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Revising Roles, Transforming Trajectories?: Community College Bachelor's Degree Programs and Educational Access, Success, and Equity

A dissertation submitted in partial satisfaction
of the requirements for the degree
Doctor of Philosophy in Education

by

Davis Vo

2026

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2026

ABSTRACT OF THE DISSERTATION

Revising Roles, Transforming Trajectories?:
Community College Bachelor's Degree Programs
and Educational Access, Success, and Equity

by

Davis Vo
Doctor of Philosophy in Education
University of California, Los Angeles, 2026
Professor Cecilia Rios-Aguilar, Chair

In the past two decades, there has been a rise in community college baccalaureate (CCB) programs, and they fundamentally shift the role and function of community colleges. My multi-method project utilizes quantitative and qualitative approaches to explore the implications of CCB adoption on educational access, success, and equity. Leveraging an administrative, longitudinal dataset of CCB-matriculated students from 2017-18 through 2023-24 in Washington state (n = 13,074), I conduct descriptive and inferential analysis to examine the extent of CCB completion differentials in total annual earnings, hourly wage rates, and employment rates in three, four, and five years after initial CCB matriculation. I generate estimates on the CCB completion differentials in a pooled analysis, as well as a stratified analysis by fields of study (CIP2), gender, race/ethnicity, and age group. I leverage a suite of analytic tools, from various forms of regression, stabilized inverse probability weighting, and the omitted variable bias framework for sensitivity analysis to ensure that the estimates generated are not dependent on a singular analytic approach.

For my qualitative inquiry, I utilize an abductive approach to explore how CCB programs, as *trajectory-responsive* policy projects, interplay with institutional and structural dimensions (i.e., administrative, economic, programmatic, social, spatial, and temporal conditions) and students' social contexts, positions, and trajectories to enable or constrain the *stratified feasibility landscape* of college participation. I conduct semi-structured one-on-one interviews with current and graduated students from five CCB programs in California (n = 30) that include Environmental CCB programs in small rural towns and Industrial and Health CCB programs in large metropolitan areas. Together, the findings generate insights in the ways that CCB programs contribute to the alleviation or reproduction of economic/social stratification, (im)mobility, and (in)equality/(in)equity. These findings have implications on policy, practice, and research as they relate to community colleges, CCB programs, and higher education broadly.

The dissertation of Davis Vo is approved.

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Cecilia Rios-Aguilar, Committee Chair

University of California, Los Angeles

2026

To my mom, dad, brother, nephews, and to everyone has who ever believed in me . . .

Dành tặng gia đình của con.

Con xin cảm ơn. Vì tất cả. Vì sự quan tâm vô bờ bến, sự tận tụy, kiên nhẫn, hy sinh, và ủng hộ dành cho con suốt bao năm qua. Nếu kể hết tất cả mọi điều cả nhà đã làm cho con, có lẽ thêm mấy xấp giấy cũng chưa đủ. Con rất biết ơn khi được sinh ra và lớn lên trong gia đình này, được cả nhà yêu thương, chăm sóc, chở che.

Con dành tặng Mẹ vì đã làm mọi thứ cho con có đủ đầy để bước vào đời.

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Dành tặng mấy đứa cháu, luôn hồn nhiên, vui vẻ.

Trong bài luận án này, và trong chính con người con, đâu đâu cũng có hình bóng của cả nhà.

Đối với con, đó là phần tuyệt vời nhất.

Con biết là con có nói bao nhiêu lời cảm ơn và yêu thương vẫn sẽ không bao giờ đủ.

Con xin cảm ơn cả nhà.

Con thương cả nhà nhiều lắm.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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CHAPTER 1

Research Context and Objectives

1.1 Bachelor's Degree Attainment and the Roles and Functions of Community Colleges

Much has been said about the positive relationship between the attainment of a bachelor's degree and positive life conditions, outcomes, and trajectories (see Brand, 2023). The relationship between bachelor's degree attainment and labor market outcomes has been the subject of some of the most prominent scholarly inquiries. Generally, the United States' labor market privileges individuals with at least a bachelor's degree since credentials are increasingly necessary to obtain jobs that have high earnings, benefits, autonomy, security, and opportunities (Kalleberg, 2011). For example, after the Great Recession of 2008, where 11.6 million jobs were added to the economy, 99 % of those jobs went to workers with some college education and 73 % of those jobs went to workers with at least a bachelor's degree (Carnevale et al., 2016).

While bachelor's degree attainment is valuable, bachelor's degree attainment in the United States is stratified due to structural and systemic inequities in postsecondary educational access and opportunities (Brand, 2023; Carnevale et al., 2022a, 2022b; Cheng et al., 2021; Hillman, 2016; Hout, 2012; Paul et al., 2022; Tate, 2008; Turley, 2009). The activation of the benefits that a bachelor's degree can confer for people in different social contexts, positions, and trajectories are also stratified. The United States' higher education system is vertically and horizontally stratified between public community colleges and the traditional four-year sector, as well as within their respective systems (Baker, Solanki, & Kang, 2023; Brint & Karabel, 1989; Calcagno et al., 2008; Charles & Bradley, 2002; Gerber & Cheung, 2008; Lin et al., 2023). The roles and functions of community colleges are complicated–at times even paradoxical–in that they can contribute to social stratification, (im)mobility, and (in)equality/(in)equity in a variety of ways simultaneously (Baber et al., 2019; Dougherty, 1994; Garza Mitchell, 2024; Schudde & Brown, 2019; Schudde & Goldrick-Rab, 2015; Schudde & Grodsky, 2018; Sydow & Alfred, 2012).

Often ignored and stigmatized, the U.S. community college system remains a significant educational pathway, enrolling over one-third of all undergraduate students (American Association of Community Colleges, 2026; National Student Clearinghouse Research Center, 2023). Comprised of over 900 public institutions across the United States, community colleges have been framed as a democratizing social institution because they are the primary entry point to postsecondary education for many (American Association of Community Colleges, 2026; Deil-Amen, 2015; Dowd, 2007; Kisker et al., 2023; Schudde & Goldrick-Rab, 2015). Among all U.S. proportion of undergraduates, a significant number of students identified as Black, Latine, and Indigenous are enrolled at community colleges (38%, 48%, and 50%, respectively). Community colleges disproportionately enroll–relative to the traditional four-year sector–more students from historically or racially minoritized communities (National Student Clearinghouse Research Center, 2023). Tuition costs in the traditional public four-year sector are about three times more expensive than public community colleges, making the latter an attractive option for many students from diverse social contexts, positions, and trajectories (American Association of Community Colleges, 2026). Across the U.S. community college system, 29% of students are identified as Latine, 13% of students are identified as Black, 67% attend part-time, 32% are first-generation college students, 13% are single parents, 23% are students with disabilities, and anywhere between 23% to 59% of students work part- or full-time (depending on whether they are attending college part- or full-time), and the average age of a community college student is 27 years-old (American

Association of Community Colleges, 2026).

One of the primary roles and functions of community colleges is that they provide a route to bachelor's degree attainment via vertical transfer (Baber et al., 2019; Brint & Karabel, 1989; Dougherty, 1994; Garza Mitchell, 2024; Kisker et al., 2023; Schudde & Goldrick-Rab, 2015). The vertical transfer function allows students to take general education and lower-division courses at community colleges and then transfer those credit units to the traditional four-year sector to complete upper-division coursework. Through this aspirational "2+2" pathway (two years at a community college and then two years at the four-year sector), community colleges promote postsecondary educational access and opportunity to students and communities who likely would not have had it otherwise. On the other hand, despite–or perhaps because of–its open admissions policies, affordable costs, and geographic accessibility, community colleges have been limited in producing equity in conventional student outcomes, such as transfer and completion rates, particularly for economically disadvantaged, Black, and Latine communities (Dowd et al., 2008; Lin et al., 2023; Schudde & Brown, 2019; Schudde & Goldrick-Rab, 2015). Not unrelated to structural and systemic conditions, such as inequities in capacity and resources allocated to community colleges (Yuen, 2020), only 18% of community college students earned a bachelor's degree within six years upon entry. The national average eight-year transfer rate is 13% among all students who receive federal aid, with considerable range in transfer rates depending on dyads of community colleges and universities (Sotherland et al., 2024). While the vertical transfer function works for some students, this has not been an effective pathway for all and policymakers continue to identify levers to improve bachelor's degree attainment through practices and policies, such as reforms to create more structured and proactive educational pathways and enhanced articulation agreements between sectors to minimize credit loss (Bailey et al., 2015a; Goldrick-Rab, 2010; Schudde & Jabbar, 2024).

Through their accessible policies and practices, community colleges seemingly address multiple dimensions, conditions, or challenges related to educational access and opportunity.

Given the diversity of the students who enroll in community colleges (American Association of Community Colleges, 2026; Deil-Amen, 2015), community colleges uniquely provide meaningful access in ways that the traditional four-year sector has not historically done. However, this educational access does not always equate to educational success and equity (Dowd et al., 2008; Lin et al., 2023; Schudde & Brown, 2019; Schudde & Goldrick-Rab, 2015). Understanding the roles and functions of community colleges is further complicated–at times seemingly paradoxical–given that they offer a range of academic programs to meet the diverse needs of their students and communities (Baber et al., 2019; Bragg, 2001; Brint & Karabel, 1989; Dougherty, 1994; Garza Mitchell, 2024; Kisker et al., 2023; Sydow & Alfred, 2012). Some scholars argue that community colleges are motivated to offer a wide range of academic programs, such as providing general education coursework to support its vertical transfer function and skill-enhancing programs through vocational and technical training, as a political strategy and to maintain its own organizational existence (Brint & Karabel, 1989; Dougherty, 1994; Townsend, 2005).

1.2 The Development and Implementation of Community College Baccalaureate or Bachelor's Degree Programs

In the past two decades, higher education leaders have authorized more community colleges to offer bachelor's degree programs, particularly in recent years (Community College Baccalaureate Association & Bragg & Associates, 2024). This mission expansion further complicates and has major implications for the field's understanding of the roles and functions of community colleges. As of writing, at least 24 states have now adopted a community college bachelor's degree program policy; approximately one-fifth (n = 214) of all public community colleges have at least one bachelor's degree program approved (Meza & Vo, 2026). Five states have scaled to full or near-full adoption. All or nearly all community colleges in Delaware, Florida, Idaho, Nevada, and Washington offer bachelor's degrees. California's community college system, which enrolls approximately two million students and is the largest higher education system in the U.S., currently offers bachelor's degrees at 43 out of its 116 colleges, and this number has steadily increased since its first cohort of students in 2016 (Vo et al., 2026). California, Florida, Georgia, Texas, and Washington represent five states who have some of the largest number of CCB programs approved and/or CCB degrees conferred nationally (Meza & Vo, 2026).

A common justification and rationale for community college bachelor's (a.k.a. community college baccalaureate or CCB) programs–as commonly proposed by practitioners and policymakers–is to expand postsecondary educational access to students who would not otherwise have it and to meet local/regional economic and workforce development goals (Bragg, 2025; Floyd et al., 2019; Fulton, 2015; McKinney et al., 2013; Meza & Love, 2023). According to the Community College Baccalaureate Association (CCBA; 2026), the primary national organization leading CCB programs, the vision of the CCBA is to ensure that, "All students have broad and effective access to high-value, high-quality baccalaureate degrees that contribute to the economic strength of their families and the vitality of their communities." By attending to multiple dimensions that have historically and currently imposed structural barriers to students, such as economic and spatial conditions, CCB programs can leverage the common assets, arrangements, and designs of the community colleges to expand educational access and meet economic and workforce development goals (Bragg & Ruud, 2011; Floyd et al., 2019; Fulton, 2015; McKinney et al., 2013; Meza & Love, 2023; Rios-Aguilar et al., 2023). While policies related to CCB adoption vary by state (Bragg, 2025), such language is exemplified in places like California (Rios-Aguilar, Vo, et al., 2025). Per Assembly Bill 927 (2021), California community colleges can only offer baccalaureate degrees in subject areas "with unmet workforce needs in the local community or region of the district" (para. 9). Such policies shaped the California CCB landscape with CCB academic offerings in programs of study not offered by their traditional public four-year sector counterparts (public regional and research universities) and an approval process in which community colleges must justify how their programs are labor market aligned (Vo & Rios-Aguilar, 2024).

While the promise of tending to students' economic interests is a worthwhile and practical endeavor for higher education institutions, education leaders should be cautious of narrow pursuits of economic and workforce development goals and their implications on whether they also support the aspirations and goals of students from historically or racially minoritized communities. Community college practitioners' pursuit of economic and workforce development goals may not always be complementary to–and may be at the expense of–the achievement of racial equity (Cuellar & Gandara, 2020; Felix & Garcia, 2024; Vo & Rios-Aguilar, 2024). A focus on socioeconomic mobility is not the same as a focus on racial equality/equity and economic justice. As such, it is possible that the adoption of CCB programs and policies may also lead to (un)intended consequences that exacerbate inequities. Relatedly, Townsend (2005) cautions that, depending on how CCB admission standards are implemented, the rise of CCB programs could limit college access over time.

1.3 Guiding Research Questions

By fundamentally shifting the scope of their mission, the adoption of CCB programs has implications on the roles and functions of the U.S. community college system. This paper will explore these implications of CCB programs, particularly on matters of educational access, success, and equity. Guided by the following research questions (RQs), this paper explores the academic and labor market experiences, outcomes, and trajectories of CCB students:

- RQ1: To what extent are there similarities/differences between CCB graduates and non-graduates across social contexts, positions, and trajectories in Washington state?
- RQ2: To what extent are there CCB completion differentials in the labor market outcomes (total annual earnings, hourly wage rates, and UI employment status) among students who matriculated into CCB programs and how do these differentials change

over time (three, four, and five years after entry) in Washington state?

  - Among CCB graduates and non-graduates, what are the mechanisms and trajectories related to total annual earnings differentials?
  - To what extent do these CCB completion differentials in labor market outcomes vary between and within students from historically/racially minoritized communities (i.e., gender, race/ethnicity, age group) and by field of study?

- RQ3: To what extent and how do CCB programs expand meaningful educational access and opportunities, particularly to students who likely would not have otherwise had it (e.g., students from historically/racially minoritized communities)?
  - How do students describe their lived experiences and everyday practices as they navigate, negotiate, sustain, and benefit from participation in college-related pathways alongside work, caregiving, household, and community commitments?
  - How do institutional and structural conditions, such as administrative, economic, programmatic, spatial, and temporal conditions, shape students' lived conditions as they navigate bachelor's degree pathways?
  - How do intersectional social contexts, identities, locations, and systems (e.g., race/racism, gender/sexism, age/ageism) shape students' experiences with and interpretations of meaningful access?
- RQ4: What can CCB programs reveal about how meaningful educational access and opportunities might be expanded across the broader higher education landscape?

To generate insights to these RQs, I will leverage both quantitative and qualitative approaches via a multi-method research design. I will also utilize institutional- and/or state-level datasets to understand to whom CCB programs provide access by exploring the academic and demographic characteristics of students in CCB-related trajectories (e.g., CCB graduates and non-graduates). I will also apply causal inference methods to examine the differences in annualized wages of students who participate in CCB programs and graduate relative to students in similar CCB-related trajectories (e.g., CCB program participants, but do not graduate in a similar time frame). Qualitatively, I will rely on student interviews and center students' voices in order to examine the ways that CCB programs may (or may not) be uniquely providing meaningful educational access and opportunities, particularly to students who likely would not have otherwise had meaningful educational access (e.g., students from historically/racially minoritized communities). I will explore meaningful educational access through various dimensions that are relevant to community colleges and CCB programs, such as administrative, economic, programmatic, social, spatial, and temporal conditions. Through this analysis, my paper will highlight the relationships between CCB programs and educational access, success, and equity. Given the size and scope of the U.S. community college system, better understanding CCB programs will have major implications on policy, practice, and research.

1.4 Summary of Findings

This paper takes a multi-method approach to explore the revising roles of community colleges through CCB adoption and their implications on access, success, and equity. The first two RQs quantitatively explore the relationships between CCB completion and labor market outcomes and trajectories. For interpretation, a visual was created to summarize the primary pooled and stratified analysis from the OLS (HC2) model (see Appendix: Figure 2). The latter two RQs qualitatively explore how CCB programs shape college participation across the conventional college life cycle: from access to completion to post-completion. Across all the results, questions of "for whom" arise as the findings are patterned by multiple intersecting organizing principles, such as program/field of study, gender, race/ethnicity, age, types of CCB transfer (internal vs. external), prior educational trajectories, etc. This paper's major findings are summarized below:

- The CCB Completion Differentials in Labor Market Outcomes (RQ1 and RQ2)
  - CCB graduates earned 24.6% ($11,402) more in total annual earnings than non-graduates three years after matriculating and this grows to 28.8% ($14,036) by year five. These positive and statistically significant estimates were robust across three analytic strategies–ordinary least squares regression with heteroskedasticity-consistent standard errors, stabilized inverse probability weighting with doubly robust covariate adjustment, and Lin (2013) regression–for all 33 versions of the outcome variables, and eight different model specifications. Total annual earnings and hourly wage rates are in 2024 dollars adjusted using the Consumer Price Index for All Urban Consumers (CPI-U) from the Bureau of Labor Statistics.
  - The primary pooled analysis of labor market trajectories in years three, four, and five after CCB matriculation suggests that the CCB completion differential in annual earnings operates through two complementary mechanisms: hourly wage rates and UI employment status. CCB graduates, relative to non-graduates, earned 16.6%-19.1% higher hourly wages and were 8.2-11.7 percentage points more likely to be UI employed. This differential also grew over time.
  - CCB completion differentials varied by fields of study (CIP2), with CCB programs in Health Professions linked to the largest completion differentials (63.6% more in annual earnings in three years after matriculating; 44.0% more in hourly wages).
  - Female and male CCB students both experienced a positive and statistically significant CCB completion differential in labor market outcomes. When comparing the CCB differentials between female CCB graduates and non-graduates vs. male CCB graduates and non-graduates, female CCB students' CCB completion differentials were at least twice as much more than for male students.
  - Similarly, the analysis revealed generally positive and statistically significant CCB completion differentials in labor market outcomes by race/ethnicity. There was

limited observed differences in labor market outcomes in pooled analysis across all CCB students when controlling for CCB completion status, field of study, and other observed covariates in the model specifications. However, stratifying the analysis and comparing CCB differentials between CCB graduates and non-graduates within the same racial/ethnic groups, differences and mechanisms in the differentials were observed. Latine, Multiracial, and white students experienced consistently positive CCB completion differentials across annual earnings and hourly wage rates while Black students experienced consistent CCB completion differential in hourly rates, but this did not proportionately translate into total annual earnings.

  - Additionally, the analysis revealed positive and statistically significant CCB completion differentials in labor market outcomes across all age groups. When comparing within each age group, younger CCB graduates–especially those aged 24 years-old or younger–experienced the largest CCB completion differentials in annual earnings and hourly wage rates. Across all four age groups, UI employment rates increased from three years after CCB matriculation to five years. CCB students 40 years-old or older experienced the strongest CCB completion differentials in UI employment.
  - Since the three analytic strategies could not fully account for self-selection and unobserved confounders, the OVB framework for sensitivity analysis was leveraged (Cinelli et al., 2024; Cinelli & Hazlett, 2025). Unobserved confounders would need to be at least five times as strong than any observed confounder utilized in the model specifications to render the observed statistically significant results null; results relating to hourly wage rate differentials were the most robust to potential unobserved confounding.

- “Checks a Lot of Boxes for Me”: How Place, Price, People, and Time Shape CCB Participation (RQ3 and RQ4)

  - CCB programs appeal to students because they are financially affordable, provide unique programs of study aligned with students' learning, interests, and goals, recognize the value of bachelor's degree through accumulated skills/knowledge and credentialism, and are geographically proximal.
  - For CCB programs in small rural towns, spatial attachments, experiences, identities, and imaginaries shaped college participation through college/community/career alignment and integration.
  - For CCB programs in large metropolitan areas, participants' everyday spatial-temporal micro-mobilities bounded college participation via commute commitments and journeying.

- Administrative and Time Navigation: How CCB Programs Mitigate and Reproduce Stratified Feasibility Across the College and Career Pathways (RQ3 and RQ4)
  - CCB programs can enable or constrain college participation via institutional agents and conditions. CCB programs minimize compliance, learning, and psychological costs of administrative burdens through their college application process.
  - Institutional agents and structures can minimize additional administrative burdens and shape time navigation via course registration, educational planning, work-based learning, internship, fieldwork, and employment opportunities during and after college.
  - Development and implementation of CCB programs are centered around a handful of agents, creating tensions of relationality and sustainability. CCB programs, through their academic community and cohort-based programming, foster socio-academic integrative institutional structures.

- From Serendipitous Socio-Academic Integrative Moments to More Intentional Socio-Academic Integrative Institutional Structures (RQ3 and RQ4)

- Faculty can leverage the continuity and student-to-faculty ratio to facilitate college participation during lower- and upper-division coursework.
- Within this academic community, these institutional conditions foster an environment where students feel a sense of belonging, connection, and competence, and were able to engage in social and career capital exchange.
- CCB programs expand college participation beyond not only who they enroll and able to retain, but through programmatic college/career capital/alignment, broadening possibilities of career and community integration and impact.

RQ1 and RQ2 quantitatively evaluates the labor market outcomes related to CCB participation and completion. Broadly speaking, CCB completion differentials in labor market outcomes are consistently positive, suggesting CCB programs are an impactful policy lever with implications for educational and economic access, success, and equity. RQ3 and RQ4 qualitatively–by centering students' experiences, perspectives, and voices–provides insights on the everyday routines of college participation and the conditions, contexts, and mechanisms in which CCB programs meaningfully expand college participation. Together, the results elevate how CCB programs are *trajectory-responsive* policy projects whose institutional arrangements, assets, and designs are leveraged to buffer the institutional and structural conditions (e.g., administrative, geographic, programmatic, social, spatial, and temporal conditions) that shape college participation in bachelor's degree programs. By selectively buffering conditions that constrain participation in college and career pathways, CCB programs uniquely expand meaningful access for students who may not have had bachelor's degree access otherwise. However, the feasibility of participation is uneven and stratified, dependent on the mutually constitutive interplay between the institutional activities, assets, arrangements, assumptions, and design of CCB programs, the structural conditions, and students' lived experiences, everyday practices, and social contexts, positions, and trajectories. Students exercise bounded agency as they shape and are shaped by a *stratified feasibility landscape* that unevenly enables and constrains participation across the college life cycle.

1.5 Structure of This Paper

The structure of this paper is as follows. In Chapter 2, I will blend a literature review and conceptual ideas that situate this paper. Here, I also describe the research and evaluation that details what the field knows about the impact of CCB programs. Chapter 3 is the Data and Methods. Here, I describe my positionalities and relationalities to this research context. Following that, I will describe the Data and Methods as it relates to the quantitative analysis (RQ1 and RQ2)–covering the Washington CCB context, the analytic sample/strategy for my quantitative inquiry, limitations, and the reporting convention for the findings/results related to this analysis. Afterwards, I will describe the Data and Methods as it relates to the qualitative analysis (RQ3 and RQ4)–covering the California CCB context and the analytic sample/strategy for my qualitative inquiry, and limitations. In Chapter 4, I report my Findings/Results. I will first report on the Findings/Results for the quantitative analysis (RQ1 and RQ2) in its entirety and then report on the qualitative analysis (RQ3 and RQ4). Chapter 5 is the Discussion and Conclusion. I will first expand on the interpretation of the quantitative analysis and then provide commentary on the qualitative analysis. Then, I will close with implications for policy, practice, and research.

CHAPTER 2

Literature Review and Conceptual Grounding

In the following sections, I blend a literature review and conceptual ideas that situate this paper. This is a synthesis of existing literature related to community college baccalaureate or bachelor's degree programs, college access, success, and equity more broadly, and conceptual ideas and theories relevant to understanding college participation. I take an interdisciplinary approach, drawing from education, economics, critical race & ethnic studies, geography, psychology, public policy, and sociology. As it is an ambiguous endeavor, it is not possible to describe, reference, and synthesize all the literature across all the disciplines and fields that relate (in)directly to this topic. I begin by describing the impact of CCB programs and the policies in California and Washington state, the two states related to this paper's analysis. Afterwards, I synthesis literature and perspectives relating to college access, success, and equity that inform this paper. I am integrating the vast existing bodies of scholarship together to understand the ways that CCB programs meaningfully expand college access and opportunities, since the literature on college "choice" relating to community colleges and CCB remains relatively thin. I am bridging these strands of scholarship together to propose a conceptual model to understand college (career and community) participation within higher education broadly and in community colleges and CCB programs specifically. This conceptual model frames college participation within a *stratified feasibility landscape*, and I specify institutional and structural conditions (e.g., administrative, economic, programmatic, social, spatial, and temporal) that enable or constrain college participation throughout the college life cycle (e.g., enrollment, retention, completion) at the micro-, meso-, and macro-level. This model helps clarify the situated conditions, contexts, processes, and mechanisms that shape and are shaped by students' lived experiences and everyday practices as they navigate, negotiate, sustain, and benefit from college participation. This model also names and acknowledges the ways in which these lived, institutional, and structural conditions are experienced are differentially patterned and stratified depending on one's social contexts, positions, and trajectories.

First, I discuss the college "choice" and access literature, the advances in recent years, and propose how meaningful access, opportunities, and college participation operate within a *stratified feasibility landscape*. Next, I draw on the idea of trait-taking and trait-making policy projects to conceptualize *trajectory-responsive* and *trajectory-shaping* policy projects for education and position CCB programs as the former. Afterwards, I discuss the importance of attending to students' lived experiences and everyday practices as students navigate college participation as bounded agents within their lived conditions and contexts. Next, I elaborate on the *stratified feasibility landscape* and specify six relevant conditions/dimensions that shape students' college participation. In each subsection, for each condition/dimension within this *stratified feasibility landscape*–administrative, economic, programmatic, social, spatial, and temporal conditions–I describe how these institutional and structural conditions are mutually constitutive in shaping college participation; I draw on relevant conceptual and theoretical perspectives, and connect them back to the CCB context. Finally, I integrate these scholarly works and concepts together to position college participation and the *trajectory-responsive* nature of CCB programs within a *stratified feasibility landscape.*

2.1 The Impact of Community College Baccalaureate or Bachelor's Degree Programs

While additional and more advanced college credentials are generally related to more positive life experiences, trajectories and outcomes, the negative selection hypothesis states that individuals who are most likely to benefit from college are also less likely to obtain a college degree (Brand, 2023; Brand et al., 2014, 2021). This paradox of advantage and disadvantage has long been a defining feature of the United States' higher education system and its role in shaping social stratification, structures, and systems. Community college baccalaureate programs aim to enhance educational and economic access and opportunities for students who might not otherwise have had the opportunity (Floyd et al., 2019; Fulton, 2015). The extent that this is actualized remains to be seen and there can be considerable variability in development, implementation, and impact of CCB programs across the United States (Bragg, 2025; Meza, 2025; Rios-Aguilar, Vo, et al., 2025). In the past decade, there has been a growing body of research and evaluation that explores the academic and labor market experiences, outcomes, and trajectories related to CCB programs (Meza & Love, 2023; Wright-Kim, 2021).

National descriptive analysis conducted by Meza and Vo (2026), alongside the Community College Baccalaureate Association, provides a general overview of the size and scope of CCB programs. The largest shares of CCB programs and bachelor's degree graduates preside primarily in Florida and Washington, states where all or almost all, respectively, community colleges have adopted at least one CCB program. These are some of the longest standing programs in existence. California, home of the largest community college system in the entire world, is also quickly rising in the number of CCB programs in implementation, with at least 43 of its 116 community colleges offering at least one CCB program. Integrated Postsecondary Education Data System (IPEDS) unfortunately does not capture the enrollment composition of CCB programs, which limits our understanding of who is accessing these programs (Rios-Aguilar, Vo, et al., 2025), but some of the national descriptive analysis suggests that CCB programs have expanded educational access and opportunity in consequential ways.

Nationally, there are signals that CCB programs have had a positive impact on expanding access and fostering greater equity in higher education (Meza & Vo, 2026). For example, while only 16% of of all Title IV colleges and universities nationally (i.e., institutions that receive federal financial aid) are designated as Minority-Serving Institutions (MSI), over 3.5 as many CCB colleges (58%) are designated as an MSI. This suggests that CCB programs are situated in community colleges where students from racially minoritized communities enroll. There are approximately 16,000 bachelor's degrees being awarded annually by CCB programs across 214 CCB programs. A descriptive analysis of who CCB graduates are–relative to who bachelor's degree graduates are nationally–suggests that the CCB graduates comprise of greater shares of students identified as adult learners (defined here and in this paper as students aged 25 years-old or older; 70% vs. 28%), Black (13% vs. 9%), and Latine (27% vs. 17%) relative to all baccalaureate-granting institutions. CCB program offerings vary considerably in terms of their programs/fields of study and are patterned by state (due to legislation), gender, and race/ethnicity. Such descriptive analysis suggest that CCB programs have provided a pathway to a bachelor's degree to a different student population than the traditional four-year sector. Given the educational success of CCB programs in facilitating bachelor's degree attainment for students identified as adult learners, Black, and Latine–students that have historically experienced structural and systemic barriers and inequitable student inputs/outcomes–CCB programs may be expanding access to students who may not have had it otherwise.

Researchers have also utilized more empirically rigorous analytic approaches to understand the factors that predict CCB adoption and/or impact of CCB program on institutional enrollment and outcomes within the higher education ecosystem (Henderson, 2014; Kramer et al., 2021; Ortagus et al., 2019; Vidal-Rodriguez, 2019; Wright-Kim, 2021). The existing evidence suggests that CCB programs generally enroll older students (Meza & Love, 2023; Wright-Kim, 2021, 2022), students from economically disadvantaged backgrounds (Wright-Kim, 2022), and that they may divert Students of Color away from the for-profit sector (Kramer et al., 2021). However, the quantitative evidence that CCB programs increase enrollment for racially minoritized communities has been mixed (Wright-Kim, 2022). Some early work on CCB programs also analyzed factors and conditions related to CCB adoption. In their analysis of CCB programs between 1989 to 2007, Henderson (2014) found that "states with close proximity to previous CCB adopters, low tuition costs, low enrollment growth, low educational attainment rates, low labor force participation rates, consolidated governing board structures, board approval for CCB adoption, and non-Republican control of the legislature were more likely to adopt the CCB" (p. x). This analysis was between 1989 to 2007, when only 16 states had authorized CCB programs–there are 24 states now, and such predictive factors for policy adoption could have changed over time.

Other papers have examined how CCB programs interplay with the broader ecosystem of credential production. In their comparison of Florida community colleges who adopted CCBs and those who did not, Ortagus et al. (2019) reported that CCB-granting institutions experienced a positive percentage increase in the number of associate degrees awarded for students identified as Black (26%), Hispanic (17%), and white (16%). While there was an increase in associate degrees produced at CCB-granting institutions, there was also a decrease of associate degrees with STEM (science, technology, engineering, mathematics) Classification of Instructional Programs codes produced for students identified as Black or Hispanic. Other papers on the baccalaureate degree production of teacher education degrees in Florida found mixed results as to whether CCB programs altered the production of bachelor's degrees in teacher education (Park et al., 2018). An examination of CCB programs in nursing found that increased production of nurses did not come at the expense of the traditional public or private four-year sector (Daun-Barnett, 2011). These studies note differential impact of CCB programs across racial lines, that the impact observed may change over time as CCB programs expand, and that they may not fully capture the processes or mechanisms that shape these results.

Descriptive analysis of California and Washington state also suggest relatively positive graduation rates. Among California's initial pilot 15 CCB programs, once students officially began upper-division coursework, 67% of students obtained a bachelor's degree in two years and 78% complete in three years (Hoang et al., 2022). However, there are disparities in graduation rates by race/ethnicity, gender, and age groups–ranging from 50% to 80%, depending on the group. California CCB students identified as adult learners and Black experience the lowest graduation rates relative to other age and racial/ethnic groups. Overall, California's CCB two-year graduation rate–even among students experiencing differential impacts–compares favorably relative to the overall two-year graduation rates among community college transfer students at the public regional state university system (41%). In Washington, graduation rates between CCB students (68%) and community college transfer students at public universities (70%) were relatively comparable (Meza & Bragg, 2020a; Meza & Love, 2022). In Washington state, racial disparities within CCB programs were also observed; Black and Hawaiian and Pacific Islander students experienced lower graduation rates relative to other racial groups (Meza & Love, 2022).

A primary area of focus within CCB programs has been the labor market returns relating CCB programs. CCB programs are often legislatively situated as programs to support economic and workforce development through college and labor market alignment (Bragg, 2025). As such, researchers have also begun to examine the labor market experiences and outcomes related to CCB programs. Much of the analysis has been conducted on the CCB programs in California, Florida, Texas, and Washington, given the growing size and scope of their respective community college systems and CCB programs (Rios-Aguilar, Vo, et al., 2025). Descriptive analysis has typically been conducted and highlights promising wage earnings among CCB graduates, particularly relative to pre-graduate earnings (Hoang et al., 2022; Love et al., 2024; Meza & Love, 2023; Thai & Love, 2024; Vo et al., 2026). These analyses tend to include data disaggregation by some organizing principle, such as U.S. state of the college, gender, race/ethnicity, and/or field of study. Descriptively, CCB programs seem to be related to positive labor market outcomes, although there are disparities in who benefits the most.

Some of the analysis on the labor market outcomes related to CCB programs compares the annualized median wages of CCB graduates versus associate degree-only holders in similar fields (Acton et al., 2025; Love, 2020). For example, Acton and colleagues (2025) observed positive wage differentials when comparing CCB graduates vs. associate's degree graduates in similar programs of study in a regression analysis. They also found that CCB graduates, on average, earn less than bachelor's degree graduates from other institutions with similar programs of study. Their analysis of wage differentials also revealed differences between and within programs of study. It should also be noted that their analysis, while using a national dataset, was not inclusive of states, like Florida and Washington, which comprise of 69% of all CCB graduates nationally (Meza & Vo, 2026).

Given the size and scope of Washington state's CCB programs, some of the most impactful and rigorous inferential analysis about CCB programs are about their CCB programs. One of the earliest causal analysis of Washington's CCB programs was a comparison of graduates in their bachelor's of applied science (BAS) programs relative to graduates from the traditional four-year sector in similar programs of study using longitudinal data from Washington (Cominole, 2017). Using an instrumental variables approach, this analysis observed no statistically significant differences between CCB and traditional university graduates in wage earnings between nursing and business graduates one year after graduating, conditional on individual and institutional variables. CCB graduates in nursing and business were also more likely to be employed than university graduates. Additional descriptive analysis has broadened an understanding of how Washington's CCB programs expand pathways to bachelor's degrees, particularly to students in rural areas and adult learners, and their relationship to positive labor market outcomes (Meza & Bragg, 2025; Meza, 2019, 2024; Meza & Bragg, 2020b, 2022). Across these Washington-related studies, students experienced differential experiences and outcomes depending on factors such as programs/field of study, gender, race/ethnicity, and prior grade point average.

Shortly after the research conducted by Cominole (2017), Kaikkonen and Quarles (2018) published one of the more robust analysis of the impact of CCB programs on employment and earnings. They utilized propensity score matching with weighted regression to highlight the wage gains of completers of CCB programs relative to students who only completed similar associate's degree programs in three CCB programs in Washington. Using a dataset that identified graduates in health, social science, or technology fields, Kaikkonen and Quarles observed higher income earnings among CCB graduates compared to graduates who attained an associate degree within a similar program. However, among CCB graduates, there were differences in earnings by various program and student characteristics, such as gender and race/ethnicity. For example, men who participated in the CCB programs experienced higher earnings than women in health, social science, and technology fields. While there were no differences in earnings between students identified as Asian/white compared to students who did not identify as Asian/white in CCB social science programs, this was not the case in health and technology fields. Whereas students identified as Asian/white experienced greater income earnings relative to students who did not identify as Asian/white in CCB technology programs, the opposite was true in health programs. Overall, while this was a useful contribution, their analysis was limited due to a small sample size (which the authors note) and the use of a racial categorization and variable generation of a Asian/white and non-Asian/white dichotomy (which was problematically labeled as "Students of Color"). Additionally, other variables that could have further explained variation in wage effects and methodological approaches that could better consider alternative approaches to address self-selection and confounding variables could bias the estimates and results reported (e.g., Kaikkonen and Quarles compared CCB graduates with associate's degree "only" graduates, but students who matriculate into CCB programs may inherently be different than students who exited after obtaining their associate's degree). Lastly, this work did not explore the extent that labor market outcomes were sustained over time after CCB entry or completion.

Despite being a decade into initial pilot implementation, most of the publicly available research and evaluation conducted about California's CCB programs has been largely descriptive and the bulk of the analysis of academic and labor market experiences has come from self-reported survey data (Hoang et al., 2022; Rios-Aguilar & Vo, 2024; Rios-Aguilar, Vo, et al., 2025; Vo et al., 2026). While California has yet to publicly publish the academic and labor market outcomes of CCB programs using official unemployment insurance wage data, a practitioner-led statewide annual survey has provided rich insights into the academic and labor market experiences of CCB graduates (Hoang et al., 2022; Vo et al., 2026). This survey suggests that CCB programs in California have expanded educational access and opportunities for students. Over 50% of CCB graduates report that they would not have had pursued a bachelor's degree had it not been for the CCB program. Nearly 90% of students state that their CCB programs were affordable. While these surveys have been useful for exploring the impact of CCB programs, they have been limited in describing the mechanisms and trajectories related to CCB enrollment, completion, and outcomes. Descriptive analysis has also revealed disparities in academic and labor market outcomes. CCB programs under-enroll Latine students relative to the overall college population of their respective institutions; however, once Latine students enroll, they experience comparable graduation rates and labor market outcomes relative to other racial groups. Conversely, there are minimal racial imbalances in college enrollment for students identified as Black or African American, but these communities experience disparities in graduation and labor market outcomes. Such results elevate how racial disparities are enacted and experienced at different parts of the college life cycle. I emphasize that these are descriptive analysis with some sample size limitations (which are not unrelated to issues of access and equity in itself), so these results should be interpreted with caution.

Nationally, qualitative research on CCB programs have generally focused on the perspectives of practitioners (Cuellar & Gandara, 2020; Love & Turk, 2023; Martinez, 2018, 2019; Martinez & Elue, 2020; Martinez et al., 2024). These lines of scholarship elevate the vital role of institutional agents in the development and implementation of CCB programs and focus their implications on faculty labor. There is still lots to learn about students' experiences in CCB programs. To be clear, qualitative research on students' experiences exist–and note positive student and employer perceptions of CCB graduates in Washington (Bragg & Soler, 2017)–but few have been published in peer-reviewed academic journals, presumably to focus on providing timely and relevant information about CCB students to education practitioners and policymakers (Meza & Love, 2023; Wetzstein et al., 2020, 2022).

2.2 College Choice and Access Within Situated Contexts and Intersecting Systems

Building upon the long tradition of scholars who have contributed to the college "choice"[1] and access literature (too many to name; see Hossler et al., 1989, Paulsen, 1990, and Perna 2006 for reviews), Perna (2006) proposed a conceptual model of student college "choice" to account for new analytic approaches, samples, and strategies used to understand college "choice" and access. Perna's (2006) model draws upon sociological and economical perspectives and assumes that an individual's college choices occur within situated contexts. She posits that college "choice" is shaped by four layers: individual habitus (layer 1), school and community context (layer 2), institutional contexts of higher education (layer 3), and social, economic, and policy contexts (layer 4). Although Perna discusses the importance of layers 3 and 4, research on college "choice" commonly centers on individual-level factors and/or the traditional four-year sector. However, as Perna herself acknowledges, the processes for college "choice" and enrollment vary for students who enroll in the traditional four-year sector relative to those who enroll in the traditional two-year sector. This scholarship inequity privileges the former context, despite the fact that the traditional public two-year sector enrolls approximately one-third of all undergraduate students. Moreover, institutional and structural conditions–layers 3 and 4–are highly informative in understanding processes of college "choice" and how college access is produced, particularly for students who are less likely to directly enroll in the traditional four-year sector upon graduating high school and/or

[1] Following previous scholars, (Cox, 2016; McLewis, 2021), I use college "choice" to denote and name the complicating conditions that shape college access and opportunities.

community college students (Cox, 2016; DeLuca et al., 2021; Hart, 2019; Rosenbaum et al., 2007). While Perna's proposed model might describe the institutional and structural contexts that may shape college access, it does not fully articulate how such conditions are actualized. College access is not simply a matter of choices and decisions in a vacuum. Rather, they are processes that are unevenly distributed to shape how students are able to navigate and negotiate college pathways.

Scholars have critically interrogated conventional college "choice" models and approaches and highlighted how intersecting identities and systems may shape college access and opportunities. The application of Black Feminist Theory (McLewis, 2021) and *college conocimiento* (Acevedo-Gil, 2017) have been instrumental in highlighting the ways that individuals' decisions and "choice" sets operate within multiple intersecting systems of power and social hierachies that are classed, gendered, racialized, etc. For example, first-generation Latina students simultaneously navigate college alongside multiple worlds, such as family, peers, and work (Rendón et al., 2014). Asset-based, critical, and equity-oriented frames also challenge deficit notions of understanding educational participation and transitions (Kiyama & Rios-Aguilar, 2018; Kolluri & Tichavakunda, 2022; Llopart & Esteban-Guitart, 2018). For example, conceptual frames like the *community cultural wealth framework* challenge deficit approaches by centering the various assets, capitals, or wealth (e.g., familial, navigational, resistant, social) that students from historically minoritized communities draw upon to successfully pursue and sustain college participation (Yosso, 2005). Through the lens of intersectionality, the intersecting dynamics suggest that systems of power operate simultaneously and interdependently to shape students' lived experiences as they navigate bounded and stratified higher education opportunity structures, particular among the most excluded, marginalized, and minoritized communities (Carastathis, 2016; Collins, 2000, 2015; Crenshaw, 1989, 1991; Matsuda, 1991).

Systems of power, such as racism, patriarchy, heteronormativity, nativism, and classism, also shape the intersectional possibilities of and how college access is mutually constituted, produced, and experienced with respect to one's social contexts, positioning, and trajectories (e.g., Comeaux et al., 2020; Duran, 2026; Museus et al., 2016; Palmer & Maramba, 2015). Individual "choice" can mask the complex and constrained opportunity structures and systems related to the distribution of institutional alignment, mobility, resources, time, and wealth (Cox, 2016). Aligned with critical race theorists that frame reforms as operating within stratified systems, this paper situates institutional and policy reforms like CCB programs as operating within these longstanding systems of inequality, inequity, and power (Bell, 1992; Bonilla-Silva, 1997). To be clear: I do not imply that such produced systems are legitimate, but the analysis of CCB programs through these conceptual lens allows educators to question how institutional or organizational activities, arrangements, assumptions, designs, and routines mediate (and can disrupt) these structures and systems in practice (Diamond & Gomez, 2023).

CCB programs may not be able to dismantle these systems of power or social ideologies and hierarchies, but allow us to assess how they may meaningfully alter and disrupt the distribution of feasible educational opportunity and futures within an imperfect institutional order. These conceptual approaches challenge normative assumptions in the college "choice" discourse and push educators to conceptualize college access as an ongoing, multidimensional, and intersectional negotiation between individuals, structures, and systems. This paper extends Perna's model by emphasizing how institutional and structural conditions (e.g., administrative, economic, programmatic, social, spatial, and temporal) constitute a *stratified feasibility landscape* that unevenly enables and constrains bachelor's degree participation across students' life course trajectories. Within this situated context and landscape, students exercise bounded agency (Perna, 2006; Rubenson & Desjardins, 2009) to navigate the intersecting conditions shaped by intersecting systems of power and their own lived experiences/conditions through everyday activities and practices. This conceptual framing emphasizes that the feasibility of sustained and "beneficial" college participation operates within students' situated contexts, positions, and trajectories.

This conceptualization provides a foundation for analyzing higher education policies and institutional designs. CCB programs can be understood as policy interventions within this *stratified feasibility landscape*. By leveraging institutional assets, arrangements, and assumptions, such as the financial affordability and geographic accessibility of community colleges, CCB programs have the potential to enhance and shift the feasibility of bachelor's degree attainment for students whose pathways are shaped by institutional and structural constraints. This paper explores the extent CCB programs produce *meaningful educational access and opportunities* (or *meaningful access*). I define *meaningful access* as the lived feasibility of entering, navigating, and benefiting from educational pathways in ways that are aligned with and sustained within the realities of students' situated contexts, positions, and trajectories. This definition recognizes that college access is not only the mere existence or illusion of opportunity, but whether students are positioned to meaningfully participate, engage, and benefit from those opportunities in consequential and impactful ways.

2.3 CCB Programs as Trajectory-Responsive and Trajectory -Shaping Policy Projects

If college access is structured by a *stratified feasibility landscape*, then a central question is how higher education policymakers and practitioners should respond to students' life experiences, contexts, conditions, positions, and trajectories. This paper builds upon Hirschman's (1967) distinction between *trait-taking* and *trait-making* policy approaches to describe the extent that higher education policies are *trajectory-responsive* or *trajectory-shaping*. Hirschman's work provides language to a common tension in policy intervention design: when to treat existing conditions as fixed attributes (*trait-taking*) versus objects of transformation (*trait-making*). He critically emphasizes that policy designs typically incorporate both and that there are risks to under- and over-estimating the extent that the required changes to attributes are possible. Recent scholarship has extended this idea by highlighting that there are varying degrees in which dimensions are manipulable (Moscona et al., 2026). Social and cultural contexts are important considerations in the design of policy projects and reforms. This frame emphasizes considerations to manipulable attributions in the development and implementation of policies.

In this paper, *trajectory-responsive* policies are those that adapt institutional arrangements and assumptions to align with students' life experiences, contexts, conditions, positions, and trajectories, while *trajectory-shaping* policies seek to alter students' lived contexts and behaviors to better match with institutional assumptions and expectations. Operating on a spectrum, this distinction is salient in higher education, where key dimensions of college access and success, such as prior educational experiences, financial resources, geographic mobility, and time availability, are unevenly distributed and may not be easily manipulable. Prior scholarship has elevated the complex, "non-linear," and heterogeneous patterns and/or outcomes of college enrollment through examinations of longitudinal datasets relating to students' educational, occupational, and household trajectories (Brand et al., 2014; Crosta, 2014; Haas & Hadjar, 2020; Lin et al., 2023; Monaghan, 2020). Such heterogeneous trajectories are evident among students who attend community colleges (Crosta, 2014; Monaghan, 2020). There is a relationship between more "linear" enrollment patterns and bachelor's degree attainment (Crosta, 2014; Goldrick-Rab, 2016; Haas & Hadjar, 2020; Milesi, 2010; Monaghan, 2020; Taniguchi & Kaufman, 2005). Yet, students from historically minoritized communities are more likely to experience complex, "non-linear," and heterogeneous enrollment trajectories. Higher education institutions, like many social institutions, are structured to align with more "linear" or "conventional" life course trajectories, which accumulate and reproduce (dis)advantages and privileges within existing social hierarchies (Hogan, 1978; Monaghan, 2020). Often, community colleges' default institutional design, broadly speaking, assumes, or implies more "linear" life course trajectories (Rosenbaum et al., 2007; Scott-Clayton, 2011) and I posit that this has limited the extent that educational policies have been effective in expanding college access, success, and equity.

Students' decisions to participate in college necessitate ongoing assessments of the feasibility of college participation within their situated contexts, positions, and trajectories. Policy interventions and reforms can be grounded to being adaptive or responsive to these contexts or they can opt to (re)shape them. For example, there are a number of community college policies that require students to be enrolled full-time (12 units or more) to be granted access to certain support services or benefits. Such policies exist to (re)shape students' enrollment intensities, since full-time enrollment is typically related to more positive student outcomes. However, students who may be balancing employment and household commitments alongside their pursuit of higher education may be limited to the extent that they would be able to be enrolled full-time. Yet, the negative selection hypothesis might suggest that the students who may most benefit from access to such support services and benefits are the same students who would be less likely to be able to enroll full-time. A *trajectory-responsive* approach to policy design would be more considerate of the heterogeneity of students' life commitments and trajectories and how difficult it is to alter or manipulate, particularly within the community college context. A *trajectory-shaping* approach would emphasize that full-time eligibility requirements could incentivize more students to enroll full-time who otherwise would not have and activate the benefits of such enrollment patterns. To be clear: this framing does not privilege *trait-taking/trajectory-responsive* or *trait-making/trajectory-shaping*, but it elevates how education leaders can strategically make decisions on the role of contexts in shaping policy design and implementation.

This continuum-based framing of *trajectory-responsive* versus *trajectory-shaping* is a valuable lens to understand how CCB programs, as policy interventions, are situated within a *stratified feasibility landscape*, as detailed in the previous section. Many dimensions of the CCB policies are *trajectory-responsive* in their efforts to meaningfully expand postsecondary educational access and opportunities. Conditions and dimensions related to college access and success are not easily manipulable, yet have historically and currently enabled and constrained college participation. For example, students may be constrained by their spatial conditions and the number of colleges that are physically close to them (Hillman, 2016; Turley, 2009). Therefore, policies that seek to expand bachelor's degree attainment by enhancing policies at strictly the traditional four-year sector may be limited–albeit may have positive impacts–in their ability to expand college access. Because CCB programs leverage the institutional assets, arrangements, and designs of community colleges–that they are typically the most financially affordable and geographically accessible public higher education institutions available to students (Floyd et al., 2019; Fulton, 2015)–CCB programs can be understood as *trajectory-responsive* policy projects. Rather than assuming that students can easily pay or relocate to obtain a bachelor's degree, CCB programs are responsive to students' life experiences, conditions, contexts, positions, and trajectories.

At the same time, the extent that CCB programs expand meaningful educational access to bachelor's degrees are likely to remain uneven and stratified. The effectiveness of CCB programs are dependent on how institutional and structural conditions jointly interplay alongside students' social contexts, positions, and trajectories. While some features of CCB programs (e.g., geographic accessibility) may be difficult to replicate across all sectors in the short-term, other features (e.g., curricular alignment and program design) may be more transferrable across other institutional contexts/sectors. Through this lens, CCB programs can demonstrate how institutional adoption/adaptation can enhance the feasibility of college participation without requiring students to fundamentally reconfigure, reorganize, and/or reshape their lives around fixed institutional arrangements and assumptions.

2.4 Lived Conditions and Experiences, Everyday Practices, and Bounded Agency

On a micro-level, college access and success is experienced through the "daily realities" of students' life conditions and experiences (Bloom, 2007; Cox, 2016; Rendón et al., 2014; Tierney & Venegas, 2009). Students experience college as a set of everyday activities and practices–navigating and negotiating things like bureaucratic processes, work schedules, course sequencing, relationships with institutional agents and social support systems, household commitments, and commutes–that are mutually constituted with broader institutional and structural conditions (Bloom, 2007; Dache, 2022; Duquaine-Watson, 2007; Goldrick-Rab, 2016; Karp, 2011; Matus-Grossman et al., 2002; Monaghan, 2020; Rendón et al., 2014; Scott-Clayton, 2011; Taniguchi & Kaufman, 2005; Wainwright et al., 2026). Moving beyond college access as narrowly college enrollment, I frame college access as sustained activities, practices, and processes in which students evaluate the feasibility of college participation within the contexts of their lives. Meaningful access is achieved and made feasible when the lived arrangements of students' structural and institutional conditions are aligned with how students conceive and experience their social worlds. This framing re-orients abstractions of college access to the everyday and concrete ways that college participation is experienced, felt, navigated, negotiated, sustained, supported, and constrained.

Life contexts, conditions, and trajectories are experienced and structured by multiple and intersecting dimensions, including administrative, economic, programmatic, social, spatial, and temporal conditions, that simultaneously shape and are shaped by the *stratified feasibility landscape* of college participation. These dimensions are embedded in institutional and structural conditions at varying levels (e.g., micro, meso, and macro), and interplay with students' social contexts, positions, and trajectories within broader systems of power to produce heterogeneous experiences of college access, participation, and success. This is a *stratified feasibility landscape*, where what is feasible for one student may not be feasible for another, and students must continuously navigate and negotiate their respective *stratified feasibility landscapes* as they actively pursue their educational goals. While mainstream measures of access and success, such as enrollment and bachelor's degree rates, make college participation legible at the aggregate level, they obscure the everyday practices required to sustain college participation and make illegible the ways that everyday practices can accumulate to constrain college access and success. By centering students' lived accounts of everyday practices, educators can attend to the localized activities, practices, knowledge, and strategies that students leverage to navigate and make bachelor's degree attainment more feasible.

The concept of bounded agency draws on scholarship relating to theories of participation and barriers–or barriers to participation. Rubenson and Desjardins (2009) theorize that participation occurs within the interactions of an individual's habitus (Bourdieu, 1973)–or systems of dispositions that shapes how one makes sense of and behaves within the social world–and the broader structural conditions and systems of one's context (e.g., welfare state regimes, labor markets, residential patterns). Institutional and structural conditions, operating at varying levels, can affect a person's capacity to participate in two ways. One, by configuring the material context that enables or constrains participation, and two, by generating dispositions and beliefs about the possibility and feasibility of participation that are not independent of that participation (Nussbaum, 2002). College participation is shaped not only by what is materially possible, but also how individuals make sense of what is feasible within their social contexts. For example, the pursuit of upward mobility via college participation is shaped by both students' economic conditions and how students reconcile relational costs and tensions with friends and family as they navigate these mobilities (Morton, 2019). The relationship between structural conditions and individual agency is mutually constitutive in that participation produces and reproduces the life conditions actualized (Giddens, 1984).

Drawing on bounded agency, this paper identifies how decisions about participation are made by individuals whose (re)construction of what is possible is continuously shaped by their life conditions and contexts (Rubenson & Desjardins, 2009). Bounded agency has direct implications for how educators can understand college participation. The individual and organizational capacities for college access, participation, and success operate within students' situated contexts and whether students are meaningfully positioned to access and activate the benefits of those educational opportunities. To operationalize this *stratified feasibility landscape*, the next section outlines six relevant dimensions through which institutional and structural conditions are shaping the lived *stratified feasibility landscape* and thresholds of college participation.

2.5 Dimensions of the Stratified Feasibility Landscape of College Participation

Building upon existing scholarship in college access and/or "choice" (see Perna, 2006), this paper introduces a multidimensional and intersectional framework to understand the mechanisms of meaningful access within a *stratified feasibility landscape*. This framework emphasizes six dimensions–administrative, economic, programmatic, social, spatial, and temporal–are shaping students ability to access, navigate, sustain, and benefit from participation in higher education. These dimensions are mutually constitutive, interplaying with one another in complex and patterned ways to produce uneven and stratified conditions of college participation. College access and success are not determined by a singular dimension, but are enabled and constrained by the concrete and material ways in which the interplay of these conditions and systems within students' lived contexts, positions, and trajectories are experienced. These six dimensions operate on a spectrum and may intersect in ways that enable or constrain college access, success, and equity throughout various points in students' college life cycle.

In the following sections, I examine each dimension as analytically distinct components of a broader system that structures the feasibility of college participation. I also highlight the relevance of this framework to examine community college contexts and specifically CCB programs. Community colleges are often shaped by complex and dynamic conditions that enable and constrain college participation. As *trajectory-responsive* policy projects, CCB programs have the potential to (re)configure and (re)oganize the *stratified feasibility landscape* in bachelor's degree pathways, depending on how these dimensions interplay with institutional and structural conditions and students' social contexts, positions, and trajectories.

2.5.1 Administrative Conditions

The dimension of administrative conditions captures the administrative, bureaucratic, and institutional procedures and processes shaping college access, success, and equity. This includes admissions and applications and course-related activities (e.g., registration, scheduling, and requirements). The concept of administrative burdens has been used to understand the difficult experiences people have when interacting with public services to gain access to government benefits or services (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). Administrative conditions through the lens of administrative burdens are central to understanding the *stratified feasibility landscape* in which students participate, navigate, sustain, and benefit from college pathways.

Learning, compliance, and psychological costs are mechanisms in which administrative burdens are realized in the context of gaining access to a program (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). Learning costs relate to the time and effort required to determine an individual's eligibility for a program, the benefits for the program, what conditions and forms must be completed, and how to apply and sustain access to such programs. Compliance costs are related to the information and documentation that must be provided as part of the process to demonstrate appropriate standing and gain access to programs as well as the financial costs related to such procedures (e.g., fees, legal representation, travel costs). Psychological costs are related to feelings of stress, frustration, anxiety, stigmatization, and loss of agency that occur as a result of applying and/or participating in the process. Such feelings can arise from intrusive administrative supervision, dealing with learning and compliance costs, unnecessary procedures, fear of administrative actors, and uncertainty about navigating and completing the process. The three types of costs relating to administrative burdens are not mutually exclusive (Baekgaard & Tankink, 2022) and the ways in which individuals experience administrative burdens are not uniformly distributed (Barnes & Riel, 2022; Herd & Moynihan, 2018).

Individuals from racially minoritized communities are more likely to experience administrative burdens (Ray et al., 2023). This conceptual framing of racialized burdens provides justifications and mechanisms in which racially minoritized communities experience frictions in interacting and navigating with government bureaucracies and bureaucrats. For example, bureaucrats in power and bureaucracies can disproportionately favor granting access to government benefits and services to certain populations through the enactment and realization of hierarchies, ideologies, and logics in racially patterned ways (Gándara et al., 2024; Ray et al., 2023). Gándara and colleagues (2024) provide the example of educational programs that grant waivers for specific requirements. Administrative actors or bureaucrats may disproportionately grant such waivers to white students over racially minoritized students, creating racial imbalances in who accesses the programs and their benefits/services (Grissom & Redding, 2016). It may be the result of bias favoring white folks due to negative and deficit assumptions, stereotypes, and views about racially minoritized communities (Hancock, 2004; Schneider & Ingram, 1997; Soss et al., 2008a, 2008b) and/or it may be the case that white folks may be more likely to ask for exceptions, highlighting organizational and navigational practices that add an additional layer of barrier for individuals and potential (dis)advantages (Hagerman, 2018). The ways in which a state via administrative conditions functions makes individuals legible for eligibility and this can have (un)intended consequences on who experiences substantive burdens, costs, and ease, and how they are experienced as this legibility and visibility in itself is related to one's social contexts, positions, and trajectories (Scott, 1998).

In higher education, administrative burdens can be racialized and disproportionately impact students from historically minoritized communities (Gándara et al., 2023, 2024; Giani, 2019; Moynihan et al., 2015; Ray et al., 2023). For example, financial aid processes can create barriers to educational access by making it difficult for eligible community college students to receive financial aid due to the complicated application process, delays in distribution of funds, or revocation of financial aid status due to punitive policies and practices

(Cesar-Davis et al., 2024). Such organizational and navigational practices require learning, compliance, and psychological costs. Another example is transferring college credits. While a significant number of students end up attending multiple colleges throughout the course of their college trajectories, this heightens the risk of credit loss, or the inability to transfer college credits to another college (Giani et al., 2026; Peter & Cataldi, 2005; Schudde et al., 2025). Nearly 41% of all community college transfer students experience credit loss (Simone, 2014) due to curricular misalignment (Spencer, 2019, 2023). Students identified as Black and Latine are disproportionately impacted by the transfer process and credit loss (Bensimon & Dowd, 2009; Logue et al., 2025). Credit loss has clear implications on students' ability to complete their degree and to do so in their preferred timeline (Monaghan & Attewell, 2015). The compliance, learning, and psychological costs of administrative burdens are exacerbated because racially minoritized communities may have more constraints on other dimensions. Since individuals from historically or racially minoritized communities may have constrained economic and time conditions (Barnes, 2022; Ray et al., 2023), the additional temporal costs related to administrative burdens can compound and reinforce inequities.

Administrative burdens can have such a large effect in program uptake, and the administrative burden framing has been beneficial to identifying ways to generate more administrative ease. Administrative burdens can have big effects on actual policy impact, reinforce inequalities, may be opaque to outsiders who do not have to navigate such processes, and shape people's views on government benefits, services, and programs (Herd & Moynihan, 2018; Herd et al., 2024). Reducing administrative burdens, or administrative easing (Fox et al., 2020), is possible via more intentional policy design and implementation. To make government programs more accessible and minimize burdens, policymakers can alter organizational cultures, expand capacity and support for potential beneficiaries, build cross-collaborative teams to reduce burdens, simplify and streamline processes, and generate critical data tools (Herd et al., 2024). On a micro-level, administrative actors or street-level bureaucrats, as individuals who directly interface with potential beneficiaries, have power and discretion in granting access or denying to programs and services (Lipsky, 1980). Institutional arrangements, assumptions, and design can attend to historical and social contexts–as well as the unique and diverse challenges that individuals from racially minoritized communities experience–that have continuously (re)produced and compounded racially differentiated experiences and outcomes to address disproportionately uneven program outcomes (Bensimon, 2020; Gándara et al., 2024; Leonardo, 2009).

