupational courses are those that prepare students for work in specific fields, such as information technology, business services, fashion, and auto mechanics. Occupational graduates are those who were enrolled in at least one of these courses but did not participate in coop courses.
- **Non-Coop/Non-Occupational graduates:** The remainder of graduates who did not participate in coop or occupational coursework are classified as non-Coop/non-Occupational graduates.

EDUCATION OUTCOMES

- Students who engage in a high concentration of occupational coursework tend to take fewer courses and typically exit with a Certificate degree or some other non-Associate award.
- Coop graduates differ from Occupational graduates largely in the type of degree they receive. Coop graduates tend to receive Associate degrees at a higher rate than Occupational graduates.
- Coop graduates differ from non-Coop/non-Occupational graduates in the number of credits received during their academic career. Although both tend to receive Associate degrees, Coop graduates also have more total credits than non-Coop/non-Occupational graduates.
- There is little difference between the groups with respect to GPA. All groups demonstrate a mean of 2.7 (slightly lower than a B average).

EARNINGS OUTCOMES

- Coop participants exit community colleges with a strong **15-22% lead in workforce participation** compared to other graduates. By the second year after graduation this gap decreases to a 5% lead, and by year three there remains a 3% difference in the employment rate of Coop graduates' compared to that of other community college graduates.

- **Coop graduates are 22% more likely to maintain stable earnings** over three years compared to non-Coop/non-Occupational graduates, and 6% more likely to maintain stable earnings when compared to Occupational graduates.
- Coop graduates demonstrate consistently higher earnings compared to other graduates.
 - **Coop graduates earn 50-71% more** annually than non-Coop/non-Occupational graduates.
 - **Occupational graduates earn 43-58% more** annually than non-Coop/non-Occupational graduates.
 - Thus, Coop graduates earn 17-21% more than graduates who participate in occupational coursework alone.

Unfortunately, the earnings gains are not shared equally among all Coop and Occupational graduates. Regardless of coop or occupational participation, black and Asian graduates earn 31% and 15% less than their peers, respectively. Additionally, the gap in earnings between non-Coop/non-Occupational graduates and Coop graduates is greater for males (71%) than it is for females (32%). These differences may be attributable to persistent race-ethnic and gender inequities in employment. Future research should explore the effects of gender and racial inequality on the benefits of coop participation.

Despite the strong earnings and employment gains for Coop graduates, participation is relatively low. Only 14% of students in the sample participated in Coop courses. Of these Coop participants, half enrolled in 4 or fewer total Coop units during their academic career. The results of this study suggest that increasing enrollment in Coop courses may be highly beneficial for the earnings success of California Community College attendees.

I. INTRODUCTION

I.1. PURPOSE OF STUDY

In this study we assess the influence of work-based learning on the education and earnings outcomes of graduates from California Community Colleges. Work-based learning—including internship, extended job shadowing, apprenticeship and cooperative work experience—is an instructional strategy that integrates classroom study with planned and supervised experiences in the workplace to enhance learning. It is distinct from general work experience, which is not necessarily connected to a specific occupational program.¹ Although there are many different types of work-based learning, we use the terms *work-based learning* and *cooperative work experience* (or *coop*) interchangeably.

Previous studies of work-based learning programs have focused on K-12 education.² In an effort to assess related outcomes at the community college level and verify practitioner experience, we present a quantitative study of graduates from four California Community College regions. The present report explores the hypothesis that work-based learning and career-related academic programs enhance student outcomes, particularly with respect to engagement in school, employment and earnings.

I.2. CALIFORNIA COMMUNITY COLLEGES

Through its system of 109 colleges in 72 districts, the California Community Colleges currently serve more than 2.5 million students with a wide variety of educational and career goals. A primary mission of the California Community Colleges (CCC) is to offer academic and vocational education at the lower division level for both younger and older students, including individuals returning to school. Additionally, CCC aims to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous workforce improvement. Work-based learning programs are one means of achieving this end. These programs allow students to earn course credit for paid or unpaid employment that is related to a specific occupational program of study.

I.3. THE EVALUATION

In 2003, the California Community College Chancellor's Advisory Committee on Work-Based Learning and Employment Services retained the services of Hatchuel Tabernik & Associates (HTA)

¹ National Center for Educational Statistics. (2000). *Vocational Education in the United States: Toward the Year 2000*. <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000029>

² *California School-to-Career Case Studies Evaluation*, WestEd, 2002; *California School-to-Career Case Studies Evaluation: EASTBAY Learns*, Hatchuel Tabernik and Associates, March 2002; *School-to-Work: Making a Difference in Education*, Institute on Education and the Economy, Teachers College, Columbia University, 2001; *National Conference of State Legislatures, School-to-Work: A Guide for State Legislators*. www.ncsl.org; U.S. Department of Education, National Center for Education Statistics. *Vocational Education in the United States: Toward the Year 2000*, NCES 2000-029, by Karen Levesque et al. Washington, DC: 2000.

to begin looking into the effects of work-based learning on education and earnings outcomes. HTA released the first report to the Committee in 2004.³ After review, in-depth discussion, and collection of additional data, a second analysis was conducted to assess additional evaluation questions. The present report presents the final results of the 2003-2005 evaluation of the CCC work-based learning programs.

³ HTA. (May 3, 2004). *The Benefits of Work-Based Learning and Occupational Coursework in the California Community Colleges*.

II. METHODOLOGY

II.1. SAMPLE SELECTION

The chief aim of this study is to examine the effect of work-based learning and other occupational coursework on the earnings and selected educational outcomes of California Community College (CCC) graduates.⁴ Students attending community colleges come from extremely diverse backgrounds, attend community college for any number of personal and economic reasons, and start their studies with various goals, including completion of an occupational certificate program, completion of their basic education requirements for transfer to a four-year university, or enhancement of particular skills, among others. To look at earnings and other outcomes in a way that would eliminate as many complicating factors as possible, we narrowed the study sample using the following criteria.

1. **Recent High School Graduates:** Only students recently out of high school were selected to eliminate the conflating problem of community college awardees with previous substantial work experience. One could expect that those with more work experience would have, all else being equal, higher earnings even with the same degree. We therefore wanted to diminish the possibility of contaminating the estimates of work-based learning effects with that of pre-community college work experience.
2. **Graduated between 1997 and 1999:** We focused our analysis on students who received CCC credit awards between 1997 and 1999. In general, credit awards fall into three major categories: Associate degrees (A.A. or A.S.), Certificate degrees requiring 6 to 60 or more units, and other credit awards for graduates with fewer than 6 units.⁵ We exclude all noncredit awards. The years 1997-99 were chosen so that CCC awardees could be tracked for at least three years post-exit. This provides a relatively adequate earnings timeframe to smooth the effect of random economic shocks that may be present if just one graduating class were examined. At the same time, the exit timeframe is short enough to allow one to examine changes occurring for students who exited CCC at roughly similar times, thus limiting the influence of economic cycles that would have to be more readily controlled when looking at those who graduated within a much longer time frame.
3. **Did not Re-Enroll or Transfer:** We selected only those who did not continue to a 4-year college or return to community college within 2 years, since students continuing their education (attending school full-time or part-time) could have lower earnings in those years than those employed full time, and, conversely, because the completion of a four-year degree can result in further earnings gains.⁶

⁴ Rates of transfer to four-year institutions and academic success beyond community college were not examined, because transfer to a 4-year institution is not the goal for many students.

⁵ Note that Chancellor's Office approved awards are Associate of Arts, Associates of Science, Certificate requiring 18 to fewer than 30 semester units, Certificate requiring 30 to fewer than 60 semester units and Certificate requiring 60 or more semester units.

⁶ According to the March 2002 CPS, average earnings for an adult between the ages of 25-64 vary widely by level of education and degree obtained: with some college but no degree - \$34,790; with an AA degree - \$36,268; with a BA degree - \$53,020.

4. **Regions:** Even with the above restrictions the number of CCC awardees was very large. To facilitate data transmission and management, we limited the overall sample to students in selected regions. Specifically, four diverse regions were selected, out of nine. The Northern region consists of those graduates from CCCs in area spanned by Lassen, Mendocino, and Siskiyou counties. Bay Area CCCs include those from Marin, Contra Costa, Alameda, San Francisco and San Mateo counties. CCCs in the Central Valley include those in Merced, Fresno, Kern, San Luis Obispo, and Santa Barbara counties. Finally, the Los Angeles region is primarily composed of those CCCs in Los Angeles County.

In all, 5,874 students met these selection criteria.

II.2. TERMINOLOGY

In this report we cluster the sample into a number of educational and earnings groups of interest. In this section we define the groups and terms used throughout the remainder of the report.

Education Terminology

All education data was obtained from the Chancellor's Management Information System. In this report we focus on three educational definitions: engagement, occupational concentration, and coop participation.

Educational Engagement

A key interest both as an outcome variable and descriptive or explanatory variable is the level of involvement in community college. Students participate in community college programs at various levels. These levels are defined according to the breadth of coursework and the number of credits received. Since Associate degree programs require more general coursework than the more targeted Certificate programs, we use the former to identify greater breadth. A full-time student who spends two years in community college will typically receive 60 credits. We therefore use this cut-off point to identify the level of student 'commitment' to community college education. From these we construct three levels of educational engagement.

1. **High Engagement Students:** High engagement students are those who have both an Associates degree and 60 or more credits.
2. **Moderate Engagement Students:** Moderate engagement students have either
 - i. An Associates degree, but less than 60 credits, or
 - ii. 60 or more credits, but received a Certificate, not an Associates degree.
3. **Low Engagement Students:** Low engagement students graduate from community college with fewer than 60 credits, a Certificate award, and no Associates degree.

In some cases we are more concerned with degree than with the actual number of credits received, and we simply divide students into those with an Associates degree and those with a Certificate.

