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**Sarah Bohn,
Jacob Jackson,
Shannon McConville**
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Courtney Lee

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Career Pathways and Economic Mobility at California's Community Colleges



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Technical appendices to this report are available on the PPIC website.

Career education programs in California’s community colleges are a critical component of public higher education in the state. Also known as career technical or vocational programs, career education trains individuals for middle-skill jobs that require more than a high school diploma but less than a four-year degree. These jobs make up a third of California’s labor market today and are projected to make up a similar share in the future.

Career education credentials, such as associate degrees and certificates, typically take less time to complete and offer lower economic payoffs than bachelor’s degrees. But career education can also connect students to career pathways that offer opportunities for advancement—particularly important for workers with lower levels of education and those in need of retraining. In this report, we examine whether career education pathways improve students’ long-term earnings and the factors associated with wage gains. Our analysis uses detailed student records that reflect enrollment and completion in career education programs as well as earnings before and after students finish their credentials. We find:

- **Career education credentials typically provide economic benefits.** Overall, credential holders saw a 20 percent increase in earnings. In addition, the majority of students begin earning middle-income wages within one year of completing a career education program. What constitutes middle income varies across the state, from at least \$23,400 in annual earnings for a single person in the Central Valley to \$32,800 in the San Jose region.
- **Wage gains vary considerably by program area and credential length.** Returns to career education credentials ranged from virtually zero in some business and IT programs to more than 100 percent increases in earnings for associate degrees in health. Students who received only one short-term certificate saw lower wage increases (8%) than those receiving a single long-term certificate (21%) or associate degree (32%).
- **Stackable pathways are linked to increased earnings, but they take longer.** Students who start with certificates but then complete additional credentials in the same field—what we refer to as “stacking”—typically catch up in earnings to students who only complete a single, high-return credential. However, it takes about two years for the majority of students who begin with a short-term certificate and then stack additional credentials to earn middle-income wages, compared to less than half a year for students who initially earn an associate degree.
- **Earnings trajectories vary across racial/ethnic groups.** These differences are largely related to the programs in which students earn their award. For example, Latino and African American students are more likely to earn

credentials in early childhood education—which typically yield low returns—while fewer enroll in higher-return programs like health. There are also earnings gaps between students of different racial/ethnic backgrounds for the same credentials, though these differences tend to be smaller.

- **Not all career education programs align with well-paying jobs.** Some career education programs prepare students for jobs in protective services, health care technical fields, and engineering technical fields, which offer current workers solidly middle-income earnings. However, other programs may lead to middle-skill jobs in low-paying industries, such as health care support and personal care.
- **Regional factors affect future opportunities for middle-skill jobs.** In the far north, the Sacramento area, the Central Valley, and the Inland Empire, at least a third of future jobs will likely require some college training but not a bachelor’s degree. In contrast, in the Bay Area and San Jose regions, no more than a quarter of future jobs are projected to need middle-skill workers.

To further boost economic outcomes for career education students, California’s community colleges should continue their efforts to enhance student advising and support services, increase access to high-return credentials, and collaborate with local employers on career pathway development. As community colleges seek to strengthen their career education programs, greater awareness of the extent to which credentials lead to economic gains is essential to promoting students’ economic mobility and meeting the state’s workforce needs.

Introduction

The importance of postsecondary education in helping Californians achieve—and maintain—labor market success has increased over recent decades and in the wake of the Great Recession (Johnson, Cuellar Mejia, and Bohn 2018). Technological advancement and continual pressure from a competitive global marketplace have led to wage stagnation and slowing economic mobility, particularly for less-skilled workers (Autor 2010; Chetty et al. 2017). Unlike a generation ago, in today’s economy, careers that can support a family require education beyond high school (Deming and Dynarski 2009). Employment alone does not eliminate poverty in California, and workers with no education beyond high school are more likely than more educated workers to be poor (Bohn, Danielson, and Thorman 2018).

Career education (CE) has received renewed attention from state and national policymakers interested in improving students’ future economic well-being and addressing employers’ workforce needs. Career education, also known as career technical education (CTE) or vocational education, typically prepares students for work in middle-skill jobs, which require some training beyond high school but not a bachelor’s degree. Workers in these jobs are critical to the state’s economy, constituting roughly one-third of the workforce. Educational programs that lead to middle-skill jobs serve a wide range of students, including recent high school graduates, stranded workers (adults age 25–34 with a high school education or less), and other workers in need of retraining. However, the extent to which career education improves career outcomes and long-term earnings trajectories is not well understood.

