



Scaling Up Community College Baccalaureates in Washington State: Labor Market Outcomes and Equity Implications for Higher Education

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Abstract: Community and technical colleges in Washington state were early adopters in the growing trend to offer bachelor's degrees, actively expanding these degrees over the last 15 years. This study describes the evolving state policy landscape on community college baccalaureate (CCB) degrees in Washington in certain programs previously classified as terminal career-technical education and assesses labor market outcomes for graduates of three high-demand program areas conferring these degrees. Comparing bachelor's graduates of community colleges to regional university graduates, CCB graduates demonstrated slightly higher employment and earnings in the first quarter post-graduation. However, university graduates caught up to approximately the same or slightly higher earnings as CCB graduates by three years post-graduation. Differences in age and prior work experience of graduates in the two groups may help explain these findings but variation in employment and earnings by gender and race were persistent for both groups, with pronounced disparities for female and some racially minoritized graduates. These findings can inform state

policy on baccalaureate attainment, CCB degrees as well as university bachelor's degrees, to help address inequities in higher education. Future studies evaluating the effects of college degrees on employment and earnings may also be enriched by these results.

Keywords: community college; higher education; baccalaureate; labor market outcomes; career-technical education

Ampliación de los bachilleratos de los colegios comunitarios en el estado de Washington: Resultados del mercado laboral e implicaciones de equidad para la educación superior

Resumen: Los colegios comunitarios y técnicos del estado de Washington fueron los primeros en adoptar la oferta de títulos de licenciatura, expandiendo activamente estos títulos en los últimos 15 años. Este estudio describe el panorama de la política estatal en evolución sobre los títulos de bachillerato de colegios comunitarios (CCB) en Washington en ciertos programas previamente clasificados como educación técnica y profesional terminal y evalúa los resultados del mercado laboral para los graduados de tres áreas de programas de alta demanda que otorgan estos títulos. Al comparar a los graduados de licenciaturas de colegios comunitarios con los graduados de universidades regionales, los graduados de CCB demostraron empleo e ingresos ligeramente más altos en el primer trimestre posterior a la graduación. Sin embargo, los graduados universitarios alcanzaron ingresos aproximadamente iguales o ligeramente superiores a los de los graduados de CCB tres años después de la graduación. Las diferencias de edad y experiencia laboral previa de los graduados en los dos grupos pueden ayudar a explicar estos hallazgos, pero la variación en el empleo y los ingresos por género y raza fue persistente para ambos grupos, con disparidades pronunciadas para las mujeres y algunos graduados pertenecientes a minorías raciales. Estos hallazgos pueden informar la política estatal sobre el logro de la licenciatura, los títulos CCB y las licenciaturas universitarias, para ayudar a abordar las desigualdades en la educación superior. Los estudios futuros que evalúen los efectos de los títulos universitarios en el empleo y los ingresos también pueden enriquecerse con estos resultados.

Palabras-clave: colegio comunitario; educación superior; bachillerato; resultados del mercado laboral; educación técnica-carrera

Ampliação de bacharelados de faculdades comunitárias no estado de Washington: Resultados do mercado de trabalho e implicações de equidade para o ensino superior

Resumo: As faculdades comunitárias e técnicas do estado de Washington foram as primeiras a adotar a oferta de diplomas de bacharel, expandindo ativamente esses diplomas nos últimos 15 anos. Este estudo descreve o cenário de política estadual em evolução nos graus de bacharelado em faculdades comunitárias (CCB) em Washington em certos programas anteriormente classificados como educação técnica de carreira terminal e avalia os resultados do mercado de trabalho para graduados de três áreas de programas de alta demanda que conferem esses diplomas. Comparando os graduados de bacharelado de faculdades comunitárias com graduados de universidades regionais, os graduados do CCB demonstraram emprego e ganhos ligeiramente mais altos no primeiro trimestre de pós-graduação. No entanto, os graduados universitários alcançaram ganhos aproximadamente iguais ou ligeiramente superiores aos graduados do CCB por três anos após a graduação. Diferenças de idade e experiência de trabalho anterior dos graduados nos dois grupos podem ajudar a explicar esses achados, mas a variação no emprego e nos rendimentos por gênero e raça foram persistentes para ambos os grupos, com disparidades pronunciadas para graduados do sexo feminino e alguns racialmente minoritários. Essas descobertas podem informar a política

estadual sobre obtenção de bacharelado, diplomas do CCB e bacharelado universitário, para ajudar a abordar as desigualdades no ensino superior. Estudos futuros avaliando os efeitos dos diplomas universitários sobre o emprego e os rendimentos também podem ser enriquecidos por esses resultados.

Palavras-chave: faculdade comunitária; ensino superior; bacharelado; resultados do mercado de trabalho; educação técnica de carreira

Scaling Up Community College Baccalaureates in Washington State: Labor Market Outcomes and Equity Implications for Higher Education

In the United States, the credential linked most closely to middle-class status is the baccalaureate degree. Using data from the Current Population Survey for 2010 to 2016, Carnevale et al. (2016) observed that of all college credentials, the baccalaureate is the most strongly associated with obtaining “good jobs,” which they define as “jobs that pay more than \$53,000 per year for full-time, full-year workers and come with benefits” (p. 4). Indeed, analysis of labor market data shows stronger returns on earnings for bachelor’s degrees than sub-baccalaureate credentials (U.S. Bureau of Labor Statistics, 2021), and this gap has grown wider during the pandemic. The wealth gap and income inequality have accelerated during COVID-19, widening the gap between White and racially minoritized households (Major, 2020). Because wealth and income are highly related to education level, the baccalaureate is increasingly important to economic security for historically underserved populations.

Advocates for community college baccalaureate (CCB) degrees, referring to formal degrees conferred by community colleges that are associated with four years of collegiate study and more typically awarded by universities, argue that the baccalaureate is important to address growing economic disparities among higher education students (Potter, 2020). However, critics resist the notion that community colleges are qualified to prepare students for the labor market as successfully as universities, also contending these degrees duplicate existing baccalaureate degrees that students can just as easily access through transfer to universities (Lynch, 2018).

Concerns about the inability of community colleges to match the quality of university baccalaureate programs have been raised from the time CCB degrees emerged on the scene in the US more than 30 years ago (Floyd & Skolnik, 2019). However, these conflicting claims remain unanswered by extant research, suggesting the need to understand empirically how CCB graduates fare in the labor market compared to their university peers. Findings showing that CCB graduates secure employment and earn wages similarly to university graduates would help to address this unanswered question about the comparability of baccalaureate degrees conferred by community colleges to those awarded by universities.