From a policymaking and institutional design perspective, administrative conditions are a relevant dimension where the feasibility of college participation is enabled or constrained. Administrative burdens, racialized burdens, and/or racialized administrative burdens in higher education policy provide conceptual tools to understand how policy design and implementation can shape students' administration conditions on a continuum of administrative ease or burdens (Fox et al., 2020; Gándara et al., 2023, 2024; Herd & Moynihan, 2018; Moynihan et al., 2015; Ray et al., 2023). Administrative burdens generate stratified and uneven experiences and outcomes, and this is not unrelated to racialized ideas and ideologies that shape policy implementation, institutional designs, and how front-facing practitioners enact policies in practice. Education leaders can enhance meaningful educational access by minimizing administrative burdens that college students experience.

CCB programs can be understood as a *trajectory-responsive* policy project because of how they interplay with administrative conditions to shape the *stratified feasibility landscape* of college participation. By streamlining admissions and matriculation processes from community college lower- to upper-division courses, CCB students are less likely to experience administrative burdens, such as credit loss. On a micro-level, institutional agents and educational practitioners, such as administrators, faculty, and staff, can amplify or buffer administrative ease/burdens. For example, the quality of an academic counselor in making appropriate determinations on which course credits count may extend or limit the number of non-degree applicable courses a student may need to take. Academic counselors' proactivity and support may also determine the frequency and quality of their interactions with students. How students experience administrative conditions is shaped by how institutional agents and structures enable or constrain college access and success.

2.5.2 Economic Conditions

The dimension of economic conditions captures the financial costs and benefits shaping college access, success, and equity. This includes financial costs, such as tuition, housing, and materials, required to enroll in college and be successful (Dynarski et al., 2022; Page & Scott-Clayton, 2016). This also includes calculations of rate of return in investing in a college degree, which may include projected/actualized projections of benefits/risks associated with measures of student loan debt and earnings. Given its impact on college and career decision-making for students, college affordability and financial aid remain at the forefront of education policy, practice, and research. There has been extensive research on the impact of financial aid policies and practices on students' experiences, outcomes, and trajectories. For community colleges, financial aid is the largest educational investment that the government makes (Goldrick-Rab, 2010). As such, economic conditions are central considerations that shape the *stratified feasibility landscape* in which students participate, navigate, sustain, and benefit from college pathways.

Rational choice models (Breen & Goldthorpe, 1997), such as human capital theory (Becker, 1964), have been dominant conceptual tools to frame the economic conditions shaping students' participation in college (Deil-Amen & Lopez Turley, 2007). Scholars have utilized human capital theory to frame the democratizing or diversion effects of community colleges (Gonzalez Canché, 2014, 2017; Long & Kurlaender, 2009). Human capital theory also provides a framework to contextualize the decisions people make to improve their social and/or economic status, such as the decision to participate in college (Becker, 1964). Human capital can be defined as a person's knowledge, skills, health, or values. Education or schooling is a form of human capital, given its relationship to improved outcomes, such as health and earnings. Younger workers who attain credentials tend to disproportionately realize the greatest returns and benefits via human capital accumulation in their life course (Ben-Porath, 1967; Carnevale et al., 2022b; Mincer, 1974). Completion of more community college credits and/or credentials has typically been linked to positive labor market outcomes and trajectories (Belfield & Bailey, 2011, 2017; Dadgar & Trimble, 2015; Jacobson et al., 2005; Jepsen et al., 2014; Kane & Rouse, 1995; Minaya & Scott-Clayton, 2022; Minaya et al., 2026; Stevens et al., 2019; Xu & Trimble, 2016). Thus, like types of financial capital, education is an investment that a person can make to increase their (human) capital, and in fact, Becker (1964) considers it the most important investment. Students' economic, social, and cultural capital are resources that students are assumed to have access to; such capitals are relevant in shaping students' college and career decision-making (Bourdieu, 2001).

Within a competitive higher education market with different college options, rational choice models and human capital theory are useful frameworks to make sense of which educational programs people elect to invest time, money, and energy (Becker, 1964; Breen & Goldthorpe, 1997). Human capital theory helps frame why students may elect to enroll in community college and CCB programs (e.g., as an investment in hopes of improved social and economic conditions) versus alternative educational and occupational trajectories (e.g., colleges with similar programs of study or entry into the labor market in lieu of postsecondary education) (Bers & Smith, 1987; Kosyakova & Gerber, 2019; Moss-Pech et al., 2021; Rosenbaum et al., 2016; Valadez, 1993). Costs and benefit calculations (e.g., the initial resource investment for college participation versus the potential economic benefits of college participation) and perceived probability of success shape students' college and career decision-making. In other words, college and career participation is shaped by students' evaluation of their labor markets and calculations of pecuniary costs (monetary costs of completing a degree from college costs, gas, etc.), psychic costs (intangible factors like enjoyment of coursework), and opportunity costs (the trade-offs of college participation, of varying enrollment intensities, in lieu of working) (Stuart et al., 2014).

However, costs and resources do not operate in a vacuum since people's access to resources required for college and career participation are unequal and stratified, varying by dimensions like age, gender, race, and class (Becker, 1964; Mincer, 1974). There are heterogeneous effects of who benefits from lower college costs, with amplified benefits for students from historically, economically, and racially minoritized communities (Angrist et al., 2021; Baber, 2014; Bettinger et al., 2019; Carruthers et al., 2020; Dynarski et al., 2022; Laanan, 2003; Nomi, 2005; O'Connor et al., 2010; Wang et al., 2009). The same research that elevates the positive labor market returns related to community college enrollment and completion also typically notes that there is heterogeneity in outcomes by dimensions such as field of study, age, gender, race/ethnicity, and socioeconomic status (Belfield & Bailey, 2011, 2017; Dadgar & Trimble, 2015; Jepsen et al., 2014; Minaya & Scott-Clayton, 2022; Minaya et al., 2026; Stevens et al., 2019; Xu & Trimble, 2016). Not unrelated, community college students often have to balance college, employment, and/or household responsibilities (American Association of Community Colleges, 2026; Huerta et al., 2022; Matus-Grossman et al., 2002). Research has revealed the benefits of bachelor's degree attainment (Carnevale et al., 2022a, 2022b; Hout, 2012) and how bachelor's degrees are privileged in the labor market to attain "good jobs" (Carnevale et al., 2016; Kalleberg, 2011). Yet, the return on investment and the activation of the benefits of educational attainment are also unequal and stratified (Carnevale et al., 2022a, 2022b; Chelwa et al., 2022; Cheng et al., 2021; Francis et al., 2022; Hamilton, 2022; Paul et al., 2022). The assumption that bachelor's degree attainment can single-handedly equalize wealth gaps omits how uneven and stratified resources and structural conditions situate people's labor market experiences. Due to broader structural and systemic conditions, younger, white, and male students tend to have access to the most benefits in the labor market (Blau & Kahn, 2017; Carnevale et al., 2022b; Gaddis, 2015; Wilson & Darity, n.d.). Conversely, Black Americans, especially Black women, have been limited in fully activating the full purported social and material benefits of bachelor's degree attainment (Bobbitt-Zeher, 2007; Chelwa et al., 2022; Francis et al., 2022; Hamilton, 2022; Paul et al., 2022; Strayhorn, 2008; Wilson & Darity, n.d.). Such disparities are directly the result of labor market discrimination and additional intersecting systems of power and social hierarchies. The stratified ways in which economic conditions are enacted and imposed on individuals, households, and communities demonstrates the limits of decision-making from a strictly human capital perspective.

Multiple theoretical and conceptual perspectives capture the multiple functions and benefits of educational credentials in the labor market beyond human capital accumulation (see Bills 2003 for an extensive review). Signaling theory would suggest that workers leverage educational credentials to signal to employers who need to evaluate and hire people under conditions of imperfect information (Spence, 1973). From the supply side, workers invest in credentials both to acquire knowledge/skills relevant in the labor market and to signal their labor market value to employers. On the demand side, screening theory would suggest that employers use credentials to screen and sort potential employees (Arrow, 1973; Stiglitz, 1975). Some credentialist theorists would position education credentials as a mechanism in which "access to lucrative occupations" are monopolized (Collins, 1979 p. 9). Organizations may use credentials to sort and stratify by constraining access to some professions through requirements of college degree attainment (Brown, 2001). Signaling theory and perspectives on credentialism frame labor market returns related to bachelor's degree completion as not only about human capital, but can be tools to constrain access to certain occupations and consequently, social, economic, and other benefits.

From a policymaking and institutional design perspective, economic conditions are a relevant dimension where the feasibility of college participation is enabled or constrained. CCB programs are *trajectory-responsive* policies because of how they interplay with economic conditions, shaping the *stratified feasibility landscape* of college participation. Costs remain a significant reason why students–even academically successful students–may leave college without a degree (Ortagus et al., 2021; Stuart et al., 2014). Community colleges facilitate college participation through their lower college costs relative to other college options (Acton, 2021; Denning, 2017; Dynarski et al., 2022; Martorell et al., 2014), including more expensive community colleges (Acton, 2021; Denning, 2017; Martorell et al., 2014). Although this may vary by college and state, community colleges buffer or relax these economic conditions since they tend to have lower upfront tuition costs relative to the traditional four-year sector (Baum & Ma, 2014). In an analysis across 15 states, the college costs of CCB programs were, on average, 42% cheaper than their traditional public four-year sector counterparts (Meza, 2025). By often being the most affordable college pathway, CCB programs are *trajectory-responsive* by leveraging the institutional assets, arrangements, and design of community colleges and providing a bachelor's degree pathway where students' evaluation of pecuniary, psychic, and opportunity costs (Stuart et al., 2014) are feasible. By enhancing meaningful access to bachelor's degree attainment, students may be better positioned–depending on their social contexts, positions, and trajectories–to activate the mechanisms (e.g., capital, credentialism, signaling, and/or screening) related to positive labor market returns. In this way, CCB programs–as *trajectory-responsive* interventions–can enable college participation by aligning economic conditions within this broader *stratified feasibility landscape.*

2.5.3 Programmatic Conditions

The dimension of programmatic conditions captures the role of academic programs of study, fields of study, majors, and curricular content and structures in shaping college access, success, and equity. These programmatic conditions can shape what students study, how they progress through their educational pathways, and how those pathways are aligned with their educational and occupational trajectories and goals. This college/career alignment and structured curricular pathways has been an area of focus in educational policy and practice, particularly with community colleges (Bailey et al., 2015a, 2015b; D'Amico, 2016). Programmatic conditions through the lens of college/career alignment and structured curricular pathways are central to understanding the *stratified feasibility landscape* in which students participate, navigate, sustain, and benefit from college pathways.

Guided Pathways reforms have been adopted by over 100 community colleges across the

United States (Community College Research Center, 2025). A major motivation for Guided Pathways reforms is based on the assumption that early entry into program-related coursework and establishment of students' educational goals are beneficial to student retention, completion, and success (Bailey et al., 2007, 2015a, 2015b; Jenkins & Cho, 2012). Research in psychology has demonstrated the positive relationship between short- and long-term goal setting and educational outcomes (Elliott & Dweck, 1988; Grant & Dweck, 2003; Latham, 2004; Locke & Latham, 2006; Pintrich & De Groot, 1990; Taing et al., 2013). Much has been said about their policy assumptions–like many reform and policy designs–and their varying policy impacts nationally (Jenkins et al., 2025). While there are benefits to major declaration and retention, there are differential experiences with fields, gender, and race (St. John et al., 2004)–organizing principles that are not independent of one another.

Students' selection of majors, fields, or programs of study are important because of their implications on labor market experiences and outcomes (Andrews et al., 2024; Wolniak et al., 2008). Although they are very connected (and will be used relatively interchangeably in the paper), majors, fields, and programs of study are distinct. Academic majors are specialized areas/fields of study (e.g., ethnic studies or sociology), whereas programs of study are academic pathways in specific majors and degrees (e.g., a bachelor's of science degree in sociology). Major enjoyment, success in major coursework, and expected labor market outcomes are factors related to students' choice(s) of their major (Baker & Orona, 2020; Baker et al., 2018) and not unrelated to other dimensions, such as economic conditions. In many ways, students' major choice(s) and labor markets are intrinsically tied. Given the relationship between majors and labor market outcomes, students' attitudes, perceptions, and understandings of their labor markets inform their college decision-making (Altonji & Zimmerman, 2018; Altonji et al., 2012; Baker, 2018; Charles & Bradley, 2009; Lovenheim & Smith, 2023; Reyes et al., 2019). In general, bachelor's degrees in STEM fields, particularly computer science and engineering, are often linked to improved economic outcomes in the short- and long-term (Altonji & Zimmerman, 2018; Carnevale et al., 2022a, 2022b; Morris et al., 2025; Zhang et al., 2024). In the community college context, there can be wide variation in outcomes relating to fields, but healthcare fields have generally been associated with positive labor market outcomes, whether via completion of coursework, sub-baccalaureate degrees, and/or CCB degrees (Acton et al., 2025; Dadgar & Trimble, 2015; Grosz et al., 2021; Jepsen et al., 2014; Meza & Bragg, 2022; Minaya et al., 2026; Stevens et al., 2019; Xu & Trimble, 2016). Yet, fields/major/program selection is stratified across class, gender, and racial/ethnic lines, and this sorting has implications on who can access certain industries and wage earnings, particularly among women, individuals from economically disadvantaged backgrounds, and racially minoritized communities (Baker & Orona, 2020; Bobbitt-Zeher, 2007; Carnevale et al., 2022a, 2022b; Charles & Bradley, 2002; Charles & Bradley, 2009; Hagedorn et al., 1996; Leslie et al., 1998). Given the implications of students' selection of their program of study on their educational and occupational trajectories, curricular alignment of college and career has increasingly become a point of emphasis in educational policy and practice.

Community colleges have long been tasked with being responsive to the labor market (Jacobs & Worth, 2019; U.S. Department of Education, Office of Vocational and Adult Education, 2004) and college/career alignment has implications on students' college and career decision-making (D'Amico, 2016; D'Amico et al., 2019). D'Amico and colleagues (2019) and Vo and Rios-Aguilar (2024) have applied the career capital framework at the student- and organizational-level, respectively, to demonstrate the value of college/career alignment. This framework suggests that clarifying knowing why (aspirations), knowing how (knowledge and skills), and knowing whom (sources of information) are relevant components to college/career alignment. Knowing why or having clarified aspirations/goals are valuable in one's pursuit and participation in college. Within the community college "choice" literature, programs of study were one of the top reasons to why students enroll in community colleges (Absher & Crawford, 1996; Kitchens, 1988). Santos (2004) found that programs of study was the top reason for Latine students to enroll in community college. Students who return to attend college are also motivated by economic conditions, such as their experiences in the labor market and career, desire for a new career path, enhanced employment and economic opportunities, and upskilling (Bers & Smith, 1987; Kosyakova & Gerber, 2019; Moss-Pech et al., 2021; Rosenbaum et al., 2016; Valadez, 1993). Although community colleges may be limited at times in aligning with labor markets, and critical questions about what alignment means and for whom remains (Cleary & Van Noy, 2014; Cleary et al., 2017; Sublett & Tovar, 2021; Sublett et al., 2021; Vo & Rios-Aguilar, 2024), institutional agents and structures play a critical role in shaping college/career alignment and participation.

Institutional conditions can enable and constrain college participation through aligned practices, policies, structures, and systems. Hirschy and colleagues (2011), in their conceptual model for student success in community college occupational programs, highlighted student success strategies, such as career support services, faculty mentorship, and curriculum that provide students with the support, strategies, and skills to navigate the labor market and workplaces. Such practices and programs can facilitate improved labor market experiences by enhancing students' know how and know whom (Dache, 2022). Such practices and programs also enhance students' social capital and networks (Chetty et al., 2022) and allow students to access and activate mobility knowledge or information and resources valuable for social and economic mobility that are specific to one's social contexts, positions, and backgrounds (Hill, 2021).

Community colleges can also establish industry partnerships that allow students to connect with their intended work environments, interact with professionals, participate in co-curricular career-related work experiences, obtain career assistance, socialize into professional norms, and access industry advisory boards (Hirschy et al., 2011; Orr, 2001; Soliz et al., 2023). Work-based learning (WBL) and internship opportunities during one's time in college can be an impactful approach to college/career alignment and have been linked to academic outcomes, identity formation, and post-graduate employment outcomes (Dailey, 2016; Kuh, 2008; Nunley et al., 2016; Parker III et al., 2016). Relatedly, career technical education, as programs intended to align with labor markets, also play a valuable role in promoting positive community college outcomes (Ecton & Wright-Kim, 2025; Soliz, 2023). These industry partnerships can result in a greater sense of knowing why, how, and whom and college/career aligned experiences for students (D'Amico et al., 2019). However, there remains racial disparities in who is able to access and have meaningful experiences in WBL and internship opportunities, particularly among Latine students (Hora et al., 2022).

Additional programmatic conditions, particularly at the course level, also shape college access, success, and equity. Course modalities, such as online or distance education can expand college access for students by offering an alternative and flexible pathway to education, but research has been mixed on the relationship between online education and student outcomes (see Xu & Xu, 2020 for a review). Course availability, timing, and scheduling also shape college access and success (Grosz et al., 2021; Sublett & Orenstein, 2023).

From a policymaking and institutional design perspective, programmatic conditions are a relevant dimension where the feasibility of college participation is enabled or constrained. As *trajectory-responsive* policy interventions, CCB programs can shape college access, success, and equity through academic programs, programs of study, majors, and curricular content and structures that are aligned with students' educational and occupational trajectories and goals. Nearly all states have language in their CCB legislation that requires CCB programs of study to align with local/regional economic and workforce development goals and students' interests (Bragg, 2025). In California, CCB legislation dictates that program offerings must be non-duplicative of existing programs of study offered at the public regional and research universities, and that CCB programs should help address the unmet economic and workforce development goals (Rios-Aguilar et al., 2023). As such, CCB programs not only provide programmatic offerings in programs of study that are aligned to labor markets, but they can–depending on the state–also offer unique majors and programs of study that may not be offered by other nearby college institutions. CCB programs, like the ones in California, are also developed and implemented by institutional agents who seek to establish college/career aligned curricular activities in and outside of the classroom (Vo & Rios-Aguilar, 2024). As such, by institutional design, CCB programs can be college/career aligned programs that support the accumulation of career capital when students know why they are enrolling in college, know how to participate and navigate college and career contexts, and know whom to reach out to for relevant information about college and career (D'Amico et al., 2019).

2.5.4 Social Conditions

The dimension of social conditions captures social interactions, intergroup relations, and social dynamics that shape college access, success, and equity. This includes the ways in which students can feel connected to other students and institutional agents, such as administrators, faculty, and staff. Scholars have extensively examined how students' sense of involvement, belonging, connectedness, and/or inclusivity are related to students' college experiences, decision-making, and outcomes (too many to name). This paper leverages socio-academic integrative moments (Deil-Amen, 2011) as a lens to understand how social conditions are central to understanding the *stratified feasibility landscape* in which students participate, navigate, sustain, and benefit from college pathways.

One of the most popular is Tinto's Model of Student Departure (1975, 1993, 1998), which posited that students choose persistence when they experience "academic" and "social" integration at an institution, or that there is a fit or alignment of students' values, social understandings, and academic quality. However, there have been extensive critiques of Tinto's model since its conception, including from Tinto himself (see Deil-Amen, 2011 for more details; Deil-Amen, 2011). "Academic" and "social" integration are not dichotomous concepts, but can be interwoven. Additionally, there has been much said about its transportability across different sectors and relevance to students from diverse social contexts, positions, and backgrounds.

One of the major limitations of Tinto's model (1975, 1993, 1998) is from the primary focus on the experiences of residential students in the traditional four-year sector. Given that community college students are more likely to be commuting students, having various educational goals, and come from historically, economically, and racially minoritized communities, Tinto's conception of "integration" may be less applicable in these contexts (Deil-Amen, 2011; Hurtado & Carter, 1997; Manski, 1989; Rendón, 1994; Rendón et al., 2000; Torres, 2006). For example, Tinto's model assumes some level of disconnection between students' community of origin prior to integration into a college community is required for optimal social and academic integration (Hurtado & Carter, 1997; Tierney, 1992, 1999), but this is less applicable since most community college students remain in their community of origin (Braxton et al., 2004). Such dynamics are additionally layered when considering gender, race, and class (Allen, 1992; Anaya & Cole, 2001; Davis, 1991; Hurtado & Carter, 1997; Nettles, 1991; Rendón, 1994; Rendón et al., 2000; Torres, 2006). Tinto's conception of "academic" and "social" integration in itself was also limited by how it was defined–needing stronger considerations to alternative interpretations and forms of integration (e.g., integration may look different for different communities and at different sectors), distinctions between behavioral integration and psychological sense of integration (Hurtado & Carter, 1997), the interconnectedness of "academic" and "social" integration (Guiffrida, 2006; Pascarella & Terenzini, 1983; Stage, 1989; Tinto, 1998), and the role of institutional agents in facilitating student success and equity (Bensimon, 2005; Bensimon, 2007; Braxton et al., 2004; Ching, 2023; Stanton-Salazar, 1997, 2001).

This paper primarily draws upon Deil-Amen's (2011) concept of "socio-academic integrative moments," developed in her research of two-year students in career-related programs, to describe opportunities or moments in which social and academic integration are simultaneously experienced. Socio-academic integrative moments are valuable to students because they confer social benefits, such as feelings of competence and belonging to an institution and clarified conception of students' college identities. They also confer informational benefits. Through socio-academic integrative moments, students gain more social and career capital, access to (exchanges of) information, relationships, and strategies that prove useful for college participation.

Deil-Amen (2011) describes multiple vehicles or mechanisms for socio-academic integrative moments. Building upon what Tinto (1993) described as "competent membership," Deil-Amen (2011) describes that the most common mechanisms for socio-academic integrative moments were:

> (a) a range of in-class interactions and dynamics, (b) formal or "spontaneous" study groups, (c) social-capital relevant interactions and mentor relationships with trusted faculty or other staff, (d) consistent access to communication with "similar" students (usually facilitated by some form of cohort scheduling that created consistency in the students that interacted with each other from one term to the next, and, to a lesser extent, (e) academically-relevant clubs and activities. These mechanisms helped students strategize academic success by incorporating college into their social identity, planning better, scheduling their time more effectively, and placing limits on their demands outside of school. (p. 81)

Structures, such as academic communities, cohort-based programming, and scheduling, can generate socio-academic opportunities for students to interact with similar students. Such structures were common in smaller, private non-profit and for-profit colleges and community college medical and electronics programs of study. Such findings align with recent research on learning communities in community colleges (Weiss et al., 2015), which puts students in cohorts to experience a shared curriculum and wraparound student support services; learning communities are related to modestly positive outcomes, such as credit accumulation. Proactive institutional agents, such as administrators, faculty, and staff, are also valuable in supporting two-year colleges. Faculty and classrooms were primary vehicles and sites for socio-academic integration, in part due to their role within the established academic community and structure. Students' access to social capital, such as informational benefits and enhanced procedure agency, was particularly useful in sustaining students' college participation; social capital could be accessed via connections with students and institutional agents.

Social conditions are inherently shaped by broader, multiple, and intersecting systems of power that generate differential patterns of college participation, depending on one's social contexts, positions, and trajectories. For example, a long line of scholarship has elevated the relevance of age, gender, and race, at the individual and institutional level, in shaping students' college participation (Acevedo-Gil, 2017; Bahr et al., 2021; Cabrera et al., 1999; Cho et al., 2008; Comeaux et al., 2020; Freeman, 1997; González Canché & Rios-Aguilar, 2015; Hurtado et al., 1997; McLewis, 2021). Students' and faculty's inter-gender and -racial dynamics also interplay to shape student motivation, course outcomes, course selection, college retention, and college completion (Fairlie et al., 2014; Llamas et al., 2021; Solanki & Xu, 2018).

From a policymaking and institutional design perspective, social conditions are a relevant dimension where the feasibility of college participation is enable or constrained. The more that higher education institutions via institutional agents and structures are able to facilitate more socio-academic integrative moments with students, the more likely students will be able to successfully access, navigate, sustain, and benefit from college participation. As *trajectory-responsive* policy projects, CCB programs can facilitate enhanced socio-academic integrative moments and shift the *stratified feasibility landscape.* Community colleges tend to have smaller classroom sizes relative to the traditional public four-year sector. Many CCB programs, especially in California, provide cohort-based programming. With this established academic community structure, CCB students are more likely to connect and interact with institutional agents and their college peers in ways that enhanced sense of belonging, connectedness, competence, and inclusivity. For example, institutional agents in CCB programs may promote graduate school pathways to students who may not have considered it previously (Martinez & Elue, 2020). Within this academic community, CCB students will have more exposure and continuity with institutional agents and students in settings that are conducive to accessing social capital. By experiencing more socio-academic integrative moments, CCB students are more likely to sustain college participation. Depending on how CCB programs leverage the institutional arrangements, assets, and designs of community colleges, social conditions may enable or constrain college access and success.

2.5.5 Spatial Conditions

The dimension of spatial conditions captures the role of space and place in shaping college access, success, and equity. The definitions of space and place have been debated due to its philosophical complexities (Cresswell, 2014). Space and place are mutually constitutive and relational processes relevant in shaping people and places. In the context of college participation, this can range from one's everyday interactions and mobilities, as commuting students journey in-between spatial conditions (Wainwright et al., 2026), to one's physical access to colleges (Hillman, 2016; Tate, 2008; Turley, 2009). Taking a spatial turn, this paper draws upon multiple lens to understand how spatial condition interplay to shape the *stratified feasibility landscape* in which students participate, navigate, sustain, and benefit from college pathways.

There are social, physical, and mental conceptions of space (Razack, 2002). Many scholars have adopted Lefebvre's (1991) conceptual triad of social space, which has three elements: conceived (representations of space), lived (representational space), and perceived spaces (spatial practice). Conceived space refers to how space is represented, conceptualized, and organized by planners (McCann, 2002). Lived space refers to the subjective experiences of space as lived in by its inhabitants and users (Razack, 2002). Perceived space refers to everyday "spatial practices that organize social life in specific ways" (Razack, 2002, p. 77).

Defining place is similarly complicated. Multiple approaches of place can be taken–descriptive, social constructionist, and phenomenological–and there is value in different approaches (Cresswell, 2014). In sociology, place has been conceptualized as a combination of geographic location, material form, and the meaning and value attached to it as it is experienced and imagined (Gieryn, 2000; Soja, 1996). A descriptive approach to place highlights the distinctiveness and particularities of places. A social constructionist approach to place is concerned with the kinds of social forces that influence how places are constructed. A phenomenological approach focuses less on places and is concerned about how being "in-place" is a fundamental and essential part of human existence. From a relational perspective, place is constructed through interactions of social processes, relations, experiences, and understandings at a particular locality, making them dynamic and open-ended (Massey, 1994).

While social sciences have typically relied on social, economic, and historical perspectives, a geographical perspective is useful to articulate how inequities and injustices are realized and perpetuated in the spaces that we occupy (Dikeç, 2001; Massey, 1994; Soja, 1996, 2010; Solórzano & Vélez, 2016). Recent research highlights the critical role of space and place in shaping organizational and institutional processes (Wright et al., 2022). Spatial turns in critical theory afford greater connections between everyday life, academic scholarship, and radical politics (Razack, 2002). Spatiality is a process that simultaneously produces and reproduces social hierarchies and structures in mutually constitutive ways that sustains (in)justices socially and spatially (Dikeç, 2001; Soja, 2010). For example, spatial and racial perspectives can document the efforts to segregate, contain, and limit the rights and opportunities for historically and racially minoritized communities. As racialization and spatialization are both legal and social practices (Razack, 2002), "racial difference is also spatial difference" (Mohanram, 1999, p. 3). Spatial theories provide insights to the political nature of places, such as how whiteness exerts its dominance in settler societies and charts the spatiality of racial hierarchies and processes (Tuck & McKenzie, 2015). The experiential and relational aspects of space elevate how spatialized (in)justices shape and are shaped by everyday practices of community, hope, and resistance (hooks, 2009).

Spatial perspectives are a means to enrich our understanding of community colleges, particularly since it is rather intuitive to consider how space and place are relevant to the study of community colleges. Applying Lefebvre's (1991) social space triad, community colleges can be understood as conceived, perceived, and lived spaces. As a conceived space, community colleges were originally named as "junior colleges"; these two-year institutions became designated as "community colleges" by the federal government in the early 1970s. This shift signals spatial ties of these postsecondary education institutions. Its articulated functions also become very spatially-inspired, since they are meant to provide "terminal occupational training for employment in the local community" (Brint and Karabel, 1989, p. 11). Drawing on Lefebvre's (1991) concept of conceived space, community colleges' function includes providing opportunities for students to transfer to the four-year sector, as well as meeting local, regional, and national economic and workforce development needs (Brint & Karabel, 1989; D'Amico, 2016; Jacobs & Worth, 2019; Katsinas, 1994; U.S. Department of Education, Office of Vocational and Adult Education, 2004).

As a perceived and lived space (Lefebvre, 1991), community colleges physically exist and occupy specific locations that shape college access, participation, and the organization of everyday life for students (Hillman, 2016; Hillman & Weichman, 2016; Lefebvre, 1991). Geography of opportunity highlights how the spatial distribution of colleges and universities in the United States are unevenly distributed and impact educational access and opportunities differently for students from historically minoritized communities (Dache, 2022; Hillman, 2016; Hillman & Weichman, 2016; Tate, 2008; Turley, 2009). There is residential and racial segregation within the higher education ecosystem and stratification processes shaping where colleges and universities are spatially situated (Baker, Edwards, et al., 2023; Baker, Solanki, & Kang, 2023). For example, communities in which there are large Latine populations and lower formal educational attainment rates tend to have fewer colleges and universities relative to communities with larger Asian and white communities (Hillman, 2016). There is a larger supply of community colleges relative to the traditional public four-year sector and the latter tend to be further away from where students reside (Hillman & Weichman, 2016). Such spatial patterns reveal racial patterns and elevate how racial segregation persists in the broader higher education ecosystem to shape college access, participation, and success. Additionally, rural communities also tend to exist in geographic locations that are distant from viable colleges and universities (Hillman & Weichman, 2016).

Rurality is a growing area of higher education research, particularly with a focus on college access (McNamee et al., 2026; Sowl & Crain, 2021). In their review of higher education research on rurality, McNamee and colleagues (2026) identified common characteristics that were uniquely attributed to rural places: smaller populations and lower population densities, fewer buildings, located far from urban areas, home to communities with close and tight-knit social networks, a labor market that is predominantly "working class" and with service industries, agriculture, and manufacturing, connected to the land socially and professionally, and slower pace of life. While bachelor's degree attainment among rural Americans is linked to outward migration patterns (Fiore et al., 2015; Gibbs, 1995; Sowl et al., 2022), rural students are also likely to attend college in rural areas. Students remaining in or relocating back to their home communities are individuals who feel close to their friends, families, and communities (Sowl et al., 2022; Vazzana & Rudi-Polloshka, 2019). Scholars have taken a wide range of approaches in defining and measuring rurality and rural students; some scholars have categorized "rurality" as an identity (Cain, 2021; McNamee et al., 2026). McNamee and Ganns (2023), citing Richards and Stambaugh (2015) and Wuthnow (2018) describe rurality in abstract terms, stating that it "is a way of life with specific cultural values and a sense of place within small, remote communities" (p. 381). High school graduates from rural places benefit from personalized instruction and smaller classroom sizes (Showalter et al., 2019). Rural students also enroll in dual enrollment at higher rates than students from suburban and urban places. The experiences of students in rural areas can also range depending on students' social contexts, positions, and trajectories. For example, students identified as Latine in rural areas draw upon various assets as they navigate college participation alongside their friends, households, and communities (Mazón, 2024; Puente, 2022; Puente et al., 2023, 2026).

In the context of these broader conditions the physical space of colleges and universities, college access and participation are also conditioned as perceived and lived spaces–the everyday spatial practices that organizes individuals' lives and the subjective experiences within them (Lefebvre, 1991). The median distance from home and college among public college enrollees is 13 miles (Hillman, 2016). However, the perceived space and proximal processes of miles-to-college may mean different things in different contexts, as the everyday rhythms of how one navigates to and from college may vary given variation in regional terrains, access to public transportation, and racial differences in sensitivity to college distance (Acton et al., 2024; Dache, 2022). For example, mobilities can be a privilege in which white students and students who are more economically advantaged are, on average, able to access so they can travel further to attend college (Chatterton, 2010; Hoxby, 2009; Long, 2004).

As perceived spaces, colleges and universities shape and are shaped by students' everyday practices, decisions, and mobilities. Wainwright and colleagues (2026) use the term "journeying" as a "spatial-temporal frame of analysis to emphasise the relational process of travelling, of moving through space between points of departure and destination" (p. 181). Journeying, as an analytic approach, elevates travel as "relationally experienced in terms of human and non-human encounters, rather than reducing it solely to a function and purposeful commute from one location to another" (p. 181-182). This approach to mobility embraces the "ordinariness" (quotation mine) and everyday occurrence that is often overlooked in research contexts (Brownlie, 2019; Neal & Murji, 2015; Pink, 2012), emphasizing how students' lived experiences in places shape their college access and participation. Everyday life occurs within a socio-spatial context and can be a critical site for inquiry into decision-making (Jarvis, 2010; Jarvis et al., 2001; Skelton, 2017). Research on the everyday can provide "rich insights onto persistent socio-spatial inequalities and their implications for daily life" (Chaney, 2002, p. 10). In higher education, the examination of students' micro-mobilities is an approach that aligns with common everyday practices of college students and captures the broad relational, emotional, and temporal experiences that shape and are shaped by college participation (Finn, 2017, 2019; Holton & Finn, 2018, 2020; Wainwright et al., 2020). Thus, everyday journeying can capture the contexts, experiences, and impact of journeying as commuter students move through and in-between temporal and spatial experiences and conditions (Wainwright et al., 2026).

From a place-based perspective, community colleges are not only abstract geometries, but are also culturally, economically, and socially embedded within the communities they serve (Gieryn, 2000; Wright et al., 2022). The roles and functions of community colleges are co-constructed alongside local contexts and conditions (Wright et al., 2022). For example, community colleges shape and are shaped by local labor markets, community relationships, and how community members conceive of their spatial identities and imaginations (Brint & Karabel, 1989; D'Amico, 2016; Jacobs & Worth, 2019; Reyes et al., 2019). While students' college access and participation are shaped by physical proximity to colleges, they are also shaped by students' spatial attachments, experiences, identities, and imaginations (Brint & Karabel, 1989; Dache, 2022; D'Amico, 2016; Gieryn, 2000; Jacobs & Worth, 2019; Massey, 1994; Puente et al., 2023; Reyes et al., 2019; Wright et al., 2022). By leveraging conceptions of space and place, researchers can enhance their understandings of how spatial conditions, social processes and structures, and everyday practices and routines interplay to shape college participation.

From a policymaking and institutional design perspective, spatial conditions are a relevant dimension where the feasibility of college participation is enabled or constrained. When bachelor's degree programs are situated in local community colleges, students' macro-level *stratified feasibility landscape* shift and in this way CCB programs are well-positioned to expand college access and participation to students. As *trajectory-responsive policies*, CCB programs can further enable participation by attending to the spatial conditions and constraints that have historically and currently derailed bachelor's degree attainment at the micro-, meso-, and macro-levels. When CCB programs are geographically proximal to students and align with students' spatial attachments, identities, and imaginations, CCB programs can meaningfully expand college access and participation.

2.5.6 Temporal Conditions

The dimension of temporal conditions captures the role of scheduling, timing, and temporal matters in shaping college access, success, and equity. Within the higher education context, students' time, time use, and time management has typically been studied from an individualistic perspective (Bettencourt et al., 2025). Students' sole agency and agency with respect to time have been the dominant approach to the study of time in higher education research, but systemic contexts and economic systems are also relevant in shaping time. In response, time navigation and time equity have been proposed as a more asset-based approach to understanding how students navigate and negotiate time as they navigate higher education contexts. Temporal conditions through the lens of time navigation and equity are central to understanding the *stratified feasibility landscape* in which students participate, navigate, sustain, and benefit from college pathways.

Under a capitalistic system, time is viewed as a resource to be utilized effectively, efficiently, and productively to maximize output of goods (Marx, 1906; Saifullah & Kleiner, 1988). Time management, or how individuals allocate their time to specific commitments and priorities, is a skill to accomplish tasks and goals (Hellsten, 2012). Time management is often linked as a determinant of student success because this is a skill related to completing tasks, reducing stress and anxiety, self-regulation, and pursuing co-curricular academic activities (Adams & Blair, 2019; Macan et al., 1990; Thibodeaux et al., 2016; Zimmerman, 2008). Time poverty relates to life conditions in which students may have insufficient quality and quantity of time that can be devoted to college work (Wladis et al., 2018). Time is related to the college outcomes students are able to experience, and this relationship is inequitably distributed across intersections of gender and race/ethnicity (Wladis et al., 2024). Moreover, it is proposed that increased work and family responsibilities limit the time that students may have for college work.

The higher education scholarship related to time management has been limited in its omission, stigmatization, and deficit approaches to understanding the complex range of commitments that shape students' time (Armstrong & Hamilton, 2013; Calarco, 2018; Goldrick-Rab, 2016; Rivera, 2016; Streib, 2016; Stuber, 2011). Capitalistic systems and systemic inequity shape students' temporal conditions and consequentially shape what college participation looks like for students. Expectations of time management are based on capitalistic, white, "middle class" norms that are often agnostic to how people from different social contexts, positions, and trajectories may interface with time (Streib, 2016). For example, the idea of time management and planning assumes that people have predictable lives and the power and resources to exert agency on their temporal conditions (Goldrick-Rab, 2016). However, delays in transportation, shifts in household and caretaking commitments, and changing work hours can quickly modify one's temporal conditions in ways that are not complementary to normative assumptions and framings of time management and planning. Such lived and everyday temporal experiences also consequentially impact students' capacities to participate in academic and co-curricular activities (Armstrong & Hamilton, 2013; Calarco, 2018; Rivera, 2016; Stuber, 2011). While such activities may be beneficial to students' college and career experiences, outcomes, and trajectories, students' temporal conditions are stratified by students' social contexts, positions, and backgrounds, such as their socioeconomic status.

In response to these limitations of the time management framing, Bettencourt and colleagues (2025) propose time navigation as an asset-based lens to understand "the process through which students negotiate the use of their time capital in various contexts and systems in higher education" (p. 286). This framing centers on navigation given its analytic value in illuminating the ways in which students maneuver hegemonic environments to construct time, as established by economic systems (Yosso, 2005). According to Bettencourt and colleagues (2025), this approach acknowledges students' contexts and the systemic barriers they experience, and allows researchers "to understand how individuals exert agency and choice to make decisions based on their specific situation and contexts" (p. 285). This approach also draws on time capital (Wladis et al., 2024). Through a time capital framing, time can be viewed as a malleable resource within broader social structure that can be exchanged or integrated to other forms of capital. Individuals exist in broader timescapes, or the complex, multidimensional temporal contexts whose construction is dependent on one's social contexts, positions, and backgrounds (Adam, 1998; Bennett & Burke, 2018; Brooks et al., 2021). Within the higher education context, time navigation is how students' continuously negotiate time capital within a timescape that is related to their ability to participate in college.

Bettencourt and colleagues (2025) propose a time equity framework to be used by researchers to consider multiple facets of time and approaches, framings, and methodologies to study time equitably. Facets of time include understanding how time is shaped, exploring agency for different groups, examining different forms of time navigation and constraints (time opportunity), measuring success by students' aspirations and goals (time goals), understanding how students holistically use and prioritize time (time values), recognizing time inequities and students' circle of influence/agency (time environment), and reframing success as an ongoing process of time navigation dependent on individual and contextual factors (mastery of time). This approach to the study of time equity can examine structural conditions that shape students' time availability, opportunity, and agency, and how time operates within broader systems of social reproduction.

From a policymaking and institutional design perspective, temporal conditions are a relevant dimension when the feasibility of college participation is enabled or constrained. Given the diversity of students' social contexts, positions, and trajectories, colleges may enroll adult learners or students who balance academic commitments alongside community, household, and employment commitments (Matus-Grossman et al., 2002). It can be valuable to understand students' temporal conditions through the lens of time navigation and equity–students' time environments and timescapes, their agency within such time environments, and their negotiation of time opportunity, goals, and values as they obtain mastery of time in their pursuit of higher education.

As *trajectory-responsive* policies, when CCB programs have institutional arrangements and designs that align with the multitude of students' commitments, such as college and work, they can shape how temporal conditions enable or constrain college participation. Community college are more likely to enroll students who navigate simultaneous commitments, such as academic, employment, and household commitments. Temporal conditions may interplay with other conditions, such as programmatic and spatial, to shape a *stratified feasibility landscape* of college participation. For example, course availability and scheduling, particularly in community college contexts, have been a limited area of scholarship, and one that may have major racial equity implications (Sublett & Orenstein, 2023) given how course structures inherently interplay with students' temporal conditions. Students who commute have to navigate spatial and temporal conditions as they navigate college pathways (Dache, 2022). Colleges can positively shape college access, success, and equity–particularly for students who are balancing multiple commitments–when they offer more flexible course scheduling (e.g., evenings and weekends) and student support services (e.g., food and childcare) (Huerta et al., 2022; Matus-Grossman et al., 2002). As such, by considering time navigation and equity, CCB programs can leverage this flexibility to expand meaningful educational access to students.

2.6 College Participation and CCB Programs Within a Stratified Feasibility Landscape

This paper advances a framework that conceptualizes college access, success, and equity within a *stratified feasibility landscape* that is structured by multiple intersecting contexts and conditions. The framework identifies six relevant dimensions (administrative, economic, programmatic, social, spatial, and temporal conditions) through which institutional and structural conditions interplay to shape students' abilities to access, navigate, sustain, and benefit from participation in higher education. Within this landscape, students exercise bounded agency as they continuously navigate and negotiate the feasibility of sustained college participation in relation to their lived conditions, contexts, experiences, locations, and trajectories.

This framework also conceptualizes higher education policies as varying along a spectrum from *trajectory-responsive* to *trajectory-shaping*. CCB programs are framed as policy projects or reforms that operate within and alter the *stratified feasibility landscape* of bachelor's degree pathways. By leveraging the institutional arrangements, assets, assumptions, and designs of community colleges, these programs have the potential to expand meaningful access. Institutional conditions, such as institutional agents and structures, can enable or constrain students' *stratified feasibility landscape*. Guided by this conceptual framing, this paper examines how CCB programs shape the feasibility of bachelor's degree participation, the extent to which college access remains stratified, and for whom.

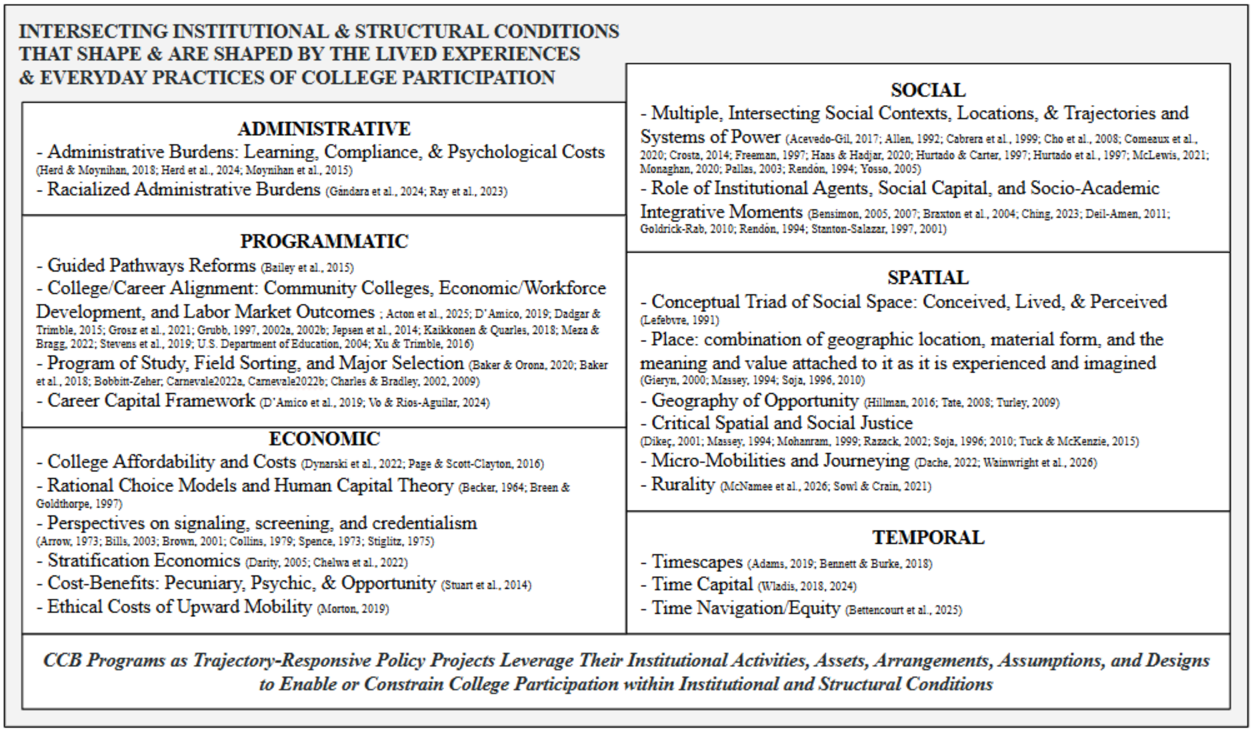


Figure 1: Stratified Feasibility Landscape of College Participation

CHAPTER 3

Data and Methods

Given the size, scope, and influence of Washington's and California's community college system and CCB programs, this paper situates itself in these two states. In the sections that follow, I will first describe my positionality and relationality as it relates to this research context. Following that, I will describe the Data and Methods as it relates to the quantitative analysis (RQ1 and RQ2)–covering the Washington CCB context, the analytic sample/strategy for my quantitative inquiry, limitations, and the reporting convention for the findings/results related to this analysis. Afterwards, I will describe the Data and Methods as it relates to the qualitative analysis (RQ3 and RQ4)–covering the California CCB context and the analytic sample/strategy for my qualitative inquiry, limitations, and the reporting convention for the findings/results related to this analysis.

3.1 Positionalities and Relationalities

With the perspective that the researcher is, in themselves, a research instrument–in both qualitative and quantitative domains—I will critically engage in this paper while being reflexive of my own positionalities and relationalities with respect to this context and topic. I hope to harness and recognize the limitations of my own social background contexts, perspectives, and lived experiences—as an Asian man who is a product of the Vietnamese diaspora, as a former educational practitioner with professional experiences across the entire public K-16 domain, and as a person who strives to act in accordance with fostering educational equity and promoting social and economic justice for communities who have historically been marginalized, minoritized, and excluded. I have taken multiple roles in the community college space–as a student, student success coach, intern, institutional researcher, faculty, and consultant–and these experiences inform how I understand community colleges and the students who attend them. I strive to be a "worthy witness" (Winn & Ubiles, 2011) and aim to document students' lives in a way that supports and enhances their dignity (Seidman, 2019).

With respect to CCB programs, I have spent the last four years working with the CCB space and generating research/evaluation about the academic and labor market experiences and outcomes of CCB programs and their implications for educational and racial equity. These experiences provide me with a unique perspective and understanding of CCB programs, but I also relied on formal and informal conversations regarding experiences of CCB programs "on the ground": with students, employers, and practitioners who are immersed in this world in ways that I am not. As I engage in this work, I acknowledge my own positionalities and relationalities to this context and topic, and hence value the potential contributions of the collaborators of this project who will be able to provide a student-, state-, and national-level perspective.

This paper could not have been done without all the students, practitioners, policymakers, and researchers who have come before me, whose extensive labor greatly contributes to this paper, and with whom I am fortunate enough to have worked alongside and hope to continue to be alongside. Following the academic tradition of the many education leaders that have come before me, I am guided by critical, asset-based, and equity-oriented perspectives in understanding students' lived experiences, by an understanding of how structural and systemic forces shape the contexts that we operate within, and the agency of individuals, households, and organizations to convert hopes and dreams into profound transformation. Throughout this paper, I make multiple methodological moves in how the analysis is conducted, considering potential implications and consequences, what assertions and patterns/themes I capture and elevate, and how they are presented. It is an honor to have been trusted to access

Washington's administrative and longitudinal dataset, as well as access to the life stories of the 30 CCB students/alumni, who gave me the space and time to work alongside me through this paper. This is a responsibility that I take seriously and I hope to do your trust in me justice.

Throughout this process, I strived to commit to reflexivity as I was trusted to hold these rich information points, reflections, stories, and narratives. I attempted to approach this paper and analysis with appropriate care and consideration, so that I could present this paper in a trustworthy and just manner. This involved trying to constantly layer my analysis across multiple forms of information and being critical in examining what I knew and how I knew it. For example, this involved taking multiple analytic approaches in the quantitative research design and thinking through multiple strategies, model specifications, and various assumptions. Qualitatively, this involved writing pages of field notes, analytic memos, and thinking through what was communicated to me and what it meant within the broader patterns of my conversations with CCB participants. I recognize that no paper or analysis is perfect, but strive to be as thorough, transparent, and open as possible. I hope this paper continues our conversations about how CCB programs shape and have shaped our worlds, and write to invite new perspectives and voices to join in the conversation as well.

3.2 Quantitative Analysis (RQ1 and RQ2): Analytic Approach

In this section, I describe my analytic approach with respect to the quantitative analysis. This approach was designed and implemented to generate insights on the guiding research questions:

- RQ1: To what extent are there similarities/differences between CCB graduates and non-graduates across social contexts, positions, and trajectories in Washington state?
- RQ2: To what extent are there CCB completion differentials in the labor market

outcomes (total annual earnings, hourly wage rates, and UI employment status) among students who matriculated into CCB programs and how do these differentials change over time (three, four, and five years after entry) in Washington state?

- Among CCB graduates and non-graduates, what are the mechanisms and trajectories related to total annual earnings differentials?
- To what extent do these CCB completion differentials in labor market outcomes vary between and within students from historically/racially minoritized communities (i.e., gender, race/ethnicity, age group) and by field of study?

3.2.1 Washington CCB Context

Given its size and scale of CCB adoption, Washington is an important part of the broader CCB ecosystem. As of writing, 33 of 34 community and technical colleges (hereafter community colleges) in Washington offer at least one bachelor's degree program. The first CCB program in Washington was approved in 2005-06 and as of 2025, there are at least 168 CCB programs in Washington (Community College Baccalaureate Association & Bragg & Associates, 2026). Compared to states with CCB programs, Washington has the second most CCB programs nationally, and in 2023-24, had awarded the second most CCB degrees (Meza & Vo, 2026). As such, Washington is an important site to examine labor market outcomes/trajectories of CCB programs because of how many CCB graduates there have been, how long these programs have been around, and because they are one of the few states with an accessible and viable dataset to support such an analysis.

In 2005, Washington authorized their community and technical colleges to offer pilot bachelor's of applied sciences (BAS) degrees at four community colleges (HB 1794, 2005). Part of the motivation for this legislation was to reconcile challenges of vertical transfer: credit loss, excessive time-to-degree, and tracking that were occurring among students enrolled in terminal career-technical education associate's degree programs (Seppanen, 2010).[1] In 2010, these pilot programs were approved and made permanent (SB 6355, 2010). The State Board of Community & Technical Colleges (SBCTC) became authorized to approve all new BAS programs in Washington's community colleges. Any Washington community college offering CCB programs would charge upper-division courses at the same tuition rates as their public regional university system to ensure institutional parity.

Washington plays a vital role within the CCB landscape given its history, size, scope, and mission. After the initial legislation authorizing BAS degrees, CCB programs were later expanded via Senate Bill 5928 (2016) and Senate Bill 5401 (2021) to offer bachelor's of science (BS) degrees in computer sciences. Per House Bill 2483, Revised Code of Washington (2021):

> The legislature finds it essential that Washington students, especially low-income students and students of color, have the necessary credentials to secure the high-demand jobs of the future... The legislature also finds that the state can do a better job of training Washington residents to secure these living wage jobs of the future. Additionally, of the 1,883 computer science degrees awarded in Washington during the 2018-19 school year, only 3.8 percent were awarded to African American students, 5.6 percent to Hispanic students, and less than 1 percent to Native Americans. The legislature further finds that Washington's competitiveness in the global economy requires the state to ensure companies are able to hire a qualified workforce of Washington residents.

In contrast to other CCB legislation nationally, Washington's legislation explicitly discusses opportunity gaps and requires disaggregated data analysis by gender, race/ethnicity,

[1] Historically, vocational education and career-technical education in the U.S. community college system has been a mechanism for student tracking since such programs tend to lead to terminal certificate or associate's degree programs, constraining (or diverting) bachelor's degree access and attainment (Atwell, 2020; Bragg, 2018; Frye, 1992; Kisker et al., 2023).

age, and socioeconomic status. Such language aligns with the adopted vision statement of the Washington State Board for Community and Technical Colleges (2019) (and is still currently in adoption):

> Leading with racial equity, our colleges maximize student potential and transform lives within a culture of belonging that advances racial, social, and economic justice in service to our diverse communities.

As such, given its alignment of CCB legislation, the expansive history, development, and implementation of CCB programs in Washington, and their data availability, Washington state is an intuitive site to examine the relationship between CCB programs and labor market outcomes.

3.2.2 Analytic Sample

An administrative, longitudinal, and statewide dataset accessed from the Washington State Education Research and Data Center (ERDC) and Washington State Board for Community and Technical Colleges is primarily used to examine the relationships between CCB programs and labor market outcomes. This is a student-level dataset obtained as part of an adjacent research/evaluation project with SBCTC. This dataset only includes students who matriculated into or entered (to be used interchangeably in the quantitative analysis) any CCB program in Washington between the academic years of 2018-19 and 2023-24. Students could have multiple observations if they matriculated into multiple CCB programs during this time frame at different colleges and years, so the unit of analysis is CCB matriculation record in Washington. In other words, each observation represents a unique combination of student, academic year of matriculation, and CCB college. There are 60 students who had multiple records of CCB matriculation; they were enrolled in two CCB programs at two different CCB colleges during this time frame. In instances where this occurred, both records were kept in the analytic sample given the small number of observations and to capture unique CCB matriculation records (0.04% of the primary analytic sample; given the small number of students, I will refer to observations in this dataset as CCB matriculation records and/or CCB students interchangeably).

This dataset includes variables relating to students' social contexts, positions, and trajectories. This includes–at time of matriculation–students' gender, race/ethnicity, age group, enrollment intensity (enrolled in at least 12 units [full-time] or less than 12 units [part-time], and whether they received need-based aid. This dataset also includes information relating to whether students attended a community college in Washington previously and whether they had an educational goal/intent of vertical transfer on record at any point. This dataset also includes the field of study information for the CCB program of study in each students' matriculation record via the Classification of Instructional Programs (CIP) code (hereafter used interchangeably). CIP codes are defined by the U.S. Department of Education's National Center of Education Statistics; the most granular CIP code, the six-digit CIP (CIP6) code, is provided in this dataset, allowing two-digit CIP (CIP2) codes to be derived (first two digits).

This data is also linked to Washington's Employment Security Department (ESD) and contains unemployment insurance (UI) records, from 9 to 20 quarters after CCB matriculation. The UI records include information as to whether students are observed in this dataset via an employment record (hereafter UI employed/employment or UI employment rate/status), total annual earnings, and median hourly wage rates (hereafter hourly wages or hourly rates) during three time periods. The UI records provides this information during quarters 9-12 after CCB students matriculated and began their CCB program (which will be referred to as year-three or Y3 labor market outcomes). This information is also provided during quarters 13-16 (hereafter year-four or Y4 labor market outcomes) and quarters 17-30 (hereafter year-five or Y5 labor market outcomes).

While this is a longitudinal statewide dataset available with verified labor market information and is comprehensive of all CCB matriculated students in Washington during this time frame, there are some caveats and limitations. First, with the scope of variables in this dataset of matriculated CCB students, I distinguished between three categories of students: (i) students who have completed their bachelor's degree (hereafter "CCB graduates" or "graduates"; defined by a receipt of a Washington CCB degree since CCB matriculation during the dataset's time frame), (ii) students who are currently non-enrolled (hereafter "CCB non-graduates" or "non-graduates" [sometimes referred to in the research literature as "exited" or "stop-out" students]; defined as by a CCB-matriculated student who has not had an enrollment record in any Washington community college for at least four quarters since their last enrollment record between 2018-19 and 2023-24), and (iii) CCB current students (defined as neither a "CCB graduate" nor "non-graduate"). Given my research questions (and choice of analytic approaches), I restrict the sample to CCB graduates and non-graduates.

The second caveat and limitation of this dataset is that–similar to most statewide UI data–the UI wage records do not contain information about individuals who do not have a social security number, who were employed outside the state of Washington, who are current active duty military, self-employed, federally employed, employed in any other way that is not covered by UI, or who are simply non-employed. Third, given the time frame of CCB adoption/implementation and the dataset available, there are not three years of labor market records across the six academic years (AY). Students who matriculated during the 2018-19, 2019-20, and 2020-21 AYs will have UI records for year-three, year-four, and year-five. CCB cohorts 2021-22 will have two years of UI records (year-three and year-four) and CCB cohort 2022-23 will have one year of UI records (year-three). CCB cohort 2023-24 have no UI records linked to them. As a related matter, only 30 of the 33 CCB colleges in Washington will have UI information, as not enough time has elapsed for newer programs to generate UI records.

The analytic sample for this paper's primary quantitative analysis represents the CCB matriculation records of CCB graduates (n = 8,927; n = 68.3%) and CCB non-graduates (n = 4,147; n = 31.7%) in 30 CCB programs in Washington who started upper-division CCB coursework between 2018-19 through 2022-23 (with student information up until 2023-24). Based on the data structure, five cohorts (2018-19 to 2022-23) have an observable window inclusive of year-three UI records (n = 13,074). The four cohorts between 2018-19 and 2021-22 have an observable window inclusive of year-four UI records (n = 10,750). The three cohorts between 2018-19 and 2020-21 have an observable window inclusive of year-five UI records (n = 8,343).

3.2.3 Analytic Strategies

In the following sections, this paper details the multi-analytic approach adopted for this paper's analysis. The analytic strategies adopted seek to quantitatively estimate the CCB completion differentials in labor market outcomes, but also aim to identify the various mechanisms that are related to CCB completion differentials, which channels or mechanisms are most robust, whether this changes over time, and whether this is different between/within different groups (fields of study, gender, race/ethnicity, and age). Since CCB students who complete their bachelor's degree may systematically differ from those who do not in ways that also impact labor market outcomes, self-selection bias is a central concern in estimating the CCB completion differential in labor market outcomes. To address this, this paper adopts a multi-analytic approach to estimate the CCB completion differential.

This paper primarily centers ordinary least squares regression as the primary estimator. When the sample size is large enough, the Lin (2013) estimator is generally used as an additional layer of robustness check and to account for potential violations of constant covariate slopes with OLS regression. As a complementary causal robustness check, I also utilize stabilized inverse probability weighting with doubly robust covariate adjustment as a third strategy. Across these analytic strategies, one model specification is prioritized in the pooled analysis and a stratified analysis is conducted by gender, race/ethnicity, age, and field of study (CIP2) group. Lastly, the omitted variable bias framework for sensitivity analysis generates additional insights on the robustness of the estimates generated and how sensitive they are to potential violations of unconfounding (Cinelli & Hazlett, 2020, 2025; Cinelli et al., 2024; Vo, in press).

In the following sections, I will first describe the primary OLS model specification, along with the outcome, treatment, and observed covariates that are included throughout the paper. Afterwards, I will describe the eight model specifications used to generate insights into the CCB differentials, as well as the details for the pooled and stratified analysis with the primary model specification. Following that, I will detail Lin (2013) regression, stabilized inverse probability weighting, the omitted variable bias framework for sensitivity analysis (Cinelli & Hazlett, 2020, 2025; Cinelli et al., 2024), and describe the benefits of this multi-analytic approach. Next, I will describe the limitations of this analytic approach and then close with the reporting convention that will be utilized in the quantitative portion of the Findings/Results chapter.