Occupational Concentration

Occupational concentration describes the type of coursework in which students are involved. Occupational courses are those that prepare students for work in specific fields, such as information technology, business services, fashion, and auto mechanics.

We define a course as *occupational* if it is labeled in the Chancellor's Office Management Information System⁷ as "clearly occupational," "advanced occupational," or "apprenticeship." Courses considered *non-occupational* are those labeled "possibly occupational" or "non-occupational." Based on these classifications we then define occupational concentration as *the percent of all course credits devoted to occupational courses*. These percentages are used to divide the sample into three groups based on theoretical and distributional considerations.⁸

1. **High Occupational Concentration:** We assume that high occupational concentration students are those with 50% or more of their coursework devoted to occupational courses. We make this choice based on the theoretical assumption that students who devote more than half of their coursework to occupational courses are much more focused on this area than those with fewer of their credits thus directed.
2. **Moderate Occupational Concentration:** We define moderate occupational concentration students as those with less than 50%, but 5% or more of their coursework devoted to occupational courses.
3. **Low Occupational Concentration:** Low occupational concentration students devote fewer than 5% of their courses to occupational courses. This choice was made on distributional grounds. There was a strong modal point between 0% and 5%, suggesting that many students either take no occupational courses or 'dabble' in a few occupational courses.

Coop Participation

Not all students in occupational programs engage in coop courses. In addition, students who are non-occupational academic programs may enroll in coop courses. We label students as Coop participants if they were enrolled in any coop courses, regardless of their participation in occupational courses.

We identify *coop* courses as those labeled as "cooperative work-experience" courses in the Chancellor's Office Management Information System.⁹ Relatively few students enrolled in any coop courses (see below). We therefore develop the following classification scheme.

⁷ Variable CB09 in MIS.

⁸ The occupational concentration classifications used here differ from those used in the original report, which divided the groups based on tercile distributions of sample. On reflection, we decided that theoretical assumptions were more relevant to understanding the occupational effects. In the majority of cases, the two classification schemes overlap.

⁹ Variable CB10 in MIS.

1. **Coop Students:** Students who enrolled in one or more coop courses during their academic career.
2. **Non-Coop Students:** Students who did not enroll in a coop course at any point during their academic career.

Earnings & Employment Terminology

All earnings data are derived from Unemployment Insurance Reports and were supplied to HTA by the Chancellor's Office. We principally rely on the following earnings and employment constructs.

Quarterly and Yearly Earnings

We define the *exit quarter* as the calendar quarter in which the student receives her/his award (based on MIS data). In most cases, graduates have no earnings during this quarter. In select cases earnings are positive in this quarter. In rarer cases earnings reach back numerous quarters before receipt of the student's final award.

The first year of exit includes the exit quarter and the subsequent three quarters. The second year includes the next four quarter and so on. Although students may have no earnings in any of these years, for ease of discussion we will refer to these broadly as yearly earnings, or 'first year of earnings,' 'second year,' etc.

At times we present earnings prior to award receipt. We classify these as, for example, 'earnings 1 year prior to award.' We count each prior quarter as a negative number. For example, quarter -1 refers to the first quarter prior to receipt of award. Prior earnings are also used to examine whether different groups, e.g. coop versus non-coop, have earnings at earlier points, which may cause bias in the interpretations of overall results.

Average Earnings

Fluctuation in quarterly and yearly earnings due to economic or personal shocks may bias some of the results. Thus, we average individuals' earnings over 4 years in order to get a more robust view of their typical annual earnings.

Continuity

A graduate is said to demonstrate *earnings continuity* if she has at least three consecutive years of positive (non-zero) earnings. This definition relies on yearly earnings rather than quarterly earnings, and thus includes graduates who may not have positive earnings in every quarter.

Time to First Earnings

In addition to overall earnings and continuity we are interested in whether program participation demonstrates an effect on how quickly graduates find jobs. We use the quarter in which first earnings are reported as a proxy for 'time to employment.'

III. SAMPLE CHARACTERISTICS

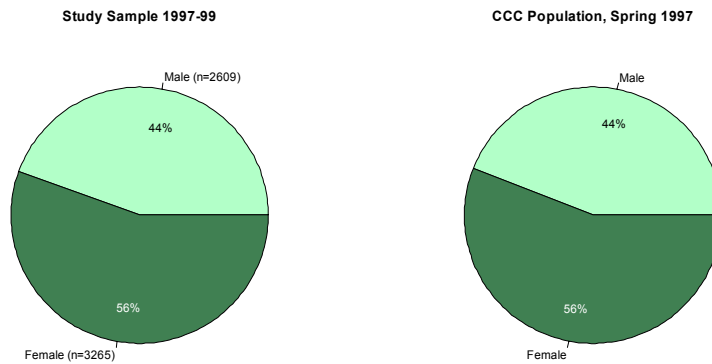
III.1. DEMOGRAPHICS

The present study relies on a sample of students graduating from the California Community Colleges (CCC) between 1997 and 1999. This sample is reflective of the overall CCC population in some key demographic areas.

Gender

Distribution of gender within the sample and population are identical. Females account for 56% of both the sample and population (Figure III.1.1).

Figure III.1.1. Sample and Population Gender



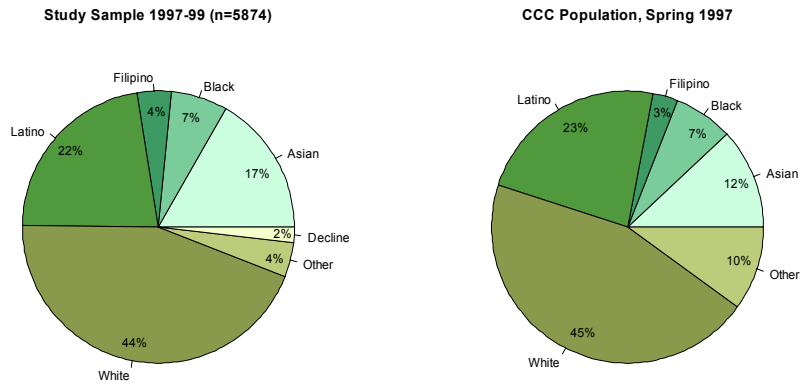
Note: 'Sample' refers to 1997-99 graduates. 'Population' refers to all students enrolled in 1997.

Ethnicity

The study sample mirrors the CCC population ethnically. Roughly, 45% of students and graduates are white, 23% are Latino, 12-17% are Asian, and only 7% are black (Figure III.1.2). These demographics are also reflective of the overall California population in 2000.¹⁰

¹⁰ U.S. Census Bureau: <http://quickfacts.census.gov/qfd/states/06000.html>

Figure III.1.2. Sample and Population Race-Ethnicity

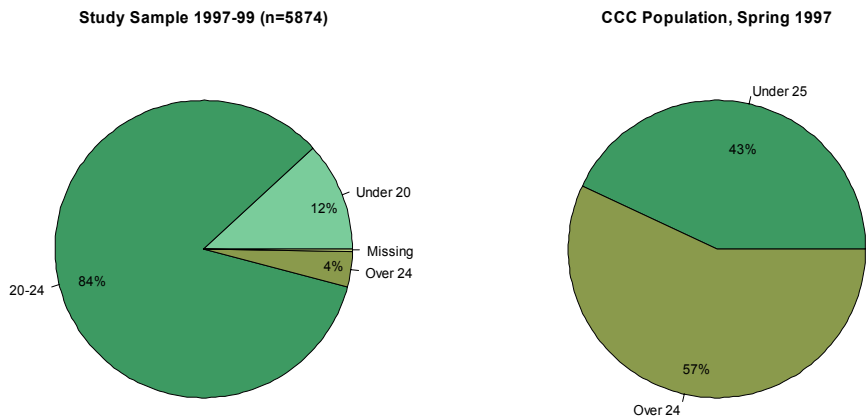


Note: 'Sample' refers to 1997-99 graduates. 'Population' refers to all students enrolled in 1997.

Age

Because we select only recent high school graduates, it is not surprising that the sample differs quite significantly from the overall CCC population with respect to age. While 96% of the sample is 24 years old or younger, this age group constitutes only 43% of the total CCC population in 1997.

Figure III.1.3. Sample and Population Age



Note: 'Sample' refers to 1997-99 graduates. 'Population' refers to all students enrolled in 1997.

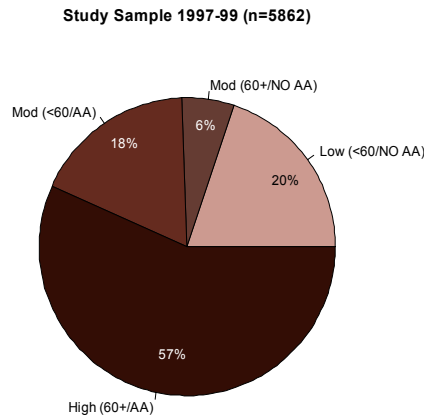
III.2. EDUCATIONAL EXPERIENCE

Students in the study demonstrate a great deal of variation with respect to their educational experiences while in community college.

Academic Engagement

Over 55% of graduates have high educational engagement (60 or more credits and an Associates degree). On the other end, 20% of graduates exit with a certificate and fewer than 60 credits (Figure III.2.1).¹¹

Figure III.2.1. Educational Engagement

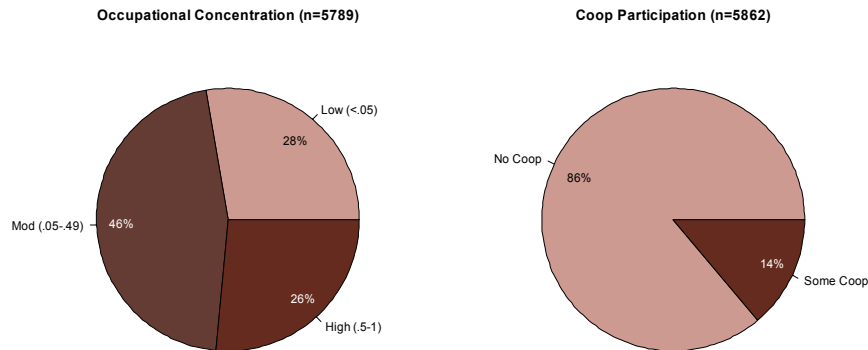


Note: Twelve (12) students in sample have missing information.