To enhance understanding of CCB graduates and labor market outcomes, this study, conducted in the state of Washington, describes employment and earnings for baccalaureate graduates of community and technical colleges (henceforth abbreviated to community colleges) compared to baccalaureate graduates of public regional broad-access universities who demonstrate more similar demographic and academic backgrounds to CCB graduates than public research university graduates. Analyses of the groups of CCB graduates and public university graduates were conducted on similar programs of study in business; healthcare, including nursing; and computer and information sciences. We used state-level longitudinal data from Washington’s Education Research and Data Center (ERDC) to describe employment and earnings for CCB graduates, specifically from programs that previously culminated in terminal associate of applied science (AAS) degrees. We compared graduates of these programs who all received the baccalaureate degree type

required by state law, the Bachelor of Applied Science (BAS), to university baccalaureate degrees, mostly the Bachelor of Science (BS), and disaggregated these results by gender and race/ethnicity. Students included in the study graduated between the 2009 and 2017 academic years and were followed for three years post-graduation.

Questions guiding this study involving the preponderance of public higher education institutions in Washington state, including 19 public community and technical colleges and regional public universities, were:

- What are the employment and earnings outcomes of BAS graduates compared to public regional university baccalaureate graduates in business; healthcare, including nursing; and computer and information sciences?
- How do the employment and earnings outcomes of BAS graduates and public regional university baccalaureate graduates vary by gender and race/ethnicity?

This research represents the only published, peer reviewed longitudinal study of employment and earnings of baccalaureate graduates of multiple programs of study offered by public community and technical colleges and regional universities. Utilizing group comparisons to identify patterns of baccalaureate degree attainment and labor market results, these findings may help to inform future research utilizing rigorous designs so as to better understand how baccalaureate degrees impact labor market outcomes for community college and university graduates.

Community College Baccalaureates in Washington State

With little fanfare, states began authorizing community colleges to confer baccalaureate degrees over three decades ago. West Virginia is commonly recognized as the first state to authorize an associates-dominant institutions to award both associates and baccalaureate degrees (Fulton, 2020; Soler, 2019). By 2021, one or more associates-dominant institutions, more commonly identified as community colleges, were approved to confer baccalaureate degrees in 24 states (Love, Bragg, & Harmon, 2021). Among these, Florida and Washington are recognized as having scaled up baccalaureate degrees to all or nearly all of their associates-dominant colleges (Floyd & Skolnik, 2019). In 2021, all public colleges in Florida were approved to confer at least one baccalaureate degree, and, in Washington, 29 of 34 community and technical colleges were authorized to do so. These two states comprise nearly half of all public colleges conferring CCB degrees in the country to date. To be considered a CCB-conferring institution in a recent national inventory conducted in 2021, a college must continue to be recognized publicly as a community college, including articulating an open-access mission, and satisfy the Carnegie Basic Classification as a public, degree-granting (Title IV) “baccalaureate, associate-dominant” (Love et al., 2021, p. 14); or “baccalaureate, mixed-mission” (p. 23) higher education institution. Consistent with the open access mission is the long-standing priority of community colleges to educate historically underserved populations to attain credentials associated with securing living-wage employment (D’Amico et al., 2019), which is also foundational to orienting CCB degrees toward the workforce and graduate employment (Jacobs & Worth, 2019).

In 2005, the Washington state legislature enacted legislation authorizing community and technical colleges to offer pilot programs designating the BAS degree, also known as an applied baccalaureate, as the state’s preferred form of CCB degree. Designation of the BAS degree as the official CCB credential reflected the state’s decision to prioritize the adoption of the baccalaureate by programs that heretofore had culminated in the Associate of Applied Science (AAS) degree as the highest credential awarded. This emphasis on the BAS degree reflected the recommendation of a

state task force charged with resolving obstacles with credit loss and extended time to degree for students transferring from community colleges to universities. As part of strategic planning led by the now-defunct Washington Higher Education Coordinating Board (HECB), this task force found that 10% of students who transferred to universities did so despite enrolling initially in community college career-technical education (CTE) programs that conferred terminal AAS degrees not covered by the state's transfer policies (Seppanen, 2010). To complement policy changes to improve transfer, the task force recommended several options, including authorizing community colleges to confer baccalaureate degrees to graduates of terminal CTE programs.

Community college leaders sought to address concerns with ways CTE programs culminating in terminal associate's degrees contributed to the discouragement and tracking of underserved populations, particularly racially minoritized groups, away from transfer programs conferring baccalaureate degrees (Ignash, 2012). Researchers of K-12 education had leveled complaints about tracking of racially minoritized groups into CTE programming rather than a college preparatory curriculum (see, for example, Oakes & Saunders, 2008), and increasingly these concerns were raised about higher education as well (see, for example, Dowd & Bensimon, 2015).

Recognizing that vocational education has been a main function of community colleges since nearly their beginning (Bragg, 2018; Cohen et al., 2014), it is important to situate CCB degrees within this historical context. From the time "junior" colleges formed in the early 1900s, education leaders advocated for separating vocational curriculum focusing on immediate employment from transfer curriculum leading to the university. The 1939 Commission on Terminal Vocational Education promoted preparing students for semi-professional occupations, claiming students who completed a vocational curriculum were unqualified for transfer to universities (Frye, 1992) because they had not completed a general studies curriculum. As recently as 1998, the American Association of Community Colleges claimed that AAS degrees "do not ensure junior status at a four-year institution" (Atwell, 2020, p. 4). Federal law governing CTE education in the United States at the present time, called the *Strengthening Career and Technical Education Act of the 21st Century Act of 2017-18*, prohibits the expenditure of federal funds for CTE programs above the associate's degree. This policy constrains baccalaureate options for students seeking to deepen knowledge and skills needed for to enter and sustain employment, and it also limits their preparedness to advance in occupations moving toward the baccalaureate as the credential of choice for career mobility (National Academies of Sciences, Engineering, and Medicine, 2021).

Authorizing Legislation in Washington State

As previously mentioned, the first authorizing bill for CCB degrees in Washington passed in 2005. Titled *Expanding Access to Baccalaureate Degrees*, this law funded pilot programs in four community colleges. The legislation explicitly mandated that at least one pilot extend curriculum from a terminal AAS degree to a BAS degree, but in fact all the early pilot programs adopted this approach. Five years later, in 2010, the state legislature found the pilot programs sufficiently successful to lift the pilot status and make state-level program approval of BAS degrees permanent. In 2012, the legislature awarded the State Board of Community & Technical Colleges (SBCTC) authority for approval of all new BAS programs offered by community colleges. This legislation required these BAS-adopting institutions to maintain their community college mission while, for upper-division courses, approximating the tuition rates offered by regional public universities, thereby ensuring similar student charges for baccalaureates across the state. Table 1 provides a timeline and snapshot of Washington's legislation on baccalaureate degree conferral by community colleges.