3.2.3.1 Ordinary Least Squares (OLS) Regression with HC2 Standard Errors Specification

To generate insights on the relationship between CCB programs and labor market outcomes, I leveraged ordinary least squares (OLS) regression with heteroskedasticity-consistent robust standard errors (HC2) as the primary estimator (hereafter simply OLS, OLS with HC2, or OLS [HC2]) (MacKinnon & White, 1985). For OLS, the model specification is:

$$Y_{it} = D_i\hat{\beta} + \mathbf{X}_i\hat{\gamma} + \hat{\varepsilon}_{it}, \tag{3.1}$$

where Y_{it} represents the labor market outcome of interest (e.g., total annual earnings in year-three) for a CCB matriculation observation, i, at time, t, where $t \in \{3, 4, 5\}$ indicates the number of years after initial CCB matriculation. The observed estimate is $\hat{\beta}$ and D_i is the treatment variable (receipt of CCB completion or not) for each observation. I interpret $\hat{\beta}$ as the CCB completion differential in labor market outcomes between the treatment group (CCB graduates) and comparison group (CCB non-graduates). $\mathbf{X}_i$ is the vector of observed covariates (which will vary by model specification) for each observation and $\hat{\gamma}$ is the corresponding vector of coefficient estimates.[2] The error term is $\hat{\varepsilon}_{it}$.

While standard OLS and OLS with HC2 generates the same estimates for $\hat{\beta}$, these two approaches compute standard errors (SEs) differently (MacKinnon & White, 1985). This has implications on p-values (and whether estimates are statistically significant). Standard OLS computes SEs while assuming homoskedasticity or equal variance. This can be problematic when there are unequal sample sizes because one group's variance will be overly influential in standard error computation. Given the high bachelor's degree completion rates observed in Washington's CCB program, there are unequal sample sizes in the treatment and comparison group. Of the full analytic sample of CCB matriculated students, CCB graduates comprise 68.3% (n = 8,927) of the sample compared to 31.7% (n = 4,147). OLS with HC2 accounts for these unequal group sizes to generate less biased standard errors in finite samples (Long & Ervin, 2000; MacKinnon & White, 1985).

Although one of the primary outcome variables explored in this paper is a dichotomous variable (whether students are UI employed or not), OLS is still leveraged to generate $\hat{\beta}$ given there are advantages in doing so. For dichotomous variables, the conditional expectation corresponds to the probability that the outcome is equal to one, $P(Y = 1 \mid X)$ (Angrist & Pischke, 2009). The OLS regression specification in Equation (3.1) estimates this conditional expectation. By estimating the model via OLS, the linear probability model allows coefficients to be interpreted directly as percentage point changes in the probability of the outcome associated with one unit change in the treatment variable, *ceteris paribus*. This makes the results much more interpretable. Additionally, OLS is compatible with the sensitivity analysis approach that will be adopted in this paper–the omitted variable bias framework for sensitivity analysis (Cinelli & Hazlett, 2020, 2025; Cinelli et al., 2024)–which

[2] In some supplemental model specifications, particularly when interpreting coefficient estimates of observed covariates, such as patterns of coefficient estimates for a field/gender/race/age, I will refer to these estimates as $\hat{\beta}$ when they are central to the present discussion.

will be described later in this chapter.

3.2.3.2 Outcome Variables

The primary outcome variable in this paper is the conditional log-transformed total annual earnings during quarters 9-12 after matriculating into the CCB program (also referred to as year-three earnings). This paper also centers two additional variables: the conditional log-transformed hourly rate and UI employment at year-three. The use of state-level UI wage records, and similar variables, have been commonly used as a standard to examine the labor market returns to community college enrollment/outcomes (Belfield & Bailey, 2011; Jepsen et al., 2014; Minaya & Scott-Clayton, 2022; Minaya et al., 2026; Stevens et al., 2019; Xu & Trimble, 2016). Throughout this paper, I will refer to the total annual earnings, hourly wage rates, and UI employment status as the three primary outcome variables. Total annual earnings and hourly wage rates are in 2024 dollars adjusted using the Consumer Price Index for All Urban Consumers (CPI-U) from the Bureau of Labor Statistics.

As mentioned in the Analytic Sample section, this dataset is linked to Washington's ESD UI records and provides labor market information three, four, and five years after students matriculate into their CCB programs. For each matriculation record in this dataset, i, I construct UI employment status, a dichotomous variable where "1" is observed in UI records ("UI employed/employment"; this is based on whether students have total annual earnings exceeding zero dollars) and "0" is not observed in UI records ("UI non-employed/employment"). This dichotomous variable, UI employed/employment, provides insight into whether CCB completion is related to whether students are employed in a recognized way by Washington's UI records. The UI employment rate, or being explicitly observed in the UI employment scope, was 76.4% (n = 13,074), 75.1% (n = 10,750), and 72.7% (n = 8,343) in the year-three, year-four, and year-five analytic samples.

As detailed in the Analytic Sample section, given the limits of UI records, not all records have earnings and hourly rate information, or explicit information as to whether they were employed anywhere. For example, a student who matriculated into a CCB program in 2018-19 may not have an UI record with annual earnings or hourly rates in year-three (2020-21). In this instance, their UI employment status would be "0" since UI information is expected within this observability window. In contrast, if a student who matriculated in 2020-21,their UI employment rate would not be expected to be observed until year-five (2025-26), so this record would be coded as "N/A." This distinction is important to recognize in order to understand students' labor market outcomes and this research design.

Across the total annual earnings and hourly rate variables, I distinguish between labor market outcomes as to when students' annual earnings and hourly wage rates are unconditional or conditional on UI employment. If records are within the observability window, where UI records are expected for earnings and hourly rates, but no information is explicitly provided, their UI employment indicator will be "0" and their unconditional earnings and hourly rates will zero dollars. In the conditional version of annual earnings and hourly rates, observations with no earnings will not be included in the estimates generated, as these outcomes would reflect "annual earnings, conditional on UI employment" (or conditional annual earnings).

I explore both unconditional and conditional labor market outcomes because they are important and can provide insights to different research questions. The unconditional outcomes provide insights on the CCB completion differentials in both UI employment and earnings on entrance into the Washington UI labor market and earnings. These outcomes will generate conservative estimates since students could be employed or generating earnings/wages in a way that may not be recognized by UI records. In contrast, conditional outcomes can isolate the CCB completion differentials in earnings and hourly rates. It can provide insights into whether CCB completion is related to increased annual earnings among those who are UI employed.

After establishing unconditional and conditional forms of annual earnings and hourly rates, there are many zero values, and this can have implication on model estimates, particularly in the unconditional outcomes. As such, I take three approaches with these variables. One, as mentioned above, I conduct the analysis keeping these variables in their raw form in dollars and treat zero values as zero dollars. However, with many zero dollar values, there is a right skew distribution of this data so I also take transformation approaches following common practices in labor economics and economics of education (Jepsen et al., 2014; Minaya & Scott-Clayton, 2022; Minaya et al., 2026). In one approach, I log-transform with a constant added, $\log(y + 1)$, the raw annual earnings and hourly rates (hereafter referred to as log-transformed [or log] earnings or hourly rates). Log-transformation with a constant is only applied in the unconditional earnings and hourly rates as the conditional versions, by definition, do not have zero dollar values. Following other proposed approaches to this research scenario, I also take an inverse hyperbolic sine (IHS) transformation to also accommodate for the zero values without using an arbitrary plus-one shift (Burbidge et al., 1988).

Annual earnings, hourly rates, and UI employment are valuable labor market outcomes to examine collectively and over time. Since annual earnings are related to UI employment and hourly rates, examining these latter two variables helps decompose and isolate the mechanisms of CCB completion differentials in annual earnings. In other words, a bachelor's degree can increase annual earnings by increasing UI employment in general or increasing hourly wage rates. Different mechanisms of CCB completion differentials in labor market outcomes have different implications for policy and practice. This decomposition approach aligns with prior work that has explored distinct mechanisms/channels of credential differentials in labor market outcomes (Belfield & Bailey, 2017; Jepsen et al., 2014; Minaya & Scott-Clayton, 2022; Minaya et al., 2026). Additionally, I also explore the labor market trajectories of CCB students: examining these outcomes in years three, four, and five after initial CCB matriculation to explore the sustainability of CCB completion differentials.

In total, this paper includes 33 outcome variables. There are three versions of UI employment (year-three, -four, and -five; dichotomous variable). There are 15 versions of total annual earnings (unconditional and conditional on employment; raw, log-transformed, and IHS-transformed; year-three, -four, and -five; continuous variable) There are 15 versions of hourly wage rates (unconditional and conditional on employment; raw, log-transformed, and IHS-transformed; year-three, -four, and -five; continuous variable).

3.2.3.3 Treatment Variable

The treatment variable is a dichotomous indicator as to whether CCB matriculated students have a receipt of CCB completion at any point during 2018-19 through 2023-24 academic years. For the purposes of this paper, those with a CCB completion record ("1") are considered CCB graduates, and those without ("0") are considered non-graduates. This within-college comparison–between students who completed versus those who enrolled/matriculated but did not complete–is a common standard approach in the labor market returns to higher education scholarship (Belfield & Bailey, 2017; Jepsen et al., 2014; Stevens et al., 2019), since it controls for the selection into enrollment/matriculation. As it will later be shown on Table 2, CCB graduates and non-graduates are not meaningfully different across many dimensions, such as gender, race/ethnicity, age group, socioeconomic status, and field of study; while there may be differences, it is not clear whether another control group would be less different.[3]

Overall, this "intent-to-treat" design ensures that non-graduates in the analytic sample do not include eventual CCB graduates, which would "contaminate" the comparison group

[3] A secondary comparison of CCB graduates, CCB non-graduates, and the overall weighted population of the Washington community colleges also provide exploratory insight on who CCB graduates are (see Table 2 and Appendix: Table 15). In general, CCB graduates and CCB non-graduates seemingly differ from the overall weighted Washington community college population. CCB matriculated students (CCB graduates and non-graduates), relative to the overall weighted student community college population at the same 30 Washington community colleges, are more likely to be identified as Asian (12.6% vs. 9.5%), Black (6.6% vs. 5.2%), and white (49.3% vs. 45.0%), and less likely to be Latine (9.7% vs. 17.8%). CCB students, relative to the overall community college student population, are also more likely to received need-based aid (44.7% vs. 21.2%) and less likely to be enrolled part-time (33.6% vs. 46.0%). These descriptive comparisons should be interpreted with caution since these values are institutional averages and may not directly correspond to student-level comparisons.

and potentially bias the estimates upward. However, since completion status is determined over a full observation window of the dataset, it is possible for some CCB graduates' labor market outcomes to have been measured while they were still enrolled and completing their bachelor's degree. For example, a student may matriculate into their CCB program in 2018-19, have year-three earnings data (2021-22), but not complete their bachelor's degree until 2023-24. In this analysis, they would still count as a CCB graduate. Therefore, the estimates in this paper are conservative, since there is likely downward bias. Some CCB graduates would technically be pre-completion earnings, hourly rates, and UI employment status. If CCB graduates' labor market outcomes reflect their earnings while they were still enrolled and completing their bachelor's degree, they may not be as active of participants in the labor market by UI standards. This trend is consistent with the results that are revealed later in this paper (e.g., CCB graduates' labor market trajectories are steady and/or typically grow from year-three to year-five). As such, the primary results of this paper more technically reflect "CCB eventual-completion differentials in labor market outcomes" (hereafter "CCB completion differentials in labor market outcomes" or similar phrasing). This pattern of enhanced labor market outcomes over time aligns with prior scholarship that highlighted the long-term labor market value of higher education credential completion, particularly in the context of community colleges (Minaya & Scott-Clayton, 2022; Minaya et al., 2026).

3.2.3.4 Observed Covariates

Up to 28 covariates are utilized in the various analytic strategies to account for variables that could explain some of the variation between CCB completion and labor market outcomes. The observed covariates incorporated in model specifications were individual-level dichotomous covariates that provided information about students' social contexts, positions, and trajectories that could be related to labor market outcomes.

Gender. The gender variable during the first term of CCB matriculation was categorized into three groups: female, non-binary or not reported, and male; male was used as the reference category in model specifications. Although not ideal, I problematically lumped "non-binary" and "not reported" together into one covariate. I explored specifications with "non-binary" and "not reported" as two separate dichotomous variables. However, since there were less than 10 non-binary CCB students in the full analytic sample (which, in itself, has equity implications), their results could not be reported due to confidentiality. When this variable was separated into two separate covariates, the full analytic strategies could not be fully conducted given the smaller sample sizes of non-binary students. When models could be computed, overall estimates and interpretation remained largely unchanged.

Race/Ethnicity. Race/ethnicity included eight covariates: American Indian or Alaska Native, Asian, Black, Latine, Multiracial, Native Hawaiian or Pacific Islander, Not Reported [hereafter "Not Listed"], and white; white was used as the reference category in model specifications.

Age Group. The age group during first term of CCB matriculation included four groups: "24 years-old or younger or not reported", 25-29 years-old, 30-39 years-old, and 40 or older. The "Not Reported" group comprised of one observation so they were lumped together with 24 years-old or younger and used as a reference group in model specifications.

CIP2 Code/Field of Study. Observed covariates capture all of Washington's CCB programs' 15 CIP2 codes that are linked to CCB students' most recent bachelor's degree program of study. To ensure stable estimation, only CIP2 codes in which there were more than 100 students in the year-three analytic sample and where more than one CCB college offered CCB programs in that CIP2 code were generated as dichotomous variables; otherwise, a "CIP2: Not Listed" category captured all other CIP2 codes. In total, there were eight dichotomous CIP2 variables: Computer & Information Sciences & Support Services (CIP

= 11), Education (13), Engineering Technologies/Technicians (15), Multi/Interdisciplinary Studies (30), Public Administration & Social Service Professions (44), Visual & Performing Arts (50), Health Professions & Related Programs (51), and Business, Management, Marketing, & Related Support Services (52). The "Not Listed" category includes seven CIP2 codes of CCB programs grouped together: Communications Technologies/Technicians & Support Services (10), Personal & Culinary Services (12), Legal Professions & Studies (22), Biological & Biomedical Sciences (26), Security & Protective Services (43), Mechanic & Repair Technologies/Technicians (47), and Transportation & Materials Moving (49). Business, Management, Marketing, & Related Support Services was used as a reference category in model specifications.

Cohort Academic Year. There were five dichotomous indicators to capture the academic cohort year of when CCB students matriculated. This includes: 2018-19, 2019-20, 2020-21, 2021-22, and 2022-23; 2018-19 was used as the reference category.[4] These observed covariates help account for cohort/temporal fixed effects.

Additional Social Contexts, Positions, & Trajectories. This includes four observed covariates: need-based aid recipient status at CCB matriculation ("1" as yes; "0" as no), enrollment intensity at CCB matriculation ("1" as enrolled part-time [less than 12 units]; "0" as enrolled full-time [at least 12 units]), whether students had previously attended a Washington community college ("1" as yes; "0" as no), and whether students had an educational goal of vertical transfer upon entry at their previous Washington community college ("1" as yes; "0" as no). The reference category is "0" for these four observed covariates.

[4]Although this data included 2023-24 student information, they were not included in the analysis since no UI records information was available. Additionally, given the variables included in the dataset, the methodology to categorize CCB graduate and non-graduate, it was not possible to discern who were CCB non-graduates vs. CCB current students

CCB College/Institution. Observed covariates also capture institutional and temporal/cohort fixed effects. A dichotomous variable for each of the 30 community college institutions with CCB matriculation record was generated. There were 30 CCB colleges in this Washington dataset. For confidentiality purposes, I minimize discussion of how the reference category was created or selected, but lumped two CCB colleges together to create a reference category. A comparison of the institutional and community contexts suggests that there are slight differences in the institutional characteristics and census tract measures linked at the institutional level (see Appendix: Table 15). Including observed covariates at the CCB college/institution-level helps provide insight on how observed and unobserved institutional fixed effects may alter estimates of CCB completion differentials.

Selection of Reference Category. My selection of reference categories was motivated by a few factors. One was for technical viability to ensure stable estimation. All reference categories selected were justified given the size of the group sample. Additionally, I selected male, white, and 24 years-old or younger as reference categories in model specifications–not to center them relative to other student communities, populations, or groups–but to recognize and name the historically advantages and experiences by these groups, particularly in the labor market. Students who did not receive need-based aid and were enrolled full-time were selected as reference categories for similar reasons, as these categories have historically been linked to traditional markers of college success (Deil-Amen, 2015). The 2018-19 matriculation cohort was the reference category due to viable sample size and it was the first cohort available in this dataset. Business & Management (52) was selected because it had a viable sample size.

3.2.3.5 Model Specifications

Across my analytic strategies, I leveraged eight model specifications to explore the CCB completion differentials in labor market outcomes. Throughout this paper, I generally focus on the results of the *M1: Primary* model. As it will be demonstrated in the results, the estimates generated in these eight model specifications were generally consistent. However, different model specifications provide different insights on how race/ethnicity, field of study, and institutional factors interplay, shaping CCB completion differentials in labor market outcomes. Additionally, separate models were utilized to generate estimates within each observability window of labor market outcomes (e.g., year-three outcomes use the year-three analytic sample, year-four outcomes use the year-four analytic sample, and year-five outcomes use the year-five analytic sample). The eight model specifications are described below.

M1: Primary. Includes the following variables from the Observed Covariates section: *Gender, Race/Ethnicity, Age Group, CIP2 Code/Field of Study, Cohort Academic Year, and Additional Social Contexts, Positions, & Trajectories.* This is the primary model specification for this paper and accounts for the main observable sources of selection into CCB completion without sacrificing degrees of freedom for the stratified/group analysis.

M2: Primary + Institutional Fixed-Effects. Includes all covariates in *M1: Primary* model, as well as the *CCB College/Institution* from the Observed Covariates section. This model specification generates insights into the extent that the CCB completion differentials are related by institutional sorting.

M3: Primary Race/Ethnicity x CCB Completion. Includes all covariates in *M1: Primary* model. Interacts each *Race/Ethnicity* covariate by the treatment variable, *CCB Completion.* This model specification examines whether the CCB completion differentials in labor market outcomes varies by race/ethnicity within the pooled models; it explores whether there is heterogeneous treatment effects across racial/ethnicity groups.

M4: (Primary Race/Ethnicity x CCB Completion) + Institutional Fixed-Effects. Includes all covariates in *M2: Primary + Institutional Fixed-Effects* model, as well as the *CCB College/Institution* from the Observed Covariates section. Interacts each *Race/Ethnicity* covariate by the treatment variable, *CCB Completion*. This model specification examines whether the CCB completion differentials in labor market outcomes varies by race/ethnicity within the pooled models after accounting for institutional fixed-effects; it explores whether the heterogeneous treatment effects across racial/ethnicity groups is related to institutional sorting.

M5: Base + Field of Study (CIP2). Includes the following variables from the Observed Covariates section: *Gender, Age Group, CIP2 Code/Field of Study, Cohort Academic Year, and Additional Social Contexts, Positions, & Trajectories.* By excluding Race/Ethnicity covariates, this model specification helps isolate the role of field of study (CIP2) in shaping the CCB completion differentials in labor market outcomes and explores the extent that primary estimates are sensitive to the inclusion of race/ethnicity control variables.

M6: Base + Race/Ethnicity. Includes the following variables from the Observed Covariates section: *Gender, Race/Ethnicity, Age Group, Cohort Academic Year, and Additional Social Contexts, Positions, & Trajectories.* By excluding *CIP2* covariates, this model specification helps isolate the role of race/ethnicity in shaping the CCB completion differentials in labor market outcomes and explores the extent that primary estimates are sensitive to the inclusion of CIP2 control variables.

M7: Base + Field of Study (CIP2) + Institutional Fixed-Effects. Includes the following variables from the Observed Covariates section: *Gender, Age Group, CIP2 Code/Field of Study, Cohort Academic Year, Additional Social Contexts, Positions, & Trajectories, and CCB College/Institution.* By comparing this to *M5: Base + Field of Study (CIP2)*, this model specification examines whether the CCB completion differentials in labor market outcomes is robust to institutional sorting.

M8: Base + Race/Ethnicity + Institutional Fixed-Effects. Includes the following variables from the Observed Covariates section: *Gender, Age Group, Race/Ethnicity, Cohort Academic Year, Additional Social Contexts, Positions, & Trajectories, and CCB College/Institution*. By comparing this to *M6: Base + Race/Ethnicity*, this model specification examines whether the CCB completion differentials in labor market outcomes is robust to institutional sorting.

3.2.3.6 Pooled vs. Stratified Primary Model Specification

The analytic approach of this paper allows for two distinct comparisons using pooled and stratified models. Prior scholarship has revealed the heterogeneity in labor market outcomes related to community colleges by credential, field of study, gender, race/ethnicity, and age (Acton et al., 2025; Belfield & Bailey, 2011, 2017; Dadgar & Trimble, 2015; Jepsen et al., 2014; Meza & Bragg, 2022; Minaya & Scott-Clayton, 2022; Minaya et al., 2026; Stevens et al., 2019; Xu & Trimble, 2016). Conducting a pooled and stratified analysis can generate insights on the implications of CCB programs on college success and equity. This approach aligns with prior scholarship that has examined heterogeneous treatment effects in the average returns to higher education by different student populations (Minaya & Scott-Clayton, 2022; Xu & Trimble, 2016).

The pooled primary model estimates the CCB completion differentials in labor market outcomes, conditional on observed covariates. This can generate an average estimate and insights on how earnings may differ between CCB graduates and non-graduates. For example, with the inclusion of variables like race/ethnicity, the primary pooled model specification reveals the extent to which labor market outcomes may differ *between* race/ethnicity among CCB graduates. This is a useful inquiry, and the inclusion of a stratified analysis provides additional insights on heterogeneity in CCB completion. The stratified primary model specifications estimate the CCB completion differentials in labor market outcomes *within* a specific group. For example, the stratified model can generate insights on how labor market outcomes may differ between CCB graduates and non-graduates *within* the same racial/ethnic group.

To generate stratified estimates, I filtered the analytic sample for the specific group and generated an estimate within that subsample using the primary model specification. When stratifying the analysis to center a specific group, the corresponding covariate was removed from the model specification and the remaining covariates were included. Like the pooled primary model specification, I estimated CCB differentials in labor market outcomes for each observability window (year-three, -four, and -five) using the respective analytic sample. So, for example, to conduct the stratified analysis for Asian students' year-three labor market outcomes, I will filter my year-three analytic sample to Asian students, remove the Asian covariate from the primary model specification, and then compute my estimator via OLS [HC2].

I conducted my stratified analysis across four dimensions: field of study (CIP2), gender, race/ethnicity, and age group. For CIP2, I focus on the four largest fields of study: Business, Management, Marketing, & Related Support Services (hereafter Business & Management), Computer & Information Sciences & Support Services (hereafter Computer & Info Sciences), Education, and Health Professions & Related Programs (hereafter Health Professions). Due to small sample sizes for some groups, some stratified analysis could not be fully computed across all analytic strategies and/or the results indicated that their results should be interpreted with caution. As much as possible, I try to avoid lumping and try to transparently report out the unique results of each group. Given the ambiguity of "Not Reported" and "Not Listed" groups, they are not reported. Where possible, I apply this stratification approach across all analytic strategies, which I will describe in the following sections.

3.2.3.7 Lin Regression

As an additional regression-based robustness check, I also use the Lin (2013) estimator. The Lin estimator centers the means of all covariates and interacts the centered covariates with the treatment variable. This approach relaxes assumptions about the functional form of OLS (e.g., linearity) by allowing CCB graduates and non-graduates to have separate slopes for their observed covariates. This is in contrast to standard OLS, which assumes that the relationship between the outcome variable and covariates are constant for both CCB graduates and non-graduates. Previously used in evaluating randomized social programs, the Lin estimator generates an estimate that is at least as asymptotically precise as the OLS estimate–even with treatment effect heterogeneity–without having to specify which covariates have heterogeneous slopes. Like the OLS specification, the Lin estimator also uses HC2 standard errors and uses the same sample for the primary OLS models specified. The Lin estimator is reliable in the pooled models where the sample size is large enough for all the additional parameters from interactions. The Lin regression specification is as follows:

$$Y_{it} = D_i\hat{\beta} + \mathbf{X}_i\hat{\gamma} + D_i(\mathbf{X}_i - \bar{\mathbf{X}})\hat{\delta} + \hat{\varepsilon}_{it}. \tag{3.2}$$

Similar to the OLS specification, Y_{it} represents the labor market outcome of interest (e.g., total annual earnings in year-three) for a CCB matriculation observation, i, at time, t, where $t \in \{3, 4, 5\}$ indicates the number of years after initial CCB matriculation. The observed estimate is $\hat{\beta}$ and D_i is the treatment variable (receipt of CCB completion or not) for each observation. I interpret $\hat{\beta}$ as the completion differential in labor market outcomes between the treatment group (CCB graduates) and comparison group (CCB non-graduates). $\mathbf{X}_i$ is the vector of observed covariates (which will vary by model specification) for each observation and $\hat{\gamma}$ is the corresponding vector of coefficient estimates. In the Lin regression, there is a third term, a treatment-covariate interaction term: $\bar{\mathbf{X}}$, the sample mean of the covariates.

This is included and subtracted from $\mathbf{X}_i$ to center $\mathbf{X}$; since this is interacted with D_i, it follows that $\hat{\delta}$ captures the differential relationship between covariates and the outcome across CCB graduates and non-graduates. The error term is $\hat{\varepsilon}_{it}$.

By allowing CCB graduates and non-graduates to have separate covariate slopes, the Lin (2013) estimator is an analytic approach that affords the possibility that the earnings penalty of students who are enrolled part-time or of a particular field of study, between CCB graduates and non-graduates, can differ. In instances where there is this heterogeneity, and the assumption of constant slopes for standard OLS is violated, the Lin estimate will be different. Therefore, if there is convergence in the OLS and Lin estimate, this provides supporting evidence to suggest that heterogeneous treatment effects across covariate values do not bias the estimate in substantive ways.

The Lin (2013) estimator is reported for the primary pooled model specifications across all outcome variables. Due to the large number of interaction terms that are generated via treatment-covariate interaction terms (since there are 28 covariates in the model specification), the Lin estimator could not be appropriately applied to generate estimates in the stratified analyses. In these instances, there is overparameterization relative to the degrees of freedom in the groups that have a smaller number of observations.

3.2.3.8 Stabilized Inverse Probability Weighting

As another robustness check, this paper also applies a complementary causal strategy. Drawing upon the potential outcomes framework (Imbens & Rubin, 2015; Rubin, 1974, 1977), I leverage propensity score matching and stabilized inverse probability weighting (SIPW) with covariate adjustment to generate doubly robust estimates of the CCB completion differential in labor market outcomes (see Imbens and Rubin, 2015 for more details to this analytic approach). To examine community college effects, many scholars have used varying forms of propensity score matching (Brand et al., 2014; Dietrich & Lichtenberger, 2015; Doyle, 2008; Gonzalez Canché, 2014; González Canché, 2018; Melguizo et al., 2011; Monaghan & Attewell, 2015). Whereas OLS adjusts for observed covariates parametrically via the regression function, SIPW adjusts for this non-parametrically by reweighting the sample so that the distribution of observed covariates is balanced across both CCB graduates and non-graduates.

This approach involves a few primary steps. First, propensity scores are estimated using a logistic regression model. The propensity score estimates represent the probability of CCB completion conditional on observed covariates and can be represented as such:

$$\hat{\pi}(\mathbf{X}_i) = \Pr(D_i = 1 \mid \mathbf{X}_i) = \frac{1}{1 + \exp(-\mathbf{X}_i\hat{\alpha})}. \tag{3.3}$$

Here, $\mathbf{X}_i$ is the same vector of observed covariates from the primary OLS specification and $\hat{\alpha}$ is the corresponding vector of estimated logistic regression coefficients. The propensity score is a one-dimensional approximate summary of the observed covariates. By conditioning on the propensity score, the treatment is independent of covariates ($D_i \perp\!\!\!\perp \mathbf{X}_i \mid \hat{\pi}(\mathbf{X}_i)$). This means that among observations with the same propensity score, the covariates are identically distributed between CCB graduates and non-graduates. If this holds, then the conditional ignorability assumption (no observed confounding) holds, and a defensible estimator can be leveraged.

Using the propensity scores, $\hat{\pi}(\mathbf{X}_i)$, the conventional inverse probability weighing (IPW) formula is:

$$IPW_i = \frac{1}{\Pr(D_i \mid \mathbf{X}_i)} = \frac{1}{D_i\hat{\pi}(\mathbf{X}_i) + (1 - D_i)(1 - \hat{\pi}(\mathbf{X}_i))}. \tag{3.4}$$

To account for potential bias when working with smaller sample sizes, this paper builds upon IPW and uses stabilized IPW instead:

$$SIPW_i = \frac{D_i \Pr(D_i = 1) + (1 - D_i)\Pr(D_i = 0)}{D_i\hat{\pi}_i(\mathbf{X}_i) + (1 - D_i)(1 - \hat{\pi}_i(\mathbf{X}_i))}. \tag{3.5}$$

SIPW normalizes the weights according to the sample distribution, so that extremely small or large weights do not severely bias the estimates. Observations with stabilized weights exceeding 10 were trimmed to limit the influence of extreme weights (Imbens & Rubin, 2015). In the pooled models, no observations needed to be trimmed. Trimming occurred only in the stratified analysis of groups with smaller sample sizes (e.g., one observation in the Pacific Islander analysis). As a quantitative approach to assess whether the conditional ignorability holds, I assessed the extent that covariate balance was sufficiently achieved after SIPW was applied using the standardized mean differences (SMD) of each threshold. Using a threshold of $|\text{SMD}| < 0.05$, I compared SMD for the unadjusted and SIPW-adjusted for each covariate; this is a more conservative approach than the conventional threshold of 0.10 typically applied (Austin & Stuart, 2015; Stuart, 2010). Since there were no extreme weights in the pooled models and covariate balance was achieved, there were sufficient common support between CCB graduates and non-graduates (see Appendix: Table 16).

The SIPW weights are then incorporated into the OLS regression model as weights per observation to help balance the covariate distribution between CCB graduates and non-graduates. I use a doubly robust estimator since the weighted regression function includes SIPW along with the full vector of covariates:

$$Y_{it} = D_i\hat{\beta} + \mathbf{X}_i\hat{\gamma} + \hat{\varepsilon}_{it}, \quad \text{weighted by } w_i. \tag{3.6}$$

SIPW with covariate adjustment (doubly robust) helps ensure that $\hat{\beta}$ will be consistent as long as the propensity score model or the OLS model is correctly specified. Like the OLS specification, HC2 robust SE were computed in these models.

Using the pooled model specification, SIPW was leveraged as an analytic strategy for the pooled and stratified analysis. The steps paralleled the OLS stratified analysis. Here, to generate stratified estimates, I also filtered the analytic sample for the specific group and generated an estimate within that subsample using the primary model specification. When stratifying on a specific group, the corresponding covariate was also removed from the propensity score model specification and the remaining covariates were included. Like the pooled and stratified primary model specifications in OLS, I also estimated CCB differentials in labor market outcomes for each observability window (year-three, -four, and -five) using the respective analytic sample. So, for example, to conduct the stratified SIPW analysis for Asian students' year-three labor market outcomes, I filtered my year-three analytic sample to Asian students, removed the Asian covariate from the propensity score model, computed SIPW weights (check if sufficient covariate balance was achieved; see Appendix; Table 17), and then computed the doubly robust estimator via weighted OLS (HC2).

3.2.3.9 Omitted Variables Bias Framework for Sensitivity Analysis

This paper adopts the omitted variable bias (OVB) framework sensitivity analysis introduced and implemented in Cinelli & Hazlett (2020, 2025) and Cinelli et al. (2024), which produces sensitivity summary statistics to make sense of confounders. This paper, as much social science and education research (Vo, in press), depends on identification strategies that make assumptions about selection-on-observables (SOO). The OLS regression formulation adopted in the primary OLS formulation was really a "restricted" regression model, since it is possible that we do not have a full suite of observed covariates that have strong explanatory power in explaining the CCB differentials in labor market outcomes:

$$Y = D_{res}\hat{\beta} + \mathbf{X}_{res}\hat{\gamma} + \hat{\varepsilon}_{res}. \tag{3.7}$$

All SOO strategies used rely on assumptions about "no unobserved confounding" and conditional ignorability that are required for a valid estimate. Yet, this assumption is inherently untestable and difficult to defend in practice in observational (education) research settings.

In an ideal world, the "full" regression model would be represented as such:

$$Y_{it} = D_i\hat{\beta} + \mathbf{X}_i\hat{\gamma} + \mathbf{Z}_i\hat{\gamma} + \hat{\varepsilon}_{it}, \tag{3.8}$$

where Cinelli and Hazlett (2020) include $\mathbf{Z}_i$, which represents all the unobserved covariates that should be accounted for to get a valid causal estimate of CCB completion status of each observation (D_i) on the labor market outcome of interest of the UI record year (Y_{it}; e.g., total annual earnings in year-three).

The bias of the estimates for the CCB completion differentials in labor market outcomes is the difference between the estimate from this full regression and the "restricted" regression estimate. As Cinelli and Hazlett (2020) and Cinelli and Hazlett (2025) show, one can mathematically derive useful sensitivity summary statistics to quantify how different levels of confounding could alter an estimate and, consequentially, the research interpretations made (Hazlett & Parente, 2023). Such statistics also allow researchers to transparently communicate the strength of unobserved confounding that could alter one's research conclusions and evaluate the degree that such confounding is plausible. Using the `sensemakr` R package (Cinelli et al., 2024), this paper relies on one sensitivity statistic from the OVB framework for sensitivity analysis (Cinelli & Hazlett, 2020, 2025; Cinelli et al., 2024).

$RV_{q,\alpha}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the effect to where it is no longer statistically significant. For this paper, I set the threshold at the conventional alpha level, $p < 0.05$. Where possible, $RV_{q=1,\alpha=0.05}$ is computed from conventional OLS without HC2[5] via `sensemakr` R package (Cinelli et al., 2024) for both the pooled and stratified analysis. In this paper, $RV_{q=1,\alpha=.05}$ may not be reported in two cases: (i) when the estimate is not statistically significant under OLS since the sensitivity statistic is mathematically zero and (ii) when SE could not be computed due to rank deficiency in small samples (e.g., often occurring in the stratified analysis).

[5]Point estimates are identical to OLS (HC2) as HC2 adjusts standard errors and not coefficient estimates.

3.2.3.10 Multi-Analytic Approach

This paper utilizes multiple analytic approaches–OLS regression, SIPW, and Lin (2013) regression–to generate estimates that can provide insight on the labor market impact of CCB program completion. All three analytic strategies rest on assumptions about "no unobserved confounding" and conditional ignorability to generate an estimate. Yet, despite selection-on-observables being commonly applied in research settings, this assumption is inherently untestable and is difficult to defend in practice. Since the assumption that "no confounding variables" cannot be fully dismissed, I leverage OVB framework for sensitivity analysis to quantify how hypothetical confounders could shift this paper's results/findings. By leveraging these complementary approaches, this paper applies a multi-analytic approach to examine the CCB completion differentials in labor market outcomes. This multifaceted approach is consistent with program evaluation scholarship that recommends triangulating across estimators that rely on different assumptions (Imbens & Wooldridge, 2009).

Although all three strategies rely on selection-on-observables, each analytic strategy adjusts for observed covariates through different methodological approaches and relies on different assumptions about the data generating process. OLS adjusts for covariates parametrically as a linear function and assumes that the relationship between covariates and the outcome variables are constant across CCB graduates and non-graduates. The Lin estimator relaxes the assumption that covariates have constant slopes and allows covariates for CCB graduates and non-graduates, respectively, to have different relationships with the outcome variable. SIPW adjusts for covariates non-parametrically by reweighting the analytic sample so that there is balance in the covariate distribution between CCB graduates and non-graduates.

To examine the robustness and sensitivity analysis of the estimates generated from these analytic strategies, I examine the stability of estimates of the CCB completion differentials in labor market outcomes across the eight model specifications. I also assess whether there is multi-analytic convergence across OLS, SIPW, and the Lin estimator, which rely on different assumptions about the regression function's functional form. I conduct a stratified analysis to examine heterogeneity *between* and *within* fields/CIP2 codes, gender, race/ethnicity, and age groups. Using a sensitivity statistic, $RV_{q=1,\alpha=0.05}$, I quantify how sensitive these estimates are to potential violations of unobserved confounding and how strong unobserved confounding would have to be to reduce any observed statistically significant effects to null. This multi-analytic approach rigorously examines CCB completion differentials in labor market outcomes in this observational research setting. If there is observed stability and robustness of the CCB differentials across analytic strategies, this provides greater confidence in the estimates generated, since they would suggest that the estimates are not the result of a single analytic strategy's methodological assumptions.

3.2.4 Limitations

Treatment and Comparison Groups. The analytic strategies adopted in this analysis relies on selection-on-observables and assumes "no unobserved confounding" that inherently cannot be completely verified in observational settings. A variety of unobserved factors may be related to CCB completion and labor market outcomes, and they may be systematically patterned. As such, self-selection bias cannot be fully dismissed. The multi-analytic approach and sensitivity analysis are valuable tools to elevate the extent to which these estimates are robust, but self-selection challenges persist and the estimates generated should not be interpreted as causal.

As a related matter, this analysis relies on comparing CCB graduates and non-graduates, as defined by a CCB completion at any point during the datasets' full observation window (2018-19 through 2023-24). This means that some of the labor market outcomes observed may not reflect the labor market outcomes after students have completed their respective CCB programs. As such, the CCB differentials are likely to be underestimated (Minaya & Scott-Clayton, 2022; Minaya et al., 2026). However, this also means that there is some ambiguity of the precise mechanisms in which CCB completion differentials in labor market outcomes are accessed.

There are also a wide range of comparison groups that one could consider within this dataset and broadly. To be clear: there is no "perfect" comparison group and different choices of comparison groups come with their own benefits and challenges. For example, if I were to restrict this analytic sample to consider labor market outcomes only once CCB graduates have completed, one must decide what to do with CCB students in the sample who may eventually complete within the observability window of the dataset; in other words, there may be systematic differences between CCB non-graduates who eventually complete vs. CCB non-graduates who do not complete that could bias CCB differentials in labor market outcomes. Beyond this dataset, one may consider comparing CCB students/graduates to other community college students who enter different academic pathways, those who vertically transfer, or students who directly began in the traditional four-year sector. There are inherent trade-offs and issues with self-selection with all these comparison groups. While some scholarship has begun to conduct these designs (Acton et al., 2025; Meza & Bragg, 2022)–all broadly generating results to suggest that there are positive impacts of CCB programs. I posit that it is valuable to select different, but reasonable comparison groups, to examine the extent to which there is congruent results across designs.

Individual Fixed Effects and Prior Labor Market Information as Pre-Treatment Variable. The outcome variables for this analysis are total annual earnings, hourly wage rates, and UI employment status after the three, four, and five years that CCB students matriculated. Current restrictions on data limit the ability to access other relevant employment information that could be used as a pre-treatment variable to condition on and explain the variation in the outcome variable. For example, while previous studies on employment incorporated the use of wage earnings prior to an intervention as individual fixed effects (Card & Krueger, 2000; Katz et al., 2001; LaLonde, 1986; Minaya et al., 2026), this type of variable (e.g., students' annual earnings prior to beginning community college or their CCB program) was not available in the current dataset. However, this type of variable can be valuable for future research to more precisely estimate the labor market returns and trajectories related to CCB enrollment/participation/completion.

Washington's Unemployment Insurance Records as a Primary Dataset. Administrative UI records are a common and widely accepted data source to understanding the relationship between higher education and labor market returns (Belfield & Bailey, 2017; Jepsen et al., 2014; Minaya & Scott-Clayton, 2022; Stevens et al., 2019). However, the use of this dataset is limited since UI records do not capture all types of employment. Like other statewide UI records, they do not contain information about students who do not have a social security number, who were employed outside the state of Washington, and are current active duty military, self-employed, federally employed, or employed in any other way that is not covered by UI. Across the analytic sample for year-three, -four, and -five outcomes, approximately one-fourth were not identified by UI records and it is not clear whether students are employed, unemployed, or non-employed. The use of both unconditional and conditional labor market outcomes helps address some of these limitations–likely by underestimating CCB completion differentials by assuming nonemployment for missing UI records in the case of unconditional outcomes. However, this still implies that estimates of CCB differentials may not be precise and likely understate the potential benefits of CCB completion, particularly if some populations or fields are disproportionately more likely to not be identified via UI records. In using the UI records, this analysis only focuses on three labor market outcomes, and there are multiple measures of labor market experiences, outcomes, and trajectories that may not be captured in this analysis. Additionally, the benefits and impact of CCB programs (and education broadly) are not limited to economic outcomes and can extend to other dimensions as well.

Generalizability of Washington's CCB Programs. This paper's quantitative analysis focuses exclusively on Washington's CCB programs. While Washington plays a major part in the broader CCB ecosystem nationally (Meza & Vo, 2026), it is still just one state. There are 24 states that have legally authorized CCB programs. Prior research has indicated that states can vary considerably in CCB program implementation, as well as what fields of study are being implemented (Bragg, 2025; Meza & Vo, 2026). A recent analysis elevated how Washington's CCB programs have a larger proportion of Computer & Information Sciences & Support Services programs relative to other states. A recent analysis of the CCB differentials in labor market outcomes of smaller CCB programs nationally (Acton et al., 2025) elevate heterogeneity in CCB completion differentials (relative to associate's degree holders) by field of study. Much of Acton and colleagues' analysis aligns with the present analysis–that CCB attainment is related to positive labor market outcomes, and there is some broad (as well as differing) alignment of CCB completion differentials by specific fields of study. Future research can explore the CCB differentials from a more representative sample of the national CCB population.

Small Sample Size in Some Student Groups. Not unsurprisingly, given the extensive analysis to examine heterogeneity in CCB completion differentials by gender, race/ethnicity, age group, and field of study (CIP2), there are some groups with smaller sample sizes. Limited inferential analysis could be appropriately conducted for groups with smaller sample sizes, such as students identified as American Indian or Alaska Native, Pacific Islander, Non-Binary, and/or enrolled in a bulk of the available fields of study for CCB programs. While these estimates are reported throughout the paper, when appropriate, they should be interpreted with caution.

3.2.5 Reporting Convention

Before jumping into the Results/Findings of the following chapter, I will note some reporting conventions that apply throughout the quantitative findings. Throughout this paper, I will primarily report the OLS regression coefficients from log-transformed outcomes as approximate percentage change using the transformation $e^{\beta} - 1$ following standard practice (Halvorsen & Palmquist, 1980). For example, if there is a coefficient of $\hat{\beta} = 0.219$ for the conditional log-transformed total annual earnings, this is approximately 24.6 % percent higher earnings since $(e^{0.220} - 1) \times 100 = 24.6$. The OLS coefficients for the dichotomous outcome variable–UI employment status–are reported as percentage point (pp) differences (this is equivalent to $\hat{\beta}$, only multiplied by 100, but is provided for visual consistency in reporting relevant percentages for the outcome variables). For example, a coefficient of $\hat{\beta} = 0.082$ for the UI employment means that CCB graduates are 8.2 percentage points more likely to appear in the Washington UI records, not that there is an 8.2 increased likelihood. Percentage change (used for annual earnings and hourly rates) describes relative change while pp difference (used for UI employment) describes the absolute change.

As mentioned in the Analytic Strategy, there are 33 variations of the three primary outcome variables. As it will be described in the Findings/Results and displayed in the Findings/Results/Appendix, there is convergence across methods. For brevity, I will generally report on the outcomes conditional on employment, with a focus on the log-transformed, raw dollar differences, and the percentage change and pp difference.

3.3 Qualitative Analysis (RQ3 and RQ4): Analytic Approach

In this section, I describe my analytic approach with respect to the qualitative analysis. This approach was designed and implemented to generate insights on the guiding research questions:

- RQ3: To what extent and how do CCB programs expand meaningful educational access and opportunities, particularly to students who likely would not have otherwise had it (e.g., students from historically/racially minoritized communities)?
  - How do students describe their lived experiences and everyday practices as they navigate, negotiate, sustain, and benefit from participation in college-related pathways alongside work, caregiving, household, and community commitments?
  - How do institutional and structural conditions, such as administrative, economic, programmatic, spatial, and temporal conditions, shape students' lived conditions as they navigate bachelor's degree pathways?
  - How do intersectional social contexts, identities, locations, and systems (e.g., race/racism, gender/sexism, age/ageism) shape students' experiences with and interpretations of meaningful access?
- RQ4: What can CCB programs reveal about how meaningful educational access and opportunities might be expanded across the broader higher education landscape?

3.3.1 California CCB Context

Enrolling nearly two million students annually, California is home to the largest and one of the most racially/ethnically diverse higher education systems in the United States. Through Senate Bill 850 (2014), 15 community colleges were authorized to pilot CCB programs (called bachelor's degree programs [BDPs] in California). These programs were made permanent via Assembly Bill 927 (2021) and up to 30 new programs could be approved per year. Of the 116 community colleges in California, at least 43 are currently approved to offer at least one CCB program (Vo et al., 2026). California's CCB legislation is framed to support the state's unmet local and regional economic and workforce development goals. As part of their approval process, CCB programs must justify how their programs are aligned to local labor markets–although the extent and how they implement this remains to be observed

(Martinez & Acevedo, 2021; Vo & Rios-Aguilar, 2024). California's CCB programs have been in implementation for about a decade now and the number of CCB programs and students has been growing over time (Community College Baccalaureate Association & Bragg & Associates, 2026, Meza & Vo, 2026).

One of the defining features of California's CCB context is that it is also home to one of the most accessible public higher education sectors in the world (Rios-Aguilar et al., 2023). In California, community colleges' lower-division tuition rates consistently rank as the cheapest and most affordable nationally (Barton, 2025; Hanson, 2025). California's CCB programs are also affordable, as they rank favorably in terms of upper-division tuition costs within the state and between states nationally. For example, their upper-division courses rank as some of the most affordable relative to other CCB programs nationally (Meza & Pawlicki, 2025). This is commendable in the context of California's high cost of living (Barton, 2025; Leonardo, 2009). In the national analysis conducted by Meza and Pawlicki (2025), the cost of California's CCB upper-division coursework was approximately three times cheaper than the traditional public four-year sector and six times cheaper than the private four-year sector; this ratio also compares favorably relative to other states.

3.3.2 Analytic Sample

To generate insights about RQ3 and RQ4, I leveraged a qualitative approach, centering students' experiences, narratives, and voices, to explore the different dimensions that shape CCB participation in California. Using convenience and purposive sampling, I recruited and interviewed CCB participants (open to students that were prospective, current, and/or exited [e.g., graduated or "stop-out"]) all throughout the state of California from December 2025 through February 2026. Since early inception of CCB programs in California, practitioners representing each community college with a CCB program have regularly met in the Bachelor's Degree Program (BDP) Committee. This grassroots effort has formalized over time and is recognized and attended by administrators from the California Community Colleges

Chancellor's Office (CCCCO). I regularly attend this meeting to stay grounded in development and implementation of CCB programs in California. For this research project, I worked with lead practitioners of California's CCB programs who had the capacity and resources to recruit CCB participants at their respective colleges. After initial recruitment efforts, I noticed that participants were from three CCB programs, all from large metropolitan areas. As I started to observe consistent patterns among participants from large metropolitan areas (e.g., in alignment to conventional notions and methodical application of theoretical saturation [Wutich et al., 2024]), I ended the recruitment of CCB participants from large metropolitan areas (n = 22) and purposefully focused on CCB programs in small rural towns. Given the mission of CCB programs to expand college access geographically, I felt it was important to have their voices represented. As such, I reached out directly to practitioner leads in CCB programs situated in small rural towns in California and was able to recruit more students from these areas (n = 8). Table 1 displays details about the analytic sample.

Table 1: Analytic Sample for Qualitative Analysis: Students' Social Contexts, Positions, and Trajectories (n = 30)

ID	Program	Locale	Self-Reported Race	Recoded Race	Gender	Age	Aid	First-Gen	Caretaker	Status
P1	Environment	Small Rural Town	white	white	Female	18-24	Yes	No	No	Enrolled
P2	Environment	Small Rural Town	white	white	Female	25-39	No	No	Yes	Graduated
P3	Environment	Small Rural Town	white	white	Female	18-24	Yes	No	No	Enrolled
P4	Environment	Small Rural Town	white	white	Female	25-39	Yes	No	No	Graduated
P5	Environment	Small Rural Town	Asian	Asian	Female	25-39	Yes	Yes	No	Graduated
P6	Environment	Small Rural Town	white	white	Female	18-24	Yes	No	No	Graduated
P7	Environment	Small Rural Town	white	white	Female	18-24	Yes	Yes	No	Enrolled
P8	Environment	Small Rural Town	white	white	Male	18-24	Yes	No	No	Enrolled
P9	Industrial	Large Metro Area	white	white	Male	25-39	Yes	No	No	Graduated
P10	Industrial	Large Metro Area	Hispanic	Latine	Male	40+	Yes	Yes	Yes	Graduated
P11	Healthcare	Large Metro Area	Mexican-American	Latine	Female	18-24	Yes	Yes	No	Graduated
P12	Healthcare	Large Metro Area	Hispanic	Latine	Female	18-24	Yes	Yes	No	Graduated
P13	Healthcare	Large Metro Area	Hispanic	Latine	Female	25-39	Yes	Yes	No	Graduated
P14	Healthcare	Large Metro Area	white	white	Female	25-39	Yes	No	Yes	Graduated
P15	Healthcare	Large Metro Area	Asian	Asian	Female	25-39	Yes	Yes	No	Graduated
P16	Healthcare	Large Metro Area	white	white	Female	25-39	No	No	No	Graduated
P17	Healthcare	Large Metro Area	Asian	Asian	Female	18-24	Yes	Yes	No	Enrolled
P18	Healthcare	Large Metro Area	white	white	Female	18-24	Yes	Yes	No	Enrolled
P19	Healthcare	Large Metro Area	Indigenous/Native American	Indigenous	Female	40+	Yes	Yes	Yes	Enrolled
P20	Healthcare	Large Metro Area	white (Irish/German)	white	Female	25-39	Yes	Yes	Yes	Enrolled
P21	Healthcare	Large Metro Area	Hispanic	Latine	Female	18-24	Yes	Yes	No	Enrolled
P22	Healthcare	Large Metro Area	African American	Black	Female	25-39	Yes	Yes	No	Graduated
P23	Healthcare	Large Metro Area	Filipino	Asian	Female	18-24	Yes	Yes	No	Enrolled
P24	Healthcare	Large Metro Area	white	white	Male	25-39	No	Yes	No	Graduated
P25	Healthcare	Large Metro Area	Caucasian	white	Female	18-24	Yes	Yes	No	Graduated
P26	Healthcare	Large Metro Area	Asian	Asian	Female	25-39	No	Yes	Yes	Graduated
P27	Healthcare	Large Metro Area	Mexican American	Latine	Female	25-39	Yes	Yes	Yes	Enrolled
P28	Healthcare	Large Metro Area	white	white	Female	25-39	Yes	Yes	Yes	Graduated

ID	Program	Locale	Self-Reported Race	Recoded Race	Gender	Age	Fin Aid	First-Gen	Caretaker	Status
P29	Healthcare	Large Metro Area	Black	Black	Female	40+	Yes	Yes	Yes	Graduated
P30	Healthcare	Large Metro Area	Vietnamese	Asian	Female	18-24	Yes	Yes	Yes	Enrolled

Note 1. The following abbreviations are used: ID = Participant ID; Program = Program of Study; Race = Race/Ethnicity; Metro = Metropolitan; Age = Age Group; Fin Aid = Financial Aid Recipient; First-Gen = First-Generation College Student

Note 2. CCB colleges (C1, C2, C3, C4, and C5) and their program of study (Environment, Industrial, and Healthcare) are organized by only program . of study on this table: C1/C2 = Environment, C3 = Industrial, and C4/C5 = Healthcare. To maintain confidentiality, CCB colleges and programs are lumped together. In the main text, they may be separated when appropriate to signal differences within programs of study (e.g., C4-Healthcare and C5-Healthcare)

I conducted one-on-one, semi-structured, and in-depth interviews with current and graduated CCB participants from five CCB programs in California (n = 30) to learn more about the extent to which and how meaningful educational access and opportunities is expanded through CCB programs. The interviews were recorded and conducted on Zoom, an online videotelephony platform that participants were familiar with. I applied principles of the three-interview series to generate datasets that consider students' rich life experiences and trajectories (Schuman, 1982; Seidman, 2019) to understand the situated contexts in which students' operate within. Each participant received at least a $50 gift card to a vendor of their choice, in honor of their labor, time, and participation. For interviews that were longer than one hour, students received a pro-rated gift card amount ($25 per 30 minutes). Some students were invited to a second interview, so I could complete my interview protocol and accommodate people's availability. On average, interviews were approximately 2 hours long, ranging from approximately 1.25 to 3.5 hours. Following each interview, I typed field notes (over 30 pages) to document students' social experiences, contexts, positions, backgrounds, and trajectories, to make connections on patterns observed across interviews, and to be reflexive of my interviewing approach, positionalities, and relationalities in this analytic setting (Emerson et al., 2011; Ravitch & Carl, 2020; Seidman, 2019; Small & Calarco, 2022; Winn & Ubiles, 2011).

This paper also reflects some of the experiences of 30 CCB students/alumni from five California CCB programs related to environmental, healthcare, and industrial fields and workforce sectors. Table 1 displays some of the social contexts, positions, and trajectories of the 30 participants. I do not report out all details in an effort to minimize reducing the rich experiences to flat categories and to protect confidentiality. However, in contrast to the normative notions of a college student–and even a normative non-traditional community college student Deil-Amen (2011)–the CCB participants came from a wide range of backgrounds. Students' diverse social contexts, positions, and trajectories ranged on the basis of gender, race/ethnicity, socioeconomic status, first-generation college student status, age, spatial upbringing, household dynamics, sexual orientation, disability status, relationship with the foster care system, K-12 experiences, work experiences prior to and during college, caregiving status, immigration status, in- or out-of-state status, prior college experiences (delayed, exited with/without a degree, participation in other community colleges, for-profit institutions, four-year universities, public vs. private, technical/trade schools), and whether they completed lower-division courses at the same community college as their CCB program (I will refer to these students occasionally as CCB internal transfer students) or completed them at other community colleges (CCB external transfers). The diversity of the participants' intersectional social contexts, positions, and backgrounds are extraordinary, highlighting the ways that community colleges–and CCB programs specifically–are providing postsecondary educational access.

As can be calculated and/or observed on Table 1, there are distinct patterns relating to this qualitative inquiry's analytic sample. The majority of the sample were female (87%) and financial aid recipients (87%). Nearly three-fourths of CCB participants (n = 22, 73%) were from three Healthcare (referred to as C4 and C5; C is for college) and Industrial (referred to as C3) CCB programs in large metropolitan areas and one fourth (n = 8, 27%) were from two Environmental CCB programs in small rural towns (referred to as C1 and C2). Distinct patterns between these two spectrums of CCB participants are observed. CCB participants from the Healthcare and Industrial CCB programs in large metropolitan areas, relative to participants from the Environmental CCB programs in small rural towns, were more likely to be older (average age was 32 vs. 25), have caretaking commitments (41% vs. 13%), be first-generation college students (86%), have graduated already from their CCB programs (64% vs. 50%), and be identified as Asian (23% vs. 13%), Black (9% vs. 0%), Indigenous (5% vs. 0%), or Latine (32% vs. 0%). In contrast, CCB participants from Environmental CCB programs in small rural towns were more likely to be younger and white (88% vs. 32%). An exploratory analysis suggests that while my analytic has some skews (e.g., more women participated), but this is not uncommon, given my understanding of CCB and career-technical education programs and what I presume reflects broader racialized and gendered field sorting within industries and sectors. Lastly, I will note that the five CCB programs were in stages of CCB program implementation: two of them which I would classify as earlier in implementation and three of them longer in implementation.

3.3.3 Analytic Strategy

I used an abductive approach to analysis, which is a recursive and iterative process of fitting theories and data to generate and narrow possible theoretical directions (Timmermans & Tavory, 2012). This qualitative approach "elicits theoretical innovations" through double engagement with existing theories that shape my understanding and engagement with CCB participants (and our generated data) and "careful methodological steps" (p. 181). An abductive approach can capture surprising–defined as novel or anomalous–findings. Given the complexity of how multiple lived, institutional, and structural conditions may intersect and interplay to shape college access and participation, this analytic strategy enabled me to directly address the paper's research questions, drawing from multiple theoretical and conceptual perspectives.

The abductive analysis allowed for the theoretical perspectives to inform codes and interpretation, as well as inductive codes (Creswell & Creswell, 2018; Miles et al., 2019; Saldaña, 2013), generating visuals (response matrices and diagrams), and memoing. I engaged with revisiting, defamiliarizing, and alternative casing to put together the empirical puzzle of this research project. Audio recordings were converted to text transcripts via noScribe (Dröge, 2025), a free and open source program that can transcribe interviews locally on one's computer, and transcripts were cleaned and coded on DeDoose, a software program for mixed methods and qualitative analysis. The first round of coding primarily used descriptive codes that were created based on interviews, field notes, and existing theories. I applied first-level codes on broad excerpts to capture the institutional and structural conditions (e.g., administrative, economics, programmatic, social, spatial, and temporal) and second-level codes to capture more descriptive characteristics of those conditions (e.g., administrative code had second-level codes like CCB application, advising/counseling and education planning, fieldwork/internship, and financial aid). After one round of coding, over 50 pages of analytic memos were generated to summarize initial impressions and noticings of the descriptive codes, as well as to reflect on assertions and think through (dis)confirming cases of the various conditions and mechanisms that shape CCB participation. Alongside these memos, I generated response matrices to think through the patterns and assertions across CCB programs and CCB participants' social contexts/positions/backgrounds. Diagrams helped me revisit and defamiliarize myself with my memos and response matrices.

With a more specific understanding of the data and theory, a refined set of descriptive and pattern codes for round two coding was generated to capture the conditions and mechanisms that enable or constrain college participation, and how participants experienced and navigated them. For example, while round one coding focused on capturing descriptive codes of excerpts with institutional agents mentioned, this round focused on patterns of how institutional agents enabled or constrained participation ("continuity" or "student-to-faculty ratio"). There were also new level-one and level-two codes included, such as "structured pathways" and "relative to the traditional four-year sector," respectively, to identify (dis)confirming or alternative cases. The goal of round two was to be more deliberate and systematic in engaging in and (dis)confirming alternative understandings of the intersecting experiences, conditions, contexts, and mechanisms that shape college participation. This was a methodological means to (re)think through my data, theories, and interpretation to ensure that the patterns and assertions that I wrote about during my memoing were trustworthy.

I took multiple, additional layers to ensure that my assertions were trustworthy and to think through conditions where they were not. During interviews, I created space for participants to make "constant comparisons" (Glaser & A.L., 1967). As embedded in the interview protocol and/or to leverage the semi-structure nature of this inquiry, I asked follow-up questions throughout the interview. I often asked participants to make comparisons as they shared about their past lived and educational experiences (e.g., “how does the CCB application compare to the application you did when you applied to other colleges?”), thought through others students’ potential experiences (e.g., “would other people you know say the same about that experience or something else?”), and considered hypothetical scenarios (e.g., “what would it be like if you went to another college for your bachelor’s degree?”). I also shared and discussed my findings with CCB practitioners and researchers in California who were familiar with the specific CCB program and/or this topical area. By ensuring that the findings were grounded in multiple and iterative layers of validation, these strategies enhanced the credibility, trustworthiness, and analytic assertions reported in my Results/Findings.

3.3.4 Limitations

Generalizability and Trustworthiness. Similar to RQ1 and RQ2, the qualitative findings are within the careful scope of the analytic sample included. The qualitative findings represent the voices of students from five CCB programs in California in three broad programs of study and workforce sectors. The sample is 30 CCB current and graduated students and may not represent the entirety of all CCB students in California, let alone the nation. There is inherently some selection and systematic bias in the community colleges that were more open to being included in this project and available to support recruitment/outreach. On the surface, while there was a wide range of social contexts, positions, and trajectories captured within the students that were interviewed, there were many that were not. Operating within broader structural and systemic sorting, CCB programs are patterned by organizing principles, such as gender and race as noted in the Analytic Sample section. The majority of the sample are female CCB students and alumni, and may not represent the experiences of other genders. While I made an attempt to interview students in small rural towns, future work should have a more robust analytic sample spanning a more diverse range of students and programs.