Coursework Concentration

Slightly more than 25% of graduates demonstrate high levels of occupational concentration (Figure III.2.2, left panel). Another 28% of graduates demonstrate low occupational concentration (0-5% of coursework), while nearly half of all graduates in the sample have moderate (5-50% of coursework) occupational concentration. Only 14% of graduates participate in any Coop coursework (Figure II.2.2, right panel).

Figure III.2.2. Occupational Concentration and Coop Participation

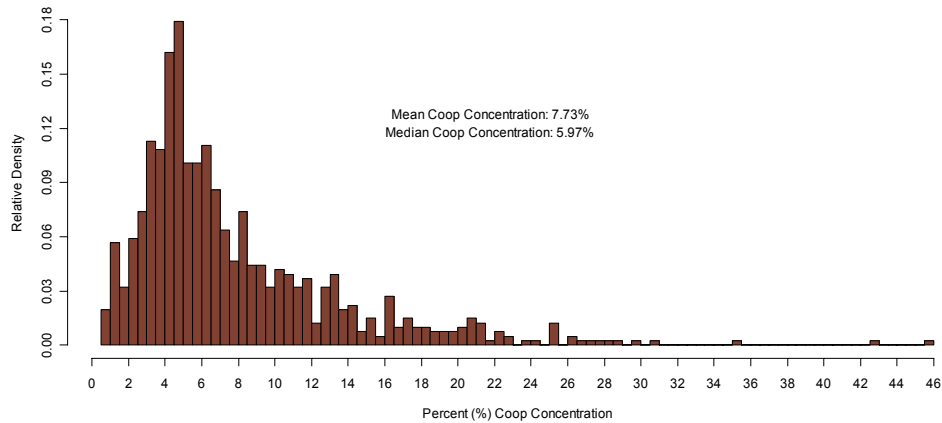


Note: 85 students missing course status information. 'Some Coop' = 1 or more Coop credits.

¹¹ These results mirror the CCC population. During the 1998-99 academic year, all CCC graduates to receive a credit award, 66% of received an Associate degree, 3% received a Certificate with 60 or more units, and 24% received a Certificate or other credit with fewer than 60 units. For details see the CCC Award Query Page <http://misweb.cccco.edu/mis/onlinestat/awards.cfm>.

Among Coop participants, coop courses generally constitute less than 10% of total course credits (Figure III.2.3). Half of all Coop participants have fewer than 6% of total course credits devoted to coop coursework.¹²

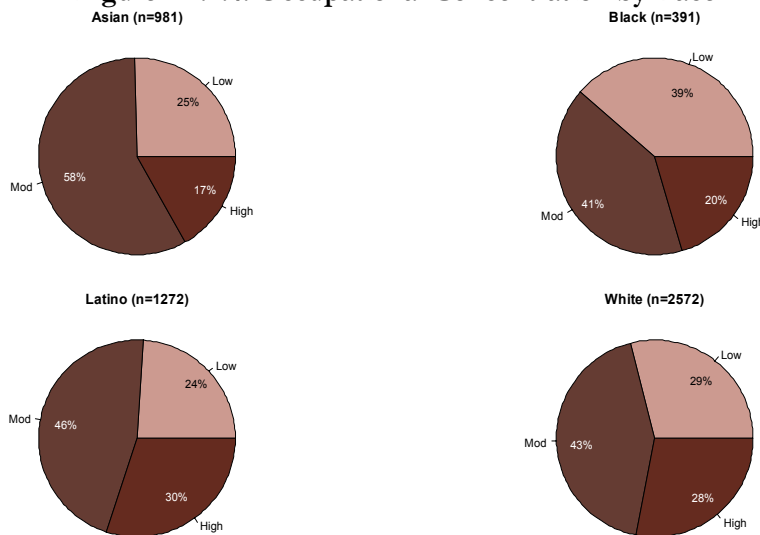
Figure III.2.3. Distribution of Coop Concentration



Note: Includes only graduates with at least one (1) unit of coop.

Occupational concentration proves to be highest among white and Latino graduates; 28-30% high occupational concentration versus 20% or less for other groups (Figure III.2.4). Occupational concentration is lowest among black graduates (39% low occupational concentration versus 30% or less for other groups). These differences are statistically significant.¹³

Figure III.2.4. Occupational Concentration by Race



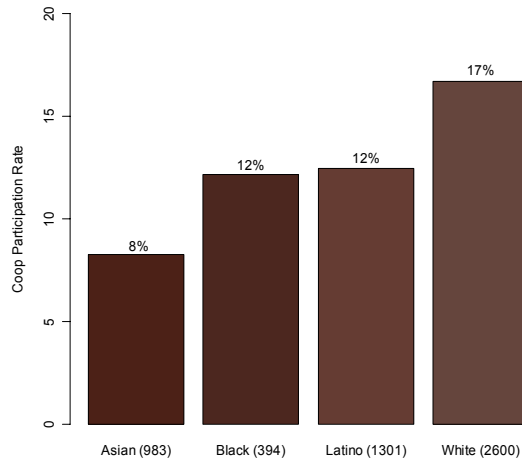
Note: Differences statistically significant ($p < .001$).

¹² Coop participants received a median of 4 Coop units; roughly the equivalent of 1 course.

¹³ Chi-square test of association ($p < .001$).

Coop participation is highest among white students (17% participation rate) and lowest for Asian students (8%) (Figure III.2.5). Black and Latino graduates demonstrate similar rates of Coop participation (12%). The racial differences in Coop participation rates are statistically significant.¹⁴

Figure III.2.5. Coop Participation by Race

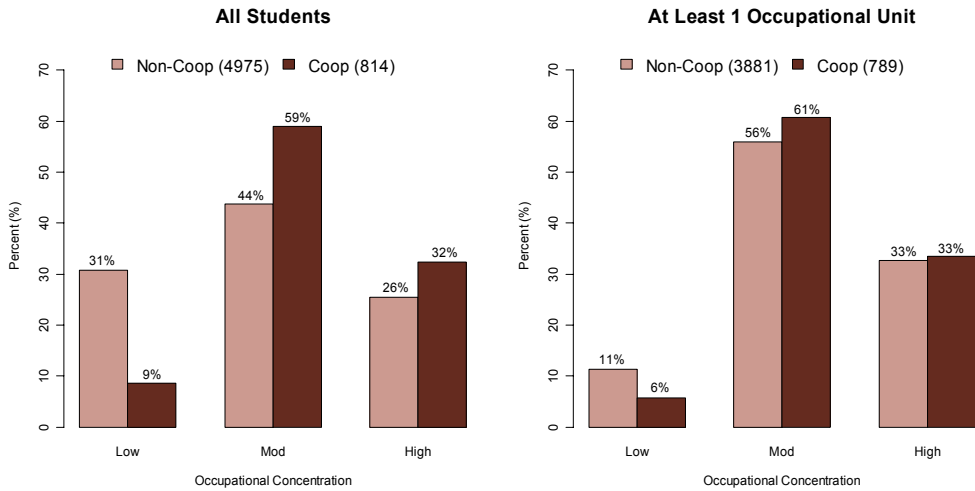


Note: Participation rates reflect percent of students with 1 or more Coop credits. Differences are statistically significant ($p < .001$).

Compared to all other students, Coop graduates demonstrate higher rates of moderate and high occupational concentration (Figure III.2.6, left panel). In particular, only 9% of Coop graduates are classified as low occupational concentration, compared to 31% of all other students. When we limit our analysis to students with at least 1 occupational credit the differences are more muted (Figure III.2.6, right panel), with 6% of Coop participants and 11% of all other students demonstrating low occupational concentration. We will use the distinctions of Coop, occupational, and other students in further analyses below.

¹⁴ Chi-square test of association ($p < .001$).

Figure III.2.6. Occupational Concentration by Coop Participation



Note: Differences in both distributions statistically significant ($p < .001$).

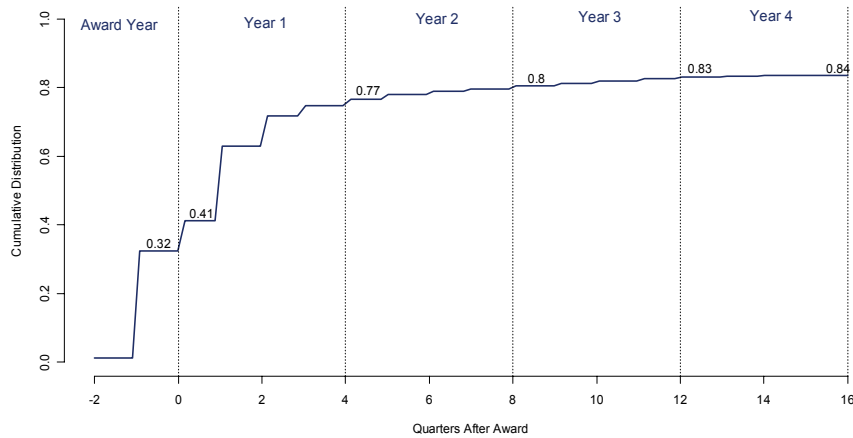
III.3. EMPLOYMENT & EARNINGS

Since we rely on UI data in order to assess earnings, we use the first instance of reported earnings as a proxy of first quarter of employment. In general, reported earnings should correlate to quarter of first employment. However, there are cases in which this may not be true.