Effective career pathways in community colleges have the potential to promote economic mobility by enabling students to build skills and earn additional credentials that can improve job placement, professional advancement, and earnings. In this report, we examine the earnings of students who complete career education credentials in California’s community college system—the primary provider of career education in the state—to assess the relationship between different career education pathways and students’ long-term earnings trajectories.

Since 2014, California legislators have allocated more than \$1.5 billion in state funds to expand and improve career education programs and pathways in community colleges.¹ In addition, the state’s online college, which is scheduled to launch in 2020, will initially focus on career education credentials and includes plans to develop career pathways designed in partnership with employers and industry groups. This investment should be informed by an understanding of the potential economic returns to different career pathways available within the community college system. Students, teachers, and administrators would also benefit from a more comprehensive picture of the economic gains of various pathways.

Finishing a career education program and earning a credential is the first step to unlocking the potential economic benefits. But career education programs, like other programs in the community college system, struggle with low completion rates. Just over half of career education students complete a degree or credential within six years of entering a program, although there are efforts currently underway to improve this rate.² Most notably, the Guided Pathways initiative is designed to boost student outcomes by providing clear pathways and better supports for students to reach their educational and professional goals. In prior work, we identified ways that colleges can increase the likelihood of students completing pathways by implementing well-designed career education programs, which seem to be especially important for Latino students (Bohn and McConville 2018).

¹ This includes \$500 million for Career Pathways Trust, \$500 million in Career Technical Education Incentive Grants, and an annual ongoing allocation of \$200 million for the Strong Workforce Program.

² Only 55 percent of students who start career education programs earn credentials within six years according to the California Community Colleges Chancellor’s Office (CCCCO) Student Success Scorecard based on the 2011–12 cohort.

Although improving completion rates is an essential and ongoing endeavor, this report focuses instead on the payoffs to completion. We examine the extent to which career education credentials boost students' economic well-being, in particular their ability to earn middle-income wages—which we define as between 200 and 700 percent of the California Poverty Measure threshold—and how long it takes students to get there. Because this threshold varies across regions to reflect differences in cost of living, the annual earnings that place people in the middle-income level are different across the state.

When examining the factors associated with wage gains, we look at both the program area and the pathway students took (e.g., earning a single credential or multiple credentials in the same field). Many career education students only complete a single short-term certificate, which provides relatively low wage returns, according to previous research (Jepsen, Troske, and Coomes 2014; Dadgar and Trimble 2015; Bohn, McConville, and Gibson 2016; Minaya and Scott-Clayton 2017; Bahr 2016; Stevens, Kurlaender, and Grosz 2018).

Our analysis is also concerned with equity and understanding which demographic groups pursue the credentials with the most economic gains—keeping in mind that delayed wage gains and low-return credentials present a particular hardship for disadvantaged students. At the same time, career education programs are intended to meet regional labor market needs, which means serving some industries where jobs are plentiful but wage levels are nevertheless low and upward mobility is less likely. While it may be challenging to balance these goals, our perspective is that stakeholders—the state, the community colleges, and students—should have full knowledge of these tradeoffs.

In the first section of this report, we draw on information from longitudinal student records that are linked with quarterly earnings data to examine returns to career education credentials, track the earnings trajectories of students who complete these awards, and evaluate the time it takes to reach a certain level of earnings. Next, we examine how these economic returns to career education vary across different student groups and across regions of the state. Then we combine information from regional employment projections with educational and earnings profiles from a large household survey to assess how available pathways align with future jobs that can move students out of poverty and into middle-income careers. We conclude with a discussion of how these findings can inform the students earning career education credentials, the community colleges designing these pathways, and the policymakers seeking ways to improve economic outcomes and meet workforce needs.

Overview of Career Pathways

Career education programs in California's community colleges offer numerous pathways that can help improve students' labor market outcomes. These programs vary in intensity, length, and the extent to which they are connected to specific job requirements and/or industry certifications (see text box on page 7). They also serve a wide range of students. Career education draws students straight from high school as well as working adults reengaging with college. However, the typical student who completes a career education credential is 29 years old, has a high school education or less, and has been working four to five years prior to earning their first credential.

Career education pathways can take many different forms. Some career training only requires a single credential (e.g., firefighters). Other pathways are amenable to stackable credentials, which allow students to build skills over time by earning more than one award in the same field. Most stackable pathways include two or more credentials within the same career discipline (see Bohn et al. 2018). While the vast majority (91%) of students who first earn

an associate degree do not earn an additional award, more than 20 percent of those who earn a short- or long-term certificate return to community college to earn at least one additional award.