Table 1

State Legislation and Timeline to Adopt and Expand Applied Baccalaureate Degrees in Washington Community and Technical Colleges

Legislative action and date passed	Primary focus
<i>Expanding Access to Baccalaureate Degrees – HB 1794 (2005, 2008)</i>	<p>Fund four community colleges (3 community colleges and 1 technical college) to pilot applied baccalaureate degrees that meet the following criteria:</p> <ul style="list-style-type: none"> • Demonstrate capacity in resources and commitment to build and sustain a high-quality program • Engage faculty appropriately qualified to develop and deliver high-quality baccalaureate-level curriculum • Demonstrate demand in student enrollment in the service area to make the program feasible and cost-effective • Demonstrate demand by employers for the level of technical training proposed • Fill a gap with a program not offered by four-year universities in the college’s geographic region <p>Pilot expanded to include three additional community colleges. At this time, 7 community colleges offer 8 BAS degree programs.</p>
<i>Expanding the Higher Education System Upon Proven Demand - SB 6344 (2010)</i>	<ul style="list-style-type: none"> ▪ Legislation lifts the designation of the applied baccalaureate as a pilot program and eliminates limitations on the number of BAS degree programs offered in Washington community colleges. ▪ The SBCTC and HECB are designated to approve applied baccalaureate programs. ▪ In accordance with regional accreditation rules, the law specifies that community colleges awarding more than 10 percent of total degrees conferred seek a mission change approved by the HECB.
<i>Applied Baccalaureate Degree Programs. Washington Revised Code HB 2483 (2012)</i>	<p>Pursuant to the elimination of the HECB, the SBCTC is granted applied baccalaureate program approval authority and requirements are specified to assess academic attainment by diverse student populations using disaggregated data analysis.</p>
<i>Bellevue College—Bachelor of Science in Computer Science SB 5928 (2016)</i>	<p>Subject to approval by SBCTC, Bellevue College can develop and confer bachelor of science (BS) degrees in computer science, given there is no program duplication in the geographic area and there is no shortage of programs demanded by industry and the workforce.</p>
<i>Authorizing community and technical colleges to offer bachelors of science in computer science – SB 5401 (2021)</i>	<p>This bill authorizes any community college to confer bachelor of science (BS) degrees in computer science, subject to approval of SBCTC. Other requirements include demonstration of institutional capacity, engagement of qualified faculty, demonstration of unmet workforce need, and access by students of color.</p>

In the past five years, the state legislature has passed two more laws related to baccalaureate degrees conferred by community colleges. The first, SB 5928, authorized a single community college to confer the BS (as distinct from BAS) degree in computer science beginning in 2016. A second bill passed in 2021 expanded authorization for BS in computer science programs to all community colleges in the state that secure program approval from the SBCTC, beginning in 2022 (Senate Democrats, 2021). These two laws change CCB degrees to allow community colleges to confer the same form of baccalaureate degree as university computer science programs, specifically the BS degree. Since passage, enthusiasm has grown among community college leaders to implement high-demand computer science BS programs while continuing to view their campuses as predominantly associates-dominant conferring colleges, and resistance from universities has been relatively limited to these degrees (Jamilyn Penn, in discussion with author, February 2021). The reasons for these favorable dynamics are unknown but it is possible there is growing understanding among higher education institutions in the state about the purpose and value of CCB degrees relative to university baccalaureates.

This most recent CCB legislation in Washington state is also important in that it offers an explicit recognition of inequities in higher education that contribute to racially minoritized students being under-represented in the state's high tech workforce. On this point, HB 2483 (2012) urged Washington to close gaps between educational requirements and achievement for populations under-represented in science, technology, engineering and mathematics (STEM) fields. The law also requires disaggregation of data on baccalaureate attainment by age, gender, race/ethnicity, and income. Importantly, this legislation also coincides with a newly adopted vision of the Washington SBCTC to recognize and address racial inequities:

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. (SBCTC, 2021)

Fully operationalizing this social equity mission in all of community college education presumably extends to CCB degrees, similar to what this new computer science BS degree attempts to do.

Literature on CCB Degrees and Labor Market Outcomes

From the start of CCB degrees in the United States, researchers and practitioners have written about the importance of applied degrees that prepare graduates for employment, going so far as to label the degrees "workforce baccalaureates" (McKee, 2005, p. 129). Some studies have solicited the opinions of employers on the value of CCB degrees and their willingness to hire CCB graduates. Grothe (2009) interviewed students and employers about BAS degrees in Washington and found students expected BAS degrees to result in employment in well-paying, training-related jobs. Employer views of BAS degrees were similarly linked to the workforce, including expressing a goal of retaining students in communities that might otherwise lose the talent needed to operate local businesses. Echoing these results, a later qualitative study (Bragg & Soler, 2017) found student and employer perceptions of BAS degrees were generally positive. Employers observe BAS graduates who work for their companies possess knowledge and skills immediately applicable to their jobs and also career advancement. Contrasting with these findings, the same study found university personnel were much more skeptical of CCB degrees, questioning their comparability to university baccalaureate degrees and speculating BAS graduates would struggle to get jobs and if they do, experience lower wages compared to university graduates.

Another qualitative study advised the state of Texas on expansion of BAS degrees in five program areas: nursing, computer and information technology, management of fire sciences,

management of production/operations technicians, and health information technology programs (Daugherty et al., 2014). Using stakeholder conversations and literature to inform the Texas Higher Education Coordinating Board (THECB), the study emphasized the role of BAS degrees in workforce development. Interviewees spoke favorably about workforce-oriented associates-level programs that lead to BAS degrees that are not as prevalent or potentially feasible to confer at the university level. However, Daugherty et al. noted that demand for graduates in the five program areas varied considerably by region, urging policy makers to consider the need for BAS degrees from a programmatic and regional perspective. Their study results made the strongest case for baccalaureate degrees in nursing. Subsequently, in 2018, the Texas legislature passed legislation authorizing bachelor of science in nursing (BSN) degrees to be conferred by community colleges. In 2021, the Texas governor signed legislation expanding the CCB to up to five bachelor's programs in community colleges demonstrating adequate local financing to support expansion of these degrees (Bonk, 2021).

In one of the few studies examining employment and earnings for CCB graduates, Love (2020) secured data from the Florida College System to compare employment and wages for CCB and associates-degree graduates in similar programs of study. Findings showed high employment rates for Black, Hispanic and White CCB graduates, averaging 83% overall, but also revealed some important differences among these groups by program of study. In the case of computer and information sciences, education, and healthcare, including nursing, Black and Hispanic CCB graduates had similar or higher employment rates than White graduates, whereas the employment rates of White graduates exceeded the other two groups in visual and performing arts and engineering technologies.