Time to First Earnings

In Figure III.3.1 we present data on graduates' time to first earnings (or time to employment). Student award dates were used to identify the year and quarter in which awards were received. These are indicated with a '0' on the x-axis of Figure III.3.1. Quarters prior to this date are indicated as negative quarters, and subsequent quarters are indicated as positive quarters. In the figure we diagram the cumulative distribution, which identifies the proportion of the sample with positive earnings by the given quarter. Thus, for example, in the quarter prior to award receipt (quarter -1), 32% of graduates have some earnings. Within the quarter of award receipt (quarter 0) 41% of graduates have earnings. By the start of the second year (quarter 4), over 75% of graduates receive some earnings.

Figure III.3.1. First Quarter of Earnings

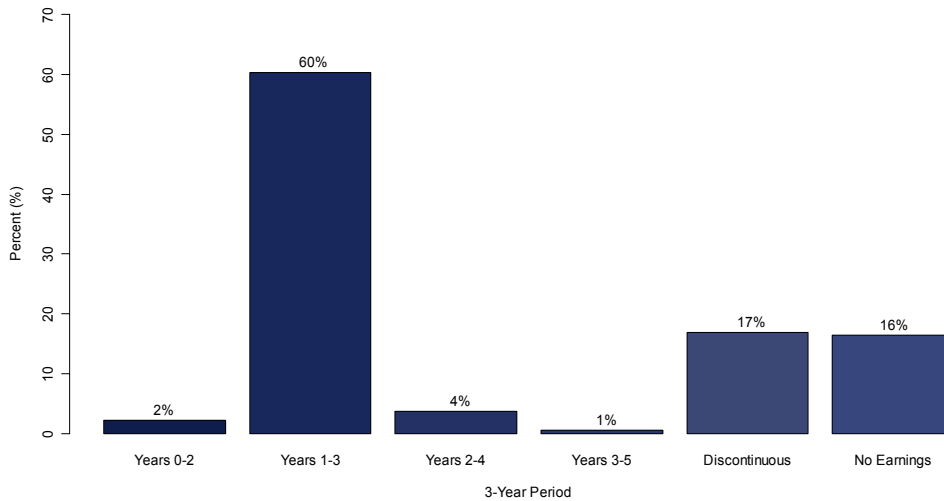


Note: Includes graduates with no earnings information in any year, and graduates with prior earnings.

Continuity

The cumulative distribution in Figure III.3.1 plateaus between years 3 and 4 at approximately 83%. This is primarily due to the lack of any earnings information for some of the graduates. As identified in Figure III.3.2, 16% of graduates have no earnings information for any of the quarters examined in the present study.¹⁵ An almost equal proportion of graduates (17%) have sporadic or ‘discontinuous’ earnings from the year prior to award receipt (year 0) to five years after award receipt (year 5). Nevertheless, 60% of graduates in the sample have 3-year continuous earnings between year 1 and year 3.

Figure III.3.2. Continuity of Earnings

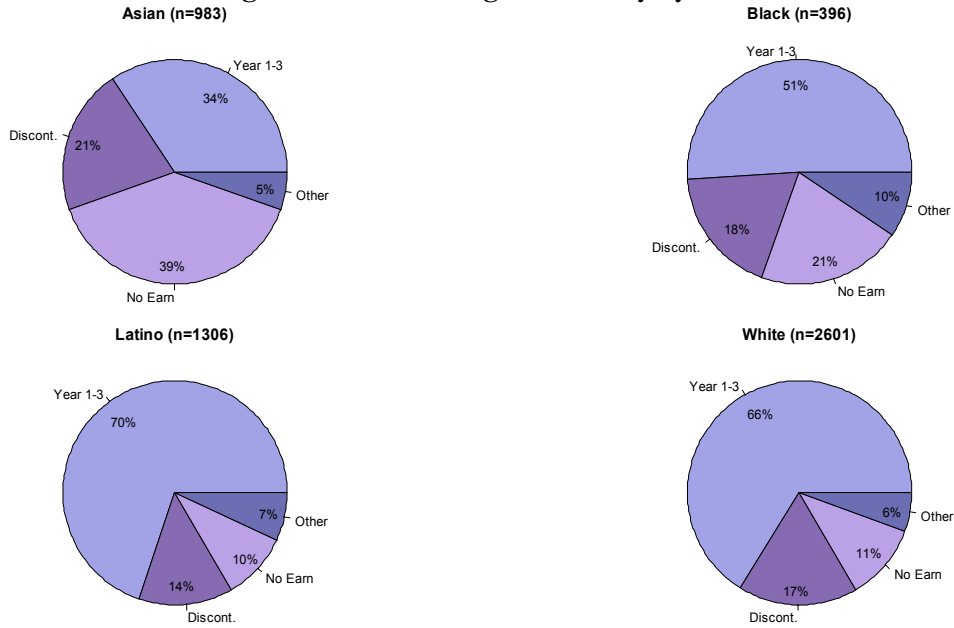


Note: N=5874.

¹⁵ Generally, we have 4 to 6 years of UI records for all graduates. However, 963 graduates have no UI information contained in their records (i.e., missing information for all quarters).

The race and ethnicity of graduates is significantly associated with differences in continuity rates (Figure III.3.3).¹⁶ Over 60% of black graduates, 77% of Latino graduates and 72% of white graduates demonstrate 3-year continuous earnings, with the majority of this continuity evident between years 1 and 3. Asian graduates have the highest rates of sporadic (discontinuous) earnings (21%) and almost 40% of Asian graduates have no reported earnings during the period under examination. Among other graduates, 21% of black graduates and 10% of white and Latino graduates have no reported earnings.

Figure III.3.3. Earnings Continuity by Race



Note: Differences are statistically significant ($p < .001$).

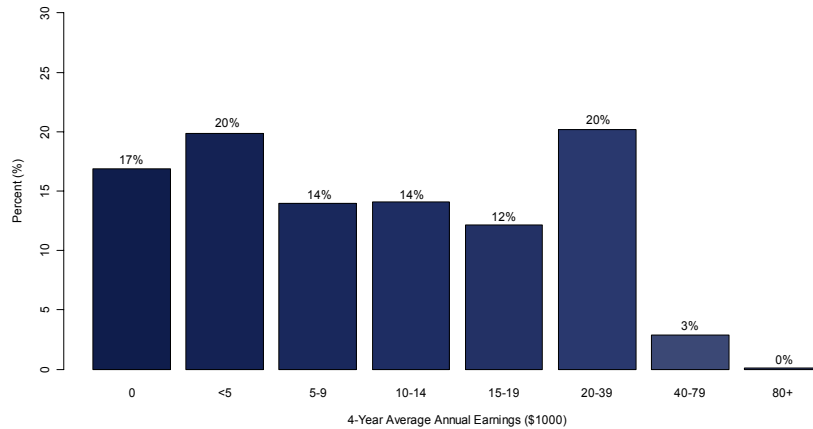
Average and Yearly Earnings

Earnings differ substantially among graduates. In addition to the 16-17% of graduates with no recorded earnings, roughly 20% of graduates have average annual earnings below \$5,000 (Figure III.3.4).¹⁷ Another 20% of graduates in the sample have average yearly earnings between \$20,000 and \$40,000. The remainder of graduates earn on average between \$5,000 and \$20,000. Less than 4% of graduates have average yearly earnings of \$40,000 or more.

¹⁶ Chi-square test of association ($p < .001$).

¹⁷ Average annual earnings reflect the mean yearly earnings per individuals between years 1 and 4.

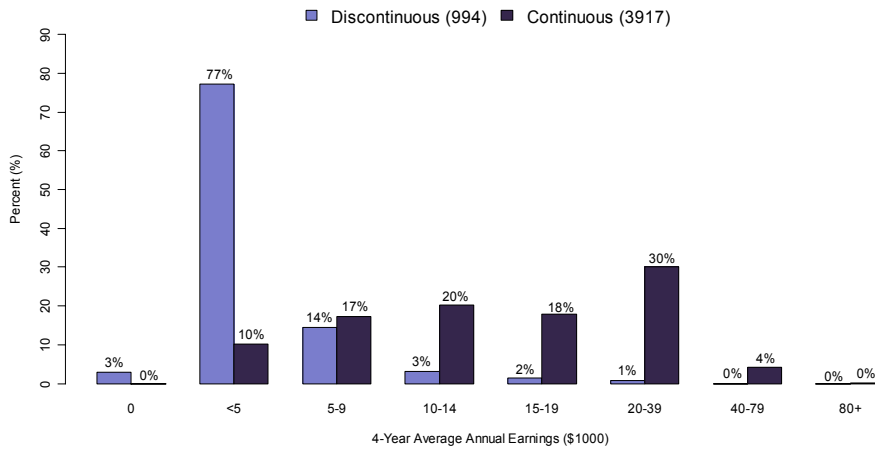
Figure III.3.4. Distribution of Average Annual Earnings



Note: Average of year of award through 3 years after award year. N=5874.

Most of the lower average annual earnings are attributable to discontinuous earners. Almost 80% of graduates who do not have 3 years of continuous earnings demonstrate average annual earnings of less than \$5,000 (Figure III.3.5). Graduates with at least one 3-year period of continuous earnings between year 1 and year 6 demonstrate more variability in average annual earnings, with a peak of 30% earning between \$20,000 and \$40,000.