In this report, we examine several different kinds of student pathways. In most cases, we focus on students who: (1) earn only an associate degree, (2) earn only a long-term credential, (3) earn a long-term credential and stack an additional credential in the same field, (4) earn only a short-term credential, and (5) earn a short-term credential and stack an additional credential in the same field.³

Career Education Credentials in California's Community Colleges

Community colleges award career education credentials in programs that vary substantially in length, where length is defined based on full-time enrollment:

- **Short-term certificates** can be earned in less than one year (6–29 units). About 40 percent of awards over our study period (2003–2010) were in this category. Some of these certificates are awarded only at specific colleges or districts, but are not recognized by the Chancellor's Office.
- **Long-term certificates** can be earned in more than one year but less than two years (30–59 units). About 20 percent of awards were in this category.
- **Associate degrees** require two years of training (60+ units). About 40 percent of awards were in this category.

Career education programs prepare students for many different occupations. These broad program areas comprise the bulk of career education offerings and are the focus of our analysis:

- **Business and management** accounts for 20 percent of credentials and includes programs like accounting and real estate.
- **Engineering and industrial technology** accounts for 13 percent of credentials and includes skilled construction trades and machining.
- **Family and consumer sciences (FACS)** accounts for 15 percent of credentials, and the vast majority are in early childhood education.
- **Health** accounts for 20 percent of credentials and includes licensed vocational nursing, dental assisting, and registered nursing.
- **Information technology (IT)** accounts for about 5 percent of credentials and includes computer networking and information security.
- **Public and protective services** accounts for about 17 percent of credentials and includes administration of justice and fire technology.

Economic Outcomes to Career Education

In this study, we are particularly interested in whether obtaining career education credentials improves economic well-being as reflected in earnings from employment. Thus we focus on students who were working before entering a career education program (most of whom continued to work during the program).

³ Where appropriate, we examine slight variations in these pathways (e.g., when we assess the returns of stacking credentials, we examine students who first earned an associate degree, long-term certificate, or short-term certificate, as well as students who earned additional awards after their first credential).

Economic well-being is a subjective concept. A given income level may be sufficient for a single person but not a parent with young children, or it may be enough in Redding but not in San Francisco. In order to make our assessments of earnings trajectories more comparable across individuals, we normalize earnings levels. Specifically, we compare earnings to multiples of the California Poverty Measure (CPM) threshold, which accounts for different family types and variation in the cost of living across regions (Bohn et al. 2013).⁴ The following definitions are used throughout this report (based on Bohn and Schiff 2011; Reed 1999; Reed 2004):

- **Low income:** below 200 percent of the regional poverty threshold. The cutoff for low-income earnings for a single person ranges from \$23,400 annually in the Central Valley to \$32,800 in the San Jose region. Individuals earning less than these thresholds are considered low income.
- **Middle income:** between 200 and 700 percent of the regional poverty threshold. Across regions, a single person in the Central Valley would be considered middle income with annual earnings between \$23,400 and \$82,000, while a single person in the San Jose region would be considered middle income with annual earnings between \$32,800 and \$114,800. Once again, these cutoffs vary across regions. With such a wide range for what constitutes middle income, we also highlight upper-middle income earnings, which are above 500 percent of the poverty threshold (see text box on page 13).
- **High income:** above 700 percent of the regional poverty threshold. High-income earnings for a single person are more than \$82,000 annually in the Central Valley and more than \$114,800 in the San Jose region.

The majority of students who obtain a certificate or degree in career education fields (58%) are considered low income (earn less than two times the poverty threshold) in the years prior to completing their first award at community college.⁵ In this report, we assess the earnings returns associated with different program areas and pathways as well as whether career education credentials help move students out of low-income status.

Measuring Student Economic Outcomes

We rely on quarterly earnings data from the state's Unemployment Insurance (UI) program in the Employment Development Department (EDD), merged with student-level data from the community college system to examine economic returns to career education credentials and earnings trajectories.

EDD data are incredibly valuable for assessing economic outcomes, especially self-sufficiency through official wage and salary work. However, there are some limitations:

- We can observe earnings over a long period of time but only for jobs covered by UI, so informal work and self-employment are not captured.
- Income from other sources, such as tax refunds, business income, government benefits, and borrowing, is not included.
- We can only observe earnings for people while they are in California.
- Earnings from all jobs in a given period are aggregated to the total amount by industrial sector and do not provide information on hours worked or number of jobs held.