Additionally, on a related note, I name my own positionalities and relationalities as a limitation to this work. As an Asian man without any caretaking commitments and having never attended a CCB program, there were various points during the semi-structured interviews where I wondered whether the follow-up questions I asked, the interview moves I made, and/or the social context of the interview environment with participants–with different social positions, as women, mothers, fathers, Black, Indigenous, Latine, and white, etc.–could have generated different responses had there been a different interviewer. Future work would benefit greatly from a more expansive team to conduct interviews. I also recognize the many benefits of my own positionalities and relationalities in this work–as a former community college practitioner and former advisor and instructor–in my ability to connect with students' experiences in one-on-one settings. On many occasions, during and after interviews, participants expressed appreciation in the questions that were being asked and the space to reflect upon their experiences, the therapeutic environment of these interviews, and the ease in which they felt comfortable sharing details of their lives with me.

Therefore, as I share the findings and generate assertions based on the stories heard and the patterns and themes, these findings should be framed within the context of these participants' lived experiences and these five CCB programs, and careful considerations must be made in understanding the extent that these findings are trustworthy within and across other CCB-related contexts.

3.3.5 Reporting Convention

Throughout the Results/Findings of the qualitative analysis, CCB participants' race/ethnicity, gender, and age group will be consistently reported with the exception of a few cases. If CCB participants are financial aid recipients, first-generation college students, or caretakers/parents, this is also reported and included in the affirmative and omitted otherwise. I acknowledge and name there will instances where these social contexts, positions, and trajectories may be more relevant to the interview content or excerpts shared, but I will share them throughout for the sake of consistency. There will be instances where some of these details for participants are omitted to maintain confidentiality, particularly given that the intersections of social contexts, positions, and trajectories can threaten potential confidentiality. To minimize attention to this, I will not notate when I do this, but the reader can safely assume that any omissions to these details were done intentionally.

CHAPTER 4

Findings/Results

In Chapter 4, I report my Findings/Results. I will first report on the Findings/Results for the quantitative analysis (RQ1 and RQ2) in its entirety and then report the qualitative analysis (RQ3 and RQ4) afterwards.

4.1 Quantitative (RQ1 and RQ2): The Labor Market Outcomes and Trajectories of CCB Students

In the following sections, I will describe the Findings/Results from the quantitative analysis relating to RQ1 and RQ2. I will first present the descriptive summary statistics of CCB graduates and CCB non-graduates across a range of variables that capture social contexts, positions, and trajectories. Next, I will report the CCB completion differentials in labor market outcomes, mechanisms, and trajectories, with a focus on the pooled primary model specification. Afterwards, I will describe the extent to which there is heterogeneity in CCB completion differentials in labor market outcomes. Drawing upon the primary model specification of the pooled and stratified analysis, I discuss the results by fields of study (CIP2), gender, race/ethnicity, and age group. Lastly, I discuss the extent to which there is multi-analytic convergence across the analytic approaches adopted through robustness and sensitivity analysis.

4.1.1 Descriptive Summary Statistics

Table 2 presents descriptive summary statistics for the full analytic sample across the five academic year entry cohorts for the year-three analysis (n = 13,074), as well as the samples for year-four (n = 10,750) and year-five (n = 8,343). As the patterns are generally stable for the covariates, I will focus on reporting the year-three sample. From this sample, 68.3% (n = 8,927) are CCB graduates and 31.7% (n = 4,147) are CCB non-graduates. The sample is 58.8% female, 40.0% male, and 1.1% categorized as not listed. The majority of CCB students in the sample are 49.3% white, followed by 14.8% Multiracial, 12.6% Asian, 9.7% Latine, 6.6% Black, 0.8% American Indian or Alaska Native, 0.6% Native Hawaiian or Pacific Islander, and not listed (5.8%). Nearly one-third are 24 years-old or younger (35.4%) and two-thirds are are 25 years-old or older (64.6%). Approximately 44.7% of students received need-based financial aid.

As displayed on Table 2, CCB graduates and non-graduates are not meaningfully different across multiple dimensions, such as gender, race/ethnicity, age group, socioeconomic status, and field of study, despite statistical significance. However, the academic profiles and trajectories vary by CCB graduates and non-graduates, with CCB graduates less likely to have been enrolled part-time at entry (28.3% vs. 45.0%, respectively; $p < .001$). The majority of CCB graduates and non-graduates have attended community college previously in the state, with CCB graduates having done so at a higher rate (93.5% vs. 87.2%, $p < .001$). The four largest fields of study by CIP2 code are Business & Management (28.7%), Computer & Information Sciences (24.3%), Health Professions (23.1%), and Education (11.0%), which account for 87.1% of the analytic sample. CCB graduates are more likely to be in Education CCB programs relative to non-graduates (11.8% vs. 9.4%, respectively; $p < .001$). Across the three largest CIP2 programs (Business & Management, Computer & Information Sciences, and Health Professions), there are no statistically significant differences in CCB programs among graduates and non-graduates. There are differences observed in the estimates for Education CCB students.

Table 3 displays the distribution of gender, racial/ethnic, and age groups by the four largest CCB program CIP2 codes for the year-three analytic sample. Descriptive differences are observed in how different gender, racial/ethnic, and age groups sort into different fields of study. While female CCB students are more distributed across Health Professions (32.4%), Business & Management (29.7%), and Education (16.4%), male CCB students are distributed in Business & Management (27.3%) and Computer & Information Sciences (45.0%) programs. Of these four CIP2 codes, Business & Management is the most popular CIP2 among American Indian/Alaska Native (41.4%), Latine (32.4%), Multiracial (30.5%), Native Hawaiian or Pacific Islander (28.0%), and white (30.4%) students. Computer & Information Sciences was the most popular CIP2 CCB program among Asian students (36.2%), and Health Professions was the most popular among Black students (26.2%). Business & Management was the most popular among students 24 years-old or younger and 30 years-old and above; among students aged 25-59 years-old, Health Professions (27.4%) was the most popular CIP2 code.

Across the board, the unadjusted labor market outcomes–conditional and unconditional total annual earnings, hourly wage rates, and UI employment rate–are higher among CCB graduates than non-graduates and this is statistically significant at $p < 0.001$ (see Table 4). For the unadjusted outcome variables, this is notably stable across year-three, -four, and five. The primary outcome variable of interest, the conditional total annual earnings, were greater among CCB graduates than non-graduates. Among those employed, CCB graduates' annual earnings three years after matriculating was \$77,392 compared with \$68,374 of non-graduates (\$9,018 difference; $p < .001$). This also increased over time. The unadjusted conditional raw annual earnings in year-three, -four, and -five is higher for CCB graduates than non-graduates, at \$77,392 vs. \$68,374, \$82,254 vs. \$70,865, and \$85,219 vs. \$72,660, respectively. Unadjusted hourly wages three years after CCB matriculation were also higher for CCB graduates compared than to non-graduates (\$41.15 vs. \$35.27; $p < .001$). At three years after CCB matriculation, 79.0% of CCB graduates and 70.8% of CCB non-graduates are observed in Washington UI employment records, a difference of 8.2 percentage points ($p < .001$).

Given the focus on total annual earnings, dumbbell plots visually display the difference in unadjusted conditional raw total annual earnings between graduates and non-graduates (see Figures 2-4). Three, four, and five years after CCB entry, CCB graduates consistently earn higher total annual earnings than CCB non-graduates. This is the case for all gender, race/ethnicity, age, and field of study groups examined, although there are varying degrees in which groups benefit the most from CCB completion. These unadjusted descriptive differences provide motivation to this paper's goal to rigorously generate insights on the CCB completion differentials in labor market outcomes among CCB graduates and non-graduates.

Table 2: Descriptive Statistics for Analytic Sample Post-Entry into CCB, Years 3-5

	Year 3 (Y3)				Year 4 (Y4)			Year 5 (Y5)		
	Overall	Grad	Non-Grad	Diff	Grad	Non-Grad	Diff	Grad	Non-Grad	Diff
n	13,074	8,927	4,147		7,219	3,531		5,579	2,764	
Gender										
Female	0.588	0.594	0.576	0.018	0.591	0.585	0.007	0.588	0.582	0.006
Male	0.400	0.396	0.411	-0.015	0.399	0.405	-0.006	0.403	0.408	-0.004
Gender: Not Listed	0.011	0.011	0.013	-0.003	0.009	0.010	-0.001	0.009	0.010	-0.002
Race/Ethnicity										
Am Ind/AK Native	0.008	0.008	0.010	-0.003	0.008	0.011	-0.003	0.009	0.011	-0.002
Asian	0.126	0.132	0.113	0.019**	0.130	0.110	0.019**	0.127	0.107	0.020**
Black	0.066	0.062	0.074	-0.012*	0.058	0.073	-0.016**	0.056	0.070	-0.015**
Latine	0.097	0.091	0.109	-0.018**	0.094	0.110	-0.017**	0.094	0.115	-0.020**
Multiracial	0.148	0.140	0.164	-0.024***	0.135	0.157	-0.021**	0.133	0.156	-0.022**
Native Hawaiian or Pacific Islander	0.006	0.005	0.007	-0.002	0.005	0.006	-0.001	0.004	0.007	-0.002
white	0.493	0.504	0.469	0.035***	0.507	0.474	0.033**	0.510	0.474	0.035**
Race/Ethnicity: Not Listed	0.058	0.059	0.055	0.004	0.064	0.058	0.005	0.067	0.061	0.006
Age Group										
24 years-old or younger	0.354	0.365	0.329	0.037***	0.363	0.332	0.031**	0.364	0.343	0.021
25-29 years-old	0.205	0.206	0.204	0.002	0.209	0.211	-0.002	0.207	0.198	0.009
30-39 years-old	0.265	0.261	0.274	-0.013	0.258	0.264	-0.005	0.260	0.262	-0.001
40 years-old or older	0.176	0.168	0.193	-0.026***	0.169	0.193	-0.024**	0.169	0.198	-0.029**
Additional										
Received Need-Based Aid	0.447	0.458	0.425	0.032***	0.446	0.420	0.026*	0.435	0.407	0.028*
Part-Time Enrolled	0.336	0.283	0.450	-0.167***	0.292	0.460	-0.168***	0.299	0.463	-0.164***
Prior CC Enrollment	0.915	0.935	0.872	0.063***	0.933	0.888	0.045***	0.931	0.882	0.049***
Prior CC Transfer Intent	0.469	0.483	0.441	0.041***	0.487	0.452	0.035***	0.487	0.446	0.041***
Field of Study (CIP2)										
Business & Management	0.287	0.285	0.290	-0.005	0.287	0.286	0.001	0.286	0.283	0.003
Computer & Info Sciences	0.243	0.242	0.246	-0.005	0.242	0.239	0.003	0.245	0.238	0.006
Education	0.110	0.118	0.094	0.024***	0.117	0.095	0.023***	0.114	0.093	0.021**
Health Professions	0.231	0.230	0.231	-0.001	0.226	0.242	-0.015	0.227	0.250	-0.023*

Note 1. For full description of variables, see the Analytic Sample and Strategy sections. Some variables are omitted for brevity and to ensure confidentiality.

Note 2. Y3 (n = 13,074; cohorts from 2018-19 through 2022-23), Y4 (n = 10,750; cohorts 2018-19 through 2021-22), Y5 (n = 8,343; cohort from 2018-19 through 2020-21).

Note 3. The "Diff" column shows the average difference by CCB graduates (Grad) and non-graduates (Non-Grad) with statistical significance levels ($^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$); Fisher's exact was used for dichotomous variables; Welch's t-test was used for continuous variables.

Table 3: Field of Study (CIP2) Distribution by Gender, Racial/Ethnic, and Age Groups, Year 3 Sample

		Business & Management			Computer & Info Sciences			Education			Health Professions		
Group	n	Overall	Grad	Non-Grad	Overall	Grad	Non-Grad	Overall	Grad	Non-Grad	Overall	Grad	Non-Grad
Gender													
Female	7,688	0.297	0.297	0.297	0.103	0.100	0.109	0.164	0.175	0.139	0.324	0.322	0.329
Male	5,236	0.273	0.270	0.279	0.450	0.454	0.442	0.033	0.034	0.032	0.089	0.088	0.090
Race/Ethnicity													
Am Ind/AK Native	-	-	-	-	-	-	-	-	-	-	-	-	-
Asian	1,645	0.222	0.211	0.249	0.362	0.339	0.420	0.048	0.054	0.032	0.247	0.279	0.168
Black	858	0.220	0.217	0.226	0.252	0.250	0.256	0.142	0.157	0.115	0.262	0.268	0.252
Latine	1,262	0.324	0.357	0.264	0.161	0.148	0.184	0.177	0.197	0.140	0.261	0.216	0.342
Multiracial	1,930	0.305	0.305	0.305	0.207	0.215	0.191	0.133	0.145	0.112	0.234	0.220	0.261
Native Hawaiian or Pacific Islander	-	-	-	-	-	-	-	-	-	-	-	-	
white	6,441	0.304	0.300	0.314	0.230	0.229	0.230	0.106	0.112	0.093	0.219	0.222	0.213
Age Group													
24 years-old or younger	4,623	0.283	0.291	0.265	0.260	0.262	0.255	0.103	0.109	0.087	0.212	0.190	0.265
25-29 years-old	2,686	0.249	0.241	0.268	0.273	0.278	0.262	0.086	0.089	0.081	0.274	0.285	0.249
30-39 years-old	3,464	0.297	0.293	0.307	0.249	0.241	0.263	0.110	0.116	0.098	0.232	0.246	0.204
40 years-old or older	2,300	0.321	0.315	0.332	0.166	0.153	0.190	0.154	0.176	0.113	0.216	0.226	0.196

Note 1. For full description of variables, see the Analytic Sample and Strategy sections. Some groups are omitted for brevity and/or to ensure confidentiality (as denoted by '-').

Note 2. This table displays the proportion of each gender, race/ethnicity, and age group based on CCB students' field of study (CIP2 code) from the year-three analytic sample (the total sample size is 13,074). Overall rows may not add up to one across fields because not all CIP2 fields are displayed.

Table 4: Labor Market Outcomes Post-Entry into CCB, Years 3-5

	Year 3 (Y3)				Year 4 (Y4)			Year 5 (Y5)		
	Overall	Grad	Non-Grad	Diff	Grad	Non-Grad	Diff	Grad	Non-Grad	Diff
n	13,074	8,927	4,147		7,219	3,531		5,579	2,764	
UI Employment Rate	0.764	0.790	0.708	0.082***	0.784	0.683	0.102***	0.764	0.652	0.112***
Conditional Outcomes										
Raw Annual Earnings ($)	$74,741	$77,392	$68,374	$9,018***	$82,254	$70,865	$11,389***	$85,219	$72,660	$12,559***
Log Annual Earnings	10.910	10.966	10.777	0.189***	11.087	10.855	0.232***	11.130	10.889	0.241***
Raw Hourly Rates ($)	$39.44	$41.15	$35.27	$5.88***	$42.47	$36.15	$6.32***	$43.77	$37.03	$6.74***
Log Hourly Rates	3.539	3.582	3.434	0.148***	3.644	3.488	0.157***	3.697	3.529	0.168***
Unconditional Outcomes										
Raw Annual Earnings ($)	$57,093	$61,128	$48,408	$12,721***	$64,491	$48,368	$16,123***	$65,102	$47,397	$17,705***
Log$(y+1)$ Annual	8.334	8.662	7.630	1.032***	8.693	7.409	1.284***	8.503	7.103	1.400***
IHS Annual	8.864	9.209	8.120	1.089***	9.236	7.882	1.354***	9.032	7.555	1.477***
Raw Hourly Rates ($)	$28.86	$31.29	$23.64	$7.65***	$31.94	$23.34	$8.60***	$31.76	$22.79	$8.97***
Log$(y+1)$ Hourly	2.612	2.746	2.324	0.422***	2.762	2.273	0.489***	2.701	2.191	0.511***
IHS Hourly	3.097	3.250	2.766	0.484***	3.263	2.700	0.563***	3.185	2.598	0.587***

Note 1. For full description of variables, see the Analytic Sample and Strategy sections.

Note 2. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 3. The "Diff" column shows the average difference by CCB graduates (Grad) and non-graduates (Non-Grad) with statistical significance levels ($^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$); Fisher's exact was used for dichotomous variables; Welch's t-test was used for continuous variables.

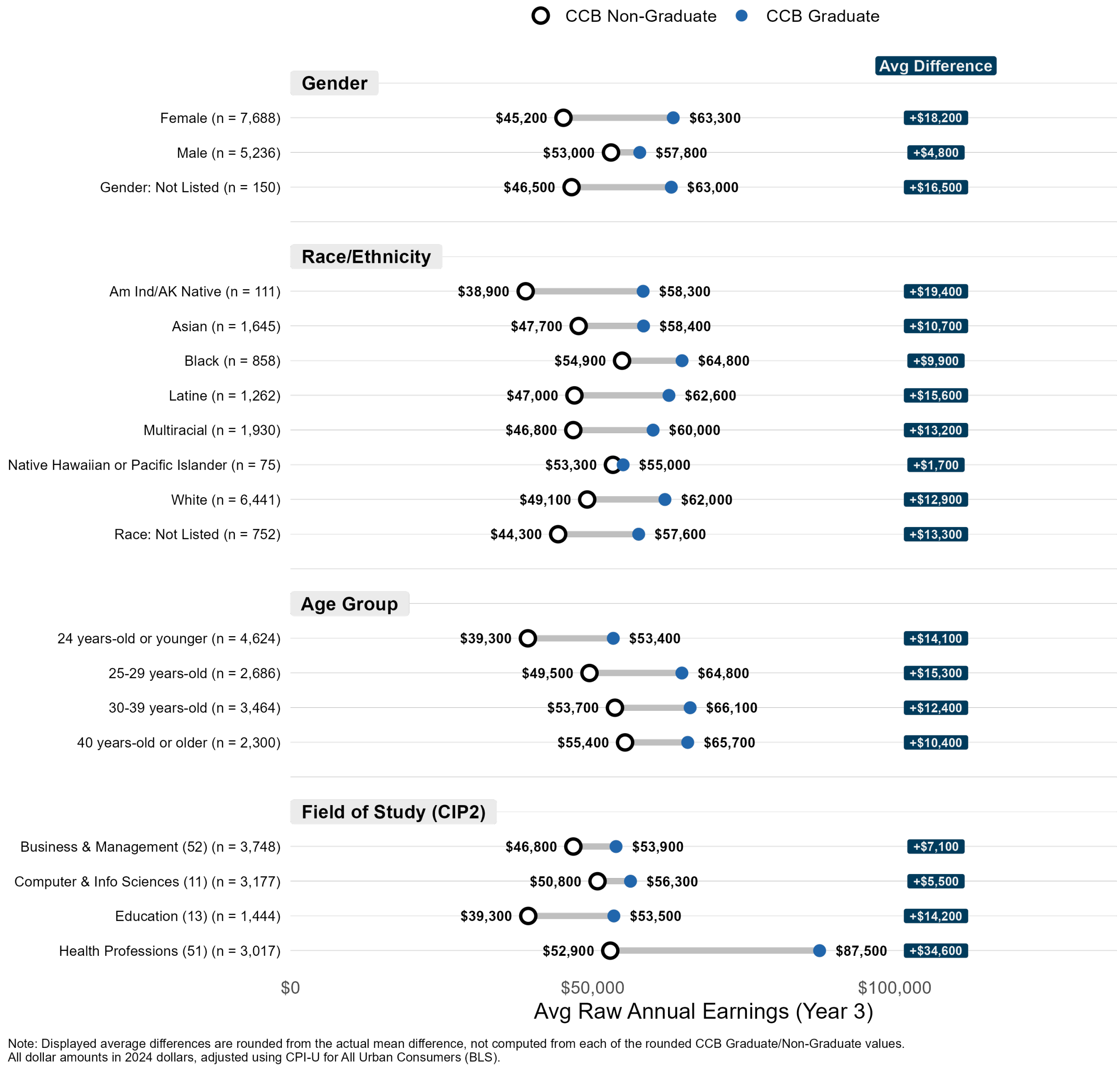


Figure 2: Dumbbell Plot of CCB Graduates vs. Non-Graduates: Average Conditional Raw Total Annual Earnings Three Years After CCB Entry

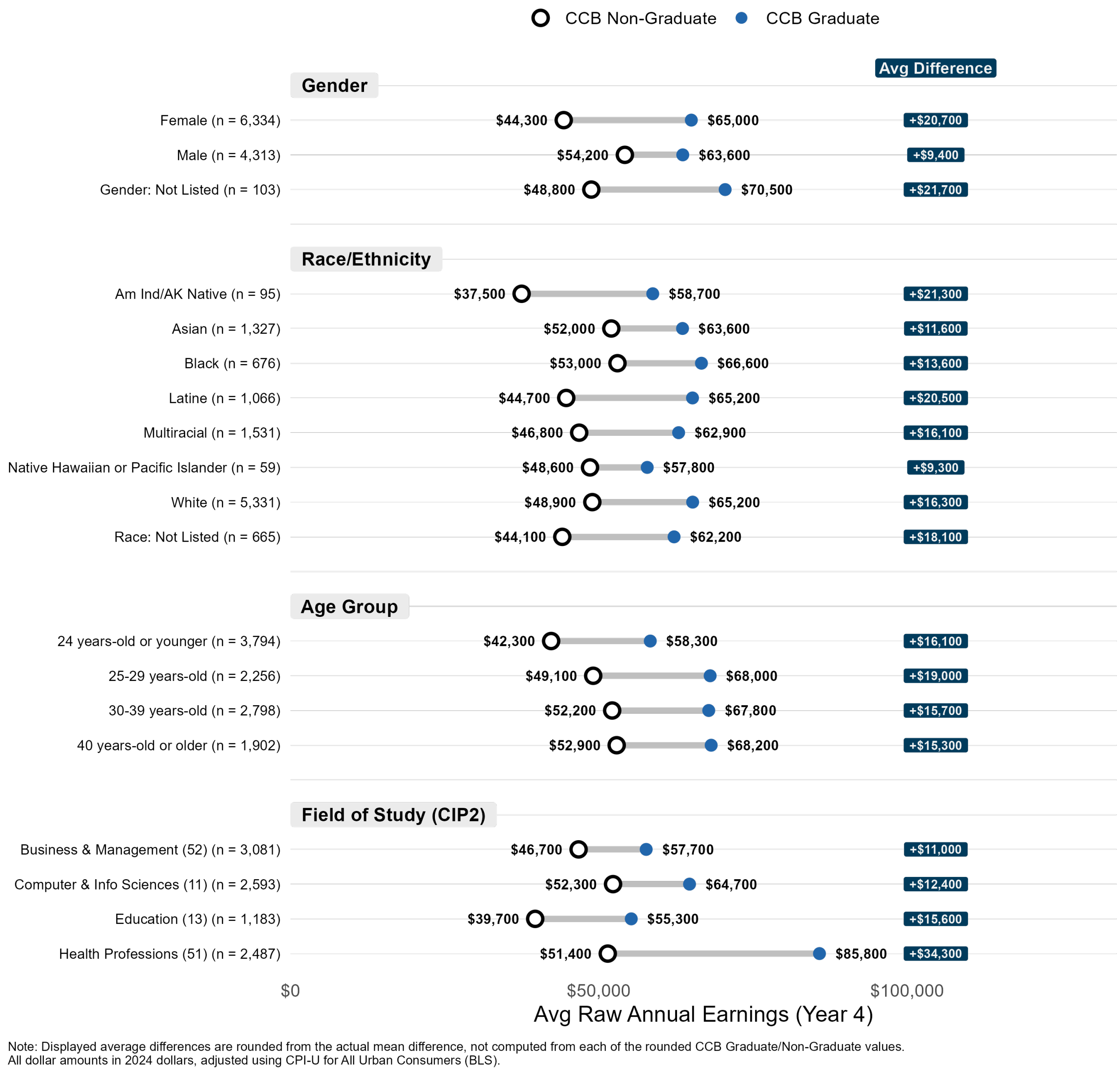
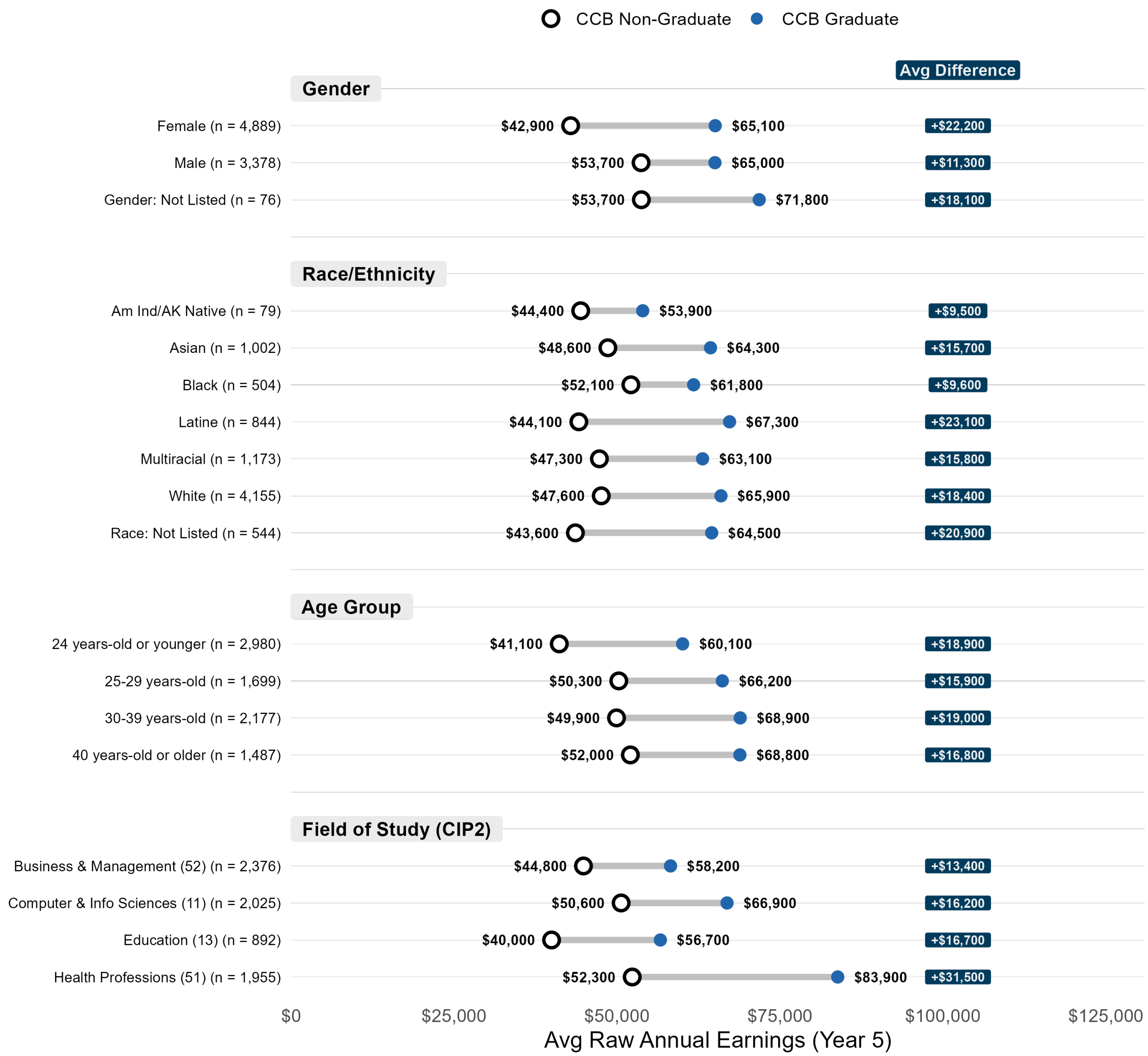


Figure 3: Dumbbell Plot of CCB Graduates vs. Non-Graduates: Average Conditional Raw Total Annual Earnings Four Years After CCB Entry



Note: Displayed average differences are rounded from the actual mean difference, not computed from each of the rounded CCB Graduate/Non-Graduate values.
All dollar amounts in 2024 dollars, adjusted using CPI-U for All Urban Consumers (BLS).

Figure 4: Dumbbell Plot of CCB Graduates vs. Non-Graduates: Average Conditional Raw Total Annual Earnings Five Years After CCB Entry

4.1.2 CCB Completion Differentials in Annual Earnings: Pooled Primary Results and Model Comparisons

Table 5 displays the estimates from the OLS with HC2 robust standard errors across all eight model specifications for conditional log-transformed total annual year-three earnings with the pooled sample. For the primary model specification with a suite of covariate adjustments, the conditional log-transformed total annual earnings in three years after CCB matriculation is positive and statistically significant ($\hat{\beta} = 0.220$; $p < .001$). This translates to 24.6% higher earnings for CCB graduates compared to non-graduates[1]. The CCB completion differential in conditional annual raw earnings in year-three was $11,402 (see Table 6). The estimates are notably stable across all model specifications and observability window years (see Tables 5-6). The conditional log-transformed CCB completion differential in annual earnings in all three observable years (three, four, and five years after CCB matriculation) ranges from 0.201 to 0.255 and is statistically significant ($p < .001$). To support interpretation, a visual was created to summarize the primary pooled and stratified analysis from the OLS (HC2) model (see Appendix: Figure 5).

Model specifications that do not include race/ethnicity as covariates (M5 and M7) generate $\hat{\beta}$ estimates that are nearly identical to the Primary (M1) specification in year-three, -four, and -five (M1: 0.220, 0.254, and 0.253, respectively; M5: 0.220, 0.255, and 0.252, respectively; M7: 0.202, 0.243, and 0.242, respectively; $p < .001$). This suggests that racial/ethnic composition may not confound the CCB completion differential after controlling for field of study. Similarly, model specifications that do not include CIP2 codes (M6 and M8) produce relatively similar, albeit slightly smaller estimates, indicating the smaller role of field of study in explaining the CCB completion differential estimated for year-three, -four, and -five (M6: 0.216, 0.250, and 0.247, respectively; M8: 0.202, 0.244, and 0.241, respectively; $p < .001$). The model specifications that interact race/ethnicity with comple-

[1] $e^{0.220} - 1 = 24.5\%$

tion (M3 and M4) confirm that the pooled primary estimates in year-three, -four, and -five remain stable when specific slopes are generated for each race/ethnicity (M3: 0.225, 0.251, and 0.254, respectively; M4: 0.206, 0.239, and 0.246, respectively; $p < .001$).

As displayed on Table 5, controlling for institutional fixed effects reduces the estimate modestly ($\hat{\beta} = 0.220$ vs. $\hat{\beta} = 0.201$). The results suggest that institutional context is related and explains a relatively modest portion of the variation of the observed completion differential in earnings. I will not center institutional fixed-effect model specifications because colleges' programs and/or where they are situated, may be related to the labor market outcomes could mediate the labor market outcomes rather than confound them via program quality, industry partnerships, pathways to employment opportunities, and local labor market conditions. The primary specification without institutional fixed effects is relatively stable across model specifications and provides generalizable estimates across specifications while avoiding overfitting the 29 dichotomous variables generated for each CCB college, particularly in the stratified analysis. As such, the remaining of the quantitative Findings/Results will focus on the primary model specification.

Table 5: OLS Regression and Sensitivity Statistic: Conditional Log Annual Earnings Post-Entry into CCB, Years 3-5

	Year 3 (n = 9,987)			Year 4 (n = 8,070)			Year 5 (n = 6,065)		
Model Specification	$\hat{\beta}$	SE	$RV_{q=1,\alpha=0.05}$	$\hat{\beta}$	SE	$RV_{q=1,\alpha=0.05}$	$\hat{\beta}$	SE	$RV_{q=1,\alpha=0.05}$
M1: Primary	0.220***	(0.021)	0.084	0.254***	(0.023)	0.105	0.253***	(0.028)	0.092
M2: Primary + Inst. FE	0.201***	(0.022)	0.075	0.242***	(0.024)	0.098	0.243***	(0.029)	0.085
M3: Primary: Race x Completion	0.225***	(0.031)	0.056	0.251***	(0.033)	0.068	0.254***	(0.039)	0.059
M4: Primary: (Race x Completion) + Inst. FE	0.206***	(0.031)	0.050	0.239***	(0.033)	0.064	0.246***	(0.040)	0.056
M5: Base + Field of Study (CIP2)	0.220***	(0.021)	0.085	0.255***	(0.023)	0.106	0.252***	(0.028)	0.092
M6: Base + Race	0.216***	(0.021)	0.082	0.250***	(0.023)	0.102	0.247***	(0.028)	0.089
M7:: Base + Field of Study (CIP2) + Inst. FE	0.202***	(0.022)	0.075	0.243***	(0.024)	0.098	0.242***	(0.029)	0.085
M8: Base + Race + Inst. FE	0.202***	(0.022)	0.074	0.244***	(0.024)	0.098	0.241***	(0.029)	0.085

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. All model specifications are described in the Analytic Strategies section. All model specifications account for cohort entry year fixed effects; only models with "Inst. FE" account for institutional fixed effects.

Table 6: Pooled Primary Specification: Completion Differentials in Labor Market Outcomes, Years 3-5

	Year 3 (Y3)			Year 4 (Y4)			Year 5 (Y5)		
Outcome	$\hat{\beta}$	SE	% / pp	$\hat{\beta}$	SE	% / pp	$\hat{\beta}$	SE	% / pp
Employment									
UI Employment Rate	0.082***	(0.008)	8.2 pp	0.104***	(0.009)	10.4 pp	0.117***	(0.011)	11.7 pp
Conditional on Employment									
Raw Annual Earnings ($)	11,402***	(1,006)		13,221***	(1,138)		14,036***	(1,342)	
Raw Hourly Rates ($)	6.08***	(0.37)		6.50***	(0.42)		6.82***	(0.49)	
Log Annual Earnings	0.220***	(0.021)	24.6%	0.254***	(0.023)	29.0%	0.253***	(0.028)	28.8%
Log Hourly Rates	0.154***	(0.009)	16.6%	0.165***	(0.010)	17.9%	0.175***	(0.011)	19.1%
Unconditional on Employment									
Log$(y + 1)$ Annual	1.057***	(0.092)		1.326***	(0.103)		1.467***	(0.120)	
IHS Annual	1.113***	(0.098)		1.397***	(0.109)		1.548***	(0.127)	
Log$(y + 1)$ Hourly	0.421***	(0.031)		0.494***	(0.035)		0.531***	(0.041)	
IHS Hourly	0.482***	(0.037)		0.567***	(0.041)		0.610***	(0.048)	

Note 1. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs. The full analytic sample for Y3, Y4, and Y5 is 13,074, 10,750, and 8,343, respectively, but will vary depending on the outcome variable.

Note 2. For the log-transformed annual earnings and hourly rates, the percentage change ($e^{\hat{\beta}} - 1$) is calculated (%). The UI employment rate was calculated using percentage point change from the linear probability model (pp). The $\hat{\beta}$ for the conditional raw annual earnings and hourly wage rates are the covariate-adjusted mean differences so no percentage change or pp are calculated. Percentage change is not reported for unconditional $\log(y + 1)$ and IHS outcomes because these transformations are applied to data with many zero values (students not identified by UI employment); the resulting numbers are not interpretable as percentage changes in earnings.

4.1.3 Mechanisms and Trajectories of the Completion Differentials

Table 6 decomposes the CCB completion differentials across different processes, mechanisms, and trajectories. Total annual earnings are related to whether CCB students are UI employed and their hourly wage rate. Distinguishing these different components generates insights into how CCB completion is related to labor market outcomes through distinct channels and mechanisms.

As discussed in the previous section and displayed on Table 6, CCB completion differentials in conditional log-transformed total annual earnings were positive and statistically significant, and grew over time. The conditional hourly wage rates are also positive and statistically significant over time ($\hat{\beta} = 0.154$, 0.165, and 0.175 in year-three, -four, and -five, respectively; all $p < .001$). The CCB completion differentials in hourly wage rates in terms of percentage increase were 16.6% three years after CCB matriculation and 19.1% five years after matriculation.

Similarly, the CCB completion differential in UI employment status is growing, positive, and statistically significant ($\hat{\beta} = 0.082$, 0.104, and 0.117 in year-three, -four, and -five, respectively; $p < .001$). In percentage point difference, CCB completion differentials in UI employment was 8.2 pp three years after matriculation and also grew over time, to 11.7 pp in year-five. These outcomes suggest that total annual earnings and their trajectories are related by both hourly wage rates and UI employment with some suggestive evidence on the more prominent role of hourly wage rates as a channel towards improved annual earnings.

As displayed on Table 6, estimates of the unconditional labor market outcomes broadly parallel the patterns of the conditional outcomes. Given the positive CCB completion differentials in labor market outcomes, the CCB completion differentials in unconditional labor market outcomes are larger than conditional outcomes since the former capture both UI employment and hourly wage rates. Mechanically speaking, CCB graduates are more likely to be UI employed, so unconditional labor market earnings and hourly wage rates will be larger than the conditional counterparts. Since conditional labor market outcome variables support the ability to better identify mechanisms of earnings differentials over time via hourly rates and/or UI employment rate, the remaining portions of this paper will generally focus on reporting conditional outcomes. I will report on the unconditional outcomes when patterns differ notably.

4.1.4 Heterogeneity in Outcomes, Mechanisms, and Trajectories

4.1.5 Field of Study and CIP2

Because labor market outcomes differ significantly across fields of study (as defined by CIP2 codes), I use field-stratified models to examine how the CCB completion differentials vary within fields (see Table 7 and Appendix: Tables 19-20). Whereas the pooled OLS models' estimates are only relative to a reference field of study (in this case, Business & Management), field-stratified models provide insights to differentials in labor market outcomes between CCB graduates and non-graduates within the same field of study. For example, the field-stratified models generate information on the difference between CCB graduates and non-graduates in Health Professions, conditional on observed covariates. The following four sections detail these patterns for the four largest CCB fields of study in Washington state: Health Professions, Business & Management, Computer & Information Sciences, and Education.

4.1.5.1 Business, Management, Marketing, & Related Support Services (CIP2 = 52) CCB Programs

This section focuses on CCB students who matriculated and were in Business, Management, Marketing, & Related Support Services CCB programs. From the primary model specification (see Table 7), the CCB differential in the conditional log-transformed annual earnings three years after matriculating is positive and statistically significant between CCB graduates and non-graduates in Business & Management ($\hat{\beta} = 0.125$, $p < .001$; 13.3% increase). The differential in conditional raw earnings for year-three is \$6,069 ($p < .001$; see Appendix: Table 19). As displayed on Table 7 and Appendix: Table 19, there is also a positive and statistically significant relationship between CCB completion and conditional log-transformed hourly wage rates ($\hat{\beta} = 0.066$, $p < .001$; 6.8% increase, \$2.36 raw). Similarly, CCB graduates experience a positive and statistically significant differential in UI employment status (7.9 percentage point increase, $p < .001$).

For the Business & Management CIP2 field, the trajectory analysis also highlights growing, positive, and statistically significant CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Table 19). As displayed on Table 7, the completion differential in conditional log-transformed earnings is positive and statistically significant at year-three, -four, and -five ($\hat{\beta} = 0.125$, 0.171, 0.176, respectively; all $p < .01$ or $p < .001$). Similarly, the differential in conditional hourly wage rates is also modestly growing, positive, and statistically significant ($\hat{\beta} = 0.066$, 0.065, and 0.081 for year-three, -four, and -five, respectively; $p < .001$). The differential in UI employment rate increases notably from year-three (7.9 percentage points) to 11.5 pp in year-four and 12.4 pp in year-five ($p < .001$).

Overall, Business & Management CCB graduates experienced a balanced profile of CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Tables 19-20). There are positive and statistically significant relationships between CCB completion and all labor market outcome variables. In Business & Management, CCB graduates, relative to CCB non-graduates, access higher total annual earnings via increases in both hourly wage rates and UI employment participation over time.

4.1.5.2 Computer & Information Sciences & Support Services (CIP2 = 11) CCB Programs

This section focuses on CCB students who matriculated and were in Computer & Information Sciences & Support Services CCB programs. From the primary model specification (see Table 7), the CCB differential in conditional log-transformed annual earnings three years after matriculating is positive and statistically significant between CCB graduates and non-graduates in Computer & Information Sciences ($\hat{\beta} = 0.115$, $p < .05$; 12.2% increase). The differential in conditional raw earnings for year-three is $2,728 and, while positive, is not statistically significant (see Appendix: Table 19). As displayed on Table 7, there is also a positive and statistically significant relationship between CCB completion and conditional log-transformed hourly wage rates ($\hat{\beta} = 0.066$, $p < .001$; 6.9% increase, $2.39 raw). Similarly, within Computer & Information Science programs, CCB graduates experience a positive and statistically significant differential in UI employment status (8.3 percentage point increase, $p < .001$).

For the Computer & Information Sciences CIP2 field, the trajectory analysis also highlights growing, positive, and statistically significant CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Table 19). As displayed on Table 7, the completion differential in conditional log-transformed earnings grows substantively over time, is positive, and is statistically significant at year-three, -four, and -five ($\hat{\beta} = 0.115$, 0.197, 0.243, respectively; $p < .01$, $p < .001$, and $p < .001$, respectively). Similarly, the differential in conditional hourly wage rates also grows substantively, is positive, and is statistically significant ($\hat{\beta} = 0.066$, 0.096, and 0.111 for year-three, -four, and -five, respectively; $p < .001$). The differential in UI employment rate increases from year-three (8.3 percentage points) to 11.5 pp in year-four and 12.4 pp in year-five ($p < .001$).

Across the four biggest CIP2 fields of study, Computer & Information Sciences CCB graduates experience the strongest growth in CCB completion differentials in labor market outcomes over time (see Table 7 and Appendix: Tables 19-20). There are positive and statistically significant relationships between CCB completion and all labor market outcome variables. While there are weaker initial effects in year-three relative to the other three CIP2 programs examined, there is notable growth over time. There is a notably jump in completion differentials in both hourly rate and UI employment over time. The notable jump in hourly wage rates suggests that this is a channel in which CCB graduates' access improved total annual earnings. Overall, since CCB graduates, relative to non-graduates, experience trajectory growth over time, it can be interpreted that the value of Computer & Information Sciences CCB degrees appreciates over time.

4.1.5.3 Education (CIP = 13) CCB Programs

This section focuses on CCB students who matriculated and were in Education CCB programs. From the primary model specification (see Table 7), the CCB differential in the conditional log-transformed annual earnings three years after matriculating is positive and statistically significant between CCB graduates and non-graduates in Education ($\hat{\beta} = 0.184$, $p < .001$; 20.2% increase). The differential in conditional raw earnings for year-three is \$10,510 ($p < .001$; Appendix: Table 20). As displayed on Table 7, there is also a positive and statistically significant relationship between CCB completion and conditional log-transformed hourly wage rates ($\hat{\beta} = 0.253$, $p < .001$; 28.8% increase, \$9.54 raw). Similarly, in Education programs, CCB graduates experience a positive and statistically significant differential in UI employment status (11.8 percentage point increase, $p < .001$).

For the Education CIP2 field, the trajectory analysis also highlights modest growth, as well as positive and statistically significant CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Table 20). As displayed on Table 7, the conditional log-transformed earnings differentials are positive and statistically significant at year-three, -four, and -five ($\hat{\beta} = 0.184, 0.291, 0.229$, respectively; $p < .001$). Similarly, the differential in conditional hourly wage rates is also relatively stable, positive, and statistically significant

($\hat{\beta}$ = 0.253, 0.286, and 0.276 for year-three, -four, and -five, respectively; $p < .001$). The UI employment rate differential is also relatively stable over time (11.8, 10.6, and 12.7 pp increase in year-three, -four, and -five, respectively). The differential in UI employment rate for year-five could not compute SEs.

Education CCB graduates experience positive and statistically significant CCB completion differentials in labor market outcomes across all outcome variables (see Table 7 and Appendix: Tables 19-20). Among the largest four CIP2 codes examined, Education CCB students have modest annual total earnings, the second highest conditional hourly wage rates differentials observed, the highest UI employment rate in year-three, and a steady UI employment rate over time. This suggests that CCB graduates, relative to CCB non-graduates, initially access and maintain higher total annual earnings via initial employment participation over time.

4.1.5.4 Health Professions & Related Programs (CIP = 51) CCB Programs

This section focuses on CCB students who matriculated and were in Health Professions & Related CCB programs. From the primary model specification (see Table 7), the CCB differential in the conditional log-transformed annual earnings three years after matriculating is positive and statistically significant between CCB graduates and non-graduates in Health Professions ($\hat{\beta} = 0.492$, $p < .001$; 63.6% increase). The differential in conditional raw earnings for year-three is \$30,501 ($p < .001$; see Appendix: Tables 20). As displayed on Table 7, there is also a positive and statistically significant relationship between CCB completion and conditional log-transformed hourly wage rates ($\hat{\beta} = 0.365$, $p < .001$; 44.0% increase, \$15.19 raw). Similarly, in Health Professions programs, CCB graduates experience a positive and statistically significant differential in UI employment status (7.1 percentage point increase, $p < .001$).

For the Health Professions CIP2 field, the trajectory analysis also highlights positive and statistically significant CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Table 20). As displayed on Table 7, the conditional log-transformed earnings differentials are positive and statistically significant at year-three, -four, and -five ($\hat{\beta} = 0.492$, 0.467, 0.451, respectively; $p < .001$). Relative to the other three CIP2 programs examined, these are the most robust differentials, although they do slightly decline with time. The differential in conditional hourly wage rates is also stable, positive, and statistically significant ($\hat{\beta} = 0.365$, 0.351, and 0.356 for year-three, -four, and -five, respectively; $p < .001$). The differential in UI employment rate increases from year-three (7.1 percentage points) to 9.5 pp in year-four and 9.3 pp in year-five ($p < .001$).

Across the four biggest CIP2 fields of study, Health Professions CCB graduates experience the largest CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Tables 19-20). There are positive and statistically significant relationships between CCB completion and all labor market outcome variables. In Health Professions, the stable differentials in hourly wage rates and growing UI employment rate over time suggest that CCB graduates, relative to CCB non-graduates, increasingly access higher total annual earnings via UI employment participation.

4.1.5.5 CIP2 CCB Programs with Smaller Sample Sizes

I report the results of Business & Management, Computer & Information Sciences, Education, and Health Professions CIP2 codes because they had the largest sample sizes across year-three, -four, and -five observable windows for their respective outcome variables (see Table 7 and Appendix: Tables 19-20). For CIP2 CCB programs with smaller sample sizes (less than 100 students) and/or only offered at a single institution, their results are not reported because they were grouped into a "Not Listed" category and this lumping makes it inappropriate to interpret the "Not Listed" results. There are four other CIP2 programs that had small sample sizes, but were not grouped into a "Not Listed" category. It should be noted that their sample size was considerably smaller (over 900 for each of the four biggest

CIP2 CCB programs) and their results should be interpreted with caution.

Table 7: Completion Differentials in Labor Market Outcomes by Field of Study (CIP2), Years 3-5

	Year 3				Year 4				Year 5			
Group / Outcome	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n
Business & Management												
Cond Log Earnings	0.125*** (0.036)	13.3%	0.027	2,773	0.171*** (0.044)	18.6%	0.050	2,255	0.176** (0.059)	19.2%	0.030	1,654
Cond Log Hourly	0.066*** (0.015)	6.8%	0.046	2,681	0.065*** (0.017)	6.7%	0.040	2,180	0.081*** (0.021)	8.4%	0.051	1,585
UI Employment	0.079*** (0.016)	7.9 pp	0.050	3,748	0.115*** (0.018)	11.5 pp	0.082	3,081	0.124*** (0.021)	12.4 pp	0.082	2,376
Computer & Info Sciences												
Cond Log Earnings	0.115* (0.050)	12.2%	0.009	2,249	0.197*** (0.053)	21.8%	0.051	1,821	0.243*** (0.062)	27.5%	0.063	1,400
Cond Log Hourly	0.066*** (0.019)	6.9%	0.033	2,113	0.096*** (0.022)	10.1%	0.057	1,699	0.111*** (0.026)	11.7%	0.063	1,296
UI Employment	0.083*** (0.018)	8.3 pp	0.048	3,177	0.115*** (0.020)	11.5 pp	0.076	2,593	0.124*** (0.023)	12.4 pp	0.078	2,025
Education												
Cond Log Earnings	0.184*** (0.046)	20.2%	0.045	1,210	0.291*** (0.056)	33.7%	0.117	978	0.229*** (0.055)	25.7%	0.072	712
Cond Log Hourly	0.253*** (0.024)	28.8%	0.208	1,174	0.286*** (0.028)	33.2%	0.232	945	0.276*** (0.035)	31.8%	0.210	681
UI Employment	0.118*** (0.025)	11.8 pp	0.086	1,444	0.106*** (0.027)	10.6 pp	0.068	1,183	0.127	12.7 pp	0.076	892
Health Professions												
Cond Log Earnings	0.492*** (0.047)	63.6%	0.182	2,568	0.467*** (0.043)	59.5%	0.191	2,051	0.451*** (0.056)	56.9%	0.145	1,581
Cond Log Hourly	0.365*** (0.018)	44.0%	0.319	2,462	0.351*** (0.019)	42.0%	0.318	1,972	0.356*** (0.021)	42.7%	0.324	1,504
UI Employment	0.071*** (0.016)	7.1 pp	0.052	3,017	0.095*** (0.018)	9.5 pp	0.072	2,487	0.093*** (0.020)	9.3 pp	0.062	1,955

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each CIP2 code. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. For the log-transformed annual earnings and hourly rates, the percentage change ($e^{\hat{\beta}} - 1$) was calculated (%). The UI employment rate was calculated using percentage point change from the linear probability model (pp). The $\hat{\beta}$ for the conditional raw annual earnings and hourly wage rates are the covariate-adjusted mean differences so no percentage change or pp are calculated.

Note 5. See Analytic Sample and Strategy section for additional details.

4.1.6 Gender

4.1.6.1 Pooled Models: Gender

The primary pooled model provide insight into the CCB completion differentials in labor market outcomes between female and male students, holding CCB graduation status and all other observed covariates constant. Relative to male CCB students, female students experienced negative conditional log-transformed annual earnings in year-three ($\hat{\beta}$ = -0.042, p = .058), year-four ($\hat{\beta}$ = -0.097, p < .001), year-five ($\hat{\beta}$ = -0.081, p < .01), although this was not statistically significant at year-three. Female students also experienced negative conditional log-transformed hourly wage rates ($\hat{\beta}$ = -0.038, p < .001). UI employment rates do not differ significantly by gender ($\hat{\beta}$ = 0.014). These pooled results suggest that the gender-based differentials in labor market outcomes among CCB students operate via wage gaps rather than UI employment gaps. Students whose gender identity was reported as non-binary or not reported (n = 150) are included in the pooled models as its own dichotomous variable, but Lin (2013) generated rank-deficient standard errors for some outcomes. Their results are not provided given the small sample sizes (n < 10); as noted in the Analytic Strategy section. As the stratified analysis will reveal, while female CCB students have weaker labor market outcomes when controlling for completion status (and other observed covariates), they benefit greatly from CCB completion.

4.1.6.2 Gender-Stratified Models: Within-Group Findings

Building upon the pooled estimates, the gender-stratified OLS models generate different estimates for women and men, respectively, using the same model specification–excluding the gender covariates (see Table 8 and Appendix: Tables 21). These estimates capture the within-gender-based CCB completion differentials in labor market outcomes (e.g., among female [or male] students, how much more do CCB graduates earn relative to non-graduates, conditional on observed covariates?). Comparing the gender-stratified results between female-and male-stratified models also provides insights as to the extent that CCB completion is more related to positive labor market outcomes for female or male students.

From the primary model specification, there is a generally positive and statistically significant relationship between CCB completion and labor market outcomes for both female and male students (see Table 8 and Appendix: Table 21). Relative to male CCB graduates, female CCB graduates experience more positive and statistically significant labor market outcomes. As displayed on Table 8, between female CCB graduates and non-graduates, the CCB completion differential in conditional log-transformed annual earnings for year-three is favorable to CCB graduates ($\hat{\beta} = 0.284$, $p < .001$; 32.8% increase). This is more than twice the conditional log-transformed completion differential in earnings for males ($\hat{\beta} = 0.120$, $p < .001$; 12.7%). As displayed on Appendix: Table 21, among female CCB graduates and non-graduates, the completion differential in conditional raw earnings for year-three is also positive and statistically significant (\$16,605, $p < .001$); among male students, it is positive, but slightly less statistically significant (\$3,777, $p < .05$).

There are also positive and statistically significant CCB completion differentials in hourly wage rates for both female and male students, respectively (see Table 8 and Appendix: Table 21). For female students, the completion differential in conditional log-transformed hourly wage rates is $\hat{\beta} = 0.210$ ($p < .001$; 23.4% increase), with a raw hourly rate year-three differential of \$8.42 ($p < .001$). For male students, the completion differential in conditional log-transformed hourly wage rates is $\hat{\beta} = 0.075$ ($p < .001$; 7.8% increase), with a raw hourly rate year-three differential of \$2.86 ($p < .001$). This is a 2.8:1 ratio when comparing the differentials in conditional hourly wage rates between females and males. Among female students, the completion differential in UI employment status is a 8.6 percentage point increase and 7.2 pp increase for male students ($p < .001$).

The trajectory analysis also suggests increased CCB completion differentials in earnings and hourly wage rates over time for both female and male students (see Table 8 and Appendix: Table 21), respectively–with greater benefits accessed by female CCB graduates.

Among female CCB students, the CCB completion differential in conditional log-transformed annual earnings is growing, positive, and statistically significant over time ($\hat{\beta} = 0.284$, 0.322, and 0.340 for year-three, year-four, and year-five, respectively; $p < .001$; see Table 8). The completion differentials in conditional log-transformed hourly wage rates also increase over time ($\hat{\beta} = 0.210$, 0.219, and 0.232; $p < .001$). In contrast, among male CCB students, the differentials in log-transformed conditional annual earnings fluctuate over time ($\hat{\beta} = 0.120$, 0.155, and 0.130 for year-three, year-four, and year-five, respectively; $p < .001$, $p < .001$, and $p < .01$, respectively); completion differentials in conditional log-transformed hourly wage rates are modestly growing, positive, and statistically significant over time ($\hat{\beta} = 0.075$, 0.084, and 0.091; $p < .001$). For female students, the differential in UI employment status increases over time (8.6 pp, 10.2 pp, and 12.0 pp in year-three, -four, and -five, respectively; $p < .001$); male students also follow this pattern (7.2 pp, 10.0 pp, and 11.1 pp; $p < .001$).

Overall, these findings by gender suggest that CCB completion disproportionately benefits the gender that has historically experienced labor market disadvantage, female students. The primary pooled OLS results reveal disparities in labor market outcomes (e.g., conditional earnings and hourly wage rates) among female students, holding CCB completion status and all other observed covariates constant (see Table 8 and Appendix: Table 21). However, the gender-stratified results reveal how female and male CCB graduates generally experience improved labor market outcomes relative to CCB non-graduates. The notable differences between female CCB graduates and female CCB non-graduates vs. male CCB graduates and male CCB non-graduates suggest that female CCB students benefit much more from CCB completion than male students. The gender-stratified models show that the CCB completion differentials are 2.4 times larger in conditional annual earnings in year-three and 2.8 times larger in conditional hourly wage rates in year-three for female students compared to male students. Given the comparable trends in UI employment status between female and male CCB students, the CCB completion differentials experienced by female CCB students, relative to male students, may be related to hourly wage rate access.

A descriptive analysis of fields of study highlights some patterns by gender. Table 3 displays descriptives of gender composition by CCB fields of study. Health Professions, the field of study related to some of the most positive labor market outcomes for CCB completion, is primarily comprised of female students (82.6%). Across all female students, 32.4% are in Health Profession programs; an additional 16.4% are in Education, which had the second highest completion differential in hourly wage rates (see Table 7 and Appendix: Table 20). This can be interpreted in multiple ways. For example, female CCB students can achieve positive labor market outcomes by graduating from fields of study with high earnings potential, but they are also in fields in which non-completion is related to greater penalties in the labor market. In contrast, male students are concentrated in CCB programs where CCB completion was not as strongly related to improved labor market outcomes (Business & Management and Computer & Information Sciences). For male students, CCB completion was not as necessary to activating the labor market benefits of bachelor's degree attainment. This is also noted in the pooled primary model, where there was a negative relationship between CCB students who are female and labor market outcomes.

Table 8: Completion Differentials in Labor Market Outcomes by Gender, Years 3-5

	Year 3				Year 4				Year 5			
Group / Outcome	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n
Female												
Cond Log Earnings	0.284*** (0.026)	32.8%	0.114	6,073	0.322*** (0.029)	38.0%	0.130	4,891	0.340*** (0.036)	40.6%	0.128	3,638
Cond Log Hourly	0.210*** (0.011)	23.4%	0.200	5,849	0.219*** (0.012)	24.5%	0.209	4,698	0.232*** (0.014)	26.2%	0.219	3,476
UI Employment	0.086*** (0.011)	8.6 pp	0.072	7,688	0.102*** (0.012)	10.2 pp	0.085	6,334	0.120*** (0.014)	12.0 pp	0.096	4,889
Male												
Cond Log Earnings	0.120*** (0.036)	12.7%	0.023	3,809	0.155*** (0.037)	16.8%	0.045	3,105	0.130** (0.047)	13.9%	0.019	2,372
Cond Log Hourly	0.075*** (0.014)	7.8%	0.055	3,618	0.084*** (0.016)	8.8%	0.061	2,943	0.091*** (0.019)	9.5%	0.061	2,224
UI Employment	0.072*** (0.014)	7.2 pp	0.048	5,236	0.100*** (0.015)	10.0 pp	0.072	4,313	0.111*** (0.017)	11.1 pp	0.077	3,378

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each gender group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. For the log-transformed annual earnings and hourly rates, the percentage change ($e^{\hat{\beta}} - 1$) was calculated (%). The UI employment rate was calculated using percentage point change from the linear probability model (pp). The $\hat{\beta}$ for the conditional raw annual earnings and hourly wage rates are the covariate-adjusted mean differences so no percentage change or pp are calculated.

Note 5. See Analytic Sample and Strategy section for additional details.

4.1.7 Race/Ethnicity

4.1.7.1 Pooled and Interaction Models: Race/Ethnicity

In the primary pooled model, the OLS estimates for each racial/ethnic group are not statistically significant for all primary outcome variables (i.e., annual earnings, hourly wage rates, and UI employment rate). The conditional log-transformed annual earnings for year-three for American Indian or Alaska Native ($\hat{\beta} = -0.154$), Asian ($\hat{\beta} = 0.012$), Black ($\hat{\beta} = -0.019$), Latine ($\hat{\beta} = 0.034$), Multiracial ($\hat{\beta} = -0.038$), and Native Hawaiian or Pacific Islander ($\hat{\beta} = -0.038$) are all not statistically significant. This suggests that, among all CCB students, there are no statistically significant differences in annual earnings between racial/ethnic groups, after controlling for CCB completion status, field of study, and other observed covariates. In other words, racial differences in labor market outcomes are not observed from the model specifications. Analytic approaches and model specifications with interaction terms further explore this pattern.

Given the persistent historical and current racial inequities in labor market experiences, outcomes, and trajectories, additional model specifications examined whether the relationship between CCB completion and labor market outcomes varied by race/ethnicity. This was conducted by interacting the CCB completion indicator and each of the racial/ethnic groups in the dataset; the results were not statistically significant for all outcome variables. For example, the CCB completion estimate for conditional log-transformed annual earnings in year-three in the interaction term model was $\hat{\beta} = 0.225$ ($p < .001$), which represents the completion differential for the reference group (white students) in the model. The results were not statistically significant for the interaction terms for Asian ($\hat{\beta} = -0.069$), Black ($\hat{\beta} = -0.062$), Latine ($\hat{\beta} = 0.087$), and Multiracial ($\hat{\beta} = -0.021$) students. Although the interaction model does not identify any statistically significant differences in CCB completion differentials in labor market outcomes across racial/ethnic groups, the race-stratified models in the following section reveals substantive variation in CCB completion differentials within racial/ethnic groups.

The Lin (2013) estimator also provides complementary evidence. In the pooled Lin regression models with only the base covariates and racial/ethnic groups (no fields of study), the log-transformed year-three earnings estimate here ($\hat{\beta} = 0.219$) was comparable to the OLS regression model ($\hat{\beta} = 0.216$). This suggests that race-specific covariate slopes do not alter the average completion differential. These results suggest that the CCB completion differentials in labor market outcomes are not significantly moderated by race/ethnicity in the primary pooled specification. Combined, these results suggest that within all CCB matriculated students, CCB completion differentials do not vary by race/ethnicity after controlling for field of study and other observed covariates. To be clear, this does not suggest that there are no differences in CCB completion differentials within or between racial/ethnic groups. This simply establishes that–at baseline–CCB matriculated students in the sample do not vary systematically in CCB differentials by race when accounting for completion, fields, and other covariates.