Figure III.3.5. Average Annual Earnings by Continuity



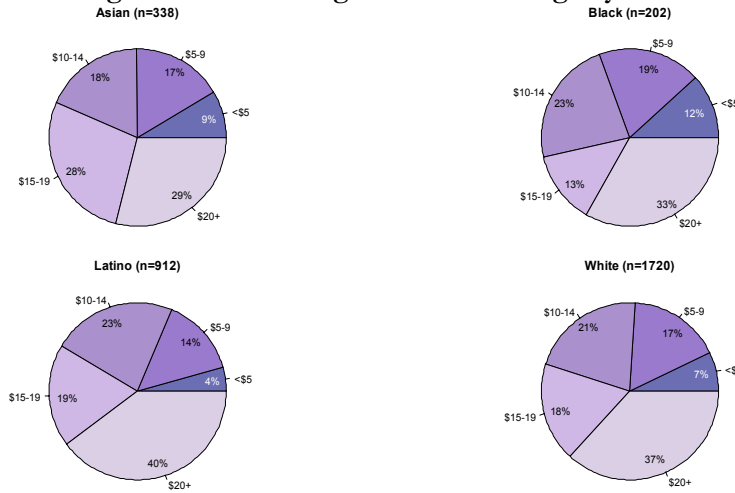
Note: 'Continuous' denotes 3-year continuous earnings between years 1 through 6.

In Figure III.3.6 we highlight average annual earnings by race. As presented above, there is a strong racial bias in continuity of earnings, which in turn influences the measured average annual earnings. We therefore restrict the racial disaggregation in Figure III.3.6 to all graduates with continuous earnings between year 1 and year 3.

Despite continuous earnings, black graduates make significantly less than their white, Latino or Asian counterparts. Nearly 55% of black graduates average less than \$10,000 annually. By contrast, roughly 41-45% of Latino, white and Asian graduates average less than \$10,000 annually. In addition, 12% of black graduates average less than \$5,000 annually compared to 4-9% of others. As

with the likelihood of continuous employment, Latino and white graduates fare better than others with respect to average annual earnings. Between 37% and 40% of white and Latino graduates average more than \$20,000 annually. Roughly 30% of Asian and black graduates have average annual earnings at this level.

Figure III.3.6. Average Annual Earnings by Race



Note: Includes year 1 to year 3 continuous earners only. Values in \$1000. Differences are statistically significant ($p < .001$).

IV. PROGRAM OUTCOMES

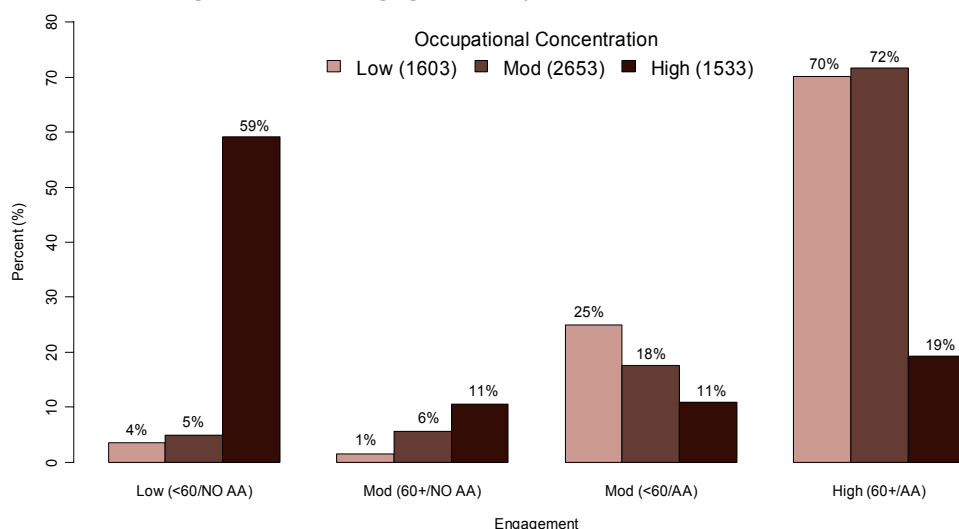
IV.1. EDUCATION

In this section we assess the relationship between Coop participation, occupational concentration and educational outcomes for the study sample of graduates. In particular, we assess differences in engagement and grade point averages for graduates.

Engagement

Graduates' concentration in occupational coursework is significantly associated with their level of engagement while in school (Figure IV.1.1). Notably, graduates with a high concentration (over 50% of coursework) in occupational courses are 12-times more likely to have low levels of academic engagement (i.e. engage in fewer than 60 units and receive only a certificate). By contrast, graduates with moderate or low levels of concentration in occupational coursework are highly likely (70%) to receive an Associates degree and 60 or more units. The difference in engagement for those with high levels of occupational concentration versus those with lower levels reflects the fact that students who enter certificate programs take fewer courses, and that these courses are often geared toward occupational coursework.

Figure IV.1.1. Engagement by Occupation Concentration

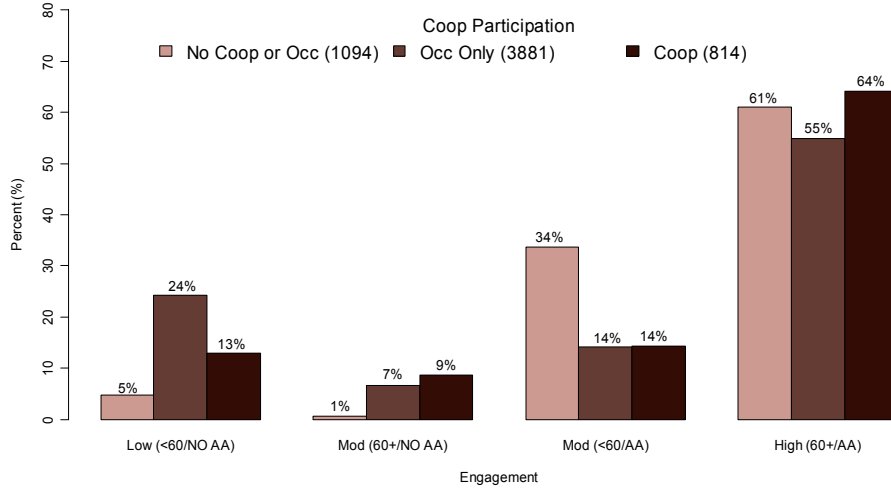


Note: Differences are statistically significant ($p < .001$).

In Figure IV.1.2 we compare Coop participants to other graduates who had at least 1 unit of occupational coursework (termed 'Occ Only') and other graduates who enroll in neither coop nor occupational coursework. Coop graduates tend to demonstrate higher levels of engagement than students who take occupational courses only. Nearly two-thirds of Coop graduates have Associate degrees and 60 or more credits from their community college. Occupational graduates have higher

rates of certificate (low-level) engagement than other graduates. Over one-third of the non-Coop/non-Occupational graduates had fewer than 60 units, but received an Associates degree.

Figure IV.1.2. Engagement by Coop Participation



Note: Differences are statistically significant ($p < .001$).

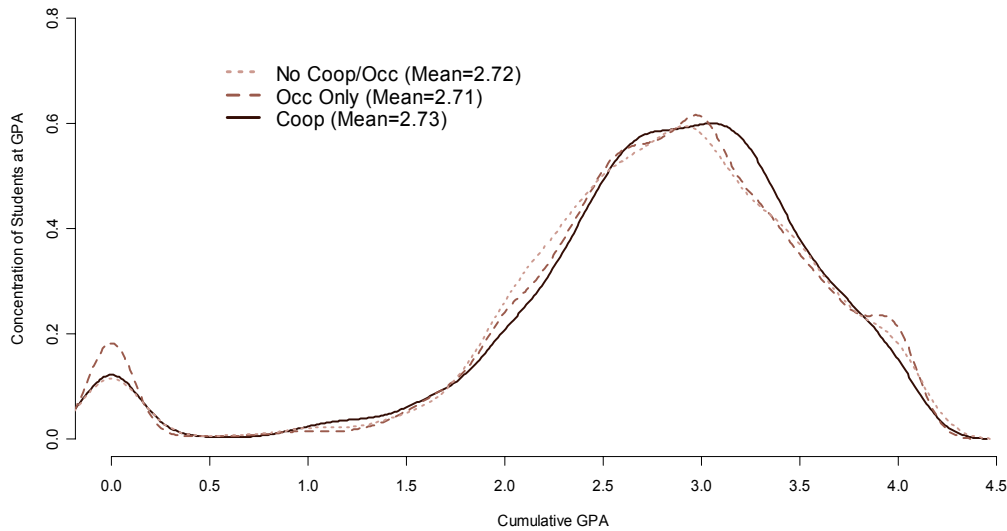
In all, Coop participation is associated with a higher level of academic engagement than strictly occupational programming for students. Although a relatively small group, Coop participants are more likely to receive an Associates degree than other occupational-focused students. However, Coop participants are less likely to pursue an Associates degree than other non-occupational/non-coop students.

Grade Point Average

In Figure IV.1.3 we present the grade point average (GPA) distribution for Coop participants, Occupational students with no Coop, and all other students. Peaks in the lines of Figure IV.1.3 identify the GPAs (along the x-axis) with the highest concentrations of students. For all three groups, most students tend to cluster around a GPA of 3.0. The mean GPA for all three groups ranges from 2.71 to 2.73. Differences in the means were not statistically significant.¹⁸ Thus, Coop participants do not necessarily outperform their counterparts academically.

¹⁸ Anova test. ($p = .71$).

Figure IV.1.3. Grade Point Distribution by Coop Participation



Note: Means are not statistically significant ($p=.714$).