Refer to [Technical Appendix D](#) for more details on our methodology for analyzing wage returns and trajectories.

⁴ The CPM thresholds are from 2016 and are similar in magnitude to regional living wage thresholds proposed in the new community college funding formula. See [Technical Appendix A](#) for a complete list of CPM threshold levels across all regions.

⁵ On average, these students earn about \$23,000 per year in the few years before earning a credential, which is considered low income in any region of the state. These figures are not markedly different if we exclude young students (who might be recent high school graduates) or students with zero earnings (who might have other forms of support).

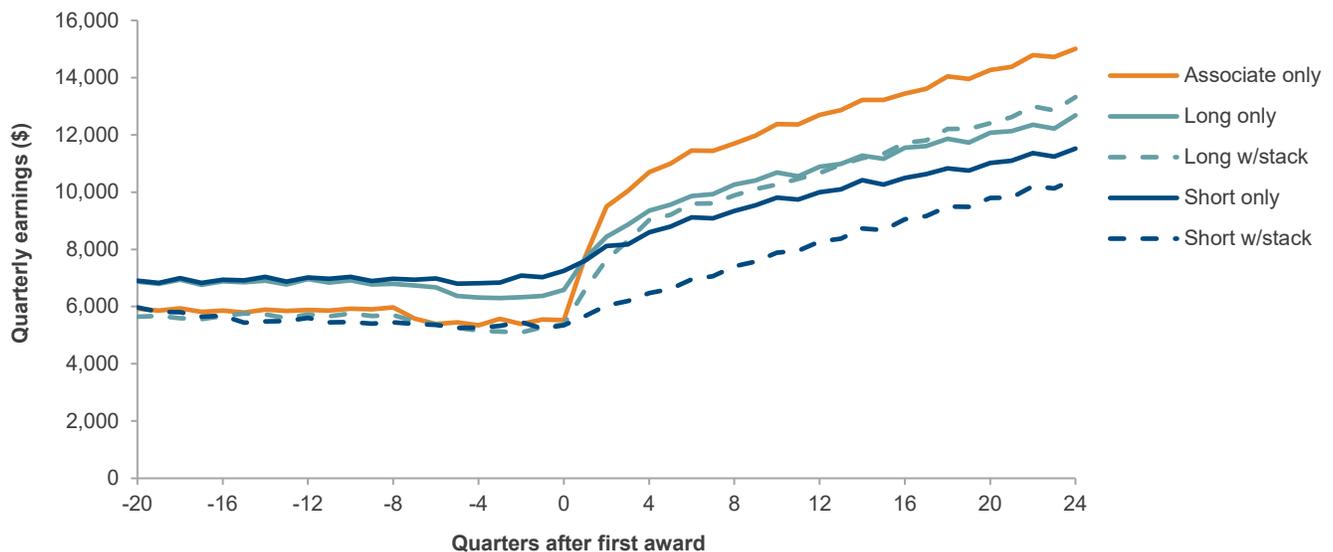
How Do Career Pathways Improve Earnings?

Our analysis finds that for students who earned their first career education credential between 2003 and 2010, subsequent earnings increased by 20 percent above what they likely would have earned without the credential. In addition to estimating the returns to a credential, we also examine the time it takes for students to achieve middle-income status. Two years after obtaining a career education credential, 60 percent of students earn at least middle-income wages. After six years, 76 percent do. These statistics are not surprising, as prior research has established the labor market value of career education credentials.

Figure 1 shows the long-term trajectory of median earnings in each quarter before and after students in each pathway earn their first career education credential. Earnings are relatively flat prior to the first credential, after which students generally see improvement over time. The typical student who completes a longer-term program sees higher earnings. Compared with those who earn only one short- or long-term certificate, those who stack credentials may initially earn less, but within six years they have made up ground and have similar or higher wages. Notably, students who complete only a single short-term or long-term credential begin with higher quarterly earnings, even five years before their credential, suggesting they may be different types of students with different goals.

FIGURE 1

Students see earnings gains after a career education credential, with higher earnings after longer programs



SOURCE: Author calculations from the Chancellor’s Office Management Information System (COMIS) and EDD UI data.

NOTES: Includes students who earned their first career education credential between 2003 and 2010, and who did not transfer. Earnings and subsequent credentials are observed for four years prior to and six years after the first credential. Wages are inflation adjusted to 2017 dollars using the consumer price index (CPI-U). This panel is unbalanced, meaning quarters where students did not work are not recorded as zero.

Economic Returns to Earning Credentials