Love (2020) also compared the earnings of CCB graduates to associates-degree graduates in the fourth quarter after graduation, revealing CCB graduates earned about \$10,000 more in annual wages than associates-degree graduates. Here too, earnings gains varied by program and race/ethnicity, as well as by gender. A larger wage gain was found from the associates degree to baccalaureate degree for men than for women in computer and information sciences, communications technologies, business, and healthcare, including nursing, whereas a similar wage gain was found for men and women in visual and performing arts. Black and Latinx graduates demonstrated a higher associates-to-baccalaureate wage gain than Whites in education and nursing, but all three groups showed a similar wage gain in computer and information sciences and business. These nuanced results show that employment and earnings vary by program, race/ethnicity, and gender, pointing to the need to analyze labor market outcomes by program and these particular demographic characteristics. However, these results do not address how CCB graduates' earnings compare to those of baccalaureate graduates from primarily-baccalaureate-granting institutions.

Turning to Washington state, where longitudinal data have been gathered on graduates since the time BAS programs were first implemented, Kaikkonen (2017) found high employment by BAS program graduates from 2009 to 2017, ranging by program area from 80% to 92%. Kaikkonen matched SBCTC student records with state Unemployment Insurance (UI) records to determine whether a student had a UI record indicating employment during a particular quarter. Of all BAS graduates, healthcare graduates showed the most consistent and high employment rate and also exhibited the highest median earnings, approximately \$92,000 annually in the seventh and eighth year after BAS completion. Though computer and information sciences was a relatively new BAS program at the time of Kaikkonen's study, these graduates ranked second to healthcare on median earnings at two years after completion, at nearly \$58,000 in median annual earnings. Business BAS completers lagged the other two program areas in early post-graduation earnings but showed reasonable median earnings of nearly \$63,000 by the eighth year past graduation. This study did not attempt to compare labor market outcomes of BAS graduates to university bachelor's graduates.

Drawing on a subset of data from the 2017 Kaikkonen study for additional analysis, Kaikkonen and Quarles (2018) studied employment and earnings among Washington CCB graduates compared to associates-degree graduates in the same program a year after completion. Again focusing on CCB graduates without comparison to university bachelor's graduates, this study sampled a relatively small group of BAS graduates in comparison to a much larger group of associates-degree graduates in healthcare, technology, and social sciences (for example, 25 BAS compared to 182 associates graduates in healthcare). The time period for completion of all graduates was from 2008-09 to 2012-2013, a period when BAS programs were relatively new and with modest numbers of graduates in Washington state. Using propensity score matching due to the SBCTC's access to individual-level data, Kaikkonen and Quarles found a difference in earnings between BAS and associate graduates in all three program areas, with the highest earnings gain in healthcare for BAS graduates at \$23,848. The BAS graduate earnings gain was more modest in technology and social science, leading Kaikkonen and Quarles to suggest other measured variables, including gender, race/ethnicity, grade point average, age, and pre-enrollment work, as well as unmeasured variables, may explain between-group differences. For example, in all three programs, the earnings gain for female BAS graduates lagged behind male BAS graduates, leading the authors to recommend more research on "why women with the same credential earn less than men" (p. 363). Their study is important for understanding earnings differences of BAS graduates compared to associates-degree program graduates but, again, does not provide findings on comparisons to university graduates.

Also using longitudinal data from Washington, Cominole (2017) conducted the first rigorous study to estimate the causal effect of earning a BAS degree on employment and earnings one year past graduation. This unpublished dissertation analyzed labor market outcomes comparing CCB and university baccalaureate graduates while accounting for geographic proximity of community colleges and universities. Among other individual and institutional variables, Cominole found BAS nursing graduates were about 33% more likely to be employed than university baccalaureate nursing graduates at one year post-graduation, and BAS business graduates were about 8% more likely to be employed than university business graduates during this same time period. Regarding earnings, fixed effects regression results show no significant differences between BAS and university graduates in hourly wages one year after graduation for nursing and business graduates. Seeing no negative effect to earning a bachelor's degree from a community college on employment or earnings, Cominole concluded there is little empirical evidence supporting claims of CCB degrees as inferior to university degrees on the basis of the measured labor market outcomes.

Building on Cominole's (2017) research, our study seeks to compare employment rates and earnings of BAS graduates to university graduates in three program areas for three years post-graduation. If BAS graduates are found to demonstrate similar or even higher labor market outcomes or more equitable labor market outcomes as graduates from regional broad-access universities charging similar tuition rates as the community college programs, we contend the CCB programs should be promoted as an equity strategy for Washington colleges and possibly policy reforms in other states that seek to provide graduates with good jobs. Utilizing a large sample size representing three popular program areas and following these students for three years post-graduation, our study adds to the literature on baccalaureate attainment and equity on state policy on higher education.

Methods

The research design we used for this analysis has some similarities but also some important differences from previous research on community college BAS graduate outcomes. Our research

involves some of the same programs and investigation of employment and earnings using similar data on Washington BAS graduates as did Kaikkonen (2017) and Kaikkonen and Quarles (2018), and like Cominole (2017) compares university students to BAS graduates. However, our analysis involves more recent datasets, involving larger numbers of BAS students, more academic programs, and greater numbers of comparable university graduates. For example, Cominole based her findings on only 280 BAS students who graduated between 2009 and 2014, while we included 1,979 students who graduated as recently as 2017. We also examined labor market outcomes over a longer time period (i.e., three years post-graduation). Whereas the design of our study does not reveal the impact of CCB degrees in a causal sense, it does document enrollment growth in BAS programs important to the state of Washington (Brown, 2021) and presents valuable new results on labor market outcomes for graduates of these programs compared to public regional university baccalaureate graduates in similar programs of study.

This study emerged from a formal, negotiated data-sharing agreement between the Washington ERDC, Washington SBCITC, and the University of Washington-Seattle to secure and analyze aggregate longitudinal data on educational credentials, employment, and earnings. The study covered the timeframe from when Washington community colleges began graduating students in BAS programs in academic year 2009 through spring 2017 graduation. The data file we obtained provided employment and earnings for graduates of BAS degrees conferred by community colleges that were similar but not considered duplicative of university baccalaureate degrees, reflecting a legislative requirement for the state approval (Washington State Council of Presidents, 2017). Because of the necessity to construct similar comparison groups of BAS and university baccalaureate graduates, we chose to study students majoring in similar programs of study in business; healthcare, including nursing; and computer and information sciences. We acknowledge there may be some differences between BAS and BS programming in that BAS programs may place more emphasis on application and less on theory than BS programs; yet, we deemed the programs similar enough for this descriptive analysis of labor market outcomes (Bragg, Townsend & Ruud, 2009).

To address program comparability, we restricted our study to public universities geographically dispersed throughout Washington that were roughly proximate to the community colleges represented in the study and that do not employ highly selective admissions standards. Washington legislation on BAS degrees requires community colleges and universities to charge similar tuition rates for upper-division programming. Thus, the sample of universities included in this study includes public, regionally located universities, some having close proximity to and direct transfer agreements and more comparable student populations with community colleges than do the state's major research university. The universities included were University of Washington-Bothell; University of Washington-Tacoma; Central Washington University; Eastern Washington University; Western Washington University; Washington State University (WSU) main campus at Pullman; and WSU's regionally located campuses in Spokane, Tri-Cities, and Vancouver. The University of Washington in Seattle was excluded because of its highly selective admissions policy and higher tuition relative to these other higher education institutions. By imposing these sampling criteria, we sought to reduce systematic differences in institutions and student demographics that could confound the descriptive comparisons in our study.