IV.2. EARNINGS & EMPLOYMENT

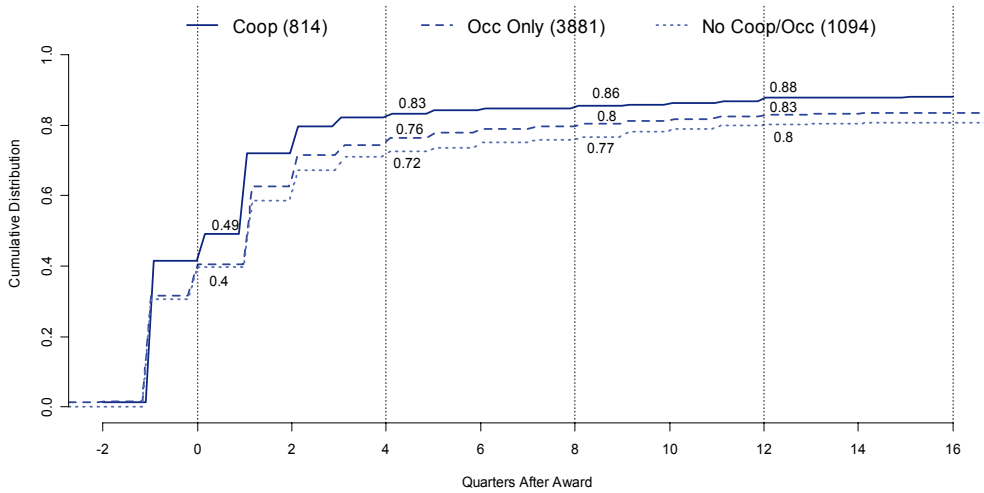
The principal aim of this study is to assess whether there are positive and substantial benefits of Coop participation on graduates' earnings. We examine three different employment and earnings outcomes: time to first earnings, the continuity of earnings (how long earnings persist), and the actual value of earnings.

Time to First Earnings

In Figure IV.2.1 we examine the time to first earnings (or, alternatively, time to employment) for Coop participants, graduates involved in occupational coursework but not Coop, and all other graduates. Coop participants exit community colleges at a substantial lead: in the quarter prior to receipt of award (quarter -1) 40% of Coop participants have some positive earnings compared to approximately 30% of Occupational and other graduates. This 10-point lead tends to persist for Coop participants throughout the first year after graduation. By the second and third years, the Occupational-only group tends to gain on Coop participants, narrowing the gap to 6-7 points.

By comparison, at the time of exit, non-Coop/non-Occupational graduates demonstrate similar earnings rates to those of Occupational graduates. Over time, however, non-Coop/non-Occupational graduates fall further behind Occupational graduates and significantly behind Coop graduates. By the second and third years, non-Coop/non-Occupational graduates maintain a 10-point gap with Coop participants.

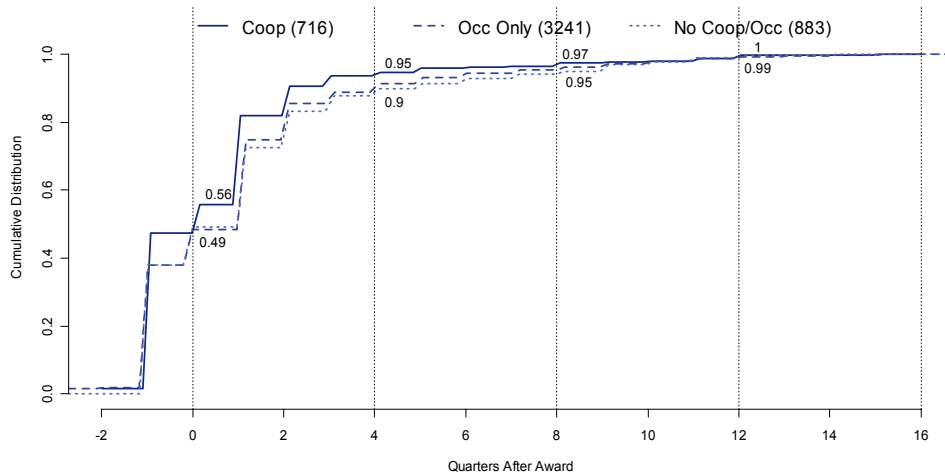
Figure IV.2.1. First Quarter of Earnings by Coop Participation



Note: Includes those with no recorded earnings.

The results in Figure IV.2.1 include graduates who do not report earnings in any quarter on file, which results in the 80-88% cumulative earnings rate by the end of year 4 (quarter 16). We re-examine these distributions for all graduates with at least one quarter of reported earnings in Figure IV.2.2. Similar to the results of Figure IV.2.1, Coop participants exit the program with a strong lead of workforce participation. Unlike the earlier results, however, this lead diminishes much more rapidly when the analysis is restricted to only those with reported (i.e. positive) earnings; by year 2 the gap between Coop participants and non-coop/non-occupational graduates is only 5 percentage points. By the third year after award receipt, virtually no gap exists, and all graduates have similar cumulative rates of employment.

Figure IV.2.2. First Quarter of Earnings, Positive Earners



Note: Excludes those with no recorded earnings.

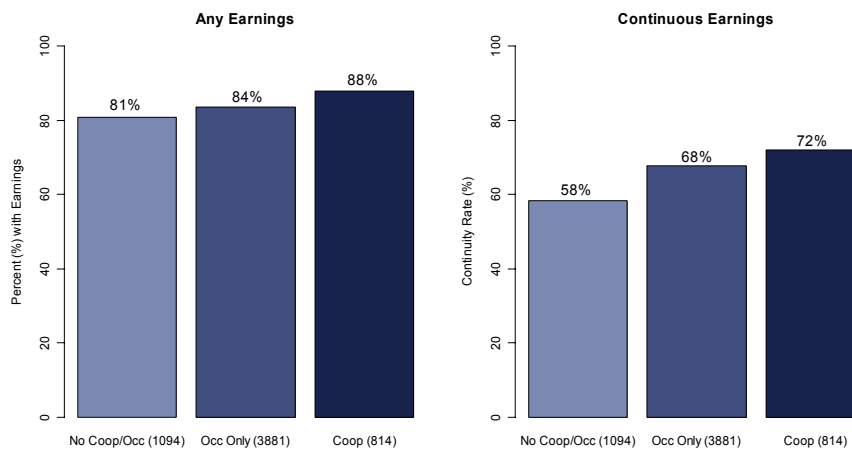
In sum, the results suggest three things. First, Coop participants exit their community college programs with higher rates of employment than other graduates who do not re-enroll in community

college or move on to 4-year college.¹⁹ Second, Coop participants are more likely than other graduates to have reported income. Third, when considering all graduates who eventually find employment at some time over a 4-year period, the employment rate advantage for Coop participants does not persist past the second year after award receipt.

Continuity of Earnings

In the left panel of Figure IV.2.3 we compare the rates of reported earnings by Coop status. Coop participants demonstrate significantly higher rates of earnings and significantly higher rates of continuous earnings compared to Occupational-only graduates and other students. Approximately 88% of Coop participants have any earnings throughout the 4 to 6 years of UI data we were able to collect. By contrast, only 81% of non-Coop/non-Occupational graduates have earnings and 84% of Occupational-only graduates have earnings at any point. These differences are statistically significant ($p < .001$).

Figure IV.2.3. Earnings & Continuity Rates by Coop Participation



Note: Rates exclude those with no reported earnings in file. All differences significant ($p < .001$).

In the left panel of Figure IV.2.3 we present the rates of 3-year continuous earnings. We include here any 3-year continuous earnings between the award year (year 0) and year 6. Again, the results are statistically significant, with Coop participants demonstrating an overall higher rate of 3-year continuous earnings (72%) compared to Occupational (Only) graduates (68%) or other graduates (58%).

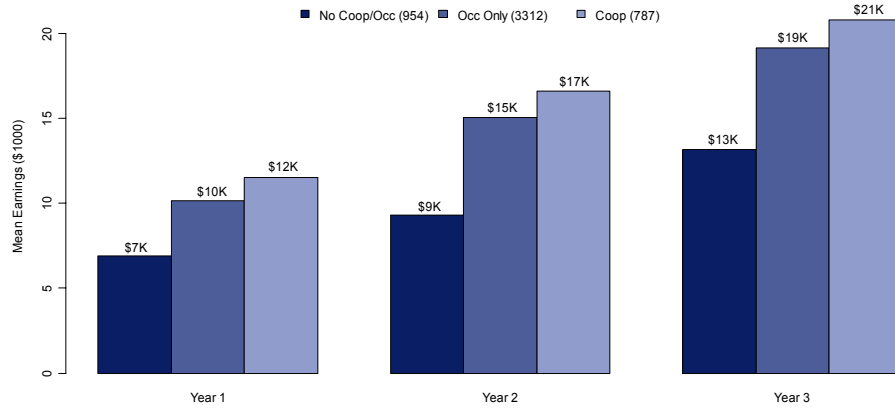
These results suggest that Coop participants are both more likely than others to have earnings and to maintain positive earnings over time.

¹⁹ This latter assertion can be made based on the selection criteria.

Earnings

We present yearly earnings for Coop participants, Occupational graduates, and other graduates in Figure IV.2.4.²⁰ Average earnings for each group grow 80-90% over the first three years. The largest gains are evident for the non-Coop/non-Occupational graduates (90%), while Coop participants make relatively smaller gains (80%).

Figure IV.2.4. Yearly Earnings by Coop Participation



Note: Values include those with no reported earnings. Amounts presented in \$1000. Differences statistically significant ($p < .001$).

In addition to the growth in earnings over time, there are substantial differences among groups with respect to overall annual earnings. In year 1, Occupational graduates earn over \$3,000 (46%) more than non-Coop/non-Occupational graduates. During the same year, Coop participants earn over \$4,600 (67%) more than the non-Coop/non-Occupational graduates.

In the second year the gap in earnings grows to nearly \$5,800 for Occupational graduates (61%) and \$7,300 for Coop graduates (78%) relative to non-Coop/non-Occupational graduates. By year 3 the non-Coop/non-Occupational group begins to make greater gains and the differences drop back to 46% and 58% for Occupational and Coop graduates, respectively.