4.1.7.2 Race-Stratified Models: Within-Group Findings

Building upon the pooled estimates, the race-stratified OLS models generate different estimates by racial/ethnic group using the the same model specification–excluding the race/ethnicity covariates (see Tables 9-10 and Appendix: Tables 22-25). These estimates capture the within-race/ethnicity CCB completion differentials from CCB completion (e.g., among a certain racial/ethnic group, how much more do CCB graduates earn relative to non-graduates, conditional on observed covariates?). Additionally, comparing the race-stratified CCB completion differentials between different racial groups can generates insights as to the extent to which CCB completion is more related to positive labor market outcomes for a specific racial/ethnic group relative to one another.

From the primary model specification, there is a generally positive relationship between CCB completion and labor market outcomes for racial/ethnic groups, when comparing graduates and non-graduates, respectively; there are varying levels of statistical significance (see Tables 9-10 and Appendix: Tables 22-25). The completion differentials in conditional log-transformed annual earnings in year-three between CCB graduates and non-graduates are positive for American Indian or Alaska Native ($\hat{\beta}$ = 0.664; 94.2%; \$28,345 raw; $p < .05$; n = 76); this estimate should be interpreted with extreme caution given the small sample size (see Tables 9 and Appendix: Table 22). The differentials in conditional log-transformed annual earnings are also positive, but not statistically significant for Asian ($\hat{\beta}$ = 0.103; 10.8%; \$1,002 raw; n = 1,159), Black ($\hat{\beta}$ = 0.129; 13.8%; \$11,090 raw; n = 674), and Native Hawaiian or Pacific Islander ($\hat{\beta}$ = 0.306; 35.8%; \$7,427 raw; n = 58) students (see Tables 9-10 and Appendix: Tables 22-24). The results for racial/ethnic groups with smaller sample sizes should be interpreted with caution as there may be power limitations; I limit discussion on the results for American Indian or Alaska Native and Native Hawaiian or Pacific Islander students due to small sample sizes (see Tables 9-10 and Appendix: Tables 22 and 23).

In contrast, the race-stratified models with larger samples are positive and statistically significant (see Tables 9-10 and Appendix: Tables 23-25). The CCB completion differential in log-transformed earnings for Latine ($\hat{\beta}$ = 0.283; 32.8%; \$17,085 raw; n = 1,039), Multiracial ($\hat{\beta}$ = 0.207; 23.0%; \$12,663 raw; n = 1,508), and white ($\hat{\beta}$ = 0.231; 26.0%; \$11,321 raw; n = 4,951) students are all positive and statistically significant ($p < .001$). For Latine, Multiracial, and white students, the CCB completion differential in labor market outcomes is stable in model specifications without field of study as well (6.2%, 7.7%, and 2.3%, respectively), suggesting that the positive relationships that these groups of CCB graduates experience, relative to non-graduates, do not appear to be field-dependent. However, field dependency is more pronounced for Asian and Black students, since controlling for field of study decreases conditional log-transformed earnings in year-three by 31.0% and 15.7%, respectively (Asian $\hat{\beta}_{No\ CIP2} = 0.149$ and $\hat{\beta}_{Primary} = 0.103$; Black $\hat{\beta}_{No\ CIP2} = 0.153$ and $\hat{\beta}_{Primary} = 0.129$; see Table 9; Appendix: Table 22 and 23).

The CCB completion differential in conditional hourly wage rates in year-three suggests the most racially equitable finding (see Tables 9-10). Across the racial/ethnic groups with larger sample sizes, CCB graduates, relative to non-graduates, experience a positive and statistically significant conditional hourly wage rates differential. This includes Asian ($\hat{\beta}$ = 0.077; 8.0%; $2.96 raw; $p < .01$), Black ($\hat{\beta}$ = 0.189; 20.9%; $8.10 raw; $p < .001$), Latine ($\hat{\beta}$ = 0.224; 25.1%; $8.64 raw; $p < .001$), Multiracial ($\hat{\beta}$ = 0.191; 21.0%; $7.29 raw; $p < .001$), and white ($\hat{\beta}$ = 0.134; 14.3%; $5.26 raw; $p < .001$) students (see Tables 9-10 and Appendix: Tables 22-25).

The CCB completion differential in UI employment status in year-three is generally positive for most racial/ethnic groups (see Tables 9-10). The percentage point difference of UI employment between CCB graduates and non-graduates is positive and statistically significant among Asian (7.0 pp; $p < .01$), Latine (5.8 pp; $p < .05$), Multiracial (7.4 pp; $p < .001$), and white (9.6 pp; $p < .001$) students. The percentage point difference in UI employment rates between Black CCB graduates and non-graduates is positive (4.9 pp), but not statistically significant (see Table 9).

The trajectory analysis also suggests growth in annual earnings, hourly rates, and UI employment for Latine, Multiracial, and white students (see Tables 9-10 and Appendix: Tables 22-25). Latine graduates, relative to non-graduates, show the largest growth over time (in year-three, -four, and -five) in conditional annual earnings ($\hat{\beta}$ = 0.283, 0.417, and 0.362, respectively; $p < .001$), conditional hourly wage rates ($\hat{\beta}$ = 0.224, 0.267, and 0.272, respectively; $p < .001$), and UI employment (5.8, 7.9, and 12.8 pp, respectively; $p < .05$, $p < .01$, and $p < .001$, respectively). Multiracial students also show positive trajectories ($\hat{\beta}_{Earnings}$ = 0.207, 0.226, and 0.283, respectively; $\hat{\beta}_{Hourly}$ = 0.191, 0.198, and 0.219, respectively; UI Employment: 7.4, 10.6, and 10.0 pp, respectively; $p < .001$). Labor market trajectories for white students are steady and modest ($\hat{\beta}_{Earnings}$ = 0.231, 0.262, and 0.253, respectively; $\hat{\beta}_{Hourly}$ = 0.134, 0.160, and 0.167, respectively; UI Employment: 9.6, 11.4, and 12.6 pp, respectively; $p < .001$).

Asian and Black CCB students experience different trajectories from completion differentials in labor market outcomes (see Tables 9-10 and Appendix: Tables 22-23). Asian CCB students' conditional earnings are positive, but not statistically significant ($\hat{\beta} = 0.103$ in year-three, 0.057 in year-four, and 0.054 in year-five). However, Asian students' completion differentials in hourly wage rates grows over time ($\hat{\beta} = 0.077$, 0.073, and 0.105 in year-three, -four, and -five, respectively; $p < .01$, $p < .05$, and $p < .01$, respectively); UI employment status also grow substantially in year-three, -four, and -five (7.0 pp, 9.4 pp, and 13.2 pp, respectively; $p < .01$, $p < .01$, and $p < .001$, respectively). This suggests that the CCB differentials in labor market outcomes experienced by Asian students are more related to UI employment status over time. Unconditional annual earnings estimates support this interpretation; the unconditional log-transformed earnings are positive and statistically significant at $p < .01$ for Asian students across all three years, even when conditional earnings estimates are not.

Black students experience more complex trajectories (see Table 9 and Appendix: Table 23). Black CCB graduates, relative to non-graduates, experience positive conditional log-transformed annual earnings that fluctuate between year-three, -four, and -five ($\hat{\beta} = 0.129$, 0.262, and 0.216, respectively; year-four is statistically significant at $p < .05$, while year-three and year-five are not). Conditional hourly wage rates are positive and statistically significant at year-three and year-four ($\hat{\beta} = 0.189$ and 0.130, respectively; $p < .001$), though the year-five hourly estimate ($\hat{\beta} = 0.173$) is not estimable due to small sample size. The CCB completion differential in UI employment status between Black CCB graduates and non-graduates is positive, but not statistically significant, and drops over time: from a 4.9 percentage points increase in year-three to 3.4 pp increase in year-four and 0.7 pp increase in year-five. These results suggest that Black CCB students' positive CCB completion differentials are linked to increased conditional hourly wage rates, not so much with UI employment, and may not translate to total annual earnings.

Overall, these findings by race/ethnicity suggest that CCB completion is associated with positive labor market outcomes across racial/ethnic groups, and vary by magnitude and mechanism (see Tables 9-10 and Appendix: Tables 22-25). The pooled OLS results reveal minimal statistically significant disparities in labor market outcomes (e.g., conditional earnings and hourly wage rates) among different racial/ethnic groups, holding CCB completion status and other observed covariates constant. The race-stratified results reveal that CCB graduates generally experience positive and statistically significant labor market outcomes relative to CCB non-graduates, particularly for Latine, Multiracial, and white students. The notable differences between Latine CCB graduates and Latine CCB non-graduates suggest that Latine CCB students experience positive CCB completion differentials in labor market outcomes relative to other racial/ethnic groups (see Table 9 and Appendix: Table 23).

The notable differences within Asian CCB students and within Black CCB students elevate different mechanisms in which CCB completion is related to positive labor market outcomes (see Table 9 and Appendix: Tables 22-23). Asian and Black CCB students' conditional earnings in year-three–while still positive–dropped when accounting for field of study. This suggests field-dependent CCB completion differentials in labor market outcomes. Additionally, Black CCB graduates benefit from CCB completion via increased hourly wage rates, but completion does not fully translate to increased and sustained UI employment or total annual earnings over time.

These findings are linked to racialized field sorting. Table 3 displays descriptives of racial/ethnic composition by CCB fields of study. Asian CCB graduates are more concentrated in Health Professions (27.9%) relative to Asian CCB non-graduates (16.8%), representing a 11.1 percentage point difference. Asian CCB graduates are also less concentrated in Computer & Information Sciences (33.9%) relative to non-graduates (42.0%), representing a 8.1 pp difference. Health Professions and Computer & Information Sciences are two CCB CIP2 programs with some of the highest earning differentials for CCB completion (see Table 7 and Appendix: Tables 19-20). When model specifications include field of study CIP2 codes as control variables, the conditional earnings differential for Asian CCB students decreases by 31.0% (from $\hat{\beta} = 0.149$ without CIP2 covariates to $\hat{\beta} = 0.103$ with CIP2 covariates (latter model details are available upon request). This suggests that a portion of the Asian CCB completion differentials in labor market outcomes operates through their concentration in fields of study with the highest earnings premiums. For Black students, the inclusion of field controls reduces the conditional earnings differential by 15.6% (from $\hat{\beta} = 0.153$ to $\hat{\beta} = 0.129$), indicating more modest field dependency (latter model details are available upon request). Rather than a single dominant sorting mechanism, the cumulative effect of slight differences across multiple fields contributes to the labor market differentials of CCB completion for Black students.

Table 9: Completion Differentials in Labor Market Outcomes by Race/Ethnicity, Years 3-5 (1 of 2)

	Year 3				Year 4				Year 5			
Group / Outcome	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n
Am Ind/AK Native†												
Cond Log Earnings	0.664* (0.321)	94.2%	0.045	76	0.556	74.4%		62	0.257 (0.176)	29.4%		52
Cond Log Hourly	0.187 (0.112)	20.6%		75	0.332** (0.117)	39.4%	0.119	58	0.293	34.0%	0.085	49
UI Employment	0.083	8.3 pp		111	0.077	7.7 pp		95	0.073 (0.118)	7.3 pp		79
Asian												
Cond Log Earnings	0.103 (0.071)	10.8%		1,159	0.057 (0.072)	5.8%		944	0.054 (0.104)	5.5%		691
Cond Log Hourly	0.077** (0.028)	8.0%	0.028	1,101	0.073* (0.029)	7.6%	0.020	905	0.105** (0.034)	11.1%	0.046	656
UI Employment	0.070** (0.026)	7.0 pp	0.021	1,645	0.094** (0.029)	9.4 pp	0.041	1,327	0.132*** (0.034)	13.2 pp	0.068	1,002
Black												
Cond Log Earnings	0.129 (0.081)	13.8%		674	0.262* (0.102)	30.0%	0.039	506	0.216 (0.119)	24.1%		355
Cond Log Hourly	0.189*** (0.031)	20.9%	0.150	628	0.130*** (0.035)	13.9%	0.073	471	0.173	18.9%	0.126	326
UI Employment	0.049 (0.030)	4.9 pp		858	0.034 (0.035)	3.4 pp		676	0.007 (0.043)	0.7 pp		504
Latine												
Cond Log Earnings	0.283*** (0.062)	32.8%	0.092	1,039	0.417*** (0.064)	51.7%	0.161	852	0.362*** (0.074)	43.7%	0.131	655
Cond Log Hourly	0.224*** (0.025)	25.1%	0.198	1,006	0.267*** (0.028)	30.6%	0.230	831	0.272*** (0.035)	31.3%	0.222	628
UI Employment	0.058* (0.024)	5.8 pp	0.016	1,262	0.079** (0.027)	7.9 pp	0.032	1,066	0.128*** (0.031)	12.8 pp	0.077	844

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD.

Note 2. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each racial/ethnic group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. For the log-transformed annual earnings and hourly rates, the percentage change ($e^{\hat{\beta}}-1$) was calculated (%). The UI employment rate was calculated using percentage point change from the linear probability model (pp). The $\hat{\beta}$ for the conditional raw annual earnings and hourly wage rates are the covariate-adjusted mean differences so no percentage change or pp are calculated.

Note 5. See Analytic Sample and Strategy section for additional details.

† Results are reported for transparency, but should be interpreted with extreme caution due to small sample sizes.

Table 10: Completion Differentials in Labor Market Outcomes by Race/Ethnicity, Years 3-5 (2 of 2)

	Year 3				Year 4				Year 5			
Group / Outcome	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n
Multiracial												
Cond Log Earnings	0.207*** (0.054)	23.0%	0.049	1,508	0.226*** (0.056)	25.4%	0.068	1,162	0.283*** (0.077)	32.7%	0.073	873
Cond Log Hourly	0.191*** (0.022)	21.0%	0.166	1,442	0.198*** (0.025)	21.9%	0.169	1,108	0.219*** (0.029)	24.5%	0.183	826
UI Employment	0.074*** (0.021)	7.4 pp	0.039	1,930	0.106*** (0.024)	10.6 pp	0.066	1,531	0.100*** (0.028)	10.0 pp	0.050	1,173
Native Hawaiian or Pacific Islander†												
Cond Log Earnings	0.306	35.8%		58	0.008 (0.420)	0.8%		39	-0.220 (0.168)	-19.8%		31
Cond Log Hourly	0.029	3.0%		54	-0.206 (0.147)	-18.6%		37	-0.032	-3.1%		28
UI Employment	-0.014 (0.113)	-1.4 pp		75	0.120 (0.149)	12.0 pp		59	0.040 (0.186)	4.0 pp		42
white												
Cond Log Earnings	0.231*** (0.031)	26.0%	0.082	4,951	0.262*** (0.033)	30.0%	0.098	4,042	0.253*** (0.040)	28.8%	0.087	3,039
Cond Log Hourly	0.134*** (0.013)	14.3%	0.117	4,761	0.160*** (0.014)	17.4%	0.143	3,865	0.167*** (0.017)	18.1%	0.143	2,897
UI Employment	0.096*** (0.012)	9.6 pp	0.076	6,441	0.114*** (0.013)	11.4 pp	0.092	5,331	0.126*** (0.016)	12.6 pp	0.097	4,155

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each racial/ethnic group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. For the log-transformed annual earnings and hourly rates, the percentage change ($e^{\hat{\beta}} - 1$) was calculated (%). The UI employment rate was calculated using percentage point change from the linear probability model (pp). The $\hat{\beta}$ for the conditional raw annual earnings and hourly wage rates are the covariate-adjusted mean differences so no percentage change or pp are calculated.

Note 5. See Analytic Sample and Strategy section for additional details.

† Results are reported for transparency, but should be interpreted with extreme caution due to small sample sizes.

4.1.8 Age Group

4.1.8.1 Pooled Models: Age Group

The primary pooled OLS models provide insight into the CCB completion differential in labor market outcomes between students younger than 24 years-old and students of older age groups (25-29, 30-39, and 40 years-old or older), holding CCB graduation status and additional observed covariates constant. Relative to CCB students who were 24 years-old or younger, CCB students who were 25 years-old or older were more likely to experience positive and statistically significant completion differentials in conditional hourly wage rates relative to students who are 24 years-old or younger (age 25-29: $\hat{\beta} = 0.132$; age 30-39: $\hat{\beta} = 0.174$; age 40+: $\hat{\beta} = 0.192$; $p < .001$; models used 24 years-old or younger as a reference group). However, adult learners were less likely to be UI employed relative to CCB students who were 24 years-old or younger (age 30-39: $\hat{\beta} = -0.027$, $p < .01$; age 40+: $\hat{\beta} = -0.081$, $p < .001$).

4.1.8.2 Age-Stratified Models: Within-Group Findings

Building upon the pooled estimates, the age-stratified OLS models generate different estimates for CCB students who matriculated at different age groups using the same model specification–excluding the age group covariates (see Table 11 and Appendix: Table 26). These estimates capture the within-age-group CCB completion differentials in labor market outcomes (e.g., among students of a specific age group, how much more do CCB graduates earn relative to non-graduates, conditional on observed covariates). Comparing the age-stratified results between each age group's stratified models also generates insight as to the extent that CCB completion is more related to positive labor market outcomes for certain age groups.

From the primary model specification, there are generally positive and statistically significant CCB completion differentials in labor market outcomes for each age group–when comparing each age group's graduates and non-graduates, respectively (see Table 11 and Appendix: Table 26). Comparatively speaking, younger students tend to benefit more from CCB completion. Among CCB students who were 24 years-old or younger, the CCB completion differential in conditional log-transformed annual earnings in year-three is $\hat{\beta} = 0.260$ ($p < .001$; 29.7% increase; \$15,051 raw). Among students aged 25-29, the completion differential in conditional log-transformed annual earnings is $\hat{\beta} = 0.262$ ($p < .001$; 29.9%; \$13,945 raw). Among students aged 30-39, the differential in conditional log-transformed annual earnings is $\hat{\beta} = 0.175$ ($p < .001$; 19.2% increase; \$7,489 raw). CCB graduates, relative to non-graduates, who were 40 years-old or older experienced positive and statistically significant completion differentials in log-transformed conditional earnings ($\hat{\beta} = 0.165$, $p < .001$; 18.0% increase; \$7,999 raw, $p < .01$), but this differential was smaller relative to the two youngest age groups.

There are similar trends with respect to conditional log-transformed hourly wage rates in year-three (see Table 11 and Appendix: Table 26), with CCB graduates aged 24 years-old or younger conferring the most positive differentials in conditional hourly wage rates relative to non-graduates in the same age group ($\hat{\beta} = 0.193$; 21.3% increase; \$7.34 raw), followed by the 25-29 age group ($\hat{\beta} = 0.167$; 18.2%; \$6.64 raw), 30-39 age group ($\hat{\beta} = 0.121$; 12.8% increase; \$4.97 raw), and 40+ age group ($\hat{\beta} = 0.111$; 11.8% increase; \$4.65 raw); all within-age-group hourly rate differentials were statistically significant ($p < .001$). The completion differential in UI employment status is positive and significant across all four age groups (24 years-old or younger: 7.2 pp increase, 25-29: 7.3 pp, 30-39: 10.0 pp, and 40+: 8.2 pp; $p < .001$), although the differential in UI employment status does not vary as sharply by age group as the differentials in conditional earnings and hourly wage rates.

The trajectory analysis suggests positive labor market trajectories for CCB completion across all age groups, with distinct patterns across the age spectrum (see Table 11 and Appendix: Table 26). Among students 24 years-old or younger, the CCB completion differential in conditional log-transformed annual earnings grows substantially ($\hat{\beta} = 0.260$, 0.290, and

0.371 for year-three, -four, and -five, respectively; $p < .001$). Completion differentials in conditional hourly wage rates also grow in year-three, -four, and -five ($\hat{\beta} = 0.193$, 0.200, and 0.228, respectively; $p < .001$). Completion differentials in UI employment status are stable (7.2, 9.1, and 8.7 pp increase, respectively; $p < .001$).

As displayed on Table 11, among the 30-39 age group, the CCB completion differential in conditional earnings grows over time ($\hat{\beta} = 0.175$, 0.213, and 0.238; $p < .001$). Completion differentials in conditional hourly wage rates are steady ($\hat{\beta} = 0.121$, 0.140, and 0.141; $p < .001$). Differentials in UI employment status grow (10.0, 11.6, and 14.3 pp; all $p < .001$). Among the 40+ age group, the differential in conditional earnings is steady in year-three, -four, and -five ($\hat{\beta} = 0.165$, 0.215, and 0.200, respectively; $p < .001$, $p < .001$, and $p < .01$, respectively). The differentials in conditional hourly wage rates are also steady ($\hat{\beta} = 0.111$, 0.122, and 0.123; $p < .001$). In contrast, completion differentials in UI employment status increasingly grow over time (8.2, 11.2, and 13.9 pp; $p < .001$).

Overall, CCB completion appears to be beneficial across the adult learner spectrum (see Table 11 and Appendix: Table 26). Within all age groups, there is generally a positive and statistically significant relationship between CCB completion and labor market outcomes. The two younger age groups (24 years-old or younger and 25-29 years-old) experience larger CCB completion differentials in conditional hourly wage rates over time. These results suggest that younger graduates' differentials in annual earnings are driven more by increasing hourly wage rates than UI employment. Students aged 30 years-old or older experience more modest completion differentials in conditional hourly wage rates, but also experience the strongest growth in differentials in UI employment status over time, suggesting that the benefits of CCB completion for older adult learners are via UI employment.

A descriptive analysis of fields of study highlights some patterns by age group. Table 3 displays descriptives of age group composition by CCB fields of study. Students who are 24 years-old or younger are concentrated in Computer & Information Sciences (26.0%) and Health Professions (21.2%), which are fields of study that are linked to stronger CCB completion differentials in labor market outcomes. There are many students 40 years-old or older in Business & Management (32.1%), which is a field of study with more moderate CCB completion differentials in labor market outcomes (see Table 7 and Appendix: Table 19). It should be noted that CCB completion differentials in conditional wage earnings are positive and statistically significant across all age groups, even in models that account for field of study (details available upon request). This suggests that the age gradient in completion differentials is not solely attributable to field sorting.

Table 11: Completion Differentials in Labor Market Outcomes by Age Group, Years 3-5

	Year 3				Year 4				Year 5			
Group / Outcome	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	% / pp	$RV_{q=1,\alpha=0.05}$	n
24 years-old or younger												
Cond Log Earnings	0.260*** (0.034)	29.7%	0.090	3,599	0.290*** (0.038)	33.7%	0.101	2,927	0.371*** (0.046)	44.9%	0.132	2,222
Cond Log Hourly	0.193*** (0.015)	21.3%	0.172	3,484	0.200*** (0.017)	22.2%	0.176	2,815	0.228*** (0.019)	25.6%	0.199	2,119
UI Employment	0.072*** (0.014)	7.2 pp	0.048	4,623	0.091*** (0.016)	9.1 pp	0.065	3,793	0.087*** (0.018)	8.7 pp	0.054	2,979
25–29 years-old												
Cond Log Earnings	0.262*** (0.048)	29.9%	0.081	2,100	0.298*** (0.053)	34.7%	0.108	1,696	0.118 (0.062)	12.5%		1,236
Cond Log Hourly	0.167*** (0.019)	18.2%	0.143	2,021	0.185*** (0.021)	20.3%	0.159	1,624	0.171*** (0.025)	18.6%	0.139	1,173
UI Employment	0.073*** (0.018)	7.3 pp	0.043	2,686	0.103*** (0.020)	10.3 pp	0.068	2,256	0.114*** (0.024)	11.4 pp	0.070	1,699
30–39 years-old												
Cond Log Earnings	0.175*** (0.045)	19.2%	0.043	2,654	0.213*** (0.042)	23.7%	0.074	2,094	0.238*** (0.059)	26.8%	0.067	1,559
Cond Log Hourly	0.121*** (0.017)	12.8%	0.102	2,529	0.140*** (0.019)	15.0%	0.115	2,015	0.141*** (0.022)	15.1%	0.108	1,476
UI Employment	0.100*** (0.016)	10.0 pp	0.074	3,464	0.116*** (0.018)	11.6 pp	0.086	2,798	0.143*** (0.021)	14.3 pp	0.103	2,177
40 years-old or older												
Cond Log Earnings	0.165*** (0.048)	18.0%	0.039	1,633	0.215*** (0.057)	24.0%	0.053	1,352	0.200** (0.068)	22.1%	0.030	1,047
Cond Log Hourly	0.111*** (0.021)	11.8%	0.079	1,531	0.122*** (0.023)	13.0%	0.089	1,255	0.123*** (0.026)	13.1%	0.080	980
UI Employment	0.082*** (0.020)	8.2 pp	0.044	2,300	0.112*** (0.022)	11.2 pp	0.070	1,902	0.139*** (0.025)	13.9 pp	0.092	1,487

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each age group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. For the log-transformed annual earnings and hourly rates, the percentage change ($e^{\hat{\beta}} - 1$) was calculated (%). The UI employment rate was calculated using percentage point change from the linear probability model (pp). The $\hat{\beta}$ for the conditional raw annual earnings and hourly wage rates are the covariate-adjusted mean differences so no percentage change or pp are calculated.

Note 5. See Analytic Sample and Strategy section for additional details.

4.1.9 Multi-Analytic Convergence: Robustness and Sensitivity Analyses

4.1.9.1 Pooled Primary Models: Multi-Analytic Convergence Across the Three Analytic Strategies (OLS, SIPW, and Lin)

For the primary specification with the pooled sample, the results are consistent across the OLS with HC2 robust SEs, stabilized SIPW with covariate adjustment (doubly robust), and Lin (2013) analytic approaches. Sufficient covariate balance was achieved in SIPW in the pooled primary specification across all covariates (see Appendix: Table 16). As displayed on Table 12, all three analytic strategies generate the same directionality (positive or negative) and statistical significance (whether estimates meet the alpha level threshold of $p < 0.05$ or not) across the 33 variations of the outcome variables, which span the conditional and unconditional total log-transformed/IHS/raw annual earnings, log-transformed/IHS/raw median hourly wage rates, and UI employment status across the three observable years. To examine the robustness and the extent to which there is multi-analytic convergence, I will primarily focus on the convergence of the year-three outcome variables, as it contains the most comprehensive analytic sample.

In the pooled primary specification (see Table 12), the OLS, SIPW, and Lin conditional log-transformed annual earnings estimates for year-three are all comparable–positive and statistically significant ($\hat{\beta}$ = 0.220 [OLS], 0.211 [SIPW], and 0.213 [Lin], respectively; each $p < .001$). This is a range of 0.009 log points, which translates to less than a percentage point difference in the completion differential in annual earnings in year-three. Similarly, the conditional raw annual earnings in year-three for OLS is \$11,402, SIPW is \$10,658, and \$10,826 for Lin (each $p < .001$), which is a range of \$576.

The CCB completion differentials in conditional hourly rates in year-three are also comparable across three analytic strategies in the primary pooled specification (see Table 12). The completion differentials in log-transformed hourly rates range from 0.010 log points ($\hat{\beta}$ = 0.154 [OLS], 0.144 [SIPW], and 0.145 [Lin]; each $p < .001$). The differentials in raw hourly rates in year-three range from \$6.08, \$5.71, and \$5.74 for OLS, SIPW, and Lin, respectively (each $p < .001$). This is a range of \$0.37. The completion differential in UI employment status in year-three is nearly identical across the three approaches ($\hat{\beta} = 0.082$ [OLS], 0.085 [SIPW], and 0.083 [Lin] (each $p < .001$). When comparing the trajectories of annual earnings, hourly rates, and UI unemployment–in year-three, year-four, and year-five–the completion differential in labor market outcomes follows similar trends across the three analytic strategies.

The convergence across the three analytic strategies supports the application of OLS (HC2) as the primary estimator and their respective estimates throughout this paper's findings. OLS, SIPW, and Lin rely on different methodological assumptions about the functional form and treatment effect heterogeneity. The convergence of these three analytic approaches provides stronger evidence about the CCB completion differential in labor market outcomes compared to the use of a single analytic approach. However, all three analytic strategies share assumptions relating to selection on observables–that there is no unobserved confounding–that will be addressed in the sensitivity analysis.

Table 12: Pooled Primary Specification: Multi-Analytic Convergence Across Outcome Variables, Years 3-5

	OLS (HC2)		SIPW		Lin				
Outcome	$\hat{\beta}$	SE	$\hat{\beta}$	SE	$\hat{\beta}$	SE	n	Sign	Sig
Employment									
UI Employment Rate, Y3	0.082***	(0.008)	0.085***	(0.009)	0.083***	(0.008)	13,074	Yes	Yes
UI Employment Rate, Y4	0.104***	(0.009)	0.110***	(0.010)	0.105***	(0.010)	10,750	Yes	Yes
UI Employment Rate, Y5	0.117***	(0.011)	0.126***	(0.011)	0.121***	(0.013)	8,343	Yes	Yes
Conditional on Employment									
Raw Annual Earnings ($), Y3	$11,402***	(1,006)	$10,658***	(1,061)	$10,826***	(1,023)	9,987	Yes	Yes
Raw Annual Earnings ($), Y4	$13,221***	(1,138)	$12,084***	(1,254)	$11,612***	(1,376)	8,070	Yes	Yes
Raw Annual Earnings ($), Y5	$14,036***	(1,342)	$13,452***	(1,403)	$12,721***	(1,702)	6,065	Yes	Yes
Log Annual Earnings, Y3	0.220***	(0.021)	0.211***	(0.022)	0.213***	(0.022)	9,987	Yes	Yes
Log Annual Earnings, Y4	0.254***	(0.023)	0.245***	(0.024)	0.245***	(0.025)	8,070	Yes	Yes
Log Annual Earnings, Y5	0.253***	(0.028)	0.247***	(0.029)	0.205***	(0.031)	6,065	Yes	Yes
Raw Hourly Rates ($), Y3	$6.08***	(0.37)	$5.71***	(0.36)	$5.74***	(0.36)	$9,566	Yes	Yes
Raw Hourly Rates ($), Y4	$6.50***	(0.42)	$6.20***	(0.41)	$6.08***	(0.44)	$7,710	Yes	Yes
Raw Hourly Rates ($), Y5	$6.82***	(0.49)	$6.74***	(0.49)	$6.66***	(0.62)	$5,749	Yes	Yes
Log Hourly Rates, Y3	0.154***	(0.009)	0.144***	(0.009)	0.145***	(0.009)	$9,566	Yes	Yes
Log Hourly Rates, Y4	0.165***	(0.010)	0.157***	(0.010)	0.157***	(0.011)	7,710	Yes	Yes
Log Hourly Rates, Y5	0.175***	(0.011)	0.170***	(0.012)	0.166***	(0.014)	5,749	Yes	Yes
Unconditional on Employment									
Raw Annual Earnings ($), Y3	$14,619***	(940)	$14,089***	(938)	$14,307***	(914)	13,074	Yes	Yes
Raw Annual Earnings ($), Y4	$17,874***	(1,105)	$17,651***	(1,123)	$17,320***	(1,208)	10,750	Yes	Yes
Raw Annual Earnings ($), Y5	$19,310***	(1,272)	$19,585***	(1,286)	$18,860***	(1,541)	8,343	Yes	Yes
Log$(y+1)$ Annual, Y3	1.057***	(0.092)	1.076***	(0.095)	1.074***	(0.093)	13,074	Yes	Yes
Log$(y+1)$ Annual, Y4	1.326***	(0.103)	1.392***	(0.106)	1.345***	(0.111)	10,750	Yes	Yes
Log$(y+1)$ Annual, Y5	1.467***	(0.120)	1.567***	(0.123)	1.484***	(0.144)	8,343	Yes	Yes
IHS Annual, Y3	1.113***	(0.098)	1.134***	(0.101)	1.131***	(0.099)	13,074	Yes	Yes
IHS Annual, Y4	1.397***	(0.109)	1.468***	(0.112)	1.418***	(0.118)	10,750	Yes	Yes
IHS Annual, Y5	1.548***	(0.127)	1.654***	(0.131)	1.567***	(0.153)	8,343	Yes	Yes
Raw Hourly Rates ($), Y3	$7.80***	(0.39)	$7.62***	(0.40)	$7.62***	(0.39)	13,074	Yes	Yes
Raw Hourly Rates ($), Y4	$8.76***	(0.45)	$8.95***	(0.46)	$8.82***	(0.48)	10,750	Yes	Yes
Raw Hourly Rates ($), Y5	$9.19***	(0.54)	$9.46***	(0.55)	$9.54***	(0.66)	8,343	Yes	Yes
Log$(y+1)$ Hourly, Y3	0.421***	(0.031)	0.425***	(0.032)	0.427***	(0.031)	13,074	Yes	Yes
Log$(y+1)$ Hourly, Y4	0.494***	(0.035)	0.524***	(0.036)	0.505***	(0.038)	10,750	Yes	Yes
Log$(y+1)$ Hourly, Y5	0.531***	(0.041)	0.566***	(0.042)	0.543***	(0.049)	8,343	Yes	Yes
IHS Hourly, Y3	0.482***	(0.037)	0.489***	(0.038)	0.489***	(0.037)	13,074	Yes	Yes
IHS Hourly, Y4	0.567***	(0.041)	0.604***	(0.042)	0.580***	(0.044)	10,750	Yes	Yes
IHS Hourly, Y5	0.610***	(0.048)	0.652***	(0.049)	0.624***	(0.058)	8,343	Yes	Yes

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. The estimates generated are based off of primary pooled model specification. See the Analytic Sample and Strategy sections for more information.

Note 3. OLS (HC2) = OLS with HC2 robust standard errors; SIPW = stabilized inverse probability weighting with covariate adjustment (doubly robust); Lin = (Lin, 2013) estimator. "Sign" = whether directionality across the three analytic approaches align; "Sig" = whether statistical significance across the three analytic approaches align at $p < .05$.

Note 4. The full analytic sample for year-three (Y3), year-four (Y4), and year-five (Y5) is 13,074, 10,750, and 8,343, respectively, but will vary depending on the outcome variable.

4.1.9.2 Stratified Primary Models: Convergence Between the OLS and SIPW

In addition to the multi-analytic convergence of the estimates across the analytic strategies (OLS, Lin, and SIPW) leveraged in the primary pooled models, there was also multi-analytic convergence in the directionality and statistical significance of the estimates across the field-, gender-, race-, and age-stratified models (see Tables 13-14). Given the smaller sample sizes in some groups (e.g., American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and the CIP2 codes of CCB programs with less students), post-weighting balance was not always sufficiently observed (standardized mean difference of 0.05), threatening the potential validity of the SIPW estimates for these groups (see Appendix: Table 17). Challenges with smaller sample sizes also prevent the application of the Lin (2013) estimator, given the number of parameters that result from the interaction terms that are generated. Therefore, I only focus on comparing OLS and SIPW estimates when post-weighting balance was observed and SIPW estimates are defensible (see Table 13). In some smaller groups (e.g., Asian and Black), HC2 robust SEs could not be consistently computed for stabilized SIPW with covariate adjustment since the H2 variance-covariance matrix is singular; SIPW estimates are still valid, but significance tests cannot be computed.

Overall, there is convergence in the results from the OLS and SIPW estimates across groups (see Tables 13-14). Across the 75 total combinations of gender, racial/ethnic, age, and CIP2 groups and the five outcome variables examined, there was 100% alignment in the directionality (positive or negative) in the OLS and SIPW outputs and 92% (69 of the 75) alignment in statistical significance (whether both estimates meet the alpha level threshold of $p < 0.05$ or not; non-computable SEs are treated as not statistically significant). Given the number of outcome variables and groups, I specifically report on comparing the primary outcome variable: log-transformed annual earnings in year-three.

OLS and SIPW converge in sign and statistical significance for the CCB completion differentials in conditional log-transformed annual earnings in year-three in stratified gender and race/ethnicity estimates (see Table 13). In the gender-stratified analysis, the estimates for female students were similar with OLS ($\hat{\beta} = 0.284$) and SIPW ($\hat{\beta} = 0.274$), as well as with male students (0.120 and 0.114, respectively). In the race-stratified analysis, there was also convergence among Asian ($\hat{\beta} = 0.103$ [OLS]; $\hat{\beta} = 0.095$ [SIPW]), Black ($\hat{\beta} = 0.129$ [OLS]; $\hat{\beta} = 0.101$ [SIPW]), Latine ($\hat{\beta} = 0.283$ [OLS]; $\hat{\beta} = 0.287$ [SIPW]), Multiracial ($\hat{\beta} = 0.207$ [OLS]; $\hat{\beta} = 0.196$ [SIPW]), and white ($\hat{\beta} = 0.231$ [OLS]; $\hat{\beta} = 0.222$ [SIPW]) students.

Convergence in the OLS and SIPW estimates was also observed within the age group and CIP2 code estimates (see Table 14). Across all four age groups, the OLS and SIPW estimates were comparable: 24 years-old or younger ($\hat{\beta} = 0.260$ [OLS]; $\hat{\beta} = 0.222$ [SIPW]), 25-29 years-old ($\hat{\beta} = 0.262$ [OLS]; $\hat{\beta} = 0.251$ [SIPW]), 30-39 years-old ($\hat{\beta} = 0.175$ [OLS]; $\hat{\beta} = 0.182$ [SIPW]), and 40 years-old or older ($\hat{\beta} = 0.165$ [OLS]; $\hat{\beta} = 0.141$ [SIPW]). For the four largest CIP2 fields, convergence in the OLS and SIPW estimates were also observed: Business & Management ($\hat{\beta} = 0.125$ [OLS]; $\hat{\beta} = 0.096$ [SIPW]), Computer & Information Sciences ($\hat{\beta} = 0.115$ [OLS]; $\hat{\beta} = 0.119$ [SIPW]), Education ($\hat{\beta} = 0.184$ [OLS]; $\hat{\beta} = 0.162$ [SIPW]), and Health Professions ($\hat{\beta} = 0.492$ [OLS]; $\hat{\beta} = 0.500$ [SIPW]).

Overall, this comparison of OLS and SIPW estimates, directionality/sign, and statistical significance from the OLS and SIPW estimates within the stratified analysis are robust (see Tables 13-14). Groups with smaller samples, such as American Indian, Alaska Native, Native Hawaiian, or Pacific Islander, did not always achieve appropriate SIPW weighting balance, so I limited my discussion on their SIPW estimates. It should be noted that this does not necessarily imply their OLS estimates are not valid, but that without valid SIPW estimates, I could not conduct an appropriate robustness check of the OLS estimates with other analytic strategies used. Additionally, for groups with smaller sample sizes whose OLS and SIPW estimates could be generated (e.g., Asian and Black), there was less consistent convergence of their results in the OLS and SIPW approaches; as such, these results should be interpreted cautiously. Overall, the multi-analytic convergence of the estimates, directionality, and statistical significance suggests general robustness in the stratified analyses, particularly with the groups with larger sample sizes. Similar to the multi-analytic convergence in the pooled model specifications, the convergence of OLS and SIPW estimates provides greater evidence that the estimates generated are not dependent on analytic approach. Again, OLS and SIPW rely on different assumptions, but both assume that there is no unobserved confounding.

Table 13: Stratified Primary Specification (Gender and Race/Ethnicity): Multi-Analytic Convergence Across Outcome Variables, Year 3

	OLS (HC2)		SIPW				
Group / Outcome	$\hat{\beta}$	SE	$\hat{\beta}$	SE	n	Sign	Sig
Gender							
Female							
Raw Annual Earnings ($)	$16,605***	(1,150)	$15,518***	(1,082)	6,073	Yes	Yes
Cond Log Annual Earnings	0.284***	(0.026)	0.274***	(0.027)	6,073	Yes	Yes
Raw Hourly Rate ($)	$8.42***	(0.47)	$7.80***	(0.43)	5,849	Yes	Yes
Cond Log Hourly Rate	0.210***	(0.011)	0.193***	(0.011)	5,849	Yes	Yes
UI Employment Rate	0.086***	(0.011)	0.090***	(0.011)	7,688	Yes	Yes
Male							
Raw Annual Earnings ($)	$3,777*	(1,835)	$3,695	(1,879)	3,809	Yes	Yes
Cond Log Annual Earnings	0.120***	(0.036)	0.114**	(0.037)	3,809	Yes	Yes
Raw Hourly Rate ($)	$2.86***	(0.60)	$2.78***	(0.57)	3,618	Yes	Yes
Cond Log Hourly Rate	0.075***	(0.014)	0.073***	(0.014)	3,618	Yes	Yes
UI Employment Rate	0.072***	(0.014)	0.076***	(0.014)	5,236	Yes	Yes
Race/Ethnicity							
Asian[†]							
Raw Annual Earnings ($)	$1,002	(3,764)	$1,892		1,159	Yes	Yes
Cond Log Annual Earnings	0.103	(0.071)	0.095		1,159	Yes	Yes
Raw Hourly Rate ($)	$2.96*	(1.15)	$3.09	(1.22)	1,101	Yes	Yes
Cond Log Hourly Rate	0.077**	(0.028)	0.079		1,101	Yes	No
UI Employment Rate	0.070**	(0.026)	0.092		1,645	Yes	No
Black[†]							
Raw Annual Earnings ($)	$11,090**	(3,911)	$8,334		674	Yes	No
Cond Log Annual Earnings	0.129	(0.081)	0.101		674	Yes	Yes
Raw Hourly Rate ($)	$8.10***	(1.22)	$7.14		628	Yes	No
Cond Log Hourly Rate	0.189***	(0.031)	0.172		628	Yes	No
UI Employment Rate	0.049	(0.030)	0.043		858	Yes	Yes
Latine							
Raw Annual Earnings ($)	$17,085***	(2,388)	$16,785***	(2,531)	1,039	Yes	Yes
Cond Log Annual Earnings	0.283***	(0.062)	0.287***	(0.068)	1,039	Yes	Yes
Raw Hourly Rate ($)	$8.64***	(0.96)	$7.74***	(1.01)	1,006	Yes	Yes
Cond Log Hourly Rate	0.224***	(0.025)	0.199***	(0.027)	1,006	Yes	Yes
UI Employment Rate	0.058*	(0.024)	0.066*	(0.026)	1,262	Yes	Yes
Multiracial							
Raw Annual Earnings ($)	$12,663***	(2,300)	$10,319***	(2,325)	1,508	Yes	Yes
Cond Log Annual Earnings	0.207***	(0.054)	0.196***	(0.058)	1,508	Yes	Yes
Raw Hourly Rate ($)	$7.29***	(0.85)	$5.99***	(0.87)	1,442	Yes	Yes
Cond Log Hourly Rate	0.191***	(0.022)	0.168***	(0.022)	1,442	Yes	Yes
UI Employment Rate	0.074***	(0.021)	0.082***	(0.021)	1,930	Yes	Yes
white							
Raw Annual Earnings ($)	$11,321***	(1,476)	$10,271***	(1,445)	4,951	Yes	Yes
Cond Log Annual Earnings	0.231***	(0.031)	0.222***	(0.031)	4,951	Yes	Yes
Raw Hourly Rate ($)	$5.26***	(0.52)	$4.95***	(0.51)	4,761	Yes	Yes
Cond Log Hourly Rate	0.134***	(0.013)	0.131***	(0.013)	4,761	Yes	Yes
UI Employment Rate	0.096***	(0.012)	0.096***	(0.013)	6,441	Yes	Yes

Note 1. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. The estimates generated are based off of primary model specification. See the Analytic Sample and Strategy sections for more information.

Note 2. OLS (HC2) = OLS with HC2 robust standard errors (SEs); SIPW = stabilized inverse probability weighting with covariate adjustment (doubly robust). "Sign" = whether directionality across the analytic approaches align; "Sig" = whether statistical significance across the approaches align at minimum of $p < .05$.

Note 3. Only groups where post-weighting covariate balance was observed (|SMD| < 0.05) are included.

[†] SIPW SEs are not generated in groups when the H2 variance-covariance matrix is singular. SIPW estimates are still valid, but statistical significance tests cannot be computed.

Table 14: Stratified Primary Specification (Age Group and CIP2 Code): Multi-Analytic Convergence Across Outcome Variables, Year 3

	OLS (HC2)		SIPW				
Group / Outcome	$\hat{\beta}$	SE	$\hat{\beta}$	SE	n	Sign	Sig
Age Group							
24 years-old or younger							
Raw Annual Earnings ($)	$15,051***	(1,478)	$12,305***	(1,505)	3,599	Yes	Yes
Cond Log Annual Earnings	0.260***	(0.034)	0.222***	(0.035)	3,599	Yes	Yes
Raw Hourly Rate ($)	$7.34***	(0.55)	$6.01***	(0.56)	3,484	Yes	Yes
Cond Log Hourly Rate	0.193***	(0.015)	0.168***	(0.015)	3,484	Yes	Yes
UI Employment Rate	0.072***	(0.014)	0.081***	(0.015)	4,623	Yes	Yes
25-29 years-old							
Raw Annual Earnings ($)	$13,945***	(1,961)	$12,667***	(1,957)	2,100	Yes	Yes
Cond Log Annual Earnings	0.262***	(0.048)	0.251***	(0.049)	2,100	Yes	Yes
Raw Hourly Rate ($)	$6.64***	(0.76)	$5.68***	(0.76)	2,021	Yes	Yes
Cond Log Hourly Rate	0.167***	(0.019)	0.152***	(0.019)	2,021	Yes	Yes
UI Employment Rate	0.073***	(0.018)	0.079***	(0.019)	2,686	Yes	Yes
30-39 years-old							
Raw Annual Earnings ($)	$7,489***	(2,153)	$6,705**	(2,165)	2,654	Yes	Yes
Cond Log Annual Earnings	0.175***	(0.045)	0.182***	(0.047)	2,654	Yes	Yes
Raw Hourly Rate ($)	$4.97***	(0.68)	$4.69***	(0.68)	2,529	Yes	Yes
Cond Log Hourly Rate	0.121***	(0.017)	0.118***	(0.017)	2,529	Yes	Yes
UI Employment Rate	0.100***	(0.016)	0.101***	(0.017)	3,464	Yes	Yes
40 years-old or older							
Raw Annual Earnings ($)	$7,999**	(2,765)	$6,178*	(2,717)	1,633	Yes	Yes
Cond Log Annual Earnings	0.165***	(0.048)	0.141**	(0.048)	1,633	Yes	Yes
Raw Hourly Rate ($)	$4.65***	(0.89)	$4.03***	(0.90)	1,531	Yes	Yes
Cond Log Hourly Rate	0.111***	(0.021)	0.101***	(0.021)	1,531	Yes	Yes
UI Employment Rate	0.082***	(0.020)	0.073***	(0.021)	2,300	Yes	Yes
Field of Study (CIP2)							
Business & Management							
Raw Annual Earnings ($)	$6,069***	(1,660)	$4,574**	(1,616)	2,773	Yes	Yes
Cond Log Annual Earnings	0.125***	(0.036)	0.096**	(0.037)	2,773	Yes	Yes
Raw Hourly Rate ($)	$2.36***	(0.57)	$1.93***	(0.55)	2,681	Yes	Yes
Cond Log Hourly Rate	0.066***	(0.015)	0.054***	(0.015)	2,681	Yes	Yes
UI Employment Rate	0.079***	(0.016)	0.081***	(0.016)	3,748	Yes	Yes
Computer & Info Sciences							
Raw Annual Earnings ($)	$2,728	(2,622)	$1,563	(2,594)	2,249	Yes	Yes
Cond Log Annual Earnings	0.115*	(0.050)	0.119*	(0.051)	2,249	Yes	Yes
Raw Hourly Rate ($)	$2.39**	(0.78)	$1.86*	(0.77)	2,113	Yes	Yes
Cond Log Hourly Rate	0.066***	(0.019)	0.060**	(0.019)	2,113	Yes	Yes
UI Employment Rate	0.083***	(0.018)	0.090***	(0.018)	3,177	Yes	Yes
Education							
Raw Annual Earnings ($)	$10,510***	(1,638)	$9,230***	(1,555)	1,210	Yes	Yes
Cond Log Annual Earnings	0.184***	(0.046)	0.162***	(0.047)	1,210	Yes	Yes
Raw Hourly Rate ($)	$9.54***	(0.94)	$8.63***	(0.93)	1,174	Yes	Yes
Cond Log Hourly Rate	0.253***	(0.024)	0.240***	(0.024)	1,174	Yes	Yes
UI Employment Rate	0.118***	(0.025)	0.112***	(0.026)	1,444	Yes	Yes
Health Professions							
Raw Annual Earnings ($)	$30,501***	(1,902)	$28,062***	(2,057)	2,568	Yes	Yes
Cond Log Annual Earnings	0.492***	(0.047)	0.500***	(0.057)	2,568	Yes	Yes
Raw Hourly Rate ($)	$15.19***	(0.73)	$12.47***	(0.79)	2,462	Yes	Yes
Cond Log Hourly Rate	0.365***	(0.018)	0.310***	(0.019)	2,462	Yes	Yes
UI Employment Rate†	0.071***	(0.016)	0.075		3,017	Yes	No

Note 1. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. The estimates generated are based off of primary model specification. See the Analytic Sample and Strategy sections for more information.

Note 2. OLS (HC2) = OLS with HC2 robust standard errors (SEs); SIPW = stabilized inverse probability weighting with covariate adjustment (doubly robust). "Sign" = whether directionality across the analytic approaches align; "Sig" = whether statistical significance across the approaches align at minimum at $p < .05$.

† SIPW SEs are not generated in groups when the H2 variance-covariance matrix is singular. SIPW estimates are still valid, but statistical significance tests cannot be computed.

4.1.9.3 Sensitivity Analysis

Drawing upon the omitted variable bias framework for sensitivity analysis (Cinelli & Hazlett, 2020, 2025; Cinelli et al., 2024), I assessed the robustness of the CCB completion differentials in labor market outcomes and trajectories to potential unobserved confounding. The OVB framework for sensitivity analysis generates sensitivity statistics to quantify and make sense of how unobserved confounders could alter the estimates and consequently, the research conclusions of the analysis. When violations of no unobserved confounding cannot be assumed and/or credibly defensible–as is the case in many selection on observables and education research contexts–the OVB framework for sensitivity analysis provides useful insight on the robustness of the OLS estimates to hypothetical levels of confounding (Vo, in press). I report and focus on $RV_{q=1,\alpha=0.05}$, which is the minimum partial R^2 that an unobserved confounder would need, in both the treatment variable (in this case, CCB completion) and the outcome variable, to reduce the OLS estimate to statistical insignificance (set at alpha level of $p = .05$).

Across the primary pooled models, the $RV_{q=1,\alpha=0.05}$ values would suggest that the CCB completion differential in labor market outcomes is moderately strong (see Table 5). The $RV_{q=1,\alpha=0.05}$ for conditional log-transformed hourly rates was the strongest; in year-three, it was 0.148 and in year-five, it was 0.165. This can be interpreted as such: an unobserved confounder would have to explain roughly 14.8% to 16.5% of the residual variation in both CCB completion and conditional hourly rates to shift the results to no longer statistically significant. The $RV_{q=1,\alpha=0.05}$ for the raw hourly wages ranged from 0.136 to 0.147. Earnings and UI employment were more sensitive to unobserved confounding, with smaller $RV_{q=1,\alpha=0.05}$ values, but still relatively modest. The $RV_{q=1,\alpha=0.05}$ of the conditional log-transformed annual earnings in year-three, -four, and -five ranged from 0.084 to 0.105; raw earnings were comparable, ranging from 0.090 to 0.104. The $RV_{q=1,\alpha=0.05}$ for the UI employment rate was smaller compared to hourly wages, ranging from 0.070 to 0.097. The unconditional log-transformed and IHS outcomes for earnings and hourly rates had similar patterns, so I will limit its discussion (see Appendix: Tables 19-20).

These patterns suggest that the pooled primary results that identify a CCB completion differential in annual earnings–driven via the hourly rate mechanism–are moderately robust to unobserved confounding (see Table 5). Additionally, to contextualize this sensitivity analysis, the strongest observed covariate was students aged 40 years-old or older, which had a partial R^2 of 0.013 in the pooled primary model specification. Therefore, across the pooled primary model specifications, the $RV_{q=1,\alpha=0.05}$ value was consistently larger than the partial R^2 of the strongest observed covariate (40 years-old or older), by at least five times (and up to 12 times depending on the outcome variable). As such, to alter the research conclusions about the CCB completion differentials in labor market outcomes, one would have to believe that there was an unobserved confounder that would have more explanatory power in explaining both the variation in the treatment and outcome variable than the existing set of observed covariates–and that it was at least five times as strong.

The sensitivity analysis of field-stratified primary models showed varying levels of strength, depending on the CIP2 of the CCB program (see Table 7 and Appendix: Tables 19-20). Of the four CIP2 fields examined, Health Professions consistently was the most robust to unobserved confounding. Like the pooled model, the $RV_{q=1,\alpha=0.05}$ values for conditional log-transformed hourly wage differentials among the Health Professions were at least 0.318 in year-three, -four, and -five (see Table 7 and Appendix: Table 20). This suggests that an unobserved confounder would need explain at least 30% of the residual variation in both CCB completion and conditional log-transformed hourly wages to alter the results to statistically not significant. The $RV_{q=1,\alpha=0.05}$ for the differentials in conditional log-transformed annual earnings was not as strong, but still high–ranging from 0.145 to 0.191. As displayed on Table 7, the $RV_{q=1,\alpha=0.05}$ for conditional wage differentials in Education were also strong ($RV_{q=1,\alpha=0.05} = 0.208$ to 0.232) and somewhat strong in conditional annual earnings ($RV_{q=1,\alpha=0.05} = 0.045$ to 0.117).

The $RV_{q=1,\alpha=0.05}$ in the CCB completion differentials in all labor market outcomes for

Business & Management were less robust, ranging from 0.027 to 0.082, but relatively strong in context (see Table 7 and Appendix: Table 19). The estimates for Computer & Information Sciences were the most sensitive to unobserved confounding. For example, the $RV_{q=1,\alpha=0.05}$ for the conditional annual earnings outcome was 0.009 in year-three, although this notably increased to 0.063 by year-five. The $RV_{q=1,\alpha=0.05}$ for CCB completion differentials in UI employment rate across the four CIP2 fields ranged from 0.048 to 0.086.

The sensitivity analysis of gender-stratified primary models reinforced the CCB completion differentials in labor market outcomes for female CCB students relative to male students (see Table 8 and Appendix: Table 21). The $RV_{q=1,\alpha=0.05}$ values of the conditional log-transformed hourly wages for female students ranged from 0.200 to 0.219 in year-three, -four, and -five; the $RV_{q=1,\alpha=0.05}$ ranged from 0.114 to 0.130 for the conditional log-transformed annual earnings outcome. The $RV_{q=1,\alpha=0.05}$ for males were much smaller: ranging from 0.055 to 0.061 for the conditional log-transformed hourly wages and 0.019 to 0.045 for the conditional log-transformed annual earnings. The $RV_{q=1,\alpha=0.05}$ values for female and male CCB students were comparable, ranging from 0.048 to 0.096.

The sensitivity analysis of race-stratified primary models also reinforce the CCB completion differentials in labor market outcomes, elevating how sensitive to unobserved confounding the estimates may be for groups with smaller sample sizes (see Table 9-10 and Appendix: Tables 22-25). The $RV_{q=1,\alpha=0.05}$ values for Latine CCB students were the most robust to unobserved confounding; the conditional log-transformed hourly wage rates ranged from 0.198 to 0.230 and conditional log-transformed earnings ranged from 0.092 to 0.161 (see Table 9 and Appendix: Table 24). Multiracial and white CCB students had less robust, but still relatively strong $RV_{q=1,\alpha=0.05}$ values across labor market outcomes; for example, the conditional log-transformed hourly wages for Multiracial and white CCB students ranged from 0.116 to 0.183 and 0.117 to 0.143, respectively (see Table 10 and Appendix: Tables 24-25). Asian and Black CCB students did not consistently generate positive and statistically significant conditional log-transformed earnings in the stratified analysis, so $RV_{q=1,\alpha=0.05}$ could not be consistently computed (see Table 9 and Appendix: Table 22-23). However, there were positive and statistically significant conditional log-transformed hourly wages and UI employment rates for Asian and Black students, and the $RV_{q=1,\alpha=0.05}$) for these outcomes ranged from 0.020 to 0.068. For Black students, $RV_{q=1,\alpha=0.05}$ of the conditional log-transformed hourly wages were strong, ranging from 0.073 to 0.150. Due to smaller sample size and observed statistical significance, $RV_{q=1,\alpha=0.05}$ could not be consistently computed for CCB students identified as American Indian, Alaska Native, Native Hawaiian, and Pacific Islanders (see Tables 9-10 and Appendix: Table 22 and 24). This analysis elevates how robust the CCB completion differentials in conditional log-transformed hourly wage rates were relative to other labor market outcomes across all racial/ethnic groups.

The sensitivity analysis of age-stratified primary models also reinforce the CCB completion differentials in labor market outcomes, particularly for younger students (see Table 11 and Appendix: Table 26). For example, $RV_{q=1,\alpha=0.05}$ values for the conditional log-transformed hourly wage rates for CCB students aged 24 years-old or younger ranged from 0.172-0.199, 0.139-0.159 for students aged 25-29 years-old, 0.043-0.115 for students aged 30-39 years-old, and 0.030-0.053 for students aged 40 years-old or older. The $RV_{q=1,\alpha=0.05}$ ranged from modest to moderately strong, depending on the age group and outcome variable. Such results suggest the strength of the CCB completion differential in conditional log-transformed hourly rate to unobserved confounding relative to differentials in conditional log-transformed earnings and UI unemployment. They also suggest that the estimates for older age groups may be more susceptible to unobserved confounding.

The sensitivity analysis and evaluation of $RV_{q=1,\alpha=0.05}$ reveal a consistent pattern across pooled and stratified models (see Tables 5, 7-11, and Appendix: Tables 18-26). First, CCB completion differentials in hourly wage rates are more robust to unobserved confounding than differentials in annual earnings across virtually every group, suggesting that the completion differential in hourly compensation reflects a relatively stable return to the CCB credential that is unlikely to be driven entirely by selection. Second, completion differentials in annual earnings–while still robust in most groups–are more susceptible to confounding, consistent with the fact that annual earnings incorporate additional channels (employment probability, hours worked, job type) that may be influenced by unobserved characteristics. Third, the strongest robustness is concentrated in fields with occupational credentialing requirements (e.g., Health Professions and Education) and among demographic groups disproportionately enrolled in those fields (e.g., female students and Latine students), suggesting that the institutional mechanism of credentialism and occupational access is a potential driver of the completion differential. Fourth, completion differentials in UI employment are moderately robust and tend to strengthen over time, suggesting that completion may confer a cumulative labor market advantage in terms of employment access. These patterns are consistent with a decomposition of the completion differential in annual earnings as a highly robust hourly wage component and a moderately robust employment component.

4.2 Qualitative (RQ3 and RQ4): CCB Programs as Trajectory-Responsive Policies and Meaningful Access in a Stratified Feasibility Landscape

In the following sections, I will describe the Findings/Results from the qualitative analysis relating to RQ3 and RQ4. This section is organized with three primary findings, each with three sub-findings (nine sub-findings total).

4.2.1 Qualitative Finding 1: "Checks a Lot of Boxes for Me": How Place, Price, People, and Time Shape CCB Participation

While prior scholarship has elevated the importance of college affordability/costs (Dynarski et al., 2022; Page & Scott-Clayton, 2016) or physical geographic proximity to college access (Hillman, 2016; Tate, 2008; Turley, 2009), interviews with CCB participants demonstrate how structural conditions (e.g., economic, social, spatial, and temporal) simultaneously intersect to produce a *stratified feasibility landscape* that varies in systemic ways, depending on students' social contexts, positions, and trajectories and the institutional conditions of the college (i.e., agents and structures). As *trajectory-responsive* policy projects, CCB programs are well-positioned to enhance college participation for many enrolled students because their institutional arrangements, assets, assumptions, and design are often calibrated in ways that align and enable conditions for college participation, particularly relative to other college pathways.

CCB programs make college participation more feasible by offering economically and geographically accessible bachelor's degree programs in programs of study that align with students' academic and career aspirations and goals. CCB programs further enhance college participation when they offer programs that align with students' spatial attachments, experiences, identities, and imaginaries (Brint & Karabel, 1989; D'Amico, 2016; Gieryn, 2000; Jacobs & Worth, 2019; Massey, 1994; Wright et al., 2022). How participation is related to programs in places and spaces was salient among CCB programs in small rural towns. The spatial arrangements–as relevant processes shaping participation–were different among students in CCB programs in large metropolitan areas, highlighting how space and place shape college participation differently. For CCB participants in large metropolitan areas, spatial conditions are dynamic and ongoing processes (Cresswell, 2014; Gieryn, 2000; Lefebvre, 1991; Massey, 1994) that interplay with timescapes (Adams & Blair, 2019; Bennett & Burke, 2018) to shape the *stratified feasibility landscape* of college participation. Here, CCB participants navigate and negotiate spatial-temporal conditions in the form of micro-mobilities–commutes and commitments–to maintain feasible college participation. As participants navigate these spatial-temporal conditions, institutional agents and structures, as well as students' social contexts, locations, and trajectories, can enable or further constrain college participation. While these findings demonstrate how CCB programs enhanced college participation by creating more feasible bachelor's degree pathways, such narratives also show how intersecting lived, institutional, and structural conditions enable and constrain a *stratified feasibility landscape* that CCB participants must navigate–under bounded agency–in their pursuit of bachelor's degree attainment.