Student Samples

The sample for our analysis was drawn from the population of 3,560 BAS graduates in Washington from the first graduates in 2009 through academic year 2017, representing a period of extensive growth of BAS programs in the state. During this period, enrollments expanded in the program areas included in our analysis (business; healthcare, including nursing; and computer and information sciences). Descriptive research of Washington BAS students conducted in recent years

show these students are older than students enrolled in other community college programs, averaging 32 years of age (Meza, 2019), and they are more likely to identify as racially minoritized than are students enrolled in similar programs offered by universities (Blume, 2020). More BAS students attend college full-time while working full-time than university students, as most programs are structured to accommodate full-time work and school with mostly hybrid schedules. Many BAS students have accumulated workforce experience prior to enrolling in a bachelor's program (Bragg & Soler, 2017).

To conduct the descriptive comparison of students by program of study, we culled the sample down to 1,979 BAS graduates in business; healthcare, including nursing; and computer and information sciences using six-digit Classification of Instruction Program (CIP) codes, as defined by the U.S. Department of Education's National Center for Education Statistics (2020). These codes provide a taxonomic scheme that supports tracking of enrollments and completions by program of study at institutions of higher education nationwide. CIP codes for BAS programs for the 1,979 graduates were identical to baccalaureate programs offered by the universities, with 16,964 students who earned baccalaureate degrees in these fields being sampled for the study. The 16,964 students represent all graduates from the universities included in our study for the same period as BAS graduates. Business and healthcare graduates predominated in both samples, with fewer BAS graduates of computer and information sciences included due, in part, to more recent implementation of these programs by community colleges compared to universities.

CIP codes used for this analysis began with the two-digit codes 52 for business, 51 for healthcare, and 11 for computer and information sciences. Modeling our approach on a study conducted by Stevens et al. (2018), who examined labor market outcomes for CTE programs in California, we constructed samples of BAS graduates and university baccalaureate graduates that were as comparable programmatically as possible. Also, these CIP codes were consistent with our prior research on BAS degrees (Meza, 2019, Meza & Bragg, 2020) and a study conducted by Blume (2020) to describe student enrollment and completion in selected BAS programs. Table 2 presents the number of graduates by program between 2009 and 2017-2018 who we tracked on labor market outcomes in the first quarter, fourth quarter (roughly equivalent to one year), and twelfth quarter (roughly equivalent to three years) after graduation.

Table 2

Distribution of BAS and University Baccalaureate Graduates by Program Area

Program area	BAS graduates (n=1,979)	University graduates (n=16,964)
Business	48.6%	60.1%
Computer & Info Sciences	13.4%	3.1%
Healthcare	38.0%	36.8%

Measures

The Washington ERDC dataset provided student demographics, as well as an in-state covered employment match between the individual BAS graduate data maintained by the SBCTC and the state's UI wage data. We used in-state covered employment match as a proxy for employment (Blagg & Washington, 2020), relying on these data to identify individuals classified as

employed according to their existence in the quarterly UI wage data maintained by the Washington Department of Employment Security. These data were provided as average quarterly earnings in the first, fourth, and twelfth quarters after graduation for BAS and university baccalaureate groups in each field. We computed year one and year three annualized earnings from these quarterly UI wage files according to recommended practice for analyzing UI wage data (Feldbaum & Harmon, 2012). As such, the annualized earnings figures are rounded to the nearest \$100 and adjusted for inflation in 2017 dollars. The comparison of annualized earnings by group was conducted in the form of descriptive statistics only, providing counts for the two groups of baccalaureate-holders by program and further disaggregated by race/ethnicity and gender.

Finally, to further analyze the data for group comparison purposes, we computed statistical differences between groups using two-tailed t-tests for significance on average wages in the fourth quarter after graduation, or the approximate end of the first year of employment. We used this point because it provided sufficient time for both groups of graduates to attain employment, and we had a large enough n size for meaningful significance testing.

Limitations of the Study

We acknowledge that our research design has some limitations. First, the use of aggregate data precludes our ability to conduct student-level analysis to control for systematic differences between BAS and university baccalaureate graduates. Despite our attempt to construct similar samples of graduates of each institution type, given the aggregate data provided by the Washington state agencies, it is not possible to draw definitive causal conclusions about the impact of BAS degrees relative to university baccalaureate degrees. Such analysis requires rigorous causal-comparative and quasi-experimental designs involving individual student unit records, but we were not granted access to individual records.

UI wage records provide incomplete detail on individuals' employment circumstances (i.e., whether an individual has a full- or part-time job, or the nature of the job), although we note these records are used widely to measure the effects of higher education on graduate employment and earnings (Blagg & Washington, 2020; Feldbaum & Harmon, 2012). Additionally, these files did not include earnings for those not covered by UI, most notably graduates who are self-employed or who work for the federal government (civilian or military). In addition, data only included earnings for state of Washington employees.

We also recognize limitations of the demographic data in that we were only able to secure data on individuals' race/ethnicity and gender, and these variables are limited by the categories included in datasets administered by SBCTC and ERDC, often using federal government terminology. This limitation includes the construction of gender as a binary variable (male and female), and classification of race/ethnicity in discrete, socially constructed categories that are not fully reflective of individuals' multiple race/ethnic identities. Also missing from our data was information about the age and work experience of our samples. There were likely differences between the two groups, and these variables are known to influence earnings.

Results

BAS Degrees and Demographics

We begin presentation of the results by describing the demographic makeup of CCB students graduating from BAS programs and comparing them to their counterparts graduating with degrees in similar fields from public regional universities. BAS graduates in the sample were 59.4% White, 10.8% Asian, 5.2% African-American, and 9.7% Latinx (Table 3). A total of 61.5% of

students in the sample of BAS graduates were female. There were differences in student demographics by program, with White and Asian students comprising a slightly larger percentage of graduates in computer and information sciences and a smaller share of graduates in healthcare and business. The program area with the largest enrollment share of African-Americans was healthcare where they made up 9.4% of graduates. The African-American share in the other two program areas is small. We also see a higher percentage of Latinx graduates in business than in other programs, with 13.7% identifying as Latinx.