The difference in earnings between non-Coop/non-Occupational graduates and the Occupational or Coop graduates is statistically significant in all three years. Earnings differences between Coop participants and Occupational graduates are also statistically significant.²¹

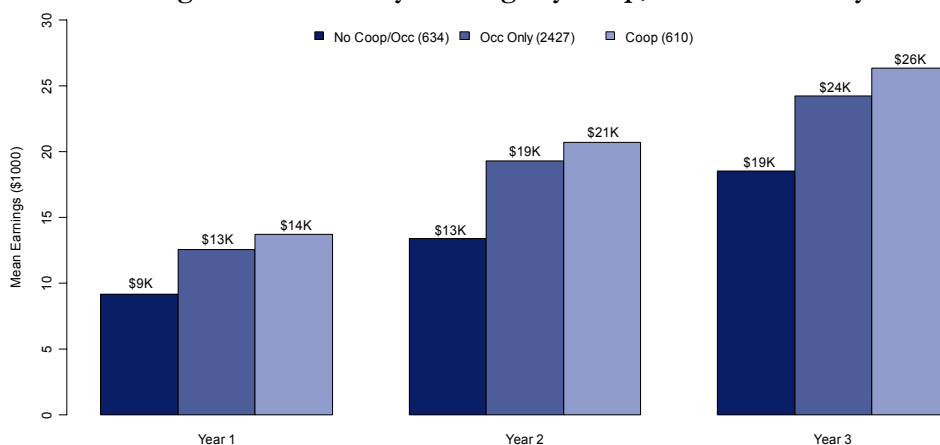
²⁰ Note that actual yearly earnings amounts differ from those presented in earlier reports. In previous reports we calculated yearly totals for only those graduates with complete information in every quarter. In the present study we calculate yearly totals for all graduates. Values presented in previous reports were therefore higher than those presented here. On average, the values presented in Figure IV.2.4 are approximately 15% lower than those offered previously, and range from 13% lower for the Coop participants to 18% lower for the non-Coop/non-Occupational group. When assessed by year, the current values are 10% lower in year 1, 15% lower in year 2, and 18% lower in year 3 than previously reported. The percent difference in values was not significant across groups ($p = .246$), but was marginally significant across years ($p = .045$). We do not expect these differences to bias the overall claims.

²¹ The p-values range from .001 for the \$1,400 (14%) gap in year 1 to .02 for the \$1,700 (9%) gap in year 3.

As presented earlier, less than 60% of the non-Coop/non-Occupational graduates have continuous earnings. Since continuity is strongly related to average earnings, we may expect the mean in overall annual earnings to be biased downward. Thus, we are likely to overestimate the difference in earnings by the inclusion of graduates with discontinuous earnings.

In Figure IV.2.5 we present yearly earnings for only graduates with continuous earnings over the first three years. The pattern is similar to that in Figure IV.2.4. There is substantial growth in earnings for all groups over time, and Coop graduates earn more each year than other graduates. The gap between Occupational graduates and non-Coop/non-Occupational graduates ranges from 37% (\$3,400) in year 1, to 44% (\$6,000) in year 2, to 31% (\$5,700) by year 3. For Coop graduates this gap is 49% (\$4,500), 55% (\$7,400) and 42% (\$7,800) in years 1, 2 and 3, respectively. Compared to Occupational Only graduates, Coop participants maintain 7-9% (\$1,000-\$2,000) greater earnings.

Figure IV.2.5. Yearly Earnings by Coop, Continuous Only



Note: Continuous earners (years 1-3).

Differences in occupational concentration status may influence the differences observed above between Occupational Only graduates and Coop participants. In order to assess whether occupational concentration affects differences between these groups, we disaggregate the Coop and Occupational Only participants by occupational concentration.

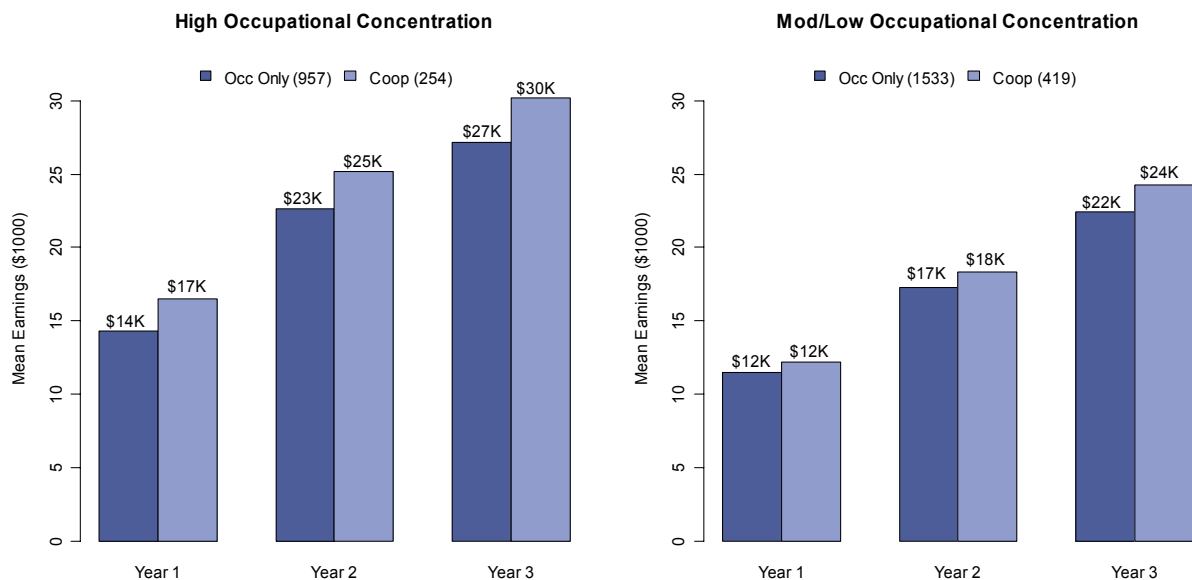
In the left panel of Figure IV.2.6 we compare Coop participants who have a high occupational concentration to those Occupational Only graduates with high occupational concentration. Differences persist between these two groups at all three years. Coop participants with high occupational concentration demonstrate 15% (year 1) to 11% (years 2 and 3) greater yearly earnings than other students who engage in high levels of occupational concentration but are not involved in coop courses.²²

It should be noted that the significant gains for high occupational concentration Coop participants compared to Occupational Only graduates may be a result of differences in education for the two

²² Detailed results are as follows: the year 1 gap is \$2,200 and significant ($p=.01$); the year 2 gap is \$2,500 and significant ($p=.02$); the year 3 gap is \$3,000 and significant ($p=.03$).

groups. In keeping with the earlier glimpse at academic engagement, the former group was found to have significantly higher rates of Associate degree receipt (27% versus 20%).²³

Figure IV.2.6. Yearly Earnings, Coop and High Occupational



Note: Continuous earners (years 1-3). Differences for high occupational concentration groups (left panel) are statistically significant.

There is evidence that educational engagement may play the confounding role in these earning differences. Coop and Occupational Only participants who have moderate or low occupational concentration have similar rates of Associate degree attainment (21%).²⁴ Although Coop participants with moderate/low occupational concentration have higher earnings than their Occupational Only counterparts, the differences are relatively small (around 6-8%) and only the 8% (\$1,800) gap in year 3 approaches significance.²⁵ These results suggest that educational attainment, rather than occupational concentration, may be the more important mediator of differences between Coop participants and their Occupational counterparts.

In order to test this hypothesis, we explore differences for Coop, Occupational Only, and other graduates with 3-year continuous earnings by degree type in Figure IV.2.7. Coop and Occupational graduates who have Certificate degrees enter the workforce with significantly higher earnings than their non-Coop/non-Occupational counterparts. Relative to the non-Coop/non-Occupational graduates, Occupational graduates have 17-49% higher earnings, with the greatest differences evident for first year (49%). Coop graduates have earnings 31-71% higher from year 1 to year 3; again, the greatest difference in earnings (71%) is evident in the first year. The differences in first year earnings are statistically significant ($p < .05$). While the non-Coop/non-Occupational graduates begin to catch up a year later, the gap appears to spread in the third year, favoring Coop participants

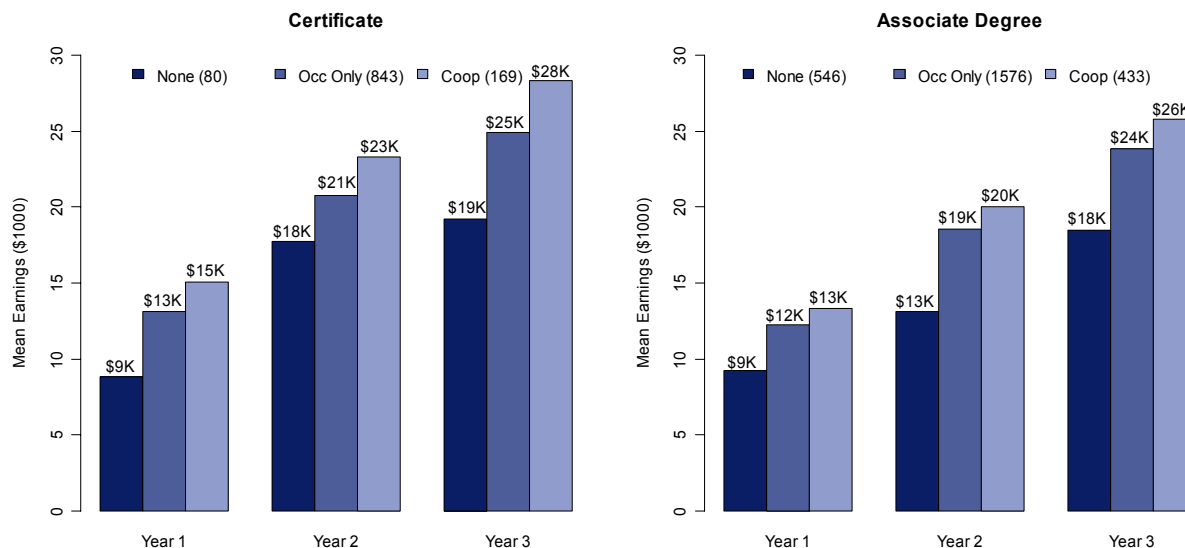
²³ Chi-square test of probabilities for graduates with Associate degrees versus non-associate degrees ($p < .001$).