4.2.1.1 Economic, Programmatic, and Spatial Appeal of CCB Programs

In alignment with previous understandings about college accessibility and community colleges, CCB participants' geography of opportunity, evaluation of pecuniary, psychic, and opportunity costs/benefits, career capital, and considerations for programs of study shaped college participation (Baker, 2018; Baker & Orona, 2020; Baker et al., 2018; D'Amico et al., 2019; Reyes et al., 2019; Stuart et al., 2014). In California, CCB programs operated as *trajectory-responsive* policy projects because they leveraged the unique assets of community colleges: their ability to provide a college education at a low tuition cost to students, the range of geographies in which the 115 California community colleges were situated (relative to the 31 traditional public four-year universities that make up the public CSU and UC systems), and their ability to develop and quickly implement academic programs that addressed unmet labor market and workforce needs (Hoang et al., 2022; Meza & Pawlicki, 2025; Rios-Aguilar et al., forthcoming; Vo et al., 2026). A recent statewide survey indicated that over 90% of CCB graduates in California reported that CCB programs were affordable and that more than half of respondents indicated that they would not have completed a bachelor's degree had it not been for the CCB program (Hoang et al., 2022; Vo et al., 2026). The economic, programmatic, and spatial arrangements of community colleges intersect to produce feasibility in ways–depending on the CCB programs themselves, institutional conditions of the CCB college, and students' social contexts, positions, and trajectories.

Aligned with the extensive prior scholarship on college affordability (Dynarski et al., 2022; Page & Scott-Clayton, 2016), the cost of college was consistently a salient condition that shaped college participation. P25 (white; woman; 25-39 years-old; financial aid recipient; first-generation college student) shares:

> So, it was definitely very hard. Financial aid made it feasible. This wasn't something that I could afford to do without it. It is affordable, but affordable in a way like, I didn't need any student loans, like financial aid covered a portion of it.

While CCB programs provided a more affordable pathway towards bachelor's degree attainment, it was relative. While CCB programs and financial aid made college affordable and feasible, students were still accumulated pecuniary and opportunity costs. Additionally, the economic conditions relating to CCB participation operated alongside other dimensions and conditions as well. As a student in C5-Healthcare, P15 (Asian; woman; 25-39 years-old; financial aid recipient; first-generation college student) summarizes how these conditions jointly inform her college participation and decisions. She shares:

> They offer a bachelor degree and the tuition pretty affordable... and they also have financial aid. They have a pretty good supportive system and [I] know [healthcare] is something that I can make a living here... and other aspect is the location.

CCB participants reinforced how bachelor's degree attainment was more feasible for them via CCB programs, due to how their lives would interplay with other dimensions, such as economic, programmatic, and spatial conditions. Aligning with prior scholarship on how geography, local labor markets, and evaluation of various costs/benefits inform community college decision-making (Baker et al., 2018; D'Amico et al., 2019; Reyes et al., 2019; Stuart et al., 2014), all CCB participants discussed the importance of college affordability and shared how their respective CCB programs offered the most affordable bachelor's degree option in their preferred program of study. Informed by pecuniary and psychic costs (Stuart et al., 2014), P12 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares how the tuition costs of C4-Healthcare compared to a local private university offering a similar program of study: "[I] saw the price tag of [(name of private university redacted), which was 160K] and closed the computer." At C5-Healthcare, P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student) affirms this cost-comparison sentiment, sharing, "The whole cost of it was less than a semester at a giant university."

Economic, programmatic, and spatial conditions intersect to shape participants' *stratified feasibility landscape*. P2 (white; woman; 25-39 years-old; caretaker) shares how programmatic and spatial conditions intersect to shape her *stratified feasibility landscape*, stating, "I like [topic related to their program of study]. There's an [environmental] program in my backyard. I don't have to go anywhere. It's cheap. I'll just do that and then I'll figure out something else later." P25 (white; woman; 25-39 years-old; financial aid recipient; first-generation college student) discusses her decision to do the CCB program and what she would do if her CCB program was further away. She shares:

> Just because it was so local. It was very easy to get there. If they didn't have a bachelor's program or if they were too far away, there's nothing else in the area that has an affordable bachelor's degree program. I don't know if I would have been able to manage financially or emotionally going to [public university].

These excerpts elevate the situated contexts that CCB participants operate within and how economic and spatial conditions bound their decision-making. College affordability, programmatic preferences, and geographic availability intersect in different ways to shape students' decisions to participate in college. By understanding the extent to which they could financially afford the pecuniary costs of attending college, how geographically mobile they were, and what they were willing (and able) to invest in, participants were making calculated decisions about what college programs were most feasible or manageable for them to become participants. Given her economic context, P3 (white; woman; 18-24 years-old; financial aid recipient), shares, "College felt more like a feasible option."

The economics of CCB program selection were not simply just because of the lower pecuniary costs of college tuition, but also because of the opportunity costs and labor market benefits that could be obtained with a bachelor's degree (Bills, 2003; Stuart et al., 2014) and its social benefits (Morton, 2019). CCB participants were making calculated decisions about the opportunity costs of participating in college and thinking about the benefits of a bachelor's degree (e.g., credentialism, human capital, signaling, screening) for their economic prospects and career progression. The majority of CCB participants (26 of 30; 87%) talked about how a bachelor's degree would enhance or have enhanced their employment opportunities. Given his extensive time in the labor market and working a variety of full-time jobs, P10 (Latino; man; 40+ years-old; financial aid recipient; first-generation college student; caretaker) shares the value of credentials in the labor market (Arrow, 1973; Brown, 2001; Collins, 1979), stating, "Most of the time–I'm not saying all the time–but most of the time, [the employer] would choose the one who has the school." In discussing the value of a bachelor's degree in a credential-oriented labor market, P10 also shares that C3-Industrial is one of the few bachelor's degree programs in this major in the nation. P14 (white; woman; 25-39 years-old; financial aid recipient; caretaker), who had been working for approximately a decade in the healthcare field, and had been recognized in the field for her work within the scope of her entry-level position, also share her experiences in a labor market that values formal academic credentials. Motivated by her children and desire for upward career mobility, she decided to participate in C4-Healthcare's bachelor's degree program. While there are other healthcare programs near her geographically, they only offered associate's degrees. She speaks about the appeal and potential opportunities of a bachelor's degree, sharing:

> ... I already got tired of trying to climb a totem pole that had nowhere to go so [I thought], 'Should I just get my bachelor's now?' That way, if I ever want to get my master's or teach... I will have more leeway.

Based on their labor experiences and histories, CCB participants demonstrated an understanding of the broader structural conditions they operated within–a labor market that privileges formal credentials and certain skills/knowledge–and how to activate economic mobility (Bills, 2003). P9 (white; man; 25-39 years-old; financial aid recipient) shares:

> It checks a lot of boxes for me... It's a Bachelor's of Science… It's that golden ticket that allows me to not just be stuck in a technician role [and] allows me to move into management or project management–or even go into, like, I was looking up master's and maybe doctorate programs after this. And, then it also ties into a subject matter that I know reasonably well, but I would like to learn more... So, at my current education level, I had reached a ceiling, so unless you know someone or your parents own the company, it's very hard to get out of these boxes without credentials... It does offer quite a bit of credibility to your repertoire… For me, it feels like a golden ticket. Now I can do something else besides being relegated to trading my body for money. I can now trade my mind for money and have a comfortable quality of life.

Beyond sheer credentials and navigating the signaling and screening processes of the labor market (Arrow, 1973; Brown, 2001; Collins, 1979; Spence, 1973; Spence, 1974), participants were motivated to participate in CCB programs because they could acquire human capital–skills and knowledge–that would expand their economic opportunities (Becker, 1964). P4 (white; woman; 25-39 years-old; financial aid recipient) shares the value of C1-Environment's curriculum:

> ... Larger [organizations] are offering more money for [employees in field] that are educated with a bachelor's degree. Like, they're recognizing that it might be more beneficial in some ways that people have gone out because sometimes, people will just stay in their one area or work [with their family]. And like, that's great. But, if you're exposed to more progressive [environmental] techniques or… more regenerative, sustainable practices… [employers] are realizing that's valuable.

P4's reflection highlights that bachelor's degrees are valuable not only because of the credential itself, but because of the additional skills and knowledge gained through additional coursework that is valuable within their respective industry.

By checking off lots of boxes for people, the institutional arrangements of CCB programs enabled college participation by creating economic, programmatic, and spatial conditions that were deemed feasible for participants. If a credential-oriented labor market that values bachelor's degrees can box people into certain roles and positions, CCB programs were appealing to students because of the potential that it could unbox and unlock participants' opportunities. As *trajectory-responsive* policies, CCB programs' institutional arrangements, assets, and design were aligned with participants' situated economic, programmatic, and spatial contexts. CCB programs leveraged their lower price point (Baum & Ma, 2014) and geographic accessibility (Hillman, 2016) to create appealing programs of study. To participants, the human capital and credentials, as well as the pecuniary, psychic, and opportunity costs/benefits of CCB programs, help shape the economic conditions of CCB participation. CCB programs were appealing because they were economically viable and situated in geographically accessible places and in alignment with their programmatic preferences. By being designed this way, CCB programs fostered a more feasible landscape of college participation.

4.2.1.2 Program Proximity: How Space and Place Shape CCB Programs in Small Rural Towns

In the analytic sample, there were two CCB programs, C1-Environment and C2-Environment, spatially situated in small rural towns and physically distant from any other public colleges–with the closest college being over 60 miles away. While the majority of CCB participants from these two CCB programs lived in California at some point (7 of 9; 78%), or had gone to high school in California (6 of 9; 67%), only four lived in the same county of C1-Environment and C2-Environment at some point in their lives (44%) and only two went to high school there (22.2%). Such patterns disrupt one of the primary value propositions and features of the *trajectory-responsiveness* of CCB programs–that they leverage the geographic proximity of community colleges to provide a bachelor's degree pathway for students, particularly for those who may not have had it otherwise (Floyd et al., 2019; Fulton, 2015). In the same way that a research university may serve multiple functions beyond research, the findings push CCB programs beyond essentialist perspectives–that CCB programs may not *only* exclusively expand educational access to local communities.

Expanding the narratives about CCB programs beyond providing bachelor's degree access to only local communities (Floyd et al., 2019; Fulton, 2015), participants discuss how C1-Environment and C2-Environment's unique programs of study motivated students to relocate. P1 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student), a student who grew up in another state, shares that she considered only three colleges–in three different states–because these places offered the major she was interested in. She says, "I remember [state name redacted] being a big one. And then I was also looking at a small one, a small community college in [another state name redacted], but they did not offer a bachelor's degree." P3 (white; woman; 18-24 years-old; financial aid recipient) confirms the unique programmatic conditions and offerings of C1-Environment. She shares, "Ours are, I feel like are so specialized... I really can't find this elsewhere. [There are some universities in California with a similar program of study], but our program is still very specialized."

In California, CCB program policies attempt to minimize competition between public higher education sectors by dictating that CCB programs of study should not duplicate the programs of study offered at their public regional and research universities (Assembly Bill 927, 2021; Rios-Aguilar et al., 2023; Senate Bill 850, 2014). In this way, CCB programs in California were conceived spaces (Lefebvre, 1991), wherein education leaders planned CCB programs in California to be aligned with students' programmatic interests, local and regional labor market needs, and with the existing, tiered public higher education system.

While C1-Environment and C2-Environment were positioned to expand college access and participation to their local communities, the geographic and programmatic conditions–while not contradictory–complicate the mechanisms of how CCB programs expand access and for whom. Participants who were relocating came from places where they would likely have to move, regardless, to pursue a bachelor's degree in their program of study. P3 (white; woman; 18-24 years-old; financial aid recipient), who relocated to C1-Environment herself, speculates about this mobility dynamic–that for some people, college was not about whether to move, but where to move–sharing:

> There are also a lot of people from very rural places... who also don't have easy access [to a public university or]... even easy access to a community college. So, if they're going to college, they're relocating no matter what... You can [go to the closest big cities with public universities or you can come here], which is a small town, and maybe has similar vibes or community to what you're used to.

Complementing this perspective on how spatial conditions can enable or constrain college participation, P4 (white; woman; 25-39 years-old; financial aid recipient), who grew up in California in an area with limited college access and had worked in a different state prior to coming to C1-Environment, shares, "I think without [C1-Environment] offering the kind of degree that they do, I don't know if I would have gone to college."

For students who wanted to participate in these specific programs of study, the spatial conditions that shaped college participation were not just about geographic proximity, but also about perceived and lived space (Lefebvre, 1991) and place (Gieryn, 2000; Soja, 1996). There were subjective and lived experiences of place and space, particularly as they related to students' spatial attachment, experiences, identities, and imaginaries (Brint & Karabel, 1989; D'Amico, 2016; Gieryn, 2000; Jacobs & Worth, 2019; Massey, 1994; Wright et al., 2022). Nearly all participants at C1-Environment and C2-Environment (7 of 8; 88%) previously had K-12 schooling experiences that incorporated flexible learning opportunities, independent studies, small classroom sizes, and/or were situated in small rural towns. This was a disproportionate amount relative to CCB participants in large metropolitan areas, where only 5 of 22 (23%) had such K-12 schooling experiences. C1-Environment and C2-Environment were perceived as familiar and comfortable places that aligned with their spatial trajectories. P7 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student), who grew up in a "village," says that her graduating class was less than 30 students. Prior to coming to C2-Environment, she attended community college and universities in two different states. She shares a motivating factor for relocating to C2-Environment, "I wanted to [horizontally] transfer, because I've always lived in smaller towns. So, small communities are a lot easier for me."

Spatial conditions operate as a mechanism shaping the *stratified feasibility landscape* because of how CCB participants made sense of and related to these college spaces and places in conjunction with their spatial identities and imaginations (Brint & Karabel, 1989; D'Amico, 2016; Gieryn, 2000; Jacobs & Worth, 2019; Massey, 1994; Wright et al., 2022). Spatial conditions not only intersected with structural conditions to enable or constrain college participation, but also operated as a social force. Beyond physical access, distance, and proximity, for participants at C1-Environment and C2-Environment, living in a small rural town and enrolling in these unique programs of study was shaped and shaped their identities. P6 (white; woman; 18-24 years-old; financial aid recipient), who grew up in the county where C1-Environment is situated, shares, "Living in a rural area... really defined who I am now and why I went into that field specifically." Upon graduating from high school, P6 relocated to a large public university. After one year, she realized that the university did not fit her academic, socio-emotional, and career needs. She decided to return to her small rural town and enroll in C1-Environment. She shares:

> ... Their whole motto is outdoor learning. They have an outdoor classroom. So, I really realized that this is similar to my high school learning experience, which I thrived the most in. And so that was a big factor. And my decision was like, 'Oh, I know I like this environment. I know I will thrive in this environment and

I know I will learn best.'

The importance of P6's spatial attachment, experiences, identities, and imaginaries (Brint & Karabel, 1989; D'Amico, 2016; Gieryn, 2000; Jacobs & Worth, 2019; Massey, 1994; Wright et al., 2022) is especially visible given her lived experiences and community contexts. During the summer, right before she moved hours away to attend a large public university, her town experienced a major natural disaster. In recollecting her first-year experience at the university and return, she shares the impact of being spatially disconnected with her community:

> I hadn't really been in my community since [then]... I was mentally struggling with accepting the fact that my entire community was [affected by the natural disaster]... because I was so tied in with my community. All of the people I had connections with were displaced... I had to heal from that and I had a lot of my life destroyed.

During our interview, she shared how she gathered her stuff in the midst of the natural disaster the week she left for college. After multiple efforts of trying to integrate into the large public university through academic and extracurricular activities, she returned to her community. The *stratified feasibility landscape* in which she was situated changed and college participation at this large public university was no longer aligned with her life conditions, preferences, and goals. She shares about her return and entry in her home county and C1-Environment, "I felt like being connected to my local land and community and our overall community culture–it was empowering and that really made me feel like I was in the right spot." During her time at C1-Environment and since graduating and becoming an educator, she has been able to support her community in their natural disaster recovery efforts. As a person whose family has been living in this county for generations, she understands the impact of being spatially aligned and part of the county's preservation and restoration efforts:

"It's a very big part of who we are as a community. It's kind of one of our main identities as a whole."

P6's specific life events and decisions to return to her place and space represents a unique case among CCB participants interviewed (e.g., leaving to a public four university in the midst of a natural disaster as a teenager). However, these details align with the patterned ways that spatial conditions beyond a physical proximal feature shape the *stratified feasibility landscape* of college participation. Spatial conditions can shape college participation through spatial attachment, experiences, identities, and imaginaries (Brint & Karabel, 1989; D'Amico, 2016; Gieryn, 2000; Jacobs & Worth, 2019; Massey, 1994; Wright et al., 2022). For participants in small rural towns, these space and place processes were continuously shaped and reinforced through participants' subjective experiences throughout college.

The type of learning experiences that participants had at C1-Environment and C2-Environment were also in spatial alignment to their preferences in the perceived and lived space (Lefebvre, 1991) of their educational environments and programmatic interests. At C1-Environment and C2-Environment, internships and fieldwork were easily embedded within the curriculum, with hands-on opportunities given where the programs were physically situated. Participants shared about how few stoplights there were in the town–taking ten minutes to get from one end of the town to the other–and how many aspects of their lives, such as college and work, were integrated. Time navigation (Bettencourt et al., 2025) was easy here, in part because of the environmental landscape of where these CCB programs were physically situated. P8 (white; man; 18-24 years-old; financial aid recipient), who grew up in the town, left in the later years of his K-12 schooling, and then came back in his early 20s shares:

> I am the one who came back... I love the town. I love people here. I just love the area... There's so many cool things to do... It's made the experience very easy. It's made my life. Pretty easy to just commute to one spot–work and school there. The town's not big either. I think, like, I never really pay for gas.

He shares his preferences of small rural towns compared to larger high school and college environments in the city:

> I think it's because I thrive in smaller environments. Growing up out here in [town name redacted], my class sizes were always like less than 20 starting off. It was like 15 people, maybe in kindergarten, and the size just dwindled off and there was seven of us in my sixth grade class. And then moved out [of the small town]. So, I got a little taste of like a 50-person class and then moved on to some bigger classes than that. So, I think it was just being raised in those small environments–a lot of teacher-to-student time.

P2 (white; woman; 25-39 years-old; caretaker), who also grew up in the town, shares:

> So, my first class would start at 8:00 a.m. and I wouldn't go home until midnight. And then, I would do work from midnight-to-four in the morning, and I'd sleep four hours, and I'd go right back to class... But, I loved it. I didn't want to go home... So, but that was mostly because I was around [a topical area in the program of study] all the time... If I was just going to college and not doing some sort of [environmental] program, that's not what my experience would have been.

Such narratives highlight how the CCB programs at C1-Environment and C2-Environment were able to enable college access and success to students who grew up in the local area and offered an educational and lived experience that programmatically and spatially aligned and integrated with their life conditions, preferences, and goals. Participants' spatial conditions, intersected with their programmatic and temporal conditions, enabled college participation. Given the size of the small rural town, participants had short commutes and the journeying (Wainwright et al., 2026) that participants had to do were enabling features of their perceived and lived space (Lefebvre, 1991). After working and attending community college in a bigger city, P8 realized that he did not like his lifestyle in the city with traffic and longer commutes. Instead, he preferred and recognized the benefits of living in a small town, where the spatial arrangements of college and work was accessible and integrated. For P2, her geographic, economic, programmatic, and temporal conditions made college participation feasible. She viewed the longer college and work hours as an opportunity and an actualization of navigating time in a way that aligned with her academic, work, and life preferences and interests.

The experiences of participants in CCB programs situated in small rural towns elevate the nuanced ways in which CCB programs expand college access and participation, but they also demonstrate the stratified nature of the feasibility landscape within and between participants at C1-Environment and C2-Environment. To pursue the program of study (or college, in general) that they were interested in, participants at C1-Environment and C2-Environment were already local or would have had to locate anyway. It is not that CCB programs only provide access to local communities, but it provides access to external, perhaps similar, communities who may not have had feasible college options otherwise.

While CCB programs expanded educational access, this higher education landscape privileged students who were geographically mobile. Such findings do not account for individuals in the same communities with limited in-person college options who could or did not move to pursue a bachelor's degree. CCB participants interviewed at C1-Environment and C2-Environment also skewed younger (average age was 25), attended less college institutions prior to C1-Environment and C2-Environment, were less likely to have caregiving commitments (13%), and white (88%), relative to students who participated in CCB programs in large metropolitan areas (average age was 32; 41% were caregivers; 37% were white). CCB participants had a *stratified feasibility landscape* that enabled college participation in patterned ways. Yet, CCB participants in small rural towns still needed to navigate an uproot and expend capacities and resources to support their pursuit of higher education. Leveraging geographic mobility is shaped by structural and systemic conditions that inform students' ability and decisions to participate in college and is not unrelated to one's contexts, positions, and trajectories, particularly as they relate to household, community, and financial dynamics. These patterns speak to the bounded and stratified nature in which students have agency in "choosing" or "deciding on" college participation.

Even for the students at C1-Environment and C2-Environment who relocated, their mobilities were not without challenges and there was horizontal stratification in these small rural towns. Participants shared the emotional, economic, and housing precarity that they experienced. All participants who relocated to attend C1-Environment and C2-Environment received financial aid; two of the eight participants (25% compared to 0% of the CCB participants in large metropolitan areas) were impacted by the foster care system and received additional support services and resources while participating in college. While such experiences may speak to the patterned ways in which the sample of participants at C1-Environment and C2-Environment were administratively legible in ways that allowed them to access resources and support (Scott, 1998), they also speak to a horizontal and vertical *stratified feasibility landscape*. Horizontal and vertical stratification mechanisms shape college participation. As P5 (Asian; woman; 25-39 years-old; financial aid recipient; first-generation college student) discusses the challenges she experienced paying for housing, especially during her last year, she says it was "harder to afford" as she worked two jobs to pay for college and housing costs. Because of weather conditions throughout the year, she talked about being called off of work on certain days, making it difficult since "I still gotta pay rent and I still need money." Such patterns speak to the uneven and stratified ways that spatial and programmatic conditions make college participation feasible and the bounded agency exercised by students, depending on their social contexts, positions, and trajectories.

In contrast to C1 and C2's Environmental CCB program, which were situated in small rural towns, C3-Industrial, C4-Healthcare, and C5-Healthcare were CCB programs situated in large metropolitan areas. The higher education landscape and the feasibility of college participation was different here than in rural locales. Among the 22 CCB participants in large metropolitan areas, the majority lived in California at some point (18 or 90%), went to high school in California (18 or 90%), or went to high school in the same county as their CCB program (16 or 80%). This can be interpreted in a multitude of ways. One interpretation suggests that this mobility may be less feasible among CCB participants who are in large metropolitan areas. It could also perhaps speak to some level of spatial identity alignment and attachment and access to college institutions that is already achieved among CCB participants who are in large metropolitan areas. Such patterns speak to the differing spatial mobilities and feasibility landscapes that enable participation in CCB programs–differentiated by processes of space and place, as well as additional organizing principles (e.g., program of study, race, and age) that are tied to structural and systemic conditions, such residential segregation. that were situated in small rural towns, C3-Industrial, C4-Healthcare, and C5-Healthcare were CCB programs situated in large metropolitan areas. The higher education landscape and the feasibility of college participation was different here than in rural locales. Among the 22 CCB participants in large metropolitan areas, the majority lived in California at some point (18 or 90%), went to high school in California (18 or 90%), or went to high school in the same county of their CCB program (16 or 80%). This can be interpreted in a multitude of ways. One interpretation suggests that that this mobility may be less feasible among CCB participants who are in large metropolitan areas. It could also perhaps speak to some level of spatial identity alignment and attachment and access to college institutions that is already achieved among CCB participants who are in large metropolitan areas. Such patterns speak to the differing spatial mobilities and feasibility landscapes that enable participation in CCB programs–differentiated by processes of space and place, as well as additional organizing principles (e.g., program of study, race, and age) that are tied to structural and systemic conditions, such as residential segregation.

4.2.1.3 "My Car Hates Me, but the Gas Station Loves Me": The Spatial-Temporal Micro-Mobilities That Bound College Participation in Large Metropolitan Areas

Place and space are ongoing and dynamic processes (Cresswell, 2014; Gieryn, 2000; Lefebvre, 1991; Massey, 1994) interplay with timescapes (Adams & Blair, 2019; Bennett & Burke, 2018) to shape the *stratified feasibility landscape* of college participation. CCB participants must navigate and negotiate spatial-temporal conditions in the form of micro-mobilities–commutes and commitments–to maintain the feasibility of college participation. C3-Industrial, C4-Healthcare, and C5-Healthcare are situated in large metropolitan areas near many of college and universities, but these CCB programs make college participation more feasible by attending to economic, programmatic, and spatial conditions. C3-Industrial is one of the few institutions in the nation that offer this program of study and none of them are in the same large metropolitan area. Near C4-Healthcare, there were other competing healthcare programs offered by private and for-profit institutions, but with much more pecuniary or monetary costs. There are no other institutions near C5-Healthcare with the same program of study. All three CCB programs occupy a different part of the higher education landscape. For CCB participants, all three programs expanded college access and participation because there were feasible college options for students who lived nearby with the same program of study and preferred the lower tuition costs of California's community colleges.

Students in these three CCB programs experienced a *stratified feasibility landscape* that required navigating spatial-temporal conditions to sustain college participation. Participants at all three CCB programs spoke about challenging commutes–spanning up to two and a half hours in one direction. This could especially be challenging for students at C4-Healthcare, since their program required clinical placements and fieldwork/internships that sent students to different parts of the area depending on the day. Students expressed how these were impactful work-based learning experiences and programmatic features–strategically established by the college and done in a way that eased putting the administrative burdens on students to find own work sites and patients, as well as allowing students to have a variety of hands-on work experiences. P12 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> So, it's 60 miles there, 60 miles back. So, every day, 120 miles, which is insane! My car hates me, but the gas station loves me... When you're a senior/junior, you go to outside clinic... which I do appreciate about the school because you get to see a lot of patients, different types, we'll go to [healthcare clinic name #1 redacted], which is closer to me. We'll go to [healthcare clinic name #2 redacted]. We go to [another healthcare clinic name #3 redacted]. We go to [another healthcare clinic name #4 redacted]. We go to [another healthcare clinic name #5 redacted], [another healthcare clinic name #6 redacted], or whatever. We go everywhere. So, I would kind of have to adjust to that.

However, these were journeying activities (Wainwright et al., 2026) that required time capital and navigation (Bettencourt et al., 2025; Wladis et al., 2018, 2024), and the development and implementation of everyday practices where participants could be successful within this timescape (Adams & Blair, 2019; Bennett & Burke, 2018). Such spatial-temporal conditions varied by where CCB participants were situated within their respective large metropolitan areas. While feasible to manage among CCB participants, the result was a long commute that could be physically, emotionally, and financially costly to CCB participants.

Aligned with prior scholarship of commutes (Dache, 2022), the nature of traffic in a large metropolitan area necessitated flexibility and problem-solving. To navigate the spatial-temporal conditions of college participation, some CCB participants carpooled with other students to save money on gas; this became a means of connection and support for participants. CCB participants also discussed how they used that driving time to accommodate academic commitments–leveraging technology to generate audio formats of course materials. CCB participants also used that time to navigate caregiving commitments. As P14 (white;

woman; 25-39 years-old; financial aid recipient; caretaker) shares:

> So, the traffic each way was typically two hours, so I used that time to deal with all my phone calls for business, as far as scheduling appointments, and this and that, or listen to my lectures or you know–there's different apps where you can talk and it types for you or all kinds of stuff, so it was helpful to use my car time to accomplish stuff... I'm sick of commuting. I had plenty of days that I cried when I had to leave my kids and other days it was, 'Oh I need a break from them. Let me get to school.'

P14 demonstrates how CCB participants, as bounded agents, navigated the lived temporal-spatial conditions to enable and constrain the feasibility of college participation. While these CCB programs were economically and geographically the most accessible to them, they also required calculated decisions and time navigation to make their college experience more feasible, particularly as they balanced academic commitments, alongside employment and household commitments. Building upon Bettencourt and colleagues' (2025) concept of time navigation and equity, CCB participants not only needed time (capital) (Wladis et al., 2018, 2024), but they also needed to have an understanding of how to navigate time; such commute commitments are distributed unevenly and are a mechanism for shaping (in)equities in college participation.

P11 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student), a younger student who was trying to balance college and work, shares how she navigated time as she moved through her landscape. As a bounded agent–navigating college participation under established spatial-temporal conditions–CCB participants, like P11, "decided to beat the traffic." For P11, this involved making precise decisions about how to navigate her time, especially since she worked on Mondays, Wednesdays, and Fridays. She shares her understanding of her city's landscape, stating, "If you're not up by at least 6:30 a.m., you already added an hour to your commute." She talked about getting to campus earlier, as well as staying on campus later to avoid traffic. She would use that time judiciously and would allocate that time to do her homework. She shares, "I got out around 5 p.m. and I was like, 'I do not want to sit in an hour traffic–[there's] no benefit for it... It's so dreadful." In this way, these journeying commute commitments and micro-mobilities operated as a mechanism that constrained college participation for students with varying non-academic commitments and were a method in which spatial-temporal conditions stratified feasibility between CCB programs in large metropolitan areas versus small rural towns.

These spatial-temporal conditions shaped the intensity and feasibility of college participation at C3-Industrial, C4-Healthcare, and C5-Healthcare, as CCB participants navigated academic, employment, and household commitments. Institutional conditions, such as agents or structures, could amplify or constrain these intensities. For example, at C4-Healthcare, practitioners told CCB participants during orientation that their life would be consumed by their bachelor's degree program for the next two years. The institutional structure at C4-Healthcare–as it interplayed with the spatial-temporal conditions and demands of the large metropolitan area–bounded students' participation in college and other activities. CCB participants in C4-Healthcare discussed how rigorous their program was and even two of the 11 participants (18%) used the word "impossible" to describe the infeasibility of doing both coursework and maintaining their job prior to their CCB program. Only one CCB participant in C4-Healthcare (9%) maintained their prior job while completing upper-division CCB coursework. P20 (white; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaking) shares the sacrifices she's made in balancing her commitments:

> I miss my son's baseball practices and I'll show up halfway through–go straight there from school... I have to spend all of my time, literally every waking second studying, you know? And they told us too... They said, 'You're not going to work.' They said, 'Tell your family, you'll see them in two years.'

At C3-Industrial, C4-Healthcare, and C5-Healthcare, participants consistently talked about the intensity of their respective CCB programs, given the rigor of their programs. P23 (Filipina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> I think I already get kind of overwhelmed and I'm only working like, 24-32 hours, so if I was working full-time–some of our peers have kids and everything, like, a hundred different responsibilities. I think I'd just be overwhelmed. I don't think I would be able to do it, to be honest.

P29 (Black; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker) shares:

> If it is a lab class, I don't think you should have students there more than two-and-a-half, three hours tops. Having the students be there until 8:30 p.m. at night after you've worked a full day is just too much... [In my] senior year, we had a professor [who] was very tech savvy. If you could not make it to class for whatever reason, he had it set up so that you could Zoom in and he had it so that the Zoom would be on one screen. So, our classmates could see us and then we could still see what our classmates saw on the other screen–doing that type of thing. So, that if you're sick, if your car breaks down, if you're just too tired, there were some days where I was just so exhausted. My mom would talk to me the whole way home, so I didn't fall asleep.

While CCB participants in C5-Healthcare still expressed the intensity felt within their respective programs, CCB participants demonstrate how programmatic conditions established by the institution (e.g., program of study, course modality, and course scheduling) made participating in both college and employment more feasible.

In contrast to CCB participants at C4-Healthcare who did not work full-time, C5-Healthcare's program encouraged students to work. For example, institutional agents at

C5-Healthcare emailed students about various employment opportunities that were passed along to them by their extensive professional networks; such opportunities were for both current and graduated CCB students. Institutional agents and structures attempted to support students' ability to work and attend college full-time. Perhaps due to the nature of the subfield of their healthcare program, C5-Healthcare had courses that started in the evening to accommodate traditional U.S. "8 to 5" working schedules; some upper-division courses were also conducted online. Such features supported students' ability to balance different commitments. As P27 (Latina; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaker) shares:

> I can't tell you how many times I've taken the laptop and the hotspot and gone to work and worked on homework during my lunch break or worked on homework right after work. Or gone to take my son to therapy and taken my laptop with me and worked on homework then and there, you know? So, for me, it's about time and accessibility to be able to finish these projects and to have access to the materials at my fingertips. So, I find that very convenient as being a parent and working part-time–the schedule is just crazy.

P28 (white; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaker) also shares:

> Sometimes, I would just set the laptop up on the counter and start cooking dinner, but be listening, of course, but I do think that was super helpful... It didn't really take away from the lecture... I was able to feed my family at the same time, so that was really nice, and luckily the kids were a lot younger then.

While the sample of CCB participants interviewed at C3-Industrial, C4-Healthcare, and C5-Healthcare skewed female, the gendered patterns of how women navigated time and managed caregiving commitments align with previous research on the gendered nature of caretaking with intensive cultural expectations for women and mothers (Hays, 1998). While the female CCB participants who were caregivers discussed how they would help their children get ready to go to school, drop and/or pick them up from school/extracurricular activities, and/or prepare meals, CCB participants also discussed how supportive their male partners were and how they made college more feasible for them. Nonetheless, the spatial-temporal conditions that shaped the feasibility of college participation were patterned by gender. One of the men in the sample, P24 (white; man; 25-39 years-old; financial aid recipient; first-generation college student) acknowledges these gendered experiences:

> I would think that the older students did [have full-time jobs]. The younger ones might have part-times... but there were also, for example, young mothers... They were taking care of their families and going to school. So, they were not working at the time, but the majority of people, I would think, especially the 25-plus age range, would have full-time jobs.

In the sample, there was one father, P10 (Latino; man; 40+ years-old; financial aid recipient; first-generation college student; caretaker), interviewed. He frames his caregiving commitments in the form of employment commitments. He shares:

> I had to drive to work 60 hours and go to school 40 hours and do homework and do this and do that... I didn't quit because... my wife and my son. So, even though I was tired, I was just going through the pain and I was just trying to zone out... If I don't work, they don't eat... I only have one kid and I want him to live as he wants.

In speaking about *the* drive–and *his* drive–P10 saw his child as a source of motivation under a feasibility landscape, where social, economic, spatial, and temporal conditions intersected to enable or constrain college participation. His family encouraged and motivated him to enroll and complete his bachelor's degree and attain greater mobility prospects, but it has been admittedly a "hard road." For many CCB participants who were caregivers, they were pursuing this degree for the prospect of social and economic mobility and being a role model for their children. P26 (Asian; woman; Asian; 25-39 years-old; first-generation college student; caretaker), returned back to C5-Healthcare for a second bachelor's degree shortly after giving birth. Weighing the social opportunity costs/benefits, she shares:

> I think with a kid and with my husband, it kind of motivates me more to go back to school... Like, I had to have a better job... because now I have family and with a kid... I can be a good example. Say, 'Look, Mommy's busy, have kids, have family, but still able to do another bachelor's degree... So, it's a good thing to tell the kid when they grow up.'

Across all three CCB programs in large metropolitan areas, CCB participants consistently discussed the intensity of their programs. As P19 (Indigenous; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker) shares:

> This is the hardest thing I've done... And, I tell people who want to apply to programs like this. I said, 'My son has had cancer. I've been hit by vehicles. I've had a very traumatic life. This is harder than all of that.'

The programmatic demands, intensity, and rigor of the CCB programs were evident in interviews with CCB participants and are further reinforced by the experiences of post-graduates. P12 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student), who has recently graduated, discussed the "bumper-to-bumper, stop-and-go thing" of her commute to C4-Healthcare and how she would be studying until 1:00 a.m. and waking up 4:00 a.m. to get ready for school. In contrast, since graduating, she shares the changes in her life without the programmatic, spatial, and temporal strains of college participation: "I'm barely transitioning back... Now, I can read a book for mental health. Now, I can exercise. Now, I can go on a walk. I feel like that's changed for me drastically."

The consistent intensity in these academic programs demonstrate that while college participation was more feasible with CCB programs, particularly relative to other college options presently available or in the past, participants were bounded agents. As P21 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student) reflects, "I think for this program, I've kind of had to come to terms [that] it takes a lot of my time." For CCB programs in large metropolitan areas, participants needed to navigate through the intersections of their programmatic, spatial, and temporal conditions. Institutional agents and structures can amplify or constrain the sustainability of college participation in how they interplay with broader structural conditions. CCB participants' experiences with CCB programs highlight them as *trajectory-responsive policy* projects–navigating the tensions of both providing an accessible pathway to bachelor's degrees, but one that needed to be navigated and negotiated throughout the college life cycle. Such narratives demonstrate that while CCB programs expanded college participation by leveraging institutional arrangements, assets, and designs related to economic, programmatic, and spatial conditions, such policy efforts do not completely dismantle institutional and structural barriers that can constrain college participation.

There are distinct patterns of who is most likely to have to navigate these spatial-temporal mobilities to participate in CCB programs and, more broadly, higher education. These findings reflect the experiences of participants in CCB programs in large metropolitan areas and, more specifically, CCB healthcare and industrial programs in large metropolitan areas. Gendered patterns of caretaking commitments have implications on how students navigate their respective programmatic and spatial-temporal conditions. CCB participants' *stratified feasibility landscape* shaped and were shaped by how institutional and structural conditions interplayed with students' social contexts, positions, and trajectories and how they were actualized in everyday practices. There are also differences between CCB participants based on programmatic and spatial conditions; CCB participants in large metropolitan areas are notably demographically different from CCB participants in small rural towns, and, more specifically, CCB participants of environmental programs in small rural towns. In its most material form, this is actualized in who has to pay for gas and, in more abstract configurations, it has implications on how CCB participants are shaped by and shape their engagement and participation in college and work activities (e.g., long hours as passion vs. long hours as strain). Relative to CCB participants in small rural towns, participants in large metropolitan areas were more likely to be older (average age: 32 vs. 25), have caretaking commitments (41% vs 13%), be first-generation college students (86% vs. 25%), Asian (23% vs. 13%), Black (9% vs. 0%), Indigenous (9% vs 0%), Latine (32% vs. 0%), and they were less likely to be white (32% vs. 88%). Such dynamics reveal the patterned ways–by age, class, gender, and race (with implications for ideas such as racialized commutes)–in which spatial-temporal conditions shape college participation in a *stratified feasibility landscape.*

4.2.2 Qualitative Finding 2: Administrative and Time Navigation: How CCB Programs Mitigate and Reproduce Stratified Feasibility in College and Career Pathways

Administrative conditions are feasibility mechanisms that enable or constrain college participation via learning, compliance, and psychological costs that require capacity and resources (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). Administrative burdens are racialized (Fox et al., 2020; Gándara et al., 2024; Moynihan et al., 2015; Ray et al., 2023) and have implications on students' time capital, navigation, and equity (Bettencourt et al., 2025; Wladis et al., 2018, 2024). CCB programs facilitate less administrative burdens–or create administrative ease (Fox et al., 2020)–through their application processes, their determination of how participants' experiences are counted (if at all) towards one's degree, their facilitation of work-based learning opportunities, and completion outcomes, by leveraging its institutional arrangements, assets, assumptions, and designs. These institutional conditions are shaped by both institutional agents and structures–the proactivity and continuity of institutional agents, an institutional commitment to college and labor market alignment, and the benefits of smaller academic communities (cohorts-based programming). However, like at other baccalaureate-granting institutions, CCB programs can also reproduce administrative burdens for students with more complex educational trajectories, as they expend additional learning, compliance, and psychological costs. Such findings reflect how administrative conditions can stratify or equalize college participation in a *stratified feasibility landscape*, depending on students' life and educational trajectories, interactions with institutional agents, and time/navigational capital, and how CCB students exercise bounded agency within and through CCB programs.

4.2.2.1 The College Application: Administrative Ease/Burdens Across Life and Educational Trajectories

Across all five CCB programs, the CCB application to gain admissions and acceptance into the program and begin upper-division coursework is generally experienced as accessible and clear. Administrative ease is experienced especially for students who have already been at the respective community college (and CCB program) that they are applying to and/or for students who have less complex educational trajectories. All CCB programs in the sample used a Google or Microsoft Form for their applications. Many CCB participants were often brief in talking about the college application process–presumably because how low the learning, compliance, and psychological costs were. As P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student) says, "Everything was easy." P20 (white; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaker), who was already enrolled and completed their lower-division requirements at the college, said "It was all really straightforward." P8 (white; man; 18-24 years-old; financial aid recipient) shares, "I think I just went to an advising meeting and you click the button because I had enough classes and I just advanced to being able to enroll in bachelor's classes."

Students shared how the CCB application was perceived to be less administratively burdensome (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015) relative to the applications requirements for the traditional four-year sector. Among the 11 students who previously enrolled in the traditional four-year sector, three shared the administrative ease of the CCB application process relative to the traditional four-year sector (most others said they were comparable or did not comment). P16 (white; woman; 25-39 years-old) previously navigated the community college transfer process and completed her bachelor's degree at a large public university. She has since transferred from a large public university to a CCB college from the same origin community college. She shares:

> For [large public university name redacted], that one was kind of complex just because I had to transfer all my paperwork because I had done pre-reqs at [community college name redacted #1]. So, I was a transfer student... Sending my transcripts and getting all my classes approved for transfer and all of that was kind of confusing. And then [community college name redacted #2]–that [CCB program at community college name redacted #2] application is super easy and basic... I would say [the CCB application] was probably easier [than at large public university name redacted].

P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student) had previously taken a few courses at both community colleges and the traditional four-year sector. When she was in the process of applying to C5-Healthcare, she also simultaneously applied to a large public university to keep her options open. She shares her experience:

> I applied to [large public university name redacted] because I didn't know if I wanted to do my bachelor's with [C5-Healthcare] or if I wanted to do it with [large public university name redacted]. I signed up for [large public university name redacted]. I got accepted. And then there was so much runaround for getting financial aid, getting classes set up, being able to speak to a counselor and being three hours behind. It was very difficult getting in contact with someone. Their application was insane. Just everything about it was an uphill battle. And once

> someone finally got back to me, I was starting my first week in the bachelor's program at [C5-Healthcare].

The experiences of P16 and P22 demonstrate the minimal learning, compliance, and psychological costs (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015) of the CCB applications for two distinct types of CCB students. P16 made comparisons of her more conventional vertical transfer application process to her experience as a CCB internal transfer. P22 compared initial enrollment into the traditional four-year sector relative to the CCB program. For both types of experiences, the CCB application incurred less learning, compliance, and psychological costs, and required little time navigation.

The administrative accessibility and clarity of the CCB application form elevates how CCB programs enhance college participation within a *stratified feasibility landscape*. P18 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student), who previously enrolled in the traditional four-year sector, described C4-Healthcare as doing a "phenomenal" job of being clear about the admissions process. She was happy that the administrative processes were not a "shroud of mystery" like other similar programs or her experiences navigating lower-division requirements elsewhere. The administrative ease (Fox et al., 2020) of the CCB application process allows students to maintain time capital (Wladis et al., 2018, 2024) for other activities. Given the diverse range of social contexts, positions, and trajectories of students, this is a meaningful way in which CCB programs facilitate college access and foster time equity (Bettencourt et al., 2025).

However, there are disparities in who was able to experience administrative ease. CCB participants that experienced more complex educational trajectories (e.g., attended multiple colleges previously) were more likely to experience administrative burdens related to the CCB application (Gándara et al., 2024; Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). The nature of this dynamic is inequitable, given that students from historically minoritized communities are more likely to have "non-linear" or complex educational trajectories (Hogan, 1978; Monaghan, 2020). Not unrelated to the scholarship on community college credit loss among vertical transfer applications (Giani, 2019; Giani et al., 2026; Hodara et al., 2017; Spencer, 2019, 2023), 5 of 11 (46%) participants who attended other baccalaureate-degree granting institutions talked about experiencing some challenges or needing additional navigational support from institutional agents when applying for their respective CCB program. For these participants, the application process required a (re)construction of institutional histories that incurred learning, compliance, and psychological costs (Gándara et al., 2024; Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015).

For students with more complex educational trajectories, the CCB application was a burdensome compliance, learning, and psychological activity rooted in social contexts and histories. It required determining which prior college credits and grades counted towards the CCB prerequisite requirements and (re)entering and (re)navigating different institutional systems. Sometimes, this required having to take additional courses to meet requirements that they had not anticipated. The time navigation for these activities require learning costs, in trying to figure out the course prerequisite requirements for CCB programs, and compliance costs in gathering transcripts to minimize time capital and credit loss (Bettencourt et al., 2025; Giani et al., 2026; Herd & Moynihan, 2018; Wladis et al., 2018). The process of compilation and making sense of their complex educational trajectories can be laborsome and time-consuming, which can disproportionately impact older students, who may be more likely to have to balance academic, caregiving, and employment commitments (Gándara et al., 2024; Matus-Grossman et al., 2002; Monaghan, 2020). This administrative process also incurs psychological costs, as they can be cognitively, emotionally, and physically draining processes (Herd & Moynihan, 2018). P19 (Indigenous; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker), who had previously attended five other colleges, shares:

> I had to submit all those colleges and all those transcripts. So, having to get all of that paperwork–it's a lot. It's very discouraging and it's a walk down memory

> lane. It's reminiscing and tells you–or reminds you–of your failures and your wins. So, mentally, it does take a lot out of you physically. It takes a lot because it can be frustrating. You're trying to figure out who's using [transcript platform name redacted], who's using this. Every school is different. You're navigating all these different systems. You're navigating all these different networks and it's very difficult.

As a counter case, P10 (Latino; man; 40+ years-old; financial aid recipient; first-generation college student; caretaker) affirms this perspective as an older student, but with a shorter and streamlined higher education history. He shares:

> For some people, I heard it was a little bit difficult because they needed to bring transcripts from other schools and whatever. For me, it was easy because it was the same school. So, when they ran my transcripts, everything was already there.

P10's administrative ease clarifies the mechanisms of administrative burdens with respect to the CCB application. Rather than having to gather transcripts and information from previous institutions, P10 incurred less learning, compliance, and psychological costs because of his shorter educational history, and because he was a CCB internal transfer student who had taken their lower-division course requirements at the same CCB college.

These experiences speak to how CCB applications can generate administrative burdens via learning, compliance, and psychological costs that require substantial time navigation (Bettencourt et al., 2025; Giani et al., 2026; Herd & Moynihan, 2018; Wladis et al., 2018). Administrative conditions are a feasibility mechanism that can enable or constrain college participation unevenly, disproportionately impacting students with more complex educational trajectories and/or students who have to be the most judicious with their time capital and management (Bettencourt et al., 2025; Wladis et al., 2024). Administrative burdens are a direct way in which time can generate inequities and bound students' educational experiences.

P19's experience with the CCB application also highlights the time navigation, time capital, and assets that students must possess and embrace. She reflects, "I'm always lucky to have my education behind me because it's taught me about processes–how to just not stop, how to ask questions, where to look, how to problem solve." Here, she articulates her bounded agency (Rubenson & Desjardins, 2009), as she details her capacity to and pride in navigating within institutional conditions that constrain college participation. While recognizing how her complex educational trajectory has added administrative burdens, she also frames her complex educational trajectories as an asset. Now, on the other side of navigating those administrative burdens, she sees them as experiences that have given her the skills and knowledge to navigate institutional and structural conditions. Her bounded agency is shaped by her college experiences and shapes her college participation.

It is important to distinguish that such administrative conditions would have likely been experienced had students (re)entered or transferred to any postsecondary institution–not just CCB programs. College applications are not a stratification tool that is exclusive to CCB programs, but a feature of many postsecondary institutions. CCB programs become *trajectory-responsive* policies for CCB students who have completed their CCB lower-division requirements at the respective CCB college (what I call as CCB internal transfer students). However, this is not always the case, as there are CCB external transfer students, students who began and completed significant relevant lower-division coursework elsewhere. CCB programs can also become more *trajectory-responsive* and reduce administrative burdens through institutional agents and structures.

One CCB participant shares that one of the reasons why she elected to stay at her CCB college after completing her lower-division courses and not transfer elsewhere:

> I have a system that I figured out how to work really well here and relearning it somewhere else–that I hear is harder... I've got an easy system here... check this box, go meet this person, turn a paper here, why would I complicate that process by going to a large school with thousands of people, who don't know my name?...

> I also think coming from foster care and having some of those unknowns, I don't know if I'm going to be allowed to stay in this house for another month, week–[not knowing] what the court is going to tell me to do tomorrow.

This CCB participant acknowledges the administrative burdens and processes that bound her college participation (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). However, this CCB participant's decision to preserve her administrative ease was in part because of the institutional agents and structures that shape her current experience at her CCB college. She had already incurred some of the learning, compliance, and psychological costs at the institution and was sustaining college participation by limiting further costs. In some respects, she had already paid the major administrative bills of college participation at her CCB college. Her preferences for administrative ease are also important to understand, given her lived experiences and dealing with administrative burdens in other institutions and contexts. The CCB application interplays with her social contexts and histories in consequential ways that inform her college decision-making.

Institutional agents and structures can also mitigate and buffer administrative burdens and expand administrative ease and college participation. Institutional agents had regularly scheduled Zoom meetings to support students with applications and, relative to other colleges, had a clear and transparent admissions policy that detailed their admissions evaluation criteria. Such institutional designs are not unique to CCB programs, but speak to the ways in which higher education institutions can expand administrative ease for students.

Additionally, C4-Healthcare facilitates administrative ease and becomes more *trajectory-responsive* with their CCB application for students with different trajectories by offering multiple application periods. As one participant from that program shares:

> And [the other healthcare associate's degree program] only have applications once a year... And I didn't get in and I didn't want to wait a whole other year to see if I was going to get in or not. And one of the girls who had applied there told

> me that she started going to [C4-Healthcare] and I should go there... Because [C4-Healthcare] takes people two times a year instead of once... So, I did like the non-traditional one in the spring.

This CCB application structure accommodates students' complex life trajectories by creating a more accessible and equitable temporal opportunity structure that expands college participation (Bettencourt et al., 2025). C4-Healthcare is surrounded by other similar healthcare programs, whether associate's or bachelor's degree programs, in the area. However, unlike those programs, which only offer one admission deadline, C4-Healthcare has multiple application cycles in a year. By altering their institutional structures to be more *trajectory-responsive*, these additional cycles can expand administrative ease. Prospective CCB students have additional time to fulfill any missing course prerequisite requirements that already come with their own compliance and learning costs (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). I note that this application cycle design is not unique to CCB programs as California's traditional public four-year also has multiple transfer cycles in a given year, and that this was not a common feature spoken about by CCB participants. I share this experience to elevate how unique institutional conditions could be (re)arranged and designed to support students' time equity.

The CCB application dually operated as a tool for administrative ease and burden, depending on CCB participants' life and educational trajectories and institutional conditions. For CCB participants who had attended fewer postsecondary educational institutions and/or were already enrolled at the CCB college, these participants experienced administrative ease with respect to the CCB application. CCB participants with more complex educational trajectories tended to be older students (average age: 32 vs. 24). These students experienced administrative burdens–incurring extraneous learning, compliance, and psychological costs that required time navigation and compounding disadvantage (Bettencourt et al., 2025). There may be horizontal and vertical stratification experienced here, as there may be differences between adult learners who have complex educational trajectories and have been admitted to the four-year sector previously compared to adult learners who delayed or never entered the traditional four-year sector. Within the administrative burdens frame, the latter are advantaged in the application process, although in other contexts, it is not inconceivable to imagine that the former had educational advantages, given the negative relationships between delayed college enrollment and bachelor's degree attainment (Andrews, 2018; Bozick & DeLuca, 2005). Institutional agents and structures can amplify or mitigate the CCB application processes by providing additional administrative support or application cycles. Features of the CCB application–whether they lead to administrative ease or burdens–are not unique to CCB programs. The college application, and transcripts specifically, are common stratification tools adopted in higher education. CCB participants' experiences with CCB applications speak to the role of that institutions can play in shaping administrative and temporal conditions that directly impact their *stratified feasibility landscape*.

4.2.2.2 College and Career Pathways: How Institutional Agents and Structures Shape the Stratified Feasibility Landscape

Once students complete CCB applications and are enrolled to officially take upper-division CCB courses, college participation is shaped by the administrative ease of course requirements/registration and proactive support of institutional agents in facilitating work-based learning, internship, and employment opportunities. Institutional conditions shape college and career alignment in impactful ways that can sustain college participation (D'Amico et al., 2019; Vo & Rios-Aguilar, 2024). Proactive faculty play a valuable role in enhancing students' procedural agency through information and mentorship relevant to their academic and career goals (Deil-Amen, 2011). In contrast to the wide range of patterns in students' prior educational trajectories (e.g., delayed enrollment, exited with/without a degree, and participation in other community colleges, for-profit institutions, four-year universities–public vs. private, and technical/trade schools), once students matriculated into CCB programs and officially began upper-division coursework, all participants in this sample continuously sustained college participation. Prior research on CCB programs in California note the higher two- and three-year graduation rates of CCB programs (Hoang et al., 2022). This pattern of college participation may be related to the administrative, programmatic, and temporal conditions students experienced once they matriculated into CCB programs.

The majority of participants (25 of 30; 83%) expressed how easy it was for them to understand what the course requirements were for their upper-division coursework. CCB programs with a course structure where students are cohorted and move through the same courses together each semester generated administrative ease for CCB participants. Since their programs were not impacted by enrollment, CCB participants were assured that there would be course slots reserved for them. CCB participants at C4-Healthcare and C5-Healthcare shared how they received an email each semester from an institutional agent with what courses they need to enroll in and the course codes. P21 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student), who had previously attended a large public university and exited, shares:

> The director sends out the little numbers that come with them and you just put that into the thing and it signs you up for those classes, so that is very easy and it's pretty well communicated to us. There's no issues with not being able to sign up for a class that you need or anything like that because you're with a cohort, so they have as many seats as there are people. So, that removes a lot of some of the barriers that might come from other places.

When asked to compare how the clarity in course requirements/registration was in CCB programs relative to their previous higher education experiences, participants consistently expressed satisfaction with the administrative ease of CCB programs. P13 (Latina; woman; 25-39 years-old; financial aid recipient; first-generation college student) shares her experience registering for prerequisite courses at a community college prior to starting her CCB program:

> It was hard to get into your classes, so anytime I would have to register for

> classes–it was terrible, I would get so much anxiety. Thankfully in this program, I don't have to deal with any of that.

She later goes on to say that instead of having to "focus on competing... on getting classes", she can "just focus on school." P7 (Asian; woman; 18-24 years-old; financial aid recipient; first-generation college student), who previously attended and completed a bachelor's degree at a large public university, shares similar sentiments:

> There's no stress for me in that aspect, where I need to go and search for my classes. Pretty much, my classes are pre-planned and available to us because we're in this specific pathway... but for [my previous large public university]... you kind of had to fight for your spot... in the course.

By providing administrative conditions that reduced logistical complexity and strain, students had more time capital to focus on other matters, such as their learning and career goals (Wladis et al., 2024).

Institutional agents in CCB programs shape the feasibility of work-based learning, internship, and employment by minimizing the learning, compliance, and psychological costs of administrative burdens and time capital (Bettencourt et al., 2025; Giani et al., 2026; Herd & Moynihan, 2018; Wladis et al., 2018). Within all CCB programs, there was a fieldwork or internship component that participants were required to do. This is likely because of CCB program's commitments and stated goal of being aligned to economic and workforce development goals, particularly in California (Bragg, 2025; Floyd et al., 2019; Fulton, 2015; Vo & Rios-Aguilar, 2024). For the more established CCB programs that have been around for longer, participants experienced administrative ease, given the proactive nature of their institutional agents and because of their CCB programs had strategically established agreements with industry partners throughout the county. As P11 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> We do a lot of rotations... So, I think the biggest thing that I really liked [about the program] is having that access... Like, I know there's a lot of [healthcare] programs that only really offer their own clinic and you have to bring in your own patients. So, you don't get to see the wide variety of patients there are.

P7 (Asian; woman; 18-24 years-old; financial aid recipient; first-generation college student), who extensively researched at least ten different dental hygiene programs in California, shares the value of C4-Healthcare's WBL/internship feature:

> So, some [healthcare] programs, they require you to find your own patients, but there are a small amount of schools, including [C4-Healthcare], where they provide their pool of patients for you. So it kind of eases the process if you were a student there.

Another participant at C4-Healthcare, P13 (Latina; woman; 25-39 years-old; financial aid recipient; first-generation college student) confirms, sharing: "Clinical placements are pretty well-integrated into your program experience."

At C5-Healthcare, institutional agents created a form for CCB participants to complete. This form asked about participants' location and topical preferences for their WBL/internship course requirement. P23 (Filipina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> I think they do most of it because all I had to do on my end was complete background [questionnaire] about me [and] then where I would want to go for an internship. Like, top three places. And then they would just get back, like, 'You're interning here.' And I'm like, 'Oh, perfect.' So, if anything, they do most of it.

Within both healthcare CCB programs, institutional agents enhanced students' time capital and navigation by facilitating WBL and internship opportunities (Bettencourt et al., 2025;

Wladis et al., 2024). While this may be the nature of their respective industries, this may also be a matter of developing implementation practices and establishing the program within the local community (D'Amico et al., 2019; Vo & Rios-Aguilar, 2024). These institutional conditions fostered college and career alignment by clarifying students' knowledge of knowing whom they could access impactful career opportunities.

However, this could range depending on CCB programs and was perhaps tied to how long CCB programs had been in operation and perhaps the occupational field/industry. At C1-Environment, navigating WBL and internship opportunities became easier over time as the program progressed in their implementation stages. P2 (white; woman; 25-39 years-old; caretaker) shares:

> They sometimes had a list–once things got going–of [employers] that were calling them and saying, 'Hey, I'd be interested in an intern from you for this year.' But, right when we first started, it was kind of us throwing needles into a haystack and seeing what stuck.

While all CCB participants at C1-Environment found WBL and internships eventually, the extent to which they experienced administrative ease varied.

By minimizing administrative burdens and time use with WBL and internship opportunities by connecting students with employers, CCB programs not only made participation in bachelor's degree pathways feasible, but also facilitated the activation of the economic benefits of a bachelor's degree. At C5-Healthcare, CCB participants consistently spoke about the proactive nature of institutional agents in supporting students' navigation of the labor market. C5-Healthcare's program encourages full-time employment during and upon graduation. As P25 (white; woman; 25-39 years-old; financial aid recipient; first-generation college student) shares:

> She's constantly sending out when one of her contacts or people that she knows is, like, 'Hey, I work over at [organization] and we have an opening for potentially

> one of your students.' She's very good about emailing that over to us and saying, 'Hey, if anyone wants to apply for this, do this, and then let me know, so I can go back to that person.'

P24 (white; man; 25-39 years-old; financial aid recipient; first-generation college student), who began his bachelor's degree initially in C5-Healthcare's associate's program, demonstrates the value of these pipelines, even during lower-division coursework. P24 is a CCB graduate and shares:

> During my associate's, I did my internship with the hospital where I work now. I started as an... intern and then I was offered a job after that. And, I've been there for over three and a half years now.

The proactive nature of institutional agents at C5-Healthcare generates a career pipeline and pathways for students to activate their bachelor's degree in the labor market. At C5-Healthcare, two-thirds of the CCB graduates (four of six) ended up working at the same company where they completed their internship. A similar experience exists at C4-Healthcare. P11 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) from C4-Healthcare shares:

> ... So, I know that some of them went back to their old office that they were at [prior to C4-Healthcare], but most of us, if the office that we were doing our [internship] hours at did like them, we ended up getting offered a position there.

P27 (Latina; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaker) expands and elevates the unique proactivity that she has experienced at C5-Healthcare relative to other postsecondary institutions she has been to. This proactivity is modeled and then adopted by students in her cohort. She shares:

> [She] has been sending us job postings from friends that she knows... They're all connected. They all know each other. It's a close-knit community. It's like a network. So, she'll shoot off like emails at us. 'Oh, such and such is looking for [someone], [employer is] hiring... [let me know if you] apply.' I really think she's a big effort for us as far as sending us those links and those job applications. Because, I think a couple of us already have been hired from one of the links she sent out. And then, those students tell us, 'Apply, they're hiring' and it's a good word of mouth within the cohort. Other than the [C5-Healthcare program], I don't feel that anywhere else that had been an option.