Table 3

BAS Graduates by Program Area and by Race and Gender

Program area	BAS grads (No. & %)	Race				Gender	
		White (No. & %)	Asian (No. & %)	African American (No. & %)	Latinx (No. & %)	Female (No. & %)	Male (No. & %)
Business	962 (48.6)	572 (59.5)	89 (9.3)	21 (2.2)	132 (13.7)	562 (58.4)	399 (41.5)
Computer & Info Sciences	265 (13.4)	167 (63.0)	36 (13.6)	10 (3.8)	13 (4.9)	45 (17.0)	220 (83.0)
Healthcare including Nursing	752 (38.0)	436 (58.0)	88 (11.7)	71 (9.4)	46 (6.1)	610 (81.1)	140 (18.6)
Total	1979 (100%)	1175 (59.4)	213 (10.8)	102 (5.2)	191 (9.7)	1217 (61.5)	759 (38.4)

Turning to a comparison between graduates of BAS and university programs, we observed similar percentages of White and female graduates among the community college and university bachelor's graduates overall (Table 4). However, we also noted smaller percentages of African-American (3.8%) and Latinx graduates (6.8%) in the university sample than the BAS sample. Asian graduates were represented among university graduates at a slightly higher percentage (14.8%) than among BAS graduates (10.8%). Also, larger proportions of African-American graduates were in healthcare and Latinx graduates in business BAS graduates compared to university graduates. Indeed, the advantage of CCs in enrolling and graduating more underrepresented students is a key rationale for CCB programs.

These findings are consistent with results reported by Blume (2020) for enrollments in nursing and business. Based on enrollment data in similar BAS and university programs in Washington, Blume observed that, based on program enrollments, BAS programs may offer greater access for women, Latinx and African-Americans in business than university business programs. Blume also observed that BAS graduates are slightly more racially and ethnically diverse than university graduates in nursing. Again, Blume's study compared BAS and university graduate demographics but did not examine these graduates' labor market outcomes, so this study does not speak to employment and earnings comparisons discussed in the remainder of this text.

Table 4*University Graduates by Program Area and by Race and Gender*

Program area	Univ. grads (No. & %)	Race						Gender	
		White (No. & %)	Asian (No. & %)	African American (No. & %)	Latin x (No. & %)	American Indian/ Alaska Native (No. & %)	Native Hawaii/ Pacific Islander (No. & %)	Female (No. & %)	Male (No. & %)
Business	10,202 (60.1)	5770 (56.6)	1764 (17.3)	265 (2.6)	662 (6.5)	148 (1.5)	120 (1.2)	4979 (48.8)	5215 (51.1)
Computer & Info Science	523 (3.1)	294 (56.2)	99 (18.9)	33 (6.3)	47 (9.0)	<10 (<1)	<10 (<1)	173 (33.1)	345 (66.0)
Healthcare including Nursing	6239 (36.8)	4060 (65.1)	646 (10.4)	341 (5.5)	434 (7.0)	116 (1.9)	22 (<10)	5309 (85.1)	946 (15.2)
Total	16,964	10,124 (59.7)	2509 (14.8)	639 (3.8)	1143 (6.8)	264 (1.5)	>142 (<1)	10,461 (61.7)	6,506 (38.4)

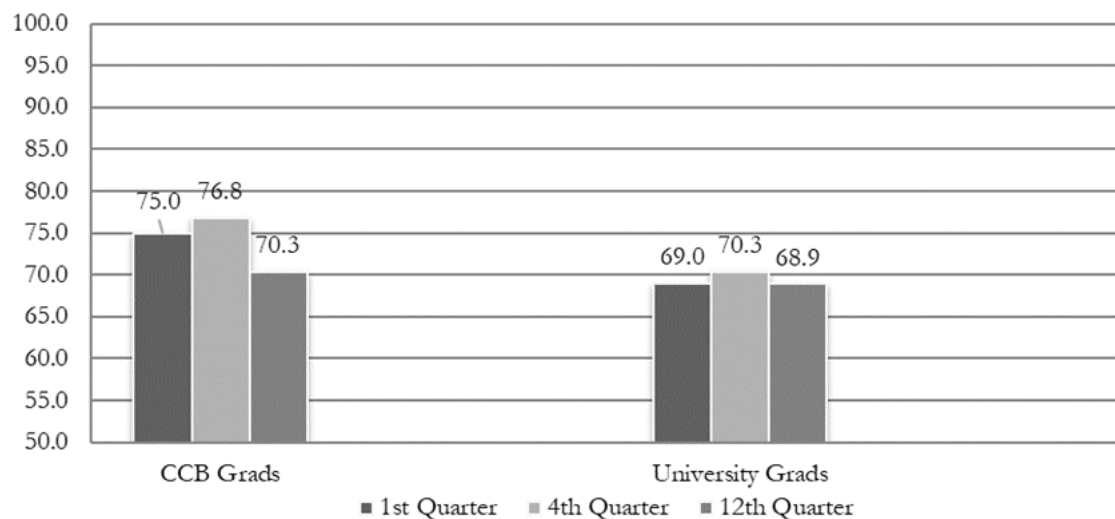
Employment Comparison

We also studied employment for BAS graduates compared to university graduates using the in-state covered UI wage employment match rate based on graduates having Unemployment Insurance (UI) earnings records in the Washington Employment Security Department system. Findings show a higher in-state covered employment match rate for all BAS graduates compared to all university graduates, both immediately after graduation and at one year after graduation. In the first quarter after graduation, BAS graduates had a 75% match rate compared to a 69% match rate for university graduates. In the fourth quarter post-degree, the match rate continued to be higher for BAS graduates (77%), compared to university graduates (70%). By the twelfth quarter after completion, however, the match rate of the two groups was nearly equal, at 70% match for BAS graduates and 69% for university graduates.

To better understand the match-rate comparison, we refer to Blagg and Washington (2020) for an explanation of how the in-state employment match rate may operate differently for community college and university graduates. Observing that university graduates may take employment out of state more often than community college graduates, who are more likely to have binding local ties, it is possible the findings for university graduates are not as reflective of the actual overall employment rate as they are for community college graduates. Although, by sampling university graduates who attend regional public universities, thus eliminating the state's flagship university that draws substantial numbers of out-of-state and international students, this concern may be partially mitigated. Most relevant may be that more graduates in the BAS group, who tend to be older on average (Meza & Bragg, 2020), are already employed in the earlier quarters after graduation than are the younger university graduates. If this is the case, the employment match rate is bound to be higher for the BAS graduates than for the university graduates.

Figure 1

In-state Covered Employment Match Rate for Three Designated Quarters after BAS and University Bachelor's Completion



Annualized Earnings Comparison

Turning to our analysis of annualized earnings, we found similar earnings for both graduate groups, though with some possibly important differences (Table 5). Except in healthcare, BAS graduates earned higher wages in the first quarter after graduation than did university graduates. By the fourth quarter (one year) after graduation, the earnings of university graduates in both healthcare and business exceeded BAS graduates. Indeed, Table 5 shows a steeper upward trajectory for university graduates, as might be expected. Because the BAS in computer and information sciences is newer than the other programs, we were unable to calculate annualized earnings based on the third year following graduation. However, earnings in the first two time periods were higher for BAS graduates than for university graduates. The fact that the BAS graduates' earnings were much higher than those of associates' graduates and grew over time provides some validation for these degree programs.