²⁴ Chi-square test of probabilities for graduates with Associate degrees versus non-associate degrees ($p = .609$).

²⁵ Detailed results are as follows: the year 1 gap is \$680 (6%) and not significant ($p = .22$); the year 2 gap is \$1,000 and not significant ($p = .17$); the year 3 gap is \$1,800 and marginally significant ($p = .048$).

over others. The difference in third-year earnings is statistically significant ($p < .01$) between Coop participants and non-Coop/non-Occupational graduates (47%), and marginally significant ($p = .07$) between Occupational graduates and non-Coop/non-Occupational graduates (29%).

Figure IV.2.7. Yearly Earnings by Coop and Degree



Note: Continuous earners (years 1-3).

Coop participants do not have significantly higher earnings than Occupational Only graduates who receive Certificate degrees (left panel). Coop participants who receive Certificates maintain a 12-15% advantage in earnings compared to Occupational graduates with similar degrees; only the 14% gap in year 3 proved to be significant ($p = .03$).

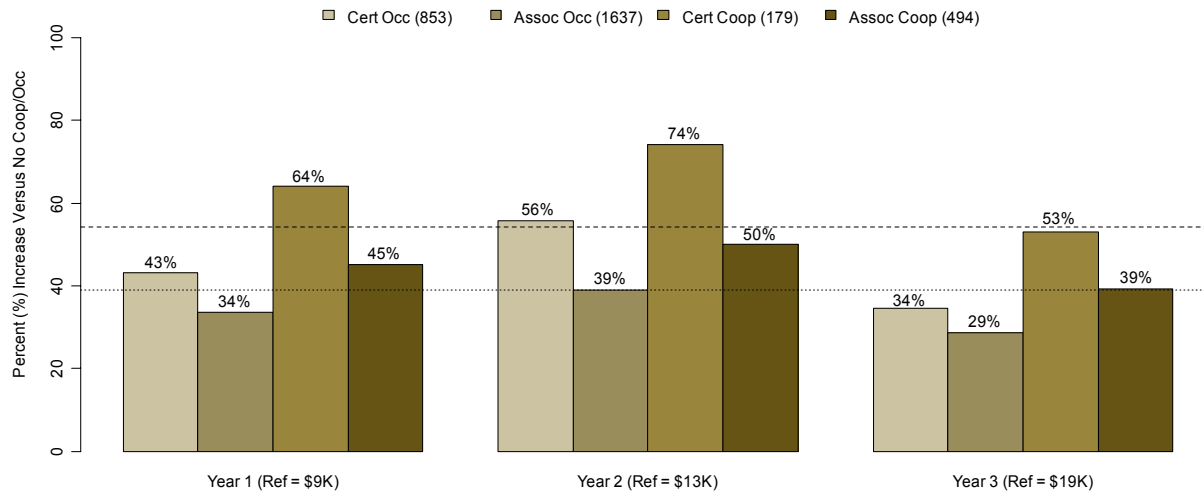
With respect to graduates with Associate degrees (Figure IV.2.7, right panel) the pattern reveals consistent gains for both Occupational and Coop graduates relative to others, as well as significant gains for Coop participants relative to Occupational graduates. Relative to the non-Coop/non-Occupational graduates, Occupational graduates have 30-40% higher earnings, and Coop participants have earnings 40-52% higher from year 1 to year 3. All of these differences were statistically significant ($p < .001$). Coop participants maintained marginally significant (p -values from .032 to .048) earnings gains of 8-9% over that of Occupational graduates.

Thus, even after controlling for educational attainment and continuity of earnings, Coop and occupational courses demonstrate strong earnings advantages ranging from 17% to over 50%. Moreover, Coop participation adds significant marginal gains over occupational coursework alone of 12-14% for graduates with Certificate degrees, and 8-9% for graduates with Associate degrees.

We summarize the earnings difference results in Figure IV.2.8. In the figure we present the earnings gap (in percents) between the four education-occupational-coop groups and the reference group of

all graduates who had no occupational coursework and did not participate in Coop courses.²⁶ Compared to the reference group of predominately Associate degree recipients, Occupational and Coop graduates demonstrate higher earnings in all three years ranging from a low of 29% to a high of 74%. The mean percent gain for Coop participants is 55% (dashed line) and the mean percent gain for Occupational graduates relative to the reference group is 39% (dotted line). Compared to the reference group, earnings gains are greatest for graduates who received a Certificate degree. Further, Coop participants demonstrate greater gains than their Occupational counterparts, even when accounting for educational attainment.

Figure IV.2.8. Difference in Yearly Earnings by Coop Status



Note: Continuous earners (years 1-3). Reference group is all non-Coop/non-Occupational graduates (n=634). Dashed line is Coop mean, and dotted line is Occupational mean. All differences statistically significant ($p < .001$).

Differences in the distribution of race, gender, degree type, region and continuity of employment may confound the interpretation of the Coop and Occupational effects. In order to control for these other influences we ran a regression of the log 3-year average annual earnings on a set of indicators for these various factors. The 3-year average annual earning variable was log-transformed in order to approximate a normal distribution, thereby permitting a more correct estimate of the effects of various factors. The log transformation also has an important interpretative advantage. The effect estimates can be interpreted as the percent difference in earnings for the given characteristic relative to the reference groups' earnings. The reference group consists of *white non-Coop/non-Occupational male graduates from the Northern region who graduated with a GPA lower than 3.0, and maintained discontinuous earnings over the three year period.*

The results from Table IV.2.1 suggest that, on average:

- **White male Occupational graduates earn 58% more** annually than white male non-Coop/non-Occupational graduates.
- **White male Coop graduates earn 71% more** than non-Coop/non-Occupational graduates annually.

²⁶ We did not divide the reference group into those with an Associates degree and those without such a degree, because only 5% of the reference group could be classified under the latter category.

- Certificate recipients earn approximately 5% more annually than Associate degree recipients, but this difference is not statistically significant.
- Graduates with 3-year **continuous earnings** have **225% higher earnings** than graduates with discontinuous earnings, all else considered.
- Compared to graduates in the Northern region of California, **Bay Area graduates earn 37% more** annually, and **Los Angeles County graduates earn 23% more** annually.

Thus, Coop and Occupational involvement have a significant effect on earnings, whereas degree type and college grades are not significantly related to overall earnings.

Table IV.2.1. Effect of Student Characteristics on 3-Year Average Annual Earnings

EXPLANATORY VARIABLES	COEFFICIENT
Program	
Occupational	.580***
Coop	.707***
Degree	
Certificate	.052
School Achievement	
GPA (3.0+)	.018
Earnings Stability	
Continuous	2.246***
Race-Ethnicity	
Black	-.309***
Asian	-.147**
Latino	.029
Other	.001
Gender	
Female	.168*
Female*Occupational	-.319***
Female*Coop	-.381***
Region	
Bay Area	.373***
Central Valley	.045
Los Angeles	.232***
Intercept	6.633***
	R-Squared = .483
	N = 4751

Dependent Variable: ln(3-year average annual earnings)

Reference group: Northern region white non-Coop/non-Occupational males with GPA<3.0 and discontinuous earnings.

* Significant at p<.05; ** Significant at p<.01; *** Significant at p<.001.

Table IV.2.1 also highlights some less desirable results. Race and gender maintain a persistent effect on earnings inequality even after accounting for program, degree, region, continuity of employment and academic achievement. Specifically,

- Although **female non-Coop/non-Occupational graduates earn 17% more** than their male counterparts,
 - **female Occupational graduates earn 15% less** than their male Occupational counterparts (16.8-31.9), and
 - **female Coop graduates earn 21% less** than their male Coop counterparts (16.8-38.1).²⁷

Thus, the 60-71% gain for Occupational and Coop participation is marginally eroded (by 15-20%) for female graduates. This also means that the earnings gap within gender groups is narrower for females than males. Although male Coop graduates earn 71% more than their male non-Coop/non-Occupational counterparts, female Coop graduates earn only 32% more than their female non-Coop/non-Occupational counterparts.

Unlike the gender effects, there were no significant interaction effects between Coop/Occupational participation and race. Thus, the race and ethnicity effects persist regardless of program involvement. Specifically:

- Latino graduates have earnings similar to their white counterparts. However,
 - **Asian graduates earn 15% less** than their white counterparts regardless of program participation.
 - **Black graduates earn 31% less** than their white counterparts regardless of program participation.

²⁷ The gender effects are estimated by adding the interaction terms. Thus, the effect for a female Occupational graduate *relative to the non-Coop/non-Occupational male reference group* is the sum of the effect of being Occupational (.580), female (.168) and both female and Occupational (-.319) = .429. The difference in earning effects between female Occupational graduates (.429) and male *Occupational* graduates (.580) is -.151, or -15%.

V. CONCLUSION

The results suggest strong Coop effects on earnings and employment continuity. Despite the strong earnings and employment gains for Coop graduates, participation in Coop is relatively low; only 14% of students in the sample participated in Coop courses. Of these Coop participants, half enrolled in 4 or fewer total Coop units during their academic career. The results of this study suggest that increasing enrollment in Coop courses may be highly beneficial for the earnings success of California Community College attendees.

Future research into the benefits of work-based learning in California Community Colleges should explore the benefits within particular industrial and occupational sectors. In addition, a closer examination of the persistent racial and gender bias in earnings is warranted. Such an investigation will be useful in uncovering ways to help further disseminate the benefits of work-based learning to historically marginalized groups and fulfill the mission of the California Community Colleges.



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