Such experiences demonstrate how institutional structures that optimize administrative ease can enhance participation in college and career pathways. CCB programs make college participation and access to labor market opportunities more feasible through institutional agents and structures. Institutional conditions can minimize the costs of administrative burdens and application of time navigation that comes with identifying and obtaining relevant WBL, internship, and employment opportunities. This was particularly salient in more established CCB programs, and perhaps tied to field/industry norms, such as healthcare programs. While this may be the nature of healthcare programs, CCB participants remarked the uniqueness of their institutional conditions relative to other healthcare programs and other postsecondary educational institutions broadly. During interviews, it was difficult at times to discern the differences between CCB participants talking about coursework, WBL, or internship experiences. This was in part due to the applied, hands-on, and experiential learning opportunities that integrated with students' college and career interests/goals. This is by policy and institutional design; at minimum, across all five CCB programs, students obtained valuable skills and knowledge for the labor market through their curricular and programmatic experiences, whether formally or informally "in the labor market." As a *trajectory-responsive* policy project, CCB programs–through institutional conditions and structures–were well-positioned to foster college/career alignment and shape the *stratified* *feasibility landscape* across multiple dimensions (e.g., administrative, economic, social, and temporal conditions).

4.2.2.3 Institutional Agents and the Sustainability of Administrative Ease

As stratified feasibility mechanisms, administration, programmatic, social, and temporal conditions can be shaped by institutional conditions. Institutional structures (e.g., course structures, where course requirements/registration or WBL/internship requirements are clear and reserved) and/or institutional agents (e.g., administrators, faculty, or staff who receive employment opportunities from their professional networks and share them to students) can enable or constrain college participation. There is a tension in how these two mechanisms can enable or constrain college participation. The latter is obvious: the reliance on a handful of institutional agents can create more uneven and fragile college environments, depending on the quality of relationships between institutional agents and students (Bensimon, 2005; Bensimon, 2007; Ching, 2023; Hart, 2019; Rosenbaum et al., 2007).

When CCB programs depend on a handful of institutional agents, this can minimize administrative burdens and compliance, learning, and psychological costs (Herd & Moynihan, 2018; Herd et al., 2024; Moynihan et al., 2015). However, this depends on students' experiences with the institutional agent. CCB participants consistently identified one or two people as leaders of the CCB program. This ranged from administrators to faculty members who provide academic and emotional support, teach multiple upper-division courses, and/or support students' navigation of the labor market. P12 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> She was literally an angel. Like, everyone, if you talk to anyone about this program, they're going to say, 'She's an angel.' So, she would go out of her way to do that. She would make spreadsheets on her own–say, we all need [healthcare procedure], a specific amount... [She would tell me to put them on

> the spreadsheet and] cross them off as you go. [She would say], ‘And every week, I’m going to talk to every professor at the outside clinics and be like, [P12] needs three [healthcare procedures]. She needs this. If there is one, let her jump in...’ She was very coordinated like that, which I feel made a bond with everybody because she really did care.

CCB participants spoke fondly of institutional agents who often proactively rose to the occasion, but this speaks to a precarious educational landscape for students to navigate (Hart, 2019; Martinez, 2018, 2019; Martinez & Elue, 2020; Martinez et al., 2024). Relying on a handful of institutional agents speaks to the capacity, resources, and scale of the CCB programs and broader structural forces at play. These structural conditions have negative downstream effects when institutional agents are not able to support students, constraining participation. For example, at two CCB programs, CCB participants discussed how counseling and support services were not available on certain days because institutional agents were assigned to work with students from other programs and/or agents had provided information that was misaligned or misinterpreted with students’ needs. In some cases, given the early stages of implementation of some of these CCB programs, not all institutional agents were on the same page or as informed about the program as students would have liked.

At one CCB program, CCB participants discussed a course in which half the students in the cohort failed a key requirement (the CCB program ultimately adapted after students later raised and advocated for themselves), which had major implications on students’ time-to-degree and college participation. Institutional agents’ personal or professional approach can generate interpersonal conflict–especially if intertwined with racism, when information flows are misaligned or misinterpreted, or if institutional agents are unavailable. Such conflicts can negatively shape students’ college participation within a *stratified feasibility landscape.*

The implementation of institutional structures can operate as a buffer against the dependency on individual institutional agents. This was observed when the CCB program was well-established and articulated the cohort structure and/or course requirements/registration processes clearly to students. P7 (Asian; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> I personally haven't needed to visit an academic counselor. I think because the program has already tailored a lot of the courses out for us already. I think we have... a good understanding of what classes we needed to take in order to fulfill the program... I guess someone... had already done [our education plan] for us because we're in the program.

Despite some participants' challenges with their respective college's academic counselor, CCB participants were able to navigate this because of the broader structure that was already established and institutionalized. While this was not ideal, this speaks to the mechanisms of how different types of institutional conditions–agents and structures–interplay to shape students' college participation. Some CCB participants were cognizant and understanding of the potential limited institutional capacities and resources of their respective CCB programs, and made connections as to how these broader conditions impacted their overall CCB experience. Prior scholarship has raised concerns on how CCB programs add additional strain on the labor of institutional agents, particularly faculty (Martinez, 2018, 2019; Martinez & Elue, 2020; Martinez et al., 2024). The dependency on a handful of institutional agents can generate institutional precarity and constrain college participation for students. There are multiple ways to interpret this: one being that CCB programs can have limits to enhancing participation when their programs are limited by their capacities and resources to hire and provide professional learning/development and personnel. The other highlights the value of creating institutional structures to help buffer the reliance on individual agents and the value of providing multiple methods for students to access the information, learning experiences, resources, and support needed to navigate, negotiate, sustain, and benefit from college participation.

4.2.3 Qualitative Finding 3: From Serendipitous Socio-Academic Integrative Moments to More Intentional Socio-Academic Integrative Institutional Structures

Aligned with previous scholarship on how socio-academic integrative moments can enhance students' community college experiences, particularly among historically minoritized communities in two-year college settings (Deil-Amen, 2011), CCB programs enhance the feasibility of college participation through more intentional socio-academic institutional structures. As *trajectoy-responsive* policies, the programmatic conditions of CCB programs were aligned with the mechanisms and vehicles in which socio-academic integrative moments are actualized. CCB programs may vary in the degree to which their institutional arrangements and designs established an environment where such experiences or moments were less reliant on serendipity. The sustained academic community of CCB programs were embedded structures, shaping the *stratified feasibility landscape* to enable college participation. Some programs have more rigid cohort structures than others, particularly in the extent that all students took all the same courses at the same time, but all five CCB programs had smaller classroom sizes and continuity in students and institutional agents. Through this structure, CCB participants had continuous, consistent, collaborative, and caring faculty interactions and peer networks that broadened students' experiences in and out of the classroom and granted them access to social and career capital (D'Amico et al., 2019; Deil-Amen, 2011). Through aligned college and career curricular programming, students integrated and made an impact within their communities. These programmatic, social, and relational conditions are differentially patterned, especially by gender and race, revealing the situated contexts in which college and career participation occurs throughout the college life cycle.

4.2.3.1 "You Didn't Have to Learn a Whole New Teacher": How CCB Faculty Facilitate Socio-Academic Integrative Moments

Through a cohort or semi-cohort structure, the academic community of CCB programs becomes a mechanism in which socio-academic integrative moments between CCB participants and faculty are made more intentional. When operating as proactive institutional agents, faculty have the ability to enhance college participation for CCB students (Bensimon, 2005; Bensimon, 2007; Ching, 2023; Deil-Amen, 2011; Rosenbaum et al., 2007). Because of the academic community of all five CCB programs, participants talked about the consistent, mere exposure of faculty. Within their respective cohort-based structures, students often had multiple classes with the same faculty member. As P7 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares, "I think she teaches, like, six classes... She's the worker bee. She just is dead set on making this degree happen."

This continuity with faculty conferred multiple benefits for students' learning experiences. This was experienced among both CCB internal and external transfers. Not surprisingly, CCB internal transfers, those who had already completed lower-division coursework and transitioned to upper-division courses at the same institution, accessed the benefits of this continuity. As P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student) shares, "You didn't have to learn like a whole new teacher every semester..." By having continuity with faculty, this provided some stability and consistency, which students often valued. This continuity was also valuable for students' academic and career trajectories. P11 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> It was crazy to see how knowledgeable a professor can be, not only in just one subject, but for all four of them and even more... [It] definitely shaped me to be a better student because she's able to see you from the beginning when you don't really know what you're doing. You're just kind of like, 'Okay, I'm studying

> this book and hopefully, it makes sense later.' And then you see her again and... 'So, let's apply it now into clinical standing...' She's seeing you build from the student that you were all the way to the end. I think it helps so much because they're able to target you in the sense that they know who you are. They know the things that you might struggle with, the things that you might need help with, the things that you excel in. So, I think that is like–it's amazing, to have that opportunity to have the same teacher who's watching you grow in this field that you're trying to manage is very helpful.

By having an academic community with smaller classroom sizes and continuity in positive faculty interactions, CCB participants had an aligned college/career curriculum (D'Amico, 2016). CCB participants gained career capital, learning valuable skills that would be valuable in the labor market. The smaller classroom size facilitated college participation in the CCB program because it allowed CCB participants to interact with one other and their faculty members. At C3-Healthcare, their WBL and internship requirement involved clinical hours. Some of these sessions were intentionally structured as five students to one faculty member due to official regulations. CCB participants at C3-Healthcare talked about the benefits of this smaller student-to-faculty ratio. P11, who also recently graduated, continues sharing:

> I feel personally, after now just going through it, I feel like if it was anything bigger than that, it would be really hard to be the student that I am today... Your skills [are] the biggest thing that comes into the program... You're basically taught by a licensed [healthcare professional] how to use this [instrument]. So, like the way that you hold it... You're basically practicing in a simulated lab... It's kind of hard to see anything bigger than that. Because one professor moving around for five students to see that individual holding that instrument or how do you probe or how do you do this. [If it was more students, it] would have been like, 'When is it my turn?'

At C5-Healthcare, P26 (Asian; woman; 25-39 years-old; first-generation college student; caretaker) shares her experiences with the faculty in the program:

> For bachelor's degree, it is more welcoming... compared to if you go to the "regular" college (quotations added by researcher). The reason is you have the three-year relationship with the professor because they teach you from associate's degree and then you see them throughout the two years in the bachelor's degree, so you get a good relationship with the professor... Because you spend that much amount with them... The two main professors... we have at least four or five classes with them throughout... and then they're the ones who organizes you for the internship... which is good because they already know your personality. They know you... within two or three years already.

Aligned with prior scholarship on the importance of validation (Rendón, 1994), racial microaffirmations (Solórzano et al., 2019), and the differential experiences that students from historically minoritized communities experience (Hurtado & Carter, 1997), Students of Color, and specifically, Women of Color, benefited greatly from faculty members who validated students' educational and career aspirations and were compassionate about students' racialized experiences. Given the structure of the CCB programs–some students had exposure to faculty in both lower- and upper-division coursework. This became a valuable means in which faculty could affirm and encourage students to pursue their respective bachelor's degrees. P27 (Latina; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaker) was first enrolled at C5-Healthcare to pursue her associate's degree. She discussed a time when she was about to finish her associate's degree. Initially upon entering C5, she planned on only completing the associate's degree, but had wondered whether she should continue on to the bachelor's degree along the way. She shares:

> And I looked at her and I said, 'I don't think I can do it.' And she looked at me and she said, 'You can do it.'... Coming from a professor that I respected and not

> only a professor that I respected, but... a Mexican American female professor... It meant so much more.

Such socio-academic integrative faculty interactions and experiences in which students' sense of belonging, connection, and competence was reinforced, were particularly valuable in the context of students' prior lived and educational experiences (Deil-Amen, 2011). P27 previously enrolled in community colleges when she was younger. And while she initially planned to transfer and obtain a bachelor's degree, she stopped participating in college early in her twenties to work and support her household. P29 (Black; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker) also shares the importance of having representation of institutional agents in their academic community. She shares, "Having these strong Black women professors in this program, seeing the difference that they make in the lives of their patients. It's huge."

The majority of CCB participants (22 of 30; 73%) shared the benefits of the smaller, more intimate community college and/or CCB experience. P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student) discussed the benefits of the academic community and talked about her thought process in continuing from lower-division to upper-division coursework. She shares:

> I'm not a kind of person who sticks with a lot of stuff. So, when I found that I was very comfortable here, everything was working well, I'm learning, I'm growing, I'm doing all of these things. And they kind of just worked with my personality type, my mindset, and with my disability as well.

CCB participants shared the benefits of academic community within the CCB programs, as well as the community college context, in relation to their past experiences in the four-year sector. P19 (Indigenous; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker), who had previously attended three public, large universities, shares:

> ... I knew my experiences at universities. They sucked. They royally sucked. [university name redacted #1] sucked. [university name redacted #2] sucked. [university name redacted #3]... I can't really say... because I was a COVID-baby there... But [the community colleges] always took care of me... [community College name redacted #1], [community College name redacted #2], [community College name redacted #3], [community College name redacted #4]. They all took very, very good care of me. I've always had the greatest support and community from all of them... I was always the older person in these classes. So, my professors became friends later.

P16 (white; woman; 25-39 years-old) previously navigated the community college vertical transfer process and completed her bachelor's degree at a large public university. She compares that experience to her cohort experience at C4-Healthcare:

> I liked it because like [large public university name redacted], I would go to a lecture class and there were 400 students in the class and it didn't feel personalized... The teachers had no idea who any of us were because there were so many of us versus [C4-Healthcare]. It's like the teachers knew you because you worked with them for two years, you know? And, so you just become close to them and it was more, it just felt more personalized, which I really liked.

P29 (Black; woman; 40+ years-old; financial aid recipient; first-generation college student/caretaker) provides an additional counter case on the benefits of the community college context. After high school, P29 directly enrolled at a large public university. However, after negative experiences with the university community–ranging from large, depersonalized class sizes to racist interactions–they exited the university after a year. It was not until years later, when she returned to a community college–different from her CCB program–to complete her lower-division coursework, that she had a more positive college experience. She shares:

> I went from being in a class with 32 kids to going to lecture halls with hundreds of people... and then having to go to your sections, which are taught by graduate students, right? That is a brutal system. If you are not prepared for it, whereas at a community college, you may only have 35 students and you have that... personal attention... from the actual professor themselves.

While P29 shares her positive experiences were at a different community college, a similar sentiment about classroom sizes was applicable to her experience in the CCB program. She continued to share about her interaction with another faculty member in her CCB program. Although she has since graduated from C5-Healthcare's CCB program, the faculty member is still in contact with her and involved in her professional learning. She shares, "She, to this day, will send me articles." Because of the cohort structure, faculty also have more exposure to students and benefit from smaller class sizes, where they can foster relationships with students. This seemed to be very salient and valued among adult learners who appreciated the more flat hierarchy between students and faculty.

CCB participants also benefit from proactive faculty from a socio-emotional perspective as well. At C4-Healthcare, CCB participants consistently talked about how one of the institutional agents not only provided academic and career support by supporting students' educational planning and placement into employment opportunities, but that she also proactively checked in with students, centering their well-being. Because of the continuity she had with students, she was able to discern shifts in students' socio-emotional well-being. P12 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student), a younger student, shares about her experience with one of the CCB faculty and program leads who she described as "motherly" and "welcoming" during her interview:

> Because they were not only professors. They were very close to us... Like, even one time when I was sick, my professor, she was, like, 'You don't look the same today. Like, you're sick. I can tell it. I can see your spirits are low today.' They

> were very connected... [She said], 'Like, I really want you to go to the doctor.' And I'm like, 'I know I need to, but I want to go to clinic this day.' And she was, like, 'No. If you need a clinic day off to go to the doctor, you need to go.' And she would follow up the next week and be, like, 'What happened?'... [It was] very supportive.

Given the small town, rural atmosphere at C1-Environment and C2-Environment, CCB participants often expressed positive student-faculty interactions. P7 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student), who previously attended three colleges and exited without a bachelor's degree, shares a similar experience:

> ... I just feel, like, so grateful that I transferred. And, I would consider each of them family... When my mom died, they all wrote me a letter. And they had an entire group meeting about what they should do–if they should ask me out to dinner and try and support me. And then, one of my professors actually made me a home-cooked meal out of her cute little sustainable garden that she grows everything herself, from meat to vegetables. They mill their own grain for wheat to make flour... And if I walk into a class and I don't say something to my professor, it's like, 'What's wrong with her? [because they know me]'... It's a really special experience.

As *trajectory-responsive* projects, CCB programs had institutional assets, arrangements, and designs–continuity and smaller classroom sizes–that promoted positive interactions between students and institutional agents. Such in-class interactions are important to facilitating socio-academic integrative moments (Deil-Amen, 2011) and in CCB programs, these institutional conditions were intentionally arranged in a way where such moments were actualized with greater frequency. At the same time, such moments are bounded by broader institutional and structural conditions. The reliance on a handful institutional agents could have potential downsides. From a labor perspective, such experiences speak to the structural conditions of resources and capacities relating to local, state, and federal investments in CCB programs, and how faculty become overextended in these roles as proactive institutional agents (Martinez, 2018, 2019; Martinez & Elue, 2020; Martinez et al., 2024). Given the constraints in human capacity and resources, there were a handful of institutional agents overseeing the CCB programs and students were relegated to having to navigate any challenges under these constraints, particularly as they related to course availability and success and education planning. As we think about inequities on whose faculty labor is most required in this bounded environment, it should be noted that most of the specific faculty members highlighted by CCB participants were women. Additionally, it should be noted that CCB participants also expressed instances where there were institutional agents that they had negative experiences with and that this required students to expend capacity and resources to enable college participation. These interpersonal exchanges are inherently subjected to social dynamics that reinforce existing social hierarchies, as they relate to the intersections of gender, race, age, and class.

4.2.3.2 "I Knew the Lay of the Land": How Socio-Academic Integrated Peer Communities Enhance College Participation

The socio-academic institutional structure embedded in CCB programs via cohort-based programmatic conditions facilitated positive interactions among CCB participants. Within this academic community, classroom sizes were small, no bigger than 35 students across all five programs. Some of this was by intentional or default design of the institution and some of it was out of availability and interest of the CCB program and their respective courses. Through the cohort or semi-cohort structure, students reinforced the benefits of academic communities in facilitating college participation and buffering against college departure (Braxton et al., 2004), since CCB participants had consistent and continuous positive exposure to other students in the program (Deil-Amen, 2011).

While the cohort or semi-cohort structure fostered an environment where such peer relationships could be fostered, CCB participants also spoke about the specific formal and informal ways that students and institutional agents facilitated greater sense of belonging and community within this structure (Deil-Amen, 2011). Students discussed about the ample formal academic activities that they had with other students, particularly through group projects and experiential learning experiences. P24 (white; man; 25-39 years-old; first-generation college student) shared that this was a unique feature because of the cohort structure of the CCB program and not something that he had experienced previously at the same community college while taking associate's degree-level courses. He shares:

> So, you got to work with all these different people during the associate's level. Even if we did that, there were more people in the associate's. So, you didn't get to have the same amount of cohesion... [but] that really happened during the bachelor's because there were like 20-something of us. So, over two years, you get to know those people pretty well.

CCB participants also organized informal academic activities, where students would form smaller groups to study and/or connect about their experiences in the CCB program. The longevity of such relationships were also evidenced among CCB graduates. CCB graduates (7 of the 18; 39%) discussed that even after graduating, they were still in contact with at least one of their peers. P1 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> Even if you might not be friends with everyone in your class, pretty much everyone found at least one or two other friends that they become close with through that program. And I even see it in many of the past grads, and I feel it myself–that you find people you're really close to that you're probably going to be friends with and be part of their life for the rest of your life.

CCB participants in some cohort years at C3-Industrial, C4-Healthcare, and C5-Healthcare also talked about how they leveraged technology to foster student collaboration and relationships. Within these three CCB programs, students created a shared Discord–a social and digital communication platform where students can text, audio, and/or video message other students. This technology platform is composed of users in a broader virtual community (e.g., people associated within a given CCB program), which can be broken down to topic-specific chat rooms and channels (e.g., general discussion, classes). In alignment with Deil-Amen's (2011) description of how interactions in which social capital is exchanged can be a mechanism for students to strategize their academic success and incorporate into the college community, Discord became a place for students in these cohorts to ask questions, connect with students, and get support on various aspects relevant to the CCB program (e.g., course content, socio-emotional support, and navigating college processes). As P11 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> The breakdown of the Discord [app] for us is to help if students [were] absent. If students need more help with homework, we kind of have like, our community class. If someone needed, let's say, like access to some [internship] hours that were given, like community hours and you needed to go do, we would upload some places where you can get that done. If someone needed help with anatomy, like, 'Oh, I have a question on this. Like, can someone help me?' We would upload on there. So, it's kind of like a side chat for our cohort to kind of like communicate back and forth... So, that was like a good place to have like unity over and have communication with each other...

The ways that the smaller classroom size enabled college participation were also demonstrated in the context of students' previous educational experiences. P6 (white; woman; 18-24 years-old; financial aid recipient), who previously attended and exited out of a large public university, shared:

> I had a class of five in my final semester, which was great... I became really close with my graduating class of 12 in my bachelor's degree... I loved every second of it. When I was researching... a big priority was smaller classes... and being able to make a connection because at [large public university], it was hard for me to make those personal connections... I felt totally disconnected and isolated into my own world.

Due to the specialized nature of CCB programs, students also connected with one another through shared interests related to their program of study. This aligns with Deil-Amen's (2011) description on how interactions with "similar" students are vehicles for socio-academic integrative moments. P2 (white; woman; 25-39 years-old; caretaker) shares her experience in her CCB program compared to high school:

> Yeah, it was a big difference [from CCB program to high school], actually, because we all enjoyed [program of study topic area]. Nobody could shut up. Everybody was talking about [program of study topic] all of the time.

P18 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student) also shares a similar sentiment while naming the everyday realities of being in close quarters with their peers:

> It's kind of like any classroom you've ever been in, but amplified... you form very fast friendships just because you see each other all the time, but then kind of like, there is the other side of that where it's like, 'Oh my god, I see you all the time'–so the little things that you do get way more annoying, way faster... I would say I'm friends with everybody... We're all very similar because we all want to be [healthcare professionals], so you already have this thing that is a connection between you and also like people who are not in [healthcare program] have no idea... I really truly struggled to have conversations with people like

> over winter break... All I can do is talk to you about [healthcare topic]. That's all I got so in that kind of way, I almost find it, at this time in my life, like more fulfilling to talk to those people than [people outside of the healthcare CCB program].

CCB programs cultivated a shared sense of belonging, connection, and competence because participants were around peers who shared similar academic and career interests and goals as them (Deil-Amen, 2011). Such experiences enhanced college participation for students because these peer interactions would provided a socio-emotional and -academic support structure for students.

The positive impact of the peer continuity of the college experience within CCB programs is also demonstrated among students who completed their lower-division requirements at the same community college as their CCB program. P5 (Asian; woman; 25-39 years-old; financial aid recipient; first-generation college student) demonstrates this dynamic as a person who had applied to vertically transfer to two other universities after they completed lower-division coursework. She shares her thought process in applying to do a vertical transfer and why she ultimately decided to stay and matriculate into the upper-division courses at her CCB college:

> But, it's kind of like you're starting all over from scratch again. And so, I think staying was the best option and route to go. Because, again, I didn't have to start over. I knew the lay of the land. Like, kind of knew already what I was getting into [by] staying... So, I already, we already all loved it. So, it was just kind of, like, 'Why would we change something we already love out here?' I think applying to [public university name redacted #1] and [public university name redacted #2], it was mainly to keep my options open. Not necessarily be, 'I want to leave.'

There was also an age-based dynamic that was observed among CCB participants. Participants often talked about how older students provided advice and mentorship to younger students, given their professional experiences in the field and/or in navigating educational systems. P30 (Asian; woman; 18-24 years-old; financial aid recipient; first-generation college student; caretaker), a younger student, shares about an older student in her classes that previously worked in the field: "I would ask her certain things, like 'How is it working [in healthcare]?'" In our conversation, P30 shared how these interactions provided her insights on how to navigate professional settings and office politics that were specific to healthcare. This exchange provided P30 with career capital, providing her an informational source of support (know whom) and valuable knowledge (know how) (D'Amico et al., 2019). Similarly, P21 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) shares:

> ... As someone with no experience in the [healthcare] field, that's kind of changed... my experience in the program... A lot of the people that are in my cohort kind of have [healthcare] experience... where they have been able to kind of see what a day-to-day life might look like... so, I think it's made my experience–it's made me more nervous, but also kind of made me feel a bit better knowing that there's people around me–that if I'm confused about something, I can ask someone and they'll know...

On the other side of the age spectrum, P19 (Indigenous; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker), an adult learner affirms this dynamic, sharing:

> I think a lot of students look at me more as a motherly person because I'm older and they come to me with so many different styles of questions or like, 'How do you know this?' or 'How do you know already?'

During her interview, P19 shared about how these relationships are reciprocated–that within their academic community, P19 would share their life experiences in and out of college, and that students would provide her with support, such as emotional or technological support. She describes their relationship fondly, stating, "We are our cohort. We're a community. We all get along with each other..." P19 shared about her cohort's role when a member of their family passed. She shares:

> I was deciding whether or not I was going to go through the program because it was just something that... was unexpected–something I never prepared for or [had to] cope for in my life. And, they showed me so much support during that time.

These positive peer dynamics speak to the ways in which the structured academic community was a valuable feature in the CCB programs. As *trajectory-responsive* policy, CCB programs' cohort-based programming allowed students to move through CCB programs together, providing consistent socio-academic and -emotional support. While there were few older male students in the interview sample, it should be noted that these dynamics were notably gendered, with older, female CCB participants exercising the additional labor of supporting younger students. While this may be a socio-academic integrative moment in itself, this also raises some questions relating to time navigation and equity, and whose labor is being disproportionately impacted (Bettencourt et al., 2025).

Such cohorts operated within broader structural conditions as programs of study mapped on to similar gender and racial patterns of their respective domains. The CCB programs–aligned with fields of studies or industries–were racialized and gendered. C4-Healthcare was predominantly composed of women of color; C3-Industrial was predominantly composed of men of color. The homogeneous gender and racial dynamics were less salient with C5-Healthcare's program. C1-Environment and C2-Environment were predominantly white and younger. Students only operated within these homogeneous environments and there are obvious limitations in how they could shape the demographic composition of their respective programs. These dynamics were salient parts of CCB participants' experiences, as many participants in C4-Healthcare often used the phrase "the girls" when discussing their cohort. Participants in C1 and C2's CCB program spoke about the gendered nature of their academic community and industry, with men gaining privileges in how they were spoken to in the program as well as in employment opportunities upon graduation. P5 (Asian; woman; 25-39 years-old; financial aid recipient; first-generation college student) shares:

> I think in the industry, it's definitely more male-dominated. So, I know it's sometimes hard to get jobs because some jobs... prefer a guy. So, it's hard... because guys have a more diverse selection of [jobs and responsibilities]. It's changing slowly, which I'm, like, 'We're in 2026'...

Such patterns speak to the ways that–while institutional conditions within CCB programs enhanced socio-academic integrative moments between students–students were still operating within broader social forces and conditions that bound the experiences of the feasibility landscape of their college and career participation.

As *trajectory-responsive* policy projects, CCB programs enable college participation within a *stratified feasibility landscape* by leveraging the institutional arrangements, assets, and designs of community colleges and CCB programs. Relative to the traditional four-year sector, community colleges tend to have smaller classroom sizes and this makes it easier for students to form relationships with one another. This is further amplified in CCB programs, where students have access to a more consistent academic community via cohort-based programmatic structures. These programmatic conditions facilitate socio-academic integrative moments in impactful ways, since CCB participants shared similar academic and career goals (Deil-Amen, 2011). CCB participants consistently discussed the benefits of these peer relationships in facilitating social and career capital, as well as emotional support (D'Amico et al., 2019; Deil-Amen, 2011). These social dynamics were patterned and operated within broader structures that shape occupational pipelines and patterns in different industries. These patterns shaped the micro-dynamics of each cohort. In general, CCB participants got along with one another and their peer relationships enabled college participation.

4.2.3.3 "You Just Taste a Whole Different World": From Socio-Academic Integrative Moments to Community Integration and Impact

Building upon Deil-Amen (2011), CCB programs intentionally structure socio-academic integrative moments in ways that expands notions of college access and retention. Through curricular college/career alignment and considerations to labor market conditions, CCB programs shape participation in college, career, and communities. One of the most defining features of CCB programs, particularly in California, is its stated commitment to supporting the unmet local/regional economic and workforce development goals (Bragg, 2025; Floyd et al., 2019; Fulton, 2015; Vo & Rios-Aguilar, 2024). Prior scholarship has also elevated the role of college/career curricular alignment in enhancing college retention and success (D'Amico, 2016; D'Amico et al., 2019; Reyes et al., 2019), particularly for adult learners (Bahr et al., 2021; Knowles et al., 2015). By shaping and being shaped by micro- and macro-economic conditions, CCB programs support college/career identities and labor market alignment–within broader economic/capitalistic systems–and were related to students' sense of community integration and impact.

CCB programs have a positive impact on CCB participants' social and economic mobility. A recent statewide survey indicated that 88% of CCB graduates in California are employed within three months of graduating (Vo et al., 2026). P4 (white; woman; 25-39 years-old; financial aid recipient) shares the impact of CCB programs:

> I can honestly say it completely changed the trajectory of my life up until now. Pretty much every single job I've had since graduating has either preferred or required a bachelor's degree... I worked for [employer name] for the last three and a half years. And now I'm starting a job with [another employer name]. And I'm back home in [city name and state redacted], which is where my mom moved

> when I was in my early teens. It is double my salary that I was making with the [first government job]. So, I can honestly say that going to [C1-Environment] and acquiring this bachelor's degree with no debt has completely benefited me.

P4 also had perspectives on other graduates as well and their trajectories: "A lot of students that go to [C1-Environment]... a lot of times, they will either go back to their [home] or start managing [at another location]." Earlier in this paper, it was mentioned that CCB programs in small rural towns, like C1-Environment and C2-Environment, may attract both locals who grew up in the community and students who relocated from similar small rural towns to obtain more aligned college opportunities and/or were more comfortable in smaller educational settings. P4's account of her peers–years after graduating–highlights the range of trajectories of students after they graduate. CCB programs can impact students locally in the short-term by expanding college participation to local communities, as well as impacting communities in the long-term, especially if students return to their communities.

As *trajectory-responsive* policies, CCB programs were geographically situated in ways that could impact economic and community outcomes. This was very salient at C1-Environment and C2-Environment, which were both situated in small rural towns where economic and community opportunities were shaped by their respective colleges/programs, and vice versa. CCB participants in C1-Environment and C2-Environment discussed how there was one company that was a primary economic engine in the community. P2 (white; woman; 25-39 years-old; caretaker), who grew up in the town, shares: "The day the [employer name redacted] dies, [this town] dies." Such descriptions demonstrate how educational and economic opportunities are intrinsically integrated and tied within the community ecosystems.

Such dynamics were also present in C4-Healthcare's program, which is situated in a large metropolitan area. Here, as part of WBL and internship requirements for C4-Healthcare's program, CCB participants did clinical hours throughout the communities and engaged with people from diverse social contexts, positions, and trajectories. P11 (Latina; woman; 18-24 years-old; financial aid recipient; first-generation college student) discusses five different clinical locations she participated in and shares the impact of this experience:

> There's patients that have a lot of medical conditions. So, I think the biggest thing for me with [C4-Healthcare] is having that access to these outside clinics because of the trust and the representation that the school brings itself, that I'm able to see and apply these clinical things that I learned in the book. Like, I read about that, but now I'm seeing it... [In class], you learn all these medications and you're like, 'That's a lot of medications. Like, what do I do with that?', but then, if you get this patient where they have like 16 medications, you have to actually understand [what you learned and what to do now]... I think that helped me bring that sensation that I've always felt [when I was] younger, like wanting to help people... I feel more confident leaving the school and saying, like, 'I can do it.'

By establishing these partnerships with local organizations, C4-Healthcare's implementation did not just enhance college access and retention, but had individual- and community-level impacts. The programmatic conditions that shape college participation in C4-Healthcare incorporated career, labor market, and community alignment and impact.

CCB programs were not only *trajectory-responsive* policies, but their programmatic conditions can change students' own trajectories. P7 (white; woman; 18-24 years-old; financial aid recipient; first-generation college student) who was "pretty die-hard" in a certain topical area within her C1-Environment program had a formative experience, where she learned about another way she could save valuable environmental resources and make a social impact. She shares about how her CCB program provided such an experience:

> I'd taken a [class] and it gave me a really good perspective. And I was like, 'Wow, this is really cool.'... And then I worked for [local employer]. And that just changed it all. Like, getting to do that work and watching my hands change

> the way the [environment] moved. It's just such an incredible experience to watch from start to finish. And I feel like you just learn, like, so much more about how important everything is... And I feel like, learning about this job not only made me passionate about the job, but it changed my entire perspective on life. And the way I explain it–which may be overdramatic–but it felt like up until that moment, my whole life, it was like eating a Tootsie Roll lollipop, licking it, and they just kind of taste the same, right?... And then randomly one day, you try a Warhead or something extreme, and you just taste a whole different world. That's what it was like. Just like, 'Holy cow. My eyes are open'. I know what I want now.

Through the college/career-aligned curricular programming of her CCB program, P7 gained valuable career capital (D'Amico et al., 2019). She gained valuable insight that shaped her career aspirations (know why) and experiences that will be valuable in the labor market and community (know how).

For P8 (white; man; 18-24 years-old; financial aid recipient) also got to participate in curricular activities that were aligned with his career goals. Within C2-Environment, he, along with other CCB students, worked with faculty and shaped the environmental landscape of the local community. Such WBL and internship opportunities are valuable because they broadened participants' skills and knowledge about their topic and community. P8 shares how their curricular experiences taught them not only the technical know-how to do a given manual routine activity in their industry, but they understood the implications from an "ecological perspective" and gained the career capital of understanding the broader implications of their professional decisions (D'Amico et al., 2019). He shares a hypothetical scenario that if he were asked to make an environmental plan that he would be able to do so in a way that would make the environment "more sustainable and healthy." He sees himself as someone who could take a leadership role in his industry and is appreciative of his CCB program. He shares: "I think that's what makes the degree stand out is... [that's more] like [skills for a] leadership management position." Such perspectives demonstrate how CCB programs and the students in them not only participate in college, but become participants and leaders in the broader community on critical matters such as the environment.

P6 (white; woman; 18-24 years-old; financial aid recipient) is a CCB graduate who initially left to attend a large public university, before returning to attend C2-Environment and the small rural towns where she was raised. She shared how important it was for her to return and support her community. During the summer before she relocated for college initially, a natural disaster struck her home county. After one year, P6 decided to return home and pursue her CCB degree at C2-Environment. Since graduating, she now works in her community as an educator. She is pursuing her passion and getting further credentials to improve environmental education in her community. She understands that this is "vital to our environment and it's a big part of everyone's lives here. We have six generations of farmers and ranchers in the area, so it's a big part of who we are as a community."

All CCB participants described career-related goals as part of their reasons to enroll in their respective CCB programs. During interviews, 14 of the 30 (47%) participants explicitly discussed how engagement with curricular content shaped and broadened their perspectives on different career avenues and/or ways to impact their community upon graduation. P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student), discussed how her curricular experiences at C5-Healthcare shaped the employment opportunities and positions she ultimately became interested in pursuing. She shares how she ultimately decided on what she wanted to pursue after she graduated:

> It was just like a culmination, like all those things [I enjoy]... And it was just really exciting work, but also the idea of helping people in a way–not everybody is cut out to be a nurse or cut out to be a doctor or have that hands-on experience with improving or helping lives. Not everybody can be a social worker, you know what I mean? Or a therapist. But, having that little part in someone's health, knowing that I'm doing my part in saving the world too. It's just really exciting

> to me, you know?

Since graduating, P22 has worked at a predominantly women-led healthcare organization, aligning with her preferences and values. This piece of career identity was a salient component among CCB participants, particularly among Women of Color who were adult learners. Like P22, P29 (Black; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker) shared similar sentiments about wanting to leverage her degree to potentially pursue a graduate degree and pay it forward by making a social impact. She shares:

> This country is the richest country in the world. There's absolutely no reason why our maternal mortality rate overall is high. When you look at other countries of the same statistical values, we do not honor women and we do not value women and girls in this country. And that needs to change. And I think one of the ways to do that is through [job in healthcare industry related to program of study]... If you don't have people who represent those communities on those teams, [that's how you get bias]. But see, these are things that I would have never thought about if I didn't have this program... So, I always think that we have an obligation.

P27 (Latina; woman; 25-39 years-old; financial aid recipient; first-generation college student; caretaker) also shares her interest in giving back to her community and pursuing graduate education. She shares:

> I've always been prone to helping people... It always comes back to that. I feel like full circle–helping lower income families, helping Mexican-American or Chicano or Chicana families–just being able to give back... and to help another family similar to mine that could be better off–give those resources. I feel like that's where I am trying to reach in my life–I'm trying to get to the point where I'm able to give back to my community.

Such experiences are amplified by institutional agents and structures. Both P22 (Black; woman; 25-39 years-old; financial aid recipient; first-generation college student) and P29 (Black; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker) are both graduates from C4-Healthcare and both share how different institutional agents, respectively, continue to stay in contact with them to support their professional progression. P29 shares about the positive impact of the curricular content and the ways that institutional agents ensured college/career alignment. She shares:

> I called it our capstone project and they helped to tie that into every single thing we had learned the previous three years, which to me was phenomenal. Just really seeing all of the connections and how–I could look back to see how these things built on each other and that it was intentional. Sometimes I felt like they could have tied it together a little bit more along the journey, so that we could see it, but at the end point, I could see it. It came out in the work because I'm still technically working on that project today... because I did it at my site at my job. And now I'm doing it for the second job I've been assigned.

While CCB programs operate within larger institutional and structural conditions that shape students' lives, from racialized and gendered health inequities, discrimination in the labor market, and climate change, CCB programs and participants have the power to shape those conditions too. CCB programs' programmatic conditions enable college participation and generate CCB graduates who can be leaders within their respective fields and communities through the conferral of skills, knowledge, and valuable credentials. This college- and career-aligned programming embedded within socio-academic integrative institutional structures expands notions of college access to college, career, and community participation (D'Amico et al., 2019; Deil-Amen, 2011). CCB participants expressed appreciation for the benefits of CCB programs and the impactful ways that they have shifted their individual trajectories and their aspirations to shift community trajectories. This was especially apparent among Women of Color CCB participants who were adult learners. Leveraging the institutional arrangements, assets, expectations, and designs of community colleges, CCB programs as *trajectory-responsive* policies are conceptualized to be aligned with local and regional economic and workforce development goals (Bragg, 2025; D'Amico, 2016; Floyd et al., 2019; Fulton, 2015; Vo & Rios-Aguilar, 2024). In its best form, through programmatic conditions where such alignment is actualized, college participation in CCB programs shapes and is shaped by not only economic conditions, but also the conditions related to the programs of study–from environmental to health to social conditions of our society.

CHAPTER 5

Discussion and Conclusion

This paper explores the adoption of community college bachelor's degree programs and their implications on access, success, and equity. Using a multi-method quantitative and qualitative approach, I focus on two states' CCB programs–Washington and California, respectively. These states play a vital role that these two states play in the ecosystem of CCB programs, community colleges, and the U.S. higher education system broadly. Using an administrative, longitudinal statewide dataset from Washington (n = 13,074), I generate estimates on the CCB completion differentials in labor market outcomes (as defined by total annual earnings, hourly wage rates, and UI employment rates), exploring the labor market mechanisms and trajectories, as well as heterogeneity of these estimates across various fields of study (CIP2), gender, racial/ethnic, and age groups. Leveraging semi-structured interviews with California CCB students who are currently enrolled and/or have graduated (n = 30), I explore the extent to which and how CCB programs, as *trajectory-responsive* policy projects, expand educational access and opportunities meaningfully, and what CCB programs' institutional arrangements, assets, assumptions, and designs can reveal about how college participation can be expanded within the broader higher education landscape. Combined, this multi-method analytic approach rigorously and comprehensively examines the impact related to CCB programs throughout the college life cycle and the extent that they are positive–under what conditions and contexts and for whom.

5.0.1 What Does the Quantitative Analysis Reveal?

Building on prior scholarship of the labor market returns to postsecondary education (Acton et al., 2025; Belfield & Bailey, 2011, 2017; Meza & Love, 2023; Meza & Bragg, 2022; Stevens et al., 2019), community colleges, and CCB programs, the multi-analytic approach rigorously examines the relationship between CCB completion and labor market outcomes/trajectories. By leveraging multiple analytic strategies–OLS with HC2 robust SEs, stabilized inverse probability weighting with doubly robust covariate adjustment, Lin (2013) regression, and the OVB framework for sensitivity analysis (Cinelli & Hazlett, 2025)–eight model specifications, pooled and stratified analysis by fields of study, gender, race/ethnicity, and age groups, and 33 variations of labor market outcome variables, this paper rigorously examines whether the implementation of CCB programs aligns with their purported goals of college, career, and economic/workforce development (Bragg, 2025, Community College Baccalaureate Association and Bragg & Associates, 2026). These estimates were robust across three analytic strategies (OLS [HC2], SIPW, and Lin) for all 33 versions of the outcome variables and eight model specifications. Since the three analytic strategies could not fully account for self-selection and unobserved confounders–like in many education research settings–the OVB framework for sensitivity analysis was leveraged (Cinelli et al., 2024; Cinelli & Hazlett, 2025; Vo, in press). Unobserved confounders would need to be at least five times as strong than any observed confounder utilized in the model specifications to render the observed statistically significant results to null; results relating to hourly wage rate differentials were the most robust to potential unobserved confounding. For interpretation, a visual was created to summarize the primary pooled and stratified analysis from the OLS (HC2) model (see Appendix: Figure 5).

Overall, the CCB completion differentials in labor market outcomes are remarkably robust across the triangulated pooled specification analysis (see Tables 5-6). CCB graduates earned 24.6% more in conditional log-transformed total annual earnings (approximately $11,402 more) than non-graduates three years after matriculating and this grows to 28.8%

($14,036) by year five. The primary pooled analysis of labor market trajectories in year three, four, and five after CCB matriculation suggests that the CCB completion differential in annual earnings operates through two complementary mechanisms: hourly wage rates and UI employment. CCB graduates, relative to non-graduates, earned 16.6% to 19.1% higher hourly wages and were 8.2 to 11.7 percentage points more likely to be UI employed; these completion differentials also grew over time. These results were consistently positive and statistically significant. From a human capital (Becker, 1964) and opportunity costs perspective (Breen & Goldthorpe, 1997; Stuart et al., 2014), the CCB completion differentials in labor market outcomes in the pooled results would suggest that lower tuition costs of CCB programs relative to other baccalaureate-degree pathways (Meza & Pawlicki, 2025), combined with the observed positive labor market outcomes, make it a viable investment and pathway towards sustained and growing socioeconomic mobility. Assuming that CCB students matriculate and graduate roughly in two years, the positive and statistically significant year-three annual earnings and hourly wage rates suggest the immediate signaling value of CCB credentials to employers (Brown, 2001; Collins, 1979; Spence, 1973; Spence, 1974). The sustained labor market outcomes through year-five after entry, particularly with growing UI employment, are consistent with perspectives of the labor market advantages of bachelor's degree attainment over time (Arrow, 1973; Brown, 2001; Collins, 1979). However, these pooled results cannot discern the many potential mechanisms of labor market returns to postsecondary education (Bills, 2003), and these results cannot speak to the extent these advantages are primarily the result of the accumulation of relevant experiences, knowledge, and skills (human or cultural capital), employer preferences to bachelor's degrees (screening), and/or occupational requirements relating to bachelor's degrees (credentialism).

The stratified analysis explores the potential heterogeneity in CCB completion differentials in labor market outcomes by fields of study (CIP2), gender, race/ethnicity, and age groups. Consistent with prior scholarship on programs of study, fields of study, and majors, fields of study shape and are shaped by stratification in higher education (Altonji &

Zimmerman, 2018; Baker & Orona, 2020; Bobbitt-Zeher, 2007; Carnevale et al., 2022a, 2022b; Charles & Bradley, 2002; Charles & Bradley, 2009; Morris et al., 2025). Among the four largest CCB programs by CIP2, the largest and most robust CCB completion differentials were in Health Professions (see Table 7 and Appendix: Tables 19-20), where CCB graduates, relative to non-graduates, earned 63.6% more in conditional log-transformed annual earnings in three years after matriculating (approximately $30,501) and 44.0% more in log-transformed hourly wage rates (approximately $15.19). The positive differentials in healthcare are consistent with prior scholarship on community college labor market returns in career technical education, certificates, associate's degrees, and CCB degrees (Acton et al., 2025; Dadgar & Trimble, 2015; Jepsen et al., 2014; Meza & Bragg, 2022; Stevens et al., 2019; Xu & Trimble, 2016). The CCB completion differentials in Education were also relatively robust (e.g., 20.2% more in year-three conditional log-transformed annual earnings or $10,510 more), especially relative to CCB students in Business, Management, Marketing, & Related Support Services ($6,069 or 13.3% more) and Computer & Information Sciences & Support Services ($2,728 or 12.2%). Given that many higher-wage occupations in Health Professions, and in CCB programs such as nursing and dental hygiene, are occupations with clear credential and licensure requirements–as well as many higher-wage occupations within Education–the positive and robust CCB completion differentials in annual earnings and hourly wage rates for Health Professions and Education provide suggestive evidence that credentialism may be a mechanism in which CCB graduates can access and activate the completion premiums of bachelor's degree attainment.

Female and male CCB students both experienced positive and statistically significant CCB completion differentials in labor market outcomes (see Table 8 and Appendix: Table 20). Three years after matriculating into CCB programs, female CCB graduates' conditional log-transformed annual earnings were 32.8% more than non-graduates (approximately $16,605), while male CCB graduates earnings were 12.7% more than non-graduates (approximately $3,777). When comparing the CCB differentials between female CCB graduates and non-graduates vs. male CCB graduates and non-graduates, female CCB students experienced at least twice as many benefits from CCB completion (i.e, in the case with year-three annual earnings conditional on employment, this was 2.6 times as much using log-transformed ratio and 4.4 times as much using the raw amounts). Perhaps not unrelated, Health Professions was the most popular field of study among female students (see Table 3)–with 32.4% of all female CCB students having matriculated into these programs (compared to 8.9% of all male CCB students). Yet, it should be noted that the gender-stratified estimates controlled for field of study, which indicates that the CCB completion differentials experienced by women cannot be fully attributed to field of study. Overall, these gender-stratified results reveal how CCB differentials benefit both female and male CCB students, and with considerable benefits to female CCB students who graduate. Such results also elevate how CCB programs, as *trajectory-responsive* projects, can implement CCB programs in fields that can positively shape outcomes for historically minoritized groups, such as women in labor market outcomes. While CCB programs may not necessarily dismantle gendered field sorting, they may be a viable means of closing gender wage gaps in the labor market, particularly if they implement CCB programs linked to occupations that require credentials. Such results can also be interpreted in the broader gender inequities in the labor market–with women experiencing greater penalties and requiring certain credentials to activate labor market benefits in contrast to men, who may not experience such labor market penalties.

Similarly, the pooled analysis revealed generally positive and statistically significant CCB completion differentials in labor market outcomes by race/ethnicity, with limited differences in labor market outcomes across all CCB students. The lack of statistically significant differences in the pooled analysis suggests that the racial/ethnic differences in labor market outcomes are accounted for when controlled for by CCB completion status, field of study, and other observed covariates in the model specifications. Such results suggest that, across CCB matriculated students, CCB programs may not widen racial inequities when conditioning on CCB completion status (and other observed covariates). The race-stratified analysis reveals that positive and statistically significant CCB completion differentials were consistently observed across and within each racial/ethnic group (see Tables 9-10 and Appendix: Tables 21-24). With the conditional log-transformed annual earnings outcomes three years after matriculation–American Indian or Alaska Native students experienced a 94.2% increase in earnings (approximately $28,345 more), Asian students experienced a 10.8% increase in earnings ($1,002 more), Black students experienced a 13.8% ($10,723 more), Latine students experienced a 32.8% increase ($17,085 more), Multiracial students experienced a 23.0% increase ($12,663 more), Native Hawaiian or Pacific Islander students experienced a 35.8% increase ($7,427 more), and white students experienced a 26.0% increase ($11,321 more). Given smaller sample sizes, the results for American Indian or Alaska Native and Native Hawaiian or Pacific Islander CCB students should be interpreted with caution.

While all racial/ethnic groups benefited from CCB completion in labor market outcomes, there were disproportional benefits to CCB completion. In the race-stratified analysis, Latine, Multiracial, and white students experienced consistently positive CCB completion differentials across annual earnings and hourly rates. In contrast, Black students experienced statistically significant CCB completion differentials in hourly rates, but this did not proportionately translate into statistically significant differentials in total annual earnings. The race-stratified analysis reveals the extent to which and how racial equity is achieved through CCB programs. The positive and statistically significant CCB completion differentials experienced by all racial/ethnic groups–combined with the descriptively high rate of CCB completers (e.g., in the analytic sample of all CCB matriculated students, 71.4% had completed their programs within the six-year window)–elevate how CCB programs are an active lever in advancing positive educational and economic outcomes across racial groups. CCB credentials are valuable in the labor market and this is especially so for Latine students, who are able to access and activate the most consistent and strongest labor market outcomes. At the same time, there are disproportionate benefits to the CCB completion differentials observed, particularly among Black students. Given the historical and current injustices experienced by Black communities–in the labor market and beyond (Bobbitt-Zeher, 2007; Carnevale et al., 2022a, 2022b; Chelwa et al., 2022; Francis et al., 2022; Hamilton, 2022; Paul et al., 2022; Strayhorn, 2008; Wilson & Darity, n.d.)–such results speak to the limits of CCB programs and credentials to redressing labor market discrimination and racism. The CCB completion differentials in hourly wage rates, but not annual earnings, experienced by Black students provide suggestive evidence that broader structural and systemic forces are at play and continue to disproportionately impose penalties against Black communities.

Additionally, the analysis also revealed positive and statistically significant CCB completion differentials in labor market outcomes across all age groups (see Table 11 and Appendix: Tables 25-26). With the conditional log-transformed annual earnings outcomes three years after CCB matriculation–students 24 years-old or younger experienced a 29.7% increase in earnings (approximately $15,051 more), students aged 25-29 years-old experienced a 29.9% increase in earnings ($13,945 more), students aged 30-39 years-old experienced a 19.2% increase in earnings ($7,489 more), and students aged 40 years-old or older experienced an 18.0% increase in earnings ($7,999 more). When comparing within each age group, younger CCB graduates, especially those 24 years-old or younger, experienced the largest CCB completion differentials in total annual earnings and hourly wage rates. This result aligns with perspectives from human capital theory and the returns and benefits of human capital earlier in one's life course (Becker, 1964; Ben-Porath, 1967; Carnevale et al., 2022b; Mincer, 1974). Across all four age groups, UI employment rates grew from three years after CCB matriculation to five years. CCB students 40 years-old or older experienced the strongest CCB completion differentials in UI employment. For example, CCB graduates who were 40 years-old or older were 8.2 percentage points more likely to be UI employed three years after CCB entry, 11.2 pp more likely to be employed four years after entry, and 13.9 pp more likely to be employed compared to CCB non-graduates. These results suggest the sustained value of CCB completion in the labor market, whether via capital accumulation and signaling (Becker, 1964; Ben-Porath, 1967; Mincer, 1974; Spence, 1973; Spence, 1974) that is particularly beneficial for younger students or the ability to access UI employment via credentialism (Brown, 2001; Collins, 1979), particularly among older students. The consistently high completion differentials for adult learners, particularly in UI employment rates, also indicate the positive ways that CCB programs support the economic aspirations of a student population that is typically overlooked within the traditional four-year sector–adult learners (Bahr et al., 2021; Deil-Amen, 2015; Donaldson & Townsend, 2007).

The quantitative results provide empirical support on the extent that students experience positive CCB completion differentials in labor market outcomes. Overall, and among students of varying social contexts, positions, and trajectories, the benefits of CCB completion are consistently observed. Such results suggest that there are positive labor market impacts in CCB program completion. Aligned to community colleges' historical and current role as labor market responsive and college/career aligned institutions, CCB programs appear to be an effective policy lever to enact this mission (D'Amico, 2016; Jacobs & Worth, 2019; U.S. Department of Education, Office of Vocational and Adult Education, 2004). These results are also congruent with the purported vision of CCB programs to support the socioeconomic mobility and advance the economic outcomes of students, households, and communities (Community College Baccalaureate Associate, 2026, Bragg, 2025, Floyd et al., 2019, Fulton, 2015).

These results also demonstrate how CCB programs are *trajectory-responsive* policy projects. While CCB graduates generally experience positive labor market outcomes relative to CCB non-graduates, the stratified analysis revealed that the CCB completion differentials can vary considerably by field of study (CIP2), gender, race/ethnicity, and age group. The patterned ways in which CCB completion differentials in labor market outcomes were actualized–by hourly wage rate increases or UI employment status–were stratified by field of study, gender, race/ethnicity, and age. Such heterogeneous results suggest that mechanisms for labor market returns to CCB participation operate through multiple and stratified channels, such as capital accumulation, screening, signaling, and credentialism (Bills, 2003).

In some ways, CCB completion differentials disrupted labor market inequalities, particularly among Latine and female CCB students. In other ways, CCB completion differentials sustained them, particularly among Black and white CCB students. These tensions speak to how CCB programs still operate within broader structural and systemic forces and where labor market discrimination places limits on the impact of CCB credentials (Bobbitt-Zeher, 2007; Carnevale et al., 2022a, 2022b; Chelwa et al., 2022; Francis et al., 2022; Hamilton, 2022; Paul et al., 2022; Strayhorn, 2008; Wilson & Darity, n.d.). In this way, this supports the positioning of CCB programs as *trajectory-responsive* policies, buffering social stratification, immobility, inequality, and inequity for some populations, while limited in rectifying broader historical barriers and injustices in the labor market.

5.0.2 What Does the Qualitative Analysis Reveal?

This paper also reflects and represents the experiences of 30 CCB students/alumni from five California CCB programs related to environmental, healthcare, and industrial fields and workforce sectors. Broadly speaking, the racial and gender composition of the CCB programs included aligned with the racialized and gendered patterns in the respective industry, fields, and occupational/workforce sectors. The analytic sample for the qualitative inquiry also aligned with the gender, racial/ethnic, and age group composition of the entire population of CCB students at the respective CCB colleges interviewed. The CCB participants at C1-Environment and C2-Environment were predominantly white and younger. CCB participants in C3, C4, and C5 were more likely to be older. Participants at C3-Industrial were all men while students at C4-Healthcare were predominantly Women of Color. C5-Healthcare was notably more diverse in terms of racial and gender composition. From the semi-structured interviews with California CCB students–current and graduated–students' experiences with CCB programs were patterned by multiple organizing principles.

Students' social contexts, positions, and trajectories intersected to shape and be shaped by students' college participation. These social contexts, positions, and trajectories included–

but were not exclusive to–their age, caretaking responsibilities, gender, race/ethnicity, first-generation college student status, socioeconomic status, prior educational trajectories, whether they transferred into CCB programs as a student already at the community college or were at an institution prior (CCB internal transfer vs. CCB external transfer, respectively). The *stratified feasibility landscape* is a conceptual framework to frame how these lived experiences and conditions intersect with various institutional and structural conditions (administrative, economic, programmatic, social, spatial, and temporal) to enable and constrain college participation in everyday practices.

CCB participants' economic, programmatic, spatial, and temporal conditions interplay to shape CCB participation. These conditions operate simultaneously to shape college access and decision-making. Aligned with the rationale for CCB programs (Floyd et al., 2019; Fulton, 2015; Rios-Aguilar et al., 2023), CCB programs appealed to students because of their affordability, because they provided unique programs of study, and because they were physically proximal to students. As *trajectory-responsive* policies, CCB programs' institutional arrangements were simultaneously aligned with students' economic, programmatic, and spatial conditions, particularly relative to other baccalaureate-granting institutions. CCB participants' descriptions of their everyday practices provide the distinct details in how spatial and temporal conditions were actualized in different CCB programs. For the Environmental CCB programs in small rural towns, spatial attachments, experiences, identities, and imaginaries shaped college participation through college, community, and career alignment and integration. For these programs and students, the ways in which college participation shapes and is shaped by space and place become evident. CCB programs are not only defined by the conceived and perceived space of CCB programs, but the lived space and the meaning and value of being in a particular place (Gieryn, 2000; Lefebvre, 1991; Soja, 1996). Rurality went beyond just about the physical locale in which CCB programs are situated or the backdrop of their experiences. For many CCB participants, rurality was linked to students' spatial attachments, identities, and imaginaries that enabled college participation–as participants took pride in being a rural student and/or a person from a small town.

This experience is juxtaposed to CCB participants' experiences in Healthcare and Industrial CCB programs in large metropolitan areas. In these contexts, participants' everyday spatial-temporal micro-mobilities bounded college participation via commute commitments and journeying. In contrast to the physical locale of CCB programs in small rural towns, the backdrop of a large metropolitan area necessitated time capital and navigation to participate in college (Bettencourt et al., 2025; Wladis et al., 2018). In these programs, CCB participants' academic, employment, and household commitments become commute commitments that had to be calculated and negotiated. Institutional agents and structures (e.g., course scheduling, modality, and curricular activities) could enable or constrain college participation, depending on how accessible, flexible, and integrated they were to students' lives. The distinct differences between the social contexts, positions, and trajectories of CCB participants in small rural towns (younger and white) vs. large metropolitan areas (older, more likely to be caretakers, and be identified as Asian, Black, Indigenous, or Latine) suggest the ways in which gendered and racialized commutes, journeying, and mobilities can shape college participation.

Through their institutional arrangements, assets, assumptions, and designs, CCB programs enabled and contrained access through the intersections of how administrative and temporal conditions were experienced by CCB participants. Through their college application process, CCB programs minimized compliance, learning, and psychological costs related to administrative burdens (Herd & Moynihan, 2018; Moynihan et al., 2015). Many CCB participants, particularly those with less complex educational trajectories and CCB internal transfers, benefited from a simple and streamlined application process to transition from lower-division to upper-division coursework. This administrative ease facilitated college participation across all five CCB programs, but the disproportionate nature of administrative burdens was also evident (Gándara et al., 2023, 2024; Ray et al., 2023). The mechanism of this administrative ease was primarily via less complex educational trajectories and transcripts. However, this mechanism was most commonly observed and accessed among younger white students in CCB programs in small rural towns. Aligned with prior scholarship, students from historically or racially minoritzed communities were more likely to experience complex, "non-linear," and heterogeneous enrollment trajectories (Crosta, 2014; Goldrick-Rab, 2016; Haas & Hadjar, 2020; Milesi, 2010; Monaghan, 2020; Taniguchi & Kaufman, 2005). Such proxies, tensions, and trajectories raise questions of what it means to be legible administratively, who is able to access these administrative conditions, and the broader implications of this legibility for different people in a changing technological landscape (Scott, 1998).

Once students matriculated into CCB programs, institutional agents and structures could minimize additional administrative burdens and shape time navigation via course registration, educational planning, work-based learning, internship, fieldwork, and employment opportunities during and after CCB completion. In many ways, CCB programs enabled college participation when it created curricular and structured pathways that were college/career-aligned, adhering to some principles of Guided Pathways reforms (Bailey et al., 2015a, 2015b) and college-and-labor-market alignment (D'Amico, 2016; D'Amico et al., 2019; Sublett & Tovar, 2021; Sublett et al., 2021; U.S. Department of Education, Office of Vocational and Adult Education, 2004; Vo & Rios-Aguilar, 2024). However, given the scale and scope of CCB programs, particularly in California, the development and implementation of CCB programs typically centered around a handful of institutional agents. Not surprisingly, this created some tensions relating to the interpersonal relational dynamics between students and agents, highlighted distinctions between CCB programs that were earlier in their implementation than others, and raised broader questions on the sustainability of how CCB programs are resourced and supported. Such questions align with prior scholarship on CCB programs and the perspectives of practitioners, who have highlighted tensions surrounding whose labor is being required to maintain program quality within a neoliberal higher education landscape (Martinez, 2018, 2019; Martinez & Elue, 2020; Martinez et al., 2024). While institutional structures can buffer and relax the reliance on institutional agents, they also play a valuable role in enabling and constraining college participation.