Looking at the healthcare specifically, annualized earnings of BAS graduates were lower than those of university graduates in all three time periods. Examining the programs of study within the healthcare category, we found the university graduate group included a higher proportion of nursing graduates than did the BAS group. Whereas both groups graduated substantial numbers of nurses, among the BAS graduates is a larger proportion of healthcare graduates in radiation and imaging, dental hygiene, respiratory care, public health, and community health. This difference in program composition might account for some of the difference in annualized earnings for BAS graduates and university graduates, although it is also possible that the within-program results for healthcare relate to other differences for which we were unable to account in our descriptive research design.

Table 5*Annualized Earnings by Program for BAS and University Graduates in 2017 Dollars*

Program area	BAS graduates			University graduates		
	Annualized earnings the year of graduation	Annualized earnings one year after graduation	Annualized earnings three years after graduation	Annualized earnings the year of graduation	Annualized earnings one year after graduation	Annualized earnings three years after graduation
Business	\$40,000	\$45,200	\$49,200	\$32,400	\$42,000	\$53,200
Computer & Information Sciences	\$47,600	\$52,000	N/A	\$42,400	\$49,200	N/A
Healthcare including Nursing	\$50,000	\$60,000	\$68,400	\$51,600	\$66,000	\$72,400

Note: Annualized earnings based on average quarterly wages. For wage calculations, we only included students who had graduated post-2012.

Using \$53,000 annual income is an indicator of participation in the middle class, as proposed by Carnevale et al. (2016), we found healthcare to be the one program area where both baccalaureate graduate groups reached annualized earnings consistent with the middle class by the year after graduation. The annual earnings were met or exceeded by these healthcare graduates at both the fourth and twelfth quarter periods after graduation as well. The only other graduate group to meet the \$53,000 threshold was university business graduates at the twelfth quarter after graduation (\$53,200). Whereas this method of understanding the meaning of annual income cannot be used to draw conclusions on merit, it is suggestive of, at minimum, labor market demand that healthcare programs are associated with higher annualized earnings than other program areas for both graduate groups.

To further analyze whether earnings differences were statistically significant between the two groups we performed two-tailed t-tests for significance using average wages in the fourth quarter, assuming this point provided sufficient time for graduates to secure what might be termed permanent employment. This analysis showed a significant difference in wages between BAS and university graduates in two program areas, healthcare and business. First, the difference in earnings in favor of university graduates in healthcare one year after graduation was statistically significant ($p < .01$, $t = 4.37$, $df = 3267$), with a significantly higher employment match rate for university graduates compared to BAS graduates. In business, the difference in earnings of BAS and university graduates was statistically significant ($p = .01$, $t = 2.58$, $df = 4006$), but this field favored BAS graduates. The business program also had a higher employment match rate for BAS graduates than for university graduates. However, this finding reversed itself by three years after graduation when the employment match rate of university graduates exceeded that of BAS graduates.

Annualized Earnings Comparisons by Gender and Race/Ethnicity

In addition to relatively small differences in the earnings match rate between the total group of BAS graduates and the total group of university graduates, we found differences by gender and race/ethnicity. Table 6 summarizes annualized earnings by gender and shows male graduates of the BAS programs and university programs earned more than female graduates. In fact, this difference between male and female graduates tended to be greater both within the BAS and university groups than were the differences between the BAS and university graduate groups. The one area in which females earned more than males was in the BAS computer and information sciences program at one year post-graduation, with annualized earnings for female BAS graduates at \$60,800 compared to male graduates at \$50,400. The reasons for this contrasting finding are unclear in these data and call for further research to understand patterns of earnings by program and gender, including research sensitive to historic gender differences in graduate earnings by program of study.

Table 6

Annualized Earnings for BAS and University Graduates by Gender

Program area	Female			Male		
	Annualized earnings the year of graduation	Annualized earnings one year after graduation	Annualized earnings three years after graduation	Annualized earnings the year of graduation	Annualized earnings one year after graduation	Annualized earnings three years after graduation
BAS graduates						
Business	\$36,400	\$40,800	\$46,000	\$45,200	\$50,800	\$53,200
Comp & Info Sci	\$37,200	\$60,800	N/A	\$49,200	\$50,400	N/A
Healthcare	\$48,000	\$57,600	\$65,200	\$58,400	\$70,800	\$80,800
University graduates						
Business	\$31,600	\$40,800	\$50,400	33,200	42,800	56,000
Comp & Info Sciences	\$38,000	\$46,000	N/A	42,800	49,600	N/A
Healthcare	\$51,200	\$65,600	\$71,600	52,400	69,200	\$77,200

Note: Annualized earnings based on average quarterly wages in 2017 dollars. For wage calculations, we only included students who had graduated post-2012.

Turning to our analysis of annualized earnings by race/ethnicity for both BAS and university graduates, we observed slightly higher earnings for White students in both samples with some notable exceptions (Table 7). For example, Latinx BAS graduates in business had higher annualized earnings than White graduates after 12 quarters, a finding not evident for university business

graduates. In healthcare, African-American BAS graduates had the lowest earnings of any race/ethnic group in the first two measurement periods but by the third year after graduation were approaching parity with the university graduate group. Small cell sizes for African-American BAS graduates prohibited group comparisons in business and computer and information sciences.

Table 7

Annualized Earnings for BAS and University Graduates by Race

Program area	White		African American		Asian		Latinx		Native American/ Alaska Native	
Business	BAS Graduates									
	1Q	\$40,400	1Q	\$28,000	1Q	\$33,600	1Q	\$42,800	1Q	\$36,800
	4Q	\$45,600	4Q	N/A	4Q	\$40,400	4Q	\$45,600	4Q	\$44,000
	12Q	\$51,200	12Q	N/A	12Q	\$53,600	12Q	\$52,800	12Q	N/A
Comp & Info Sciences	1Q	\$49,200	1Q	N/A	1Q	\$36,000	1Q	\$57,600	1Q	N/A
	4Q	\$53,600	4Q	N/A	4Q	\$42,000	4Q	N/A	4Q	N/A
	12Q	N/A	12Q	N/A	12Q	N/A	12Q	N/A	12Q	N/A
Healthcare	1Q	\$52,000	1Q	\$42,000	1Q	\$50,400	1Q	\$46,400	1Q	N/A
	4Q	\$62,800	4Q	\$54,000	4Q	\$58,800	4Q	\$62,800	4Q	N/A
	12Q	\$72,000	12Q	\$74,600	12Q	\$77,600	12Q	N/A	12Q	N/A
University Graduates										
Business	1Q	\$34,000	1Q	\$31,600	1Q	\$27,600	1Q	\$31,600	1Q	\$33,200
	4Q	\$43,600	4Q	\$40,800	4Q	\$38,400	4Q	\$39,600	4Q	\$42,800
	12Q	\$55,200	12Q	\$55,200	12Q	\$50,400	12Q	\$48,800	12Q	\$54,000
Comp & Info Sciences	1Q	\$48,400	1Q	\$34,400	1Q	\$33,600	1Q	\$37,200	1Q	N/A
	4Q	\$51,600	4Q	\$44,400	4Q	\$43,200	4Q	\$46,800	4Q	N/A
	12Q	N/A	12Q	N/A	12Q	N/A	12Q	N/A	12Q	N/A
Healthcare	1Q	\$52,000	1Q	\$58,400	1Q	\$57,600	1Q	\$45,200	1Q	\$44,400
	4Q	\$66,000	4Q	\$72,400	4Q	\$68,000	4Q	\$63,600	4Q	\$55,600
	12Q	\$71,600	12Q	\$76,800	12Q	\$75,600	12Q	\$70,800	12Q	\$65,600