Through its cohort-based programming and academic community, CCB programs enabled college participation by creating institutional structures that made socio-academic integrative moments less serendipitous (Deil-Amen, 2011). Through continuity with students and institutional agents–especially faculty–the institutional conditions of CCB programs helped foster an environment where students could feel a sense of belonging, connection, and competence, and were able to engage in social and career capital exchange (D'Amico et al., 2019; Deil-Amen, 2011). Within this institutional structure, micro-level socio-academic interactions could more readily be actualized. By providing socio-academic and emotional support to students (Deil-Amen, 2011; Rendón, 1994; Rendón et al., 2014), faculty leveraged the continuity and student-to-faculty ratio to enable increased participation during lower- and upper-division coursework. Depending on programmatic conditions, this extended to curricular activities that were college- and career- integrated in students' college experiences. Through these socio-academic integrative institutional structures, CCB programs expanded college participation not only by who they enrolled and were able to retain, but through programmatic college/career capital/alignment and by broadening possibilities of career and community integration and impact.

Through semi-structured interviews, this paper elevates the lived experiences of 30 CCB students and alumni in California across Environmental, Healthcare, and Industrial fields in small rural towns and large metropolitan areas. Administrative, economic, programmatic, social, spatial, and temporal conditions shape and are shaped by students' participation in college at the micro-, meso-, and macro-level. These narratives highlight the situated contexts–the structural and institutional conditions–that intersect with students' everyday practices and lived conditions to enable and constrain college access. The *stratified feasibility landscape* frames how college participation is uneven and stratified–patterned by students' social contexts, positions, and trajectories. CCB programs operate as *trajectory-responsive* policy projects, with the potential to amplify or buffer existing inequalities and inequities through its institutional arrangements, assets, assumptions, and design.

5.0.3 Implications for Policy, Practice, and Research

5.0.3.1 Trajectory Responsive Policy Projects: The Role and Function of Community Colleges and CCBs Within a Stratified Feasibility Landscape of College Participation

This multi-method analytic paper applies a series of rigorous analytic strategies to understand the extent that CCB programs work, under what conditions, contexts, and mechanisms, and for whom–across a diverse range of social contexts, positions, and trajectories. The quantitative analysis provides numeric insights and support on the positive relationship between CCB completion and labor market outcomes and trajectories. However, the benefits of higher education, community colleges, and CCB programs extend beyond simply labor market returns (Rios-Aguilar et al., forthcoming). The qualitative analysis provides insights on students' experiences prior to, during, and after CCB participation. Through semi-structured interviews, this paper elevates the extent to which and how CCB programs have expanded meaningful educational access and opportunities to students who likely would not have had it otherwise. These findings provide empirical support on the value and impact of CCB programs with implications for practice, policy, and research.

Within the conceptual framework of the *stratified feasibility landscape* that this paper sets forth, this paper positions CCB programs as *trajectory-responsive* policy projects whose institutional arrangements, assets, assumptions, and designs are leveraged to buffer the institutional and structural conditions (e.g., administrative, economic, geographic, programmatic, social, and temporal) that shape college participation in bachelor's degree programs. By selectively buffering conditions and dimensions that constrain participation in college and career pathways, CCB programs uniquely expand meaningful access for students who may not have had bachelor's degree access otherwise. However, the feasibility of participation is uneven and horizontally/vertically stratified, dependent on the interplay between institutional activities, assets, arrangements, assumptions, and design of CCB programs, broader structural conditions, and students' lived experiences, everyday practices, and social contexts, positions, and trajectories. Within this situated context, students exercise bounded agency as they shape and are shaped by a *stratified feasibility landscape* that unevenly enables and constrains participation across the college and career life cycle.

With over 900 institutions nationally, community colleges are an important part of the U.S. higher education system, enrolling nearly one-third of all U.S. undergraduates, many of whom are from historically or racially minoritized communities (American Association of Community Colleges, 2026; Bailey et al., 2015a; National Student Clearinghouse Research Center, 2023). Scholars have long debated the roles and function of community colleges as democratizing or diversionary institutions (Baber et al., 2019; Brint & Karabel, 1989; Dougherty, 1994; Garza Mitchell, 2024; Kisker et al., 2023; Schudde & Goldrick-Rab, 2015; Schudde & Grodsky, 2018). As social institutions and a public good, U.S. community colleges have historically had complicated and paradoxical roles within the broader U.S. higher education ecosystem. As community colleges expand their programmatic offerings to offer bachelor's degrees, this fundamentally alters their position within this ecosystem. This paper's quantitative and qualitative findings elevate the potential of CCB programs to expand college access, success, and equity and advance social and economic justice. Yet, as *trajectory-responsive* policy projects, CCB programs operate within the broader ecosystem of higher education and structural and systemic forces. They buffer, but not completely eradicate, social stratification, immobilities, inequalities, inequities, and injustices.

This paper's findings also elevate the need for educators to expand our conceptions of "access" and "outcomes." College access is not a point-in-time activity and college outcomes are not simply about labor market returns. Interviews with CCB participants revealed the multiple attempts and complex educational journeys that students have navigated throughout their lives. The decision to pursue and sustain enrollment in college requires ongoing assessments, situated in one's *stratified feasibility landscape* and life course trajectories. The impact of college goes beyond labor market returns, as students also valued what a bachelor's degree would mean to their sense of self/selves, their households, their ability to learn and engage in a field of their interest, and their ability to integrate and make an impact in various ecosystems of their community (e.g., health and environmental). To be clear: bachelor's degree completion as credentials and the labor market return of bachelor's degrees are important dimensions to which we can assess CCB impact, but postsecondary education has long conferred multiple benefits to society, spanning civic to social to technology (Rios-Aguilar et al., forthcoming). Both can be acknowledged as valuable public functions to which higher education can be assessed.

Black economists and stratification economics (Chelwa et al., 2022; Francis et al., 2022; Hamilton, 2022; Paul et al., 2022; Wilson & Darity, n.d.) have elevated the racial disparities in the outcomes even once bachelor's degree attainment has been achieved. Such work, alongside this paper's findings, elevate the role that institutions play in facilitating meaningful access to college enrollment, meaningful access to activities, conditions, and contexts that promote bachelor's degree attainment, and meaningful access to the activation of the benefits of bachelor's degree attainment. The quantitative results consistently revealed positive CCB completion differentials in labor market outcomes across multiple fields of study, gender, racial/ethnic, and age groups. Yet, there are disparities in completion rates–albeit promising relative to other baccalaureate-degree pathways, which disproportionately benefit the most from these completion differentials–that raise questions as to how and the extent to which institutions can address labor market discrimination and broader structural and systemic forces that shape what credentials, skills, and knowledge count, how they count, and for whom. As *trajectory-responsive* policies, CCB programs should not be expected to dismantle structural and systemic inequalities/inequities, but they play a role in shaping them. In an era where postsecondary institutions are pressured to promote bachelor's degree attainment and ensure college/career alignment, so that the value of college is clear and actualized by individuals and communities (State Higher Education Executive Officers Association, 2026), CCB programs are a valuable site to understand how access, attainment, and activation of bachelor's degrees can be meaningfully achieved.

As this paper highlights, while there are a multitude of barriers in college participation–CCB programs exist as imperfect programs in an imperfect society–CCB programs represent a consequential pathway in which students have obtained meaningful educational access and opportunities. No better to elevate this are the voices of students who have been transformed as a result of CCB policy adoption. P29 (Black; woman; 40+ years-old; financial aid recipient; first-generation college student; caretaker) demonstrates how her college experiences in CCB programs–while not without their challenges–were still more feasible relative to previous college experiences. The feasibility of her college participation was bounded–shaped and stratified by broader institutional and structural conditions within which she operated. P29 previously attended a large public university out of high school, but dropped out after a year after feeling disconnected and experiencing racism. Over the next two-plus decades, she attended two other community colleges before enrolling at C5-Healthcare. While she shared that the workload at C5 was "tremendously hard" and still continued to witness institutional challenges and racism in this setting, the path to a bachelor's degree was more feasible here than ever before. She shares:

> I walked onto that campus as a scared 18 year-old in [year redacted]. I walked across the stage at [CCB college name redacted] as a [40+] year-old woman with a bachelor's degree. It was such a powerful moment for me. And I was just so proud of myself. It wouldn't have been possible without [college name] having a bachelor's degree on a community college level campus. I would have never made it back to [previous large public university name redacted]. And so I'm really grateful that somebody had the foresight to see that this is a need and that everybody can't just walk onto a four-year university campus and thrive. That

> some of us have to have life happen. And, so from 18 to [40+] is a lot of years of living. And each one of those years prepared me to walk across that stage. And so, I'm really grateful.

As more community colleges expand their missions to offer bachelor's degrees, it will be vital to continue to understand the extent to which and how CCB programs become a viable public pathway towards meaningful bachelor's degree access, attainment, and activation of its benefits (Meza & Love, 2023; Vo & Rios-Aguilar, 2024; Wright-Kim, 2021). CCB programs are an interesting site to understand college, career, and community participation broadly, given the historic and current roles and functions of community colleges and because they disproportionately enroll students from historically, economically, and racially minoritized communities (Baber et al., 2019; Garza Mitchell, 2024; Schudde & Goldrick-Rab, 2015). There are multiple avenues for future work in the CCB space.

5.0.3.2 The Rich Contexts of California and Washington: Lessons Learned for Adaptive Policy and Practice

The empirical support for the positive impact related to CCB programs in this paper provides insights on how access, success, and equity can be shaped by other CCB programs nationally, as well as other postsecondary institutions. Among all students who matriculated into CCB programs in this six-year Washington analytic sample, 71.4% completed their bachelor's degree. While there are disparities by field, gender, race/ethnicity, and age group, the proportion of graduates is high–ranging from 53.3% to 86.4%. While an imperfect comparison–given that this analytic sample includes community college students who attend part-time–this rate compares favorably to the six-year graduation rate for first-time, full-time undergraduate students across baccalaureate-degree granting institutions (64%; National Center for Education Statistics, 2022). Such descriptive data suggests the positive impact of CCB programs as a viable pathway to bachelor's degree attainment, particularly for students from historically and currently minoritized communities. As such, much can be learned from CCB programs that could be adapted to other CCB contexts, community colleges, and higher education, more broadly.

California, despite/while boasting the highest costs of living in the entire nation, maintains one of the most accessible higher education systems in the United States (Barton, 2025; Hanson, 2025; Leonard & Zakharenko, 2026). This trend is sustained with their CCB programs, which ranks as some of the most affordable CCB programs relative to other CCB programs nationally when comparing cost of upper-division tuition costs (Meza & Pawlicki, 2025; Revised Code of Washington, Title 28B, Chapter 50, Section 825, 2021). Relative to the traditional public and private four-year sector, California's CCB programs also cost considerably less and this ratio also compares favorable across the nation. California's development and implementation of CCB programs in fields of study that are unique and comparatively accessible to the private four-year sector is another means in which California's CCB programs expand access (Assembly Bill 927, 2021). This allows California's CCB programs to not only appeal to local communities by meeting economic and workforce development goals, but these programs–when nationally recognized and are so unique–can appeal to students in other states as well. The benefits of these economic and programmatic conditions were consistently elevated in student interviews–as students' college decisions to participate and sustain participation in CCB programs were informed by the affordability of CCB programs and unique programs of study offered. On the flip side of this is that–given California's narrow focus on only unique programs of study, or ones that are non-duplicative of programs at their public regional state and research universities–they place self-imposed limits on the ways in which their public higher education system can impact California's economy and broader ecosystems, be it civic, health, environmental, etc.

Washington's development and implementation of CCB programs elevates how more flexible policies between higher education sectors can be embraced. By recognizing that bachelor's degree growth is not a zero-sum game, that CCB programs do not duplicate the same students, and that the state benefits when there are more bachelor's degree holders in general, Washington has been able to offer CCB programs in high-demand fields of study, such as computer science and nursing. Such programs and policies, particularly nursing, has benefited students, households, and communities, particularly in the context of a global healthcare crisis of nursing shortages (American Association of Community Colleges, 2026). Community college degrees in Health Professions–be it certificates, associate's degrees, or bachelor's degrees–have consistently been linked to positive labor market returns in California and other states (Acton et al., 2025; Dadgar & Trimble, 2015; Jepsen et al., 2014; Meza & Bragg, 2022; Stevens et al., 2019; Xu & Trimble, 2016). This paper's findings are consistent with these findings and elevate the robustness of the CCB completion differentials in labor market outcomes of Health Professions. Such economic outcomes have major implications for gender and racial equity, given that Health Professions remains to be one of the most popular fields of study among Washington's female, Black, and Latine CCB students. These outcomes benefit not only students' and households' economic prospects, but also benefit the health ecosystems of the communities in which CCB graduates will impact.

Washington's CCB legislation explicitly discusses racial, social, and economic justice, as well as the need to examine disaggregated student data (Revised Code of Washington, Title 28B, Chapter 50, Section 825, 2021; Washington State Board for Community and Technical Colleges, 2019). This intentional feature of Washington's program has been valuable in supporting access, attainment, and activation of bachelor's degree attainment via CCB programs (Washington State Board for Community and Technical Colleges, 2026). Perhaps not unrelated, Washington is a leader nationally in data and information systems, particularly as they relate to CCB students and programs (Rios-Aguilar, Vo, et al., 2025). Through agencies such as the Washington State Board for Community and Technical Colleges and Education Research and Data Center, they provide public and robust intersegmental data related to students' educational outcomes. By doing so, they have created an accessible and transparent information infrastructure to understand the extent that their educational sectors and systems are working, under what conditions and contexts, and for whom. Because of this, they have created an infrastructure that has facilitated rigorous research and evaluation of their educational programs. This is no small feat, given that even in states like California, where–nearly a decade into implementation–there is still no publicly provided any information on the labor market returns of their CCB programs using official and verified UI wage records despite its policy's purported focus on meeting unmet labor market needs (Rios-Aguilar, Vo, et al., 2025; Vo et al., 2026). Washington's educational system provides a useful model in how commitments of justice can be aligned and actualized in the policy/practice of coordinated data/information infrastructures and educational systems.

California and Washington are two useful contexts to understand how CCB programs can be developed and implemented, but any practices and policies adopted must be adapted to local contexts. While community colleges possess unique assets, arrangements, and assumptions that have been leveraged to enable CCB programs to expand educational access and opportunities, many features of CCB program development and implementation can be adopted in other postsecondary educational contexts to enable meaningful college participation, particularly for students from historically and racially minoritized communities. Institutions have the capacity to enable college, career, and community participation when their institutional arrangements attend to students' administrative, economic, programmatic, social, spatial, and temporal conditions. Students benefit when college experiences are financially affordable and align with students' calculations of opportunity costs. Students benefit when their college is spatially proximal and aligned, and when programmatic offerings are aligned with students' identities, interests, and college/career goals. Students benefit when students have institutional agents and structures that facilitate experiential and work-based learning, and employment opportunities that provide them with the skills and knowledge to make an impact in their respective labor markets and communities. Students benefit when there are clear and accessible college application, course availability, and registration processes. Students benefit when they have access to an academic community that intentionally structures socio-academic integrative moments and social and career capital exchange to be less serendipitous. This takes place through intentional care, continuity, collaboration, and customization among students and institutional agents. The implication of these institutional design features can create different implications and (un)intended consequences for students from varied social contexts, positions, and trajectories. None of these institutional features should be surprising–they are congruent with how many scholars have conceptualized models of student success and equity (Deil-Amen & Lopez Turley, 2007; Goldrick-Rab, 2010) and the Community College Baccalaureate Association' Quality Framework for Community College Baccalaureate Degrees (Pawlicki et al., 2023).

5.0.3.3 What Counts? Who Counts? Who Decides?

While this paper quantitatively and qualitatively provides insights on the lived and labor market experiences of CCB students, what it means to be a "CCB student" or "CCB participant" or a "participant/student of a CCB program" remains a broad and philosophical question. National datasets are still not able to capture the social contexts, positions, and trajectories of all CCB students (Rios-Aguilar, Vo, et al., 2025). For example, to date, no dataset or report captures the demographic composition of students enrolled in CCB programs nationally at a given point in time. There has been some descriptive work in California, Texas, and Washington (e.g., Hoang et al., 2022, Meza, 2019, Love, 2020), as well as a recent descriptive analysis of CCB degrees awarded (Meza & Vo, 2026). These works provide compelling data to suggest that CCB programs provide bachelor's degree pathways for students who likely would not have had a feasible bachelor's degree pathway otherwise and especially for the adult learner student population.

From a philosophical and technical perspective, identifying CCB students requires–at minimum–determining what counts as a community college, what counts as a CCB program, and when do students count as CCB students. These reflect data challenges that are not exclusive to CCB programs, but broader data challenges that the U.S. community colleges are often confronted with (Fink & Jenkins, 2020)–which are in no part agnostic and unrelated to inequities, marginalization, and stigmatization of community colleges (McCambly et al., 2023; Rios-Aguilar et al., forthcoming). With over 200 CCB programs nationally (Community College Baccalaureate Association & Bragg & Associates, 2026), there are diverse ways in which colleges have implemented these programs, which complicates the question of who and how CCB students should be counted. Some CCB programs' lower- and upper-division coursework are more streamlined and these programs are likely to have CCB internal transfers–students who completed a substantive portion of both their lower- and upper-division coursework at the same college. Other CCB programs, by design and/or because of their success, are more susceptible to admitting CCB external transfers–where students may complete the bulk of lower-division coursework somewhere else before transferring into a CCB program to complete their bachelor's degree.

This paper does not provide a definitive answer of when students become CCB participants or when this becomes a salient identity for students. This paper generally designates a CCB participant or matriculation at the time that students officially began upper-division coursework. To be clear: the flexibility of community colleges and CCB programs in acccomodating complex educational trajectories and multiple college pathways/pipelines can be an asset and a point of embrace. The reality is that CCB participants can be defined in multiple ways: it can be when students first began at a community college and had an educational goal of completing a CCB program; it can be when they first enrolled and took a course to fulfill their CCB program requirements; it can be when students apply into upperdivision coursework; it can be when they get accepted into upper-division coursework; it can be when they first take a course in upper-division coursework; it can be when they first complete upper-division coursework, and so on and so forth. There are various trade-offs to these different methods of defining CCB participants and they have implications on what outcomes are observed. The history of classication and categorization is complex, as there are tensions to balance– counting can reduce students' experiences, but counting is also a method to identify and elevate inequities along the college life cycle (e.g., understanding any patterns or differences in who gets accepted and matriculates into upper-division coursework vs. who gets accepted and does not matriculate; who completes?).

5.0.3.4 The CCB Movement and Moving Forward

This paper qualitatively and quantitatively explores the academic and labor market outcomes and trajectories related to CCB completion differentials, as well as students' experiences in CCB programs, to help understand the conditions, contexts, experiences, and mechanisms that enable CCB participation within a *stratified feasibility landscape*. As CCB programs continue to expand and shift the higher education ecosystem, it is vital that future work occurs with education policymakers, practitioners, and researchers in community, collaboration and partnership–to transform what access, success, and equity means, when and how it is achieved, and for whom. Future collective work should further explore, identify, and specify the various dimensions, factors, and mechanisms that shape college, community, and career participation in CCB programs. For example, this can involve understanding how dimensions and factors, such as students' prior educational and occupational trajectories may predict CCB enrollment, completion, and outcomes (defined broadly as academic and labor market outcomes and beyond). As this paper reveals, CCB differentials in labor market outcomes were generally positive and statistically significant; the proportion of students who matriculate into CCB programs and complete are relatively high relative to national bachelor's degree attainment rates (National Center for Education Statistics, 2022).

Yet, there are disparities and inequities within CCB programs (and broadly) that must be addressed with unique considerations to social contexts, positions, and trajectories at various parts during the college life cycle. In both the quantitative and qualitative analysis, field sorting is salient and patterned by gender and race/ethnicity. While CCB programs operate within broader structure and systemic forces that establish occupational pipelines, CCB programs may be in a position to disrupt some field sorting and expand the diversity of students in different fields and programs. While CCB programs can and have expanded educational access and opportunities, issues of access at the time of enrollment and matriculation remain. In this paper and others, Latine CCB students typically experience comparable and favorable CCB outcomes relative to other racial/ethnic groups (Rios-Aguilar, Vo, et al., 2025; Vo et al., 2026); the extent to which Latine students are well represented and accessing/matriculating into CCB programs remains variable. Yet, in other research/evaluation, as perhaps most robustly here, Latine CCB students consistently experienced positive completion differentials in labor market outcomes. These results suggest that CCB participation is constrained for Latine students when it comes to initial access/enrollment into CCB programs and less so with the activation of bachelor's degree benefits. In contrast, one of the major challenges to CCB participation among Black students is most salient once students graduate. In this paper's analysis, Black CCB students' completion differentials suggest positive outcomes among graduates and non-graduates–such differentials were less robust relative to other racial/ethnic groups. Their outcomes demonstrate a disconnect between hourly wage differentials and total annual earnings. As such, future work should also explore how educators can develop and implement more equitable policies and practices that facilitate college, career, and community participation through the CCB life cycle and beyond, with specific interventions designed for different student communities. Such policies and practices involve continuous inquiry in discerning not just the impact of these programs, but the mechanisms and systems of power shaping (in)equality and (in)equity through a variety of qualitative and quantitative methods (Rangel & Carson Byrd, 2025).

Future education policy, practice, and research should also embrace diverse ways of knowing and implementation–through qualitative and quantitative approaches, through partnerships across leaders and stakeholders, and expansive notions of access and opportunities. This requires comprehensive data and information systems that capture, collect, and honor the rich contexts and ways in which students experience college, learning, and life. This can involve understanding how and implementing curricular activities and structures in and outside of the classroom, such as experiential learning experiences, work-based learning opportunities, internships/employment placement, and community engagement that are more equitably facilitated and can facilitate more equitable outcomes and trajectories. Practitioners, policymakers, and researchers should explore the conditions and contexts in which industry and community partnerships can generate positive and sustained educational and economic experiences (Vo & Rios-Aguilar, 2024), how practitioners can leverage asset-based, critical, and equitable approaches to understanding students' experiences and knowledge/skills, particularly in the labor market, as a resource and pedagogical tool (Murillo et al., forthcoming; Rios-Aguilar, Wright, & Vo, 2025), and how socio-academic integrative institutional structures can be more intentionally designed and scaled within CCB programs. Future work should continue to consider the intersectional identities, structures, and systems that interplay across multiple dimensions to shape college access, success, and equity. Students take on many roles and identities, and their relationships with other people–whether in their households, with peers, with institutional agents, or employers–shape their college participation. For example, future work can explore the organizational activities involved in the selection of CCB programs of study, the systems of power and procedures that perpetuate (racialized and gendered) field sorting and pipelines, the role of the political economy and historical contexts in shaping CCB implementation, how institutions can develop administrative and programmatic procedures from a critical spatial-temporal micro-mobilities lens, and employ practices that address inequities in bachelor's degree access, attainment, and activation.

This paper contributes to a growing body of scholarship that seeks to understand the impact of CCB programs, how they shift the roles and functions of community colleges, and their implications for access, success, and equity broadly. CCB programs represent a *trajectory-responsive* policy project operating within a broader higher education ecosystem that has historically played a significant role in social stratification to enable college participation. Given the unique student population that CCB programs serve, this paper proposes the *stratified feasibility landscape* of college participation is a conceptual framework to understand how students access, navigate, sustain, and benefit from college participation as students' social contexts, positions, and trajectories interplay with institutional and structural conditions. As CCB programs continue to expand, this research project provides updated understandings of the impact of CCB programs from students' perspectives and their implications on CCB policy, practice, and research. This project also contributes to the field's understandings of the ways in which community colleges (and higher education broadly) can contribute to the alleviation or reproduction of social stratification, (im)mobility, and (in)equality/(in)equity.

CHAPTER 6

Appendix: Supplemental Tables

Table 15: Descriptives of Analytic Sample Post Entry into CCB, Years 3-5: Institutional/Community Contexts

	Year 3 (Y3)				Year 4 (Y4)			Year 5 (Y5)		
	Overall	Grad	Non-Grad	Diff.	Grad	Non-Grad	Diff.	Grad	Non-Grad	Diff.
n	13,074	8,927	4,147		7,219	3,531		5,579	2,764	
Institutional Characteristics (IPEDS)										
Fall Enrollment	6,487	6,503	6,452	50	6,669	6,600	69	6,909	6,792	116
% Asian	0.095	0.097	0.090	0.007***	0.093	0.087	0.006***	0.091	0.084	0.007***
% Black	0.052	0.052	0.053	-0.001	0.050	0.051	-0.001	0.048	0.049	-0.001
% Latine	0.178	0.172	0.190	-0.018***	0.168	0.191	-0.023***	0.164	0.188	-0.024***
% white	0.450	0.451	0.448	0.003	0.453	0.447	0.007**	0.454	0.448	0.006*
% Part-Time	0.460	0.460	0.461	-0.002	0.459	0.462	-0.003	0.459	0.462	-0.003
% Receiving Federal Aid	0.212	0.210	0.217	-0.007***	0.213	0.219	-0.006***	0.215	0.222	-0.006**
Student-Faculty Ratio	15.3	15.2	15.3	-0.1**	15.2	15.4	-0.2***	15.1	15.3	-0.3***
Academic Spending per FTE ($)	$1,342	$1,353	$1,318	$35**	$1,266	$1,248	$18	$1,179	$1,175	$4
Instructional Spending per FTE ($)	$6,896	$6,941	$6,800	$141***	$6,672	$6,577	$95***	$6,473	$6,416	$57*
Student Support Spending per FTE ($)	$2,143	$2,164	$2,097	$67***	$2,094	$2,029	$65***	$2,006	$1,957	$50**
Certificate Proportion	0.107	0.108	0.105	0.003	0.109	0.105	0.004*	0.114	0.110	0.004
Locale: City	0.687	0.717	0.621	0.096***	0.712	0.600	0.112***	0.706	0.586	0.120***
Locale: Suburb	0.250	0.217	0.323	-0.106***	0.222	0.346	-0.123***	0.230	0.360	-0.131***
Locale: Town	0.049	0.051	0.045	0.006	0.051	0.044	0.007	0.048	0.043	0.005
Locale: Rural	0.013	0.014	0.010	0.004*	0.015	0.010	0.005*	0.016	0.010	0.006*
Community Characteristics (ACS)										
% Asian (Census Tract)	0.143	0.148	0.131	0.016***	0.149	0.134	0.015***	0.149	0.133	0.016***
% Black (Census Tract)	0.039	0.036	0.043	-0.006***	0.036	0.042	-0.005***	0.037	0.041	-0.005***
% Latine (Census Tract)	0.226	0.209	0.261	-0.052***	0.210	0.271	-0.061***	0.207	0.273	-0.065***
% white (Census Tract)	0.526	0.538	0.501	0.037***	0.538	0.493	0.046***	0.541	0.493	0.048***
% Bachelor's Degree or Higher	0.360	0.372	0.334	0.038***	0.368	0.329	0.038***	0.364	0.324	0.040***
Median Household Income ($)	$88,733	$90,766	$84,357	$6,409***	$88,822	$83,447	$5,376***	$87,241	$81,891	$5,350***
Poverty Rate	0.130	0.124	0.143	-0.019***	0.126	0.147	-0.021***	0.128	0.150	-0.021***
Unemployment Rate	0.054	0.054	0.055	-0.001	0.052	0.054	-0.001**	0.051	0.053	-0.002***

Note 1. Institutional contexts are from the Integrated Postsecondary Education Data System (IPEDS) data and merged to each CCB record's institution and entry cohort year. Community contexts are from the American Community Survey (ACS), matched to the U.S. census tract of the CCB college, not by student address. As tracts have shifted over time, all tract data are harmonized to the 2020 tract boundaries. Since values are weighted by record, CCB colleges with more CCB students in the sample are weighted more in the average calculations displayed.

Note 2. The "Diff" column shows the average difference by CCB graduates (Grad) and non-graduates (Non-Grad) with statistical significance levels ($^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$); Fisher's exact was used for dichotomous variables; Welch's *t*-test was used for continuous variables.

Note 3. FTE = full-time equivalent student; Certificate prpoprtion reflect the share of credentials awarded at the institution that were certificates. Median household income is adjusted to 2024 dollars using Consumer Price Index (CPI) methodology of the United States' Bureau of Labor Statistics.

Table 16: Stabilized SIPW Covariate Balance, Pooled Primary Specification Diagnostic

Covariate	|Standard Mean Diff (SMD)|		Balanced
	Unadjusted	SIPW	(< 0.05)
Overall Diagnostic			
Mean |SMD|	0.078	0.004	Yes
Max |SMD|	0.354	0.019	Yes
Gender			
Female	0.036	0.006	Yes
Gender: Not Listed	0.025	0.003	Yes
Race/Ethnicity			
Am Ind/AK Native	0.030	0.003	Yes
Asian	0.056	0.004	Yes
Black	0.047	0.000	Yes
Latine	0.059	0.000	Yes
Native Hawaiian or Pacific Islander	0.024	0.000	Yes
Multiracial	0.067	0.002	Yes
Race/Ethnicity: Not Listed	0.018	0.003	Yes
Age Group			
25-29 years-old	0.004	0.003	Yes
30-39 years-old	0.029	0.004	Yes
40 years-old or older	0.067	0.003	Yes
Additional			
Received Need-Based Aid	0.065	0.003	Yes
Part-Time Enrolled	0.354	0.001	Yes
Prior CC Enrollment	0.225	0.004	Yes
Prior CC Transfer Intent	0.083	0.002	Yes
CCB Entry Cohort Year			
2019-20	0.096	0.003	Yes
2020-21	0.085	0.004	Yes
2021-22	0.003	0.000	Yes
2022-23	0.112	0.013	Yes
Field of Study (CIP2)			
Computer & Info Sciences	0.011	0.008	Yes
Education	0.077	0.011	Yes
Health Professions	0.003	0.019	Yes
Engineering Tech	0.043	0.002	Yes
Interdisciplinary	0.050	0.004	Yes
Public Administration	0.086	0.002	Yes
Visual/Performing Arts	0.020	0.001	Yes
CIP2: Not Listed	0.029	0.004	Yes

Note 1. k is the number of covariates in the propensity score model; "Max |Standard Mean Diff (SMD)|" is the maximum absolute standardized mean difference across all k covariates before (Unadjusted) and after stabilized weighting (SIPW). The balance threshold is less than 0.05 of the absolute value of the standardized mean difference.

Note 2. Stabilized SIPW weights were computed from a logistic propensity score model using the primary model specification with all 28 covariates. All 28 covariates achieved balance after SIPW weighting (max |SMD| = 0.019). Reference categories for modelled covariates are not displayed–male (gender), white (race/ethnicity), 24 years-old or younger (age group), 2018-19 (entry cohort), Business & Management (CIP2).

Table 17: Stratified Primary Specification: Stabilized SIPW Covariate Balance Diagnostic

group	k	Max |Standard Mean Diff (SMD)|		Balanced
		Unadjusted	SIPW	(< 0.05)
Gender				
Female	26	0.349	0.032	Yes
Male	26	0.362	0.014	Yes
Gender: Not Listed†	26	0.414	0.153	No
Race/Ethnicity				
American Indian/Alaska Native†	21	0.301	0.098	No
Asian	21	0.401	0.043	Yes
Black	21	0.287	0.030	Yes
Latine	21	0.431	0.034	Yes
Multiracial	21	0.379	0.015	Yes
Pacicific Islander†	20	0.497	0.188	No
white	21	0.346	0.010	Yes
Race/Ethnicity: Not Listed	21	0.245	0.035	Yes
Field of Study (CIP2)				
Business & Management	20	0.377	0.011	Yes
Computer & Info Sciences	20	0.278	0.016	Yes
Education	20	0.330	0.015	Yes
Health Professions	20	0.482	0.038	Yes
Engineering Technology	20	0.592	0.173	No
Interdisciplinary	19	0.560	0.205	No
Public Administration	20	0.282	0.040	Yes
Visual/Performing Arts	20	0.402	0.075	No
Transportation	18	0.271	0.076	No
Age Group				
24 years-old or younger	25	0.422	0.023	Yes
25-29 years-old	25	0.358	0.044	Yes
30-39 years-old	25	0.344	0.015	Yes
40 years-old or older	25	0.208	0.013	Yes

Note 1. k is the number of covariates in each stratified propensity score model; "Max |Standard Mean Diff (SMD)|" is the maximum absolute standardized mean difference across all k covariates before (Unadjusted) and after stabilized weighting (SIPW). The balance threshold is less than 0.05 of the absolute value of the standardized mean difference.

Note 2. Each row represents the stratified SIPW model estimated within the specified group using the primary model specification. When filtering by group, that group's covariates are removed (e.g., race/ethnicity covariates were removed in race-stratified models). Balance is achieved for 20 of the 24 stratified models.

† Given the small sample size, the balance threshold was not achieved and the stratified SIPW analysis for this group should be interpreted with caution.

Table 18: CIP2: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (1 of 2)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
Business & Management									
Cond Raw Annual Earnings ($)	$6,069*** (1,657)	0.032	2,773	$7,156*** (1,920)	0.036	2,255	$8,955*** (2,322)	0.046	1,654
Cond Raw Hourly Rates ($)	$2.36*** (0.61)	0.037	2,681	$2.16** (0.67)	0.026	2,180	$2.65** (0.84)	0.030	1,585
Uncond Raw Annual Earnings ($)	$10,120*** (1,652)		3,748	$13,764*** (1,891)		3,081	$16,168*** (2,235)		2,376
Uncond Log($y+1$) Annual Earnings	0.956*** (0.177)	0.058	3,748	1.387*** (0.198)	0.092	3,081	1.487*** (0.232)	0.091	2,376
Uncond IHS Annual Earnings	1.011*** (0.188)	0.057	3,748	1.467*** (0.210)	0.091	3,081	1.572*** (0.246)	0.090	2,376
Uncond Raw Hourly Rates ($)	$4.69*** (0.72)		3,748	$5.91*** (0.80)		3,081	$6.86*** (0.96)		2,376
Uncond Log($y+1$) Hourly Rates	0.337*** (0.058)	0.063	3,748	0.466*** (0.066)	0.093	3,081	0.521*** (0.077)	0.096	2,376
Uncond IHS Hourly Rates	0.394*** (0.069)	0.062	3,748	0.546*** (0.078)	0.092	3,081	0.609*** (0.092)	0.095	2,376
Computer & Info Sciences									
Cond Raw Annual Earnings ($)	$2,728 (2,598)		2,249	$5,606 (3,066)		1,821	$10,699** (3,561)	0.028	1,400
Cond Raw Hourly Rates ($)	$2.39** (0.81)	0.019	2,113	$3.44*** (0.97)	0.038	1,699	$4.31*** (1.12)	0.050	1,296
Uncond Raw Annual Earnings ($)	$8,705*** (2,259)		3,177	$14,455*** (2,688)		2,593	$18,369*** (3,097)		2,025
Uncond Log($y+1$) Annual Earnings	0.981*** (0.196)	0.055	3,177	1.411*** (0.221)	0.087	2,593	1.538*** (0.255)	0.090	2,025
Uncond IHS Annual Earnings	1.039*** (0.209)	0.054	3,177	1.491*** (0.235)	0.086	2,593	1.624*** (0.270)	0.090	2,025
Uncond Raw Hourly Rates ($)	$5.08*** (0.87)		3,177	$6.88*** (1.01)		2,593	$7.85*** (1.17)		2,025
Uncond Log($y+1$) Hourly Rates	0.360*** (0.066)	0.062	3,177	0.469*** (0.074)	0.083	2,593	0.520*** (0.086)	0.089	2,025
Uncond IHS Hourly Rates	0.421*** (0.078)	0.061	3,177	0.545*** (0.088)	0.082	2,593	0.605*** (0.101)	0.087	2,025

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each CIP2 code. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

Table 19: CIP2: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (2 of 2)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
Education									
Cond Raw Annual Earnings ($)	$10,510*** (1,800)	0.109	1,210	$11,995*** (1,891)	0.133	978	$11,885*** (2,334)	0.114	712
Cond Raw Hourly Rates ($)	$9.54*** (1.13)	0.177	1,174	$10.91*** (1.29)	0.194	945	$10.25*** (1.54)	0.168	681
Uncond Raw Annual Earnings ($)	$15,124*** (1,952)		1,444	$15,920*** (2,133)		1,183	$16,542		892
Uncond Log($y+1$) Annual Earnings	1.411*** (0.266)	0.098	1,444	1.384*** (0.293)	0.090	1,183	1.559	0.090	892
Uncond IHS Annual Earnings	1.493*** (0.283)	0.098	1,444	1.458*** (0.312)	0.088	1,183	1.647	0.089	892
Uncond Raw Hourly Rates ($)	$11.59*** (1.26)		1,444	$12.08*** (1.42)		1,183	$11.24		892
Uncond Log($y+1$) Hourly Rates	0.584*** (0.090)	0.122	1,444	0.548*** (0.100)	0.105	1,183	0.556	0.089	892
Uncond IHS Hourly Rates	0.663*** (0.106)	0.116	1,444	0.616*** (0.119)	0.098	1,183	0.628	0.084	892
Health Professions									
Cond Raw Annual Earnings ($)	$30,501*** (2,039)	0.227	2,568	$31,008*** (2,130)	0.245	2,051	$29,133*** (2,525)	0.216	1,581
Cond Raw Hourly Rates ($)	$15.19*** (0.79)	0.294	2,462	$14.84*** (0.84)	0.299	1,972	$14.63*** (0.93)	0.299	1,504
Uncond Raw Annual Earnings ($)	$31,769*** (2,151)		3,017	$33,084*** (2,272)		2,487	$31,195*** (2,657)		1,955
Uncond Log($y+1$) Annual Earnings	1.198*** (0.177)	0.092	3,017	1.428*** (0.199)	0.107	2,487	1.391*** (0.229)	0.093	1,955
Uncond IHS Annual Earnings	1.247*** (0.187)	0.090	3,017	1.494*** (0.211)	0.105	2,487	1.455*** (0.243)	0.091	1,955
Uncond Raw Hourly Rates ($)	$15.97*** (0.98)		3,017	$16.64*** (1.06)		2,487	$15.51*** (1.24)		1,955
Uncond Log($y+1$) Hourly Rates	0.593*** (0.064)	0.132	3,017	0.687*** (0.071)	0.150	2,487	0.624*** (0.082)	0.122	1,955
Uncond IHS Hourly Rates	0.657*** (0.075)	0.124	3,017	0.770*** (0.083)	0.142	2,487	0.695*** (0.096)	0.114	1,955

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each CIP2 code. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

Table 20: Gender: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
Female									
Cond Raw Annual Earnings ($)	$16,605***	0.148	6,073	$18,505***	0.164	4,891	$19,428***	0.165	3,638
	(1,150)			(1,277)			(1,516)		
Cond Raw Hourly Rates ($)	$8.42***	0.187	5,849	$8.77***	0.194	4,698	$9.05***	0.197	3,476
	(0.47)			(0.52)			(0.61)		
Uncond Raw Annual Earnings ($)	$18,869***		7,688	$21,506***		6,334	$22,986***		4,889
	(1,157)			(1,288)			(1,500)		
Uncond Log($y+1$) Annual Earnings	1.155***	0.091	7,688	1.357***	0.105	6,334	1.562***	0.116	4,889
	(0.117)			(0.131)			(0.154)		
Uncond IHS Annual Earnings	1.215***	0.090	7,688	1.428***	0.104	6,334	1.645***	0.115	4,889
	(0.125)			(0.140)			(0.164)		
Uncond Raw Hourly Rates ($)	$9.66***		7,688	$10.33***		6,334	$10.98***		4,889
	(0.55)			(0.61)			(0.71)		
Uncond Log($y+1$) Hourly Rates	0.466***	0.109	7,688	0.522***	0.119	6,334	0.591***	0.128	4,889
	(0.040)			(0.045)			(0.052)		
Uncond IHS Hourly Rates	0.529***	0.104	7,688	0.594***	0.115	6,334	0.675***	0.123	4,889
	(0.047)			(0.053)			(0.062)		
Male									
Cond Raw Annual Earnings ($)	$3,777*	0.001	3,809	$5,421*	0.011	3,105	$6,537**	0.015	2,372
	(1,835)			(2,123)			(2,468)		
Cond Raw Hourly Rates ($)	$2.86***	0.044	3,618	$3.08***	0.046	2,943	$3.56***	0.050	2,224
	(0.60)			(0.68)			(0.81)		
Uncond Raw Annual Earnings ($)	$8,446***		5,236	$12,377***		4,313	$14,352***		3,378
	(1,678)			(1,948)			(2,253)		
Uncond Log($y+1$) Annual Earnings	0.877***	0.055	5,236	1.213***	0.080	4,313	1.320***	0.083	3,378
	(0.150)			(0.168)			(0.193)		
Uncond IHS Annual Earnings	0.928***	0.054	5,236	1.282***	0.080	4,313	1.397***	0.083	3,378
	(0.159)			(0.178)			(0.205)		
Uncond Raw Hourly Rates ($)	$5.23***		5,236	$6.36***		4,313	$6.59***		3,378
	(0.67)			(0.76)			(0.89)		
Uncond Log($y+1$) Hourly Rates	0.346***	0.068	5,236	0.435***	0.086	4,313	0.435***	0.079	3,378
	(0.051)			(0.057)			(0.066)		
Uncond IHS Hourly Rates	0.403***	0.066	5,236	0.506***	0.084	4,313	0.506***	0.077	3,378
	(0.060)			(0.067)			(0.077)		

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and SE values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by gender group. $RV_{q=1,\alpha=0.05}$ from the OVB sensitivity framework (Cinelli et al., 2024; Cinelli & Hazlett, 2025); blank when estimate is not statistically significant, for unconditional raw dollar outcomes where the framework is not applied, or when SE could not be computed.

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix).

Note 4. See Analytic Sample and Strategy section for additional details.

Table 21: Race/Ethnicity: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (1 of 4)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
Am Ind/AK Native†									
Cond Raw Annual Earnings ($)	$28,345	0.071	76	$32,564	0.076	62	$17,482 (11,081)		52
Cond Raw Hourly Rates ($)	$7.63 (5.33)		75	$13.18* (5.04)	0.084	58	$10.79* (4.71)	0.035	49
Uncond Raw Annual Earnings ($)	$21,959		111	$23,818		95	$13,394 (9,673)		79
Uncond Log($y+1$) Annual Earnings	1.235		111	1.072		95	0.918 (1.304)		79
Uncond IHS Annual Earnings	1.293		111	1.125		95	0.968 (1.385)		79
Uncond Raw Hourly Rates ($)	$7.63		111	$9.48		95	$8.15 (5.12)		79
Uncond Log($y+1$) Hourly Rates	0.398		111	0.384		95	0.420 (0.428)		79
Uncond IHS Hourly Rates	0.456		111	0.426		95	0.478 (0.506)		79
Asian									
Cond Raw Annual Earnings ($)	$1,002 (3,442)		1,159	$1,165 (3,882)		944	$4,838 (4,474)		691
Cond Raw Hourly Rates ($)	$2.96* (1.16)	0.018	1,101	$2.95* (1.27)	0.012	905	$4.56** (1.49)	0.042	656
Uncond Raw Annual Earnings ($)	$6,798* (2,979)		1,645	$9,864** (3,478)		1,327	$15,507*** (3,959)		1,002
Uncond Log($y+1$) Annual Earnings	0.838** (0.284)	0.028	1,645	1.101*** (0.319)	0.045	1,327	1.515*** (0.377)	0.071	1,002
Uncond IHS Annual Earnings	0.886** (0.302)	0.027	1,645	1.167*** (0.339)	0.045	1,327	1.605*** (0.400)	0.071	1,002
Uncond Raw Hourly Rates ($)	$5.83*** (1.24)		1,645	$6.59*** (1.42)		1,327	$8.46*** (1.68)		1,002
Uncond Log($y+1$) Hourly Rates	0.378*** (0.096)	0.052	1,645	0.420*** (0.108)	0.056	1,327	0.534*** (0.126)	0.074	1,002
Uncond IHS Hourly Rates	0.439*** (0.113)	0.050	1,645	0.487*** (0.127)	0.055	1,327	0.619*** (0.149)	0.072	1,002

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each racial/ethnic group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

† Results are reported for transparency, but should be interpreted with extreme caution due to small sample sizes.

Table 22: Race/Ethnicity: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (2 of 4)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
Black									
Cond Raw Annual Earnings ($)	$11,090**	0.029	674	$16,096***	0.064	506	$19,075**	0.066	355
	(4,163)			(4,780)			(5,965)		
Cond Raw Hourly Rates ($)	$8.10***	0.151	628	$5.82***	0.081	471	$7.56***	0.138	326
	(1.34)			(1.55)			(1.66)		
Uncond Raw Annual Earnings ($)	$13,749***		858	$16,796***		676	$15,162**		504
	(4,013)			(4,639)			(5,410)		
Uncond Log($y+1$) Annual Earnings	0.648		858	0.605		676	0.244		504
	(0.334)			(0.396)			(0.481)		
Uncond IHS Annual Earnings	0.682		858	0.628		676	0.249		504
	(0.355)			(0.421)			(0.511)		
Uncond Raw Hourly Rates ($)	$7.86***		858	$4.91**		676	$4.77*		504
	(1.57)			(1.82)			(2.05)		
Uncond Log($y+1$) Hourly Rates	0.302**	0.021	858	0.128		676	0.094		504
	(0.115)			(0.137)			(0.165)		
Uncond IHS Hourly Rates	0.336*	0.016	858	0.136		676	0.094		504
	(0.136)			(0.162)			(0.195)		
Latine									
Cond Raw Annual Earnings ($)	$17,085***	0.145	1,039	$23,089***	0.204	852	$22,282***	0.180	655
	(2,401)			(2,696)			(3,188)		
Cond Raw Hourly Rates ($)	$8.64***	0.185	1,006	$10.47***	0.214	831	$10.36***	0.197	628
	(1.02)			(1.18)			(1.41)		
Uncond Raw Annual Earnings ($)	$18,118***		1,262	$24,137***		1,066	$26,056***		844
	(2,525)			(2,834)			(3,291)		
Uncond Log($y+1$) Annual Earnings	0.866**	0.040	1,262	1.201***	0.065	1,066	1.681***	0.101	844
	(0.266)			(0.299)			(0.346)		
Uncond IHS Annual Earnings	0.906**	0.038	1,262	1.256***	0.063	1,066	1.770***	0.100	844
	(0.283)			(0.318)			(0.368)		
Uncond Raw Hourly Rates ($)	$8.65***		1,262	$11.25***		1,066	$12.30***		844
	(1.20)			(1.38)			(1.60)		
Uncond Log($y+1$) Hourly Rates	0.349***	0.056	1,262	0.490***	0.088	1,066	0.642***	0.116	844
	(0.091)			(0.102)			(0.118)		
Uncond IHS Hourly Rates	0.387***	0.049	1,262	0.549***	0.081	1,066	0.730***	0.110	844
	(0.107)			(0.120)			(0.140)		

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each racial/ethnic group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

Table 23: Race/Ethnicity: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (3 of 4)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
Multiracial									
Cond Raw Annual Earnings ($)	$12,663***	0.079	1,508	$14,173***	0.089	1,162	$13,416***	0.072	873
	(2,415)			(2,750)			(3,235)		
Cond Raw Hourly Rates ($)	$7.43***	0.148	1,442	$7.29***	0.145	1,108	$8.05***	0.149	826
	(0.91)			(1.04)			(1.23)		
Uncond Raw Annual Earnings ($)	$15,100***		1,930	$17,969***		1,531	$17,100***		1,173
	(2,337)			(2,682)			(3,150)		
Uncond Log($y+1$) Annual Earnings	0.962***	0.054	1,930	1.320***	0.079	1,531	1.296***	0.067	1,173
	(0.226)			(0.263)			(0.308)		
Uncond IHS Annual Earnings	1.013***	0.053	1,930	1.394***	0.079	1,531	1.365***	0.066	1,173
	(0.240)			(0.279)			(0.327)		
Uncond Raw Hourly Rates ($)	$8.41***		1,930	$9.13***		1,531	$9.64***		1,173
	(1.02)			(1.18)			(1.40)		
Uncond Log($y+1$) Hourly Rates	0.423***	0.080	1,930	0.517***	0.097	1,531	0.536***	0.090	1,173
	(0.077)			(0.089)			(0.105)		
Uncond IHS Hourly Rates	0.481***	0.076	1,930	0.593***	0.093	1,531	0.612***	0.086	1,173
	(0.091)			(0.105)			(0.124)		
Native Hawaiian or Pacific Islander†									
Cond Raw Annual Earnings ($)	$7,427		58	$-6,621		39	$-36,194		31
				(24,226)			(22,635)		
Cond Raw Hourly Rates ($)	$0.69		54	$-10.31		37	$-0.73		28
				(6.17)					
Uncond Raw Annual Earnings ($)	$2,949		75	$4,738		59	$-23,729		42
	(11,418)			(15,806)			(30,213)		
Uncond Log($y+1$) Annual Earnings	0.047		75	1.321		59	0.311		42
	(1.233)			(1.646)			(2.147)		
Uncond IHS Annual Earnings	0.038		75	1.404		59	0.339		42
	(1.310)			(1.749)			(2.275)		
Uncond Raw Hourly Rates ($)	$2.14		75	$-0.69		59	$4.60		42
	(5.75)			(7.46)			(9.75)		
Uncond Log($y+1$) Hourly Rates	0.201		75	0.205		59	0.382		42
	(0.429)			(0.583)			(0.722)		
Uncond IHS Hourly Rates	0.237		75	0.254		59	0.445		42
	(0.505)			(0.688)			(0.845)		

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each racial/ethnic group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

† Results are reported for transparency, but should be interpreted with extreme caution due to small sample sizes.

Table 24: Race/Ethnicity: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (4 of 4)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
white									
Cond Raw Annual Earnings ($)	$11,321*** (1,439)	0.081	4,951	$12,873*** (1,616)	0.090	4,042	$13,929*** (1,893)	0.094	3,039
Cond Raw Hourly Rates ($)	$5.26*** (0.55)	0.105	4,761	$6.30*** (0.61)	0.127	3,865	$6.42*** (0.71)	0.124	2,897
Uncond Raw Annual Earnings ($)	$15,358*** (1,397)		6,441	$18,313*** (1,574)		5,331	$20,045*** (1,824)		4,155
Uncond Log($y+1$) Annual Earnings	1.217*** (0.134)	0.090	6,441	1.447*** (0.149)	0.107	5,331	1.574*** (0.172)	0.110	4,155
Uncond IHS Annual Earnings	1.284*** (0.143)	0.089	6,441	1.527*** (0.158)	0.106	5,331	1.661*** (0.183)	0.109	4,155
Uncond Raw Hourly Rates ($)	$7.83*** (0.62)		6,441	$9.20*** (0.69)		5,331	$9.24*** (0.81)		4,155
Uncond Log($y+1$) Hourly Rates	0.461*** (0.045)	0.102	6,441	0.544*** (0.051)	0.118	5,331	0.554*** (0.059)	0.112	4,155
Uncond IHS Hourly Rates	0.532*** (0.054)	0.099	6,441	0.628*** (0.060)	0.115	5,331	0.638*** (0.069)	0.109	4,155

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each racial/ethnic group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

Table 25: Age Group: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (1 of 2)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
24 years-old or younger									
Cond Raw Annual Earnings ($)	$15,051*** (1,464)	0.131	3,599	$15,598*** (1,722)	0.124	2,927	$19,592*** (2,007)	0.155	2,222
Cond Raw Hourly Rates ($)	$7.34*** (0.60)	0.162	3,484	$7.51*** (0.67)	0.161	2,815	$8.58*** (0.78)	0.181	2,119
Uncond Raw Annual Earnings ($)	$15,973*** (1,398)		4,623	$18,138*** (1,656)		3,793	$20,508*** (1,929)		2,979
Uncond Log($y+1$) Annual Earnings	0.967*** (0.154)	0.066	4,623	1.208*** (0.172)	0.084	3,793	1.219*** (0.198)	0.077	2,979
Uncond IHS Annual Earnings	1.017*** (0.164)	0.065	4,623	1.271*** (0.182)	0.083	3,793	1.279*** (0.210)	0.076	2,979
Uncond Raw Hourly Rates ($)	$8.09*** (0.65)		4,623	$8.87*** (0.74)		3,793	$9.26*** (0.88)		2,979
Uncond Log($y+1$) Hourly Rates	0.394*** (0.051)	0.085	4,623	0.462*** (0.057)	0.098	3,793	0.460*** (0.067)	0.088	2,979
Uncond IHS Hourly Rates	0.447*** (0.061)	0.080	4,623	0.526*** (0.068)	0.093	3,793	0.521*** (0.079)	0.083	2,979
25–29 years-old									
Cond Raw Annual Earnings ($)	$13,945*** (2,042)	0.102	2,100	$15,843*** (2,420)	0.107	1,696	$10,604*** (2,913)	0.047	1,236
Cond Raw Hourly Rates ($)	$6.64*** (0.82)	0.128	2,021	$7.43*** (0.91)	0.144	1,624	$6.63*** (1.06)	0.119	1,173
Uncond Raw Annual Earnings ($)	$15,660*** (2,031)		2,686	$19,524*** (2,383)		2,256	$16,729*** (2,829)		1,699
Uncond Log($y+1$) Annual Earnings	0.987*** (0.199)	0.061	2,686	1.347*** (0.224)	0.086	2,256	1.353*** (0.270)	0.076	1,699
Uncond IHS Annual Earnings	1.038*** (0.211)	0.060	2,686	1.419*** (0.238)	0.085	2,256	1.432*** (0.287)	0.075	1,699
Uncond Raw Hourly Rates ($)	$8.00*** (0.93)		2,686	$9.61*** (1.05)		2,256	$9.17*** (1.25)		1,699
Uncond Log($y+1$) Hourly Rates	0.407*** (0.067)	0.079	2,686	0.531*** (0.076)	0.103	2,256	0.535*** (0.091)	0.092	1,699
Uncond IHS Hourly Rates	0.464*** (0.080)	0.075	2,686	0.609*** (0.090)	0.099	2,256	0.616*** (0.108)	0.089	1,699

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each age group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

Table 26: Age Group: Supplemental Completion Differentials in Labor Market Outcomes, Years 3-5 (2 of 2)

	Year 3			Year 4			Year 5		
Group / Outcome	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n	$\hat{\beta}$	$RV_{q=1,\alpha=0.05}$	n
30–39 years-old									
Cond Raw Annual Earnings ($)	$7,489***	0.030	2,654	$9,822***	0.048	2,094	$11,658***	0.057	1,559
	(2,107)			(2,340)			(2,746)		
Cond Raw Hourly Rates ($)	$4.97***	0.093	2,529	$5.73***	0.103	2,015	$5.64***	0.091	1,476
	(0.72)			(0.84)			(1.01)		
Uncond Raw Annual Earnings ($)	$13,142***		3,464	$16,274***		2,798	$19,617***		2,177
	(2,012)			(2,253)			(2,600)		
Uncond Log($y+1$) Annual Earnings	1.218***	0.084	3,464	1.438***	0.097	2,798	1.748***	0.115	2,177
	(0.180)			(0.204)			(0.239)		
Uncond IHS Annual Earnings	1.288***	0.083	3,464	1.519***	0.097	2,798	1.847***	0.114	2,177
	(0.191)			(0.216)			(0.254)		
Uncond Raw Hourly Rates ($)	$7.52***		3,464	$8.95***		2,798	$9.42***		2,177
	(0.84)			(0.96)			(1.13)		
Uncond Log($y+1$) Hourly Rates	0.445***	0.090	3,464	0.538***	0.108	2,798	0.601***	0.113	2,177
	(0.061)			(0.069)			(0.082)		
Uncond IHS Hourly Rates	0.514***	0.087	3,464	0.622***	0.106	2,798	0.697***	0.111	2,177
	(0.072)			(0.082)			(0.096)		
40 years-old or older									
Cond Raw Annual Earnings ($)	$7,999**	0.020	1,633	$11,936***	0.050	1,352	$10,867**	0.031	1,047
	(2,874)			(3,123)			(3,678)		
Cond Raw Hourly Rates ($)	$4.65***	0.069	1,531	$5.09***	0.078	1,255	$5.19***	0.070	980
	(0.99)			(1.06)			(1.23)		
Uncond Raw Annual Earnings ($)	$12,974***		2,300	$18,301***		1,902	$19,679***		1,487
	(2,697)			(2,930)			(3,369)		
Uncond Log($y+1$) Annual Earnings	1.029***	0.054	2,300	1.386***	0.082	1,902	1.681***	0.102	1,487
	(0.228)			(0.251)			(0.284)		
Uncond IHS Annual Earnings	1.086***	0.053	2,300	1.463***	0.081	1,902	1.778***	0.101	1,487
	(0.242)			(0.266)			(0.302)		
Uncond Raw Hourly Rates ($)	$7.44***		2,300	$7.88***		1,902	$9.11***		1,487
	(1.11)			(1.20)			(1.37)		
Uncond Log($y+1$) Hourly Rates	0.437***	0.075	2,300	0.477***	0.080	1,902	0.581***	0.101	1,487
	(0.078)			(0.086)			(0.097)		
Uncond IHS Hourly Rates	0.506***	0.073	2,300	0.551***	0.078	1,902	0.675***	0.099	1,487
	(0.091)			(0.101)			(0.114)		

Note 1. Conditional outcomes are calculated among those identified via Unemployment Insurance (UI) records in Washington's ESD. Unconditional outcomes include zeros for those not identified via UI employment. IHS refers to the inverse hyperbolic sine transformation.

Note 2. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. All $\hat{\beta}$ and standard error (SE) values were generated via OLS with HC2 robust SEs using the primary model specification, filtered by each age group. $RV_{q=1,\alpha=0.05}$ is a sensitivity statistic that quantifies the minimum strength of an unobserved confounder–in terms of its partial R^2 with both the treatment and the outcome–required to reduce the estimate to statistical insignificance at $\alpha = .05$ (Cinelli et al., 2024; Cinelli & Hazlett, 2025).

Note 3. Blank SE values indicate computation was not possible due to small sample size (e.g., rank-deficient variance-covariance matrix). Blank $RV_{q=1,\alpha=0.05}$ values indicate that $\hat{\beta}$ is not statistically significant under OLS and/or that the SE was not able to be computed.

Note 4. See Analytic Sample and Strategy section for additional details.

	Total Annual Earnings (Conditional Log)			UI Employment Status			Hourly Wage Rates (Conditional Log)		
	Year 3	Year 4	Year 5	Year 3	Year 4	Year 5	Year 3	Year 4	Year 5
POOLED									
Primary	***	***	***	***	***	***	***	***	***
STRATIFIED									
Field of Study (CIP2)									
Business, Management, Marketing, & Related Support Services	***	***	***	***	***	***	***	***	***
Computer & Information Sciences & Support Services	*	***	***	***	***	***	***	***	***
Health Professions & Related Programs	***	***	***	***	***	***	***	***	***
Education	***	***	***	***	***		***	***	***
GENDER									
Female	***	***	***	***	***	***	***	***	***
Male	***	***	***	***	***	***	***	***	***
RACE/ETHNICITY									
American Indian or Alaska Native*	*							**	
Asian				**	**	***	**	**	**
Black		*					***	***	
Latine	***	***	***	*	**	***	***	***	***
Multiracial	***	***	***	***	***	***	***	***	***
Native Hawaiian or Pacific Islander*									
white	***	***	***	***	***	***	***	***	***
AGE GROUP									
24 years-old or younger	***	***	***	***	***	***	***	***	***
25-39 years-old	***	***		***	***	***	***	***	***
30-39 years-old	***	***	***	***	***	***	***	***	***
40 years-old or older	***	***	**	***	***	***	***	***	***

Note. To support visual interpretation, the figure above displays the statistical significance levels of the point efficients of the primary pooled OLS (HC2) esimates (*p < .05. **p < .01. ***p < .001).
This figure displays the CCB completion differentials in UI employment status, conditional log-transformed total annual earnings, and conditional log-transformed hourly wage rates.
Data is displayed over time: Year 3 represents three years after CCB matriculation, Year 4 represents four years, and Year 5 represents five years. P
lease refer to other tables for most details (coefficient estimates, SE, n-size, sensitivity analysis, etc. to support rigorous understanding of observed estimates.

* Due to smaller sample sizes, the results for American Indian or Alaska Native and Native Hawaiian or Pacific Islander should be interpretted with caution.

Figure 5: Visual Summary of Primary Pooled and Stratified Analysis

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