Further, Asian-American graduates of business programs and computer and information sciences programs had lower annualized earnings than other race/ethnic groups in both graduate samples. In earlier research on BAS student demographics, Meza (2019) found some evidence that Asian American students are, on average, younger than their BAS peers and therefore may have less work experience, which may be associated with lower wages. Latinx graduates who completed BAS degrees in business had higher wages than their university counterparts and, again, this finding may be associated with Latinx BAS business graduates having more work experience relative to university business graduates. However, we were unable to measure prior employment in the aggregate data from Washington state, calling for more data on student demographics, especially age, work experience, and prior earnings to examine this and other important questions regarding employment and earnings for BAS graduates compared to university graduates in similar programs of study.

Implications for More Equitable Policy and Research

Washington is a leading state in the adoption of CCB degrees nationally. Florida, the other leading state, has garnered a lot of attention because of early and continuing efforts of the Florida College System to support CCB implementation statewide (Love, 2020). By comparison, Washington state has approved 29 of 34 colleges to confer one or more baccalaureate degrees in the form of BAS degrees associated with CTE programs heretofore terminating in AAS degrees, only recently adding the BS degree in computer and information sciences. Rectifying a historic legacy of terminal CTE programs designed to prepare students for immediate employment rather than transfer to universities, the BAS degree was integrated into Washington's 2006 strategic plan to help remedy what a state task force saw as a structural inequity in higher education. In addition to simply producing more degrees in high-demand fields, important to Washington's approach to CCB degrees is the state's intent to address inequities in college access and completion by improving baccalaureate attainment and labor market outcomes for racially minoritized students and others underserved historically by higher education, groups that often are concentrated in community colleges.

Comparing results of the overall groups descriptively, we found BAS graduates had higher measured employment rates than university graduates, at least initially, and we also saw that BAS graduates' earnings were higher than those of university graduates in the first year following graduation. Looking three years past graduation, we found growth in earnings for both the BAS and university graduate groups in all three program areas, with evidence that university graduate earnings caught up or surpassed BAS graduate earnings. Whereas it is not possible to draw definitive conclusions on effects based on these descriptive comparisons, similar to Cominole (2017), we do not see a substantial penalty for BAS degrees relative to university graduates on employment and earnings. Cominole studied graduates up to one year past graduation, and our study of graduates up to three years past completion extends for this 3-year period. If these results hold in studies of larger samples, especially when using research designs allowing for additional individual variables relating to employment and earnings, the case of CCB degrees could potentially be strengthened.

Delving more deeply into student demographics, we found large differences in earnings by gender, with higher earnings for male graduates compared to female graduates in both the BAS and university groups. Earnings differences were larger within some program areas than others, and within-program gender differences were more pronounced than those between BAS and university graduates. These findings raise the question of why an earnings gap between males and females appears in both the BAS and university graduate samples, and why the BAS gap appears to be larger. Clearer patterns were not possible to discern for the BAS and university graduates on race/ethnicity

differences due to the nature of the aggregate data files accessible to us, but we generally did see higher earnings for BAS graduates who identified as White and Latinx than other race/ethnic groups, suggesting BAS programs may be somewhat more adept at addressing racial gaps than university programs wherein White graduates tended to have higher earnings than all other race/ethnic group graduates. These findings suggest more attention should be paid to inequitable outcomes in occupationally specific BAS programs by race and gender, but also in similarly occupationally focused university baccalaureate degree programs.

Future Research

With BAS degrees spreading across Washington, it is important to understand more about the labor market outcomes of BAS relative to university baccalaureate degree-holders. Given the focus of BAS programs on placing graduates in employment in good jobs consistent with reaching the middle class, it is important to know about these baccalaureate graduates' employment and earnings. Knowing the labor market outcomes of these graduates may contribute to future policy decisions about the conferral of baccalaureate degrees.

This study focused specifically on BAS degrees in Washington to help address a gap in the literature on labor market outcomes for graduates of previously terminal CTE programs who now hold this relatively new form of baccalaureate degree (Cotner et al., 2021). Students enrolling in postsecondary CTE are hard-pressed to make decisions about their career pathways without a clear understanding of employment and earnings associated with specific programs of study. This study points to the need for more research on the labor market outcomes of graduates of particular programs at both the community college and university levels. An unexplored reason for variation in these findings may also be due to substantial heterogeneity in programs that complicate estimations of returns for graduates, especially for diverse populations where numbers may be small (Stevens et al., 2019). Because students who enroll in baccalaureate programs are diverse, it is possible their observed, and also unobserved (e.g., age and prior work experience), characteristics vary within and across programs in ways unaccounted for in our employment and earnings data. As noted earlier, the lack of availability of student-level data providing a rich array of relevant variables precluded us from engaging in more rigorous analysis of the impact of BAS on labor market outcomes relative to university graduates. Future research in Washington and other states necessitates student-level data, including data on key characteristics such as student/graduate age and prior work experience and earnings, that allows for more robust designs to measure causally the effects of BAS degrees on employment and earnings relative to university graduates.

Finally, Cuellar and Gandara (2021) argue the early stage of development and implementation of CCB degrees may facilitate “equity-oriented strategies” (p. 71) that could improve baccalaureate completion for underserved populations, especially racially minoritized students, who are often concentrated in CCs. Following their call for action, we recommend future research focus on understanding factors affecting CCB program completion, labor market outcomes, and other effects not yet studied for diverse student populations. This research should provide information useful to states, higher education systems, and community colleges considering adopting CCB degrees, as well as students who are considering attending these programs. Calls for better labor market information on college graduates are already common in higher education (see, for example, Hughes et al., 2021; Rosen et al., 2018; Sublett & Tovar, 2021), but this information is especially critical for CCB programs where preparation for good jobs is a stated goal. Results on the outcomes of CCB programs disaggregated by gender, race/ethnicity, and other demographic characteristics are

also important to know, given the importance of ensuring more equitable outcomes in baccalaureate attainment for underserved populations in higher education.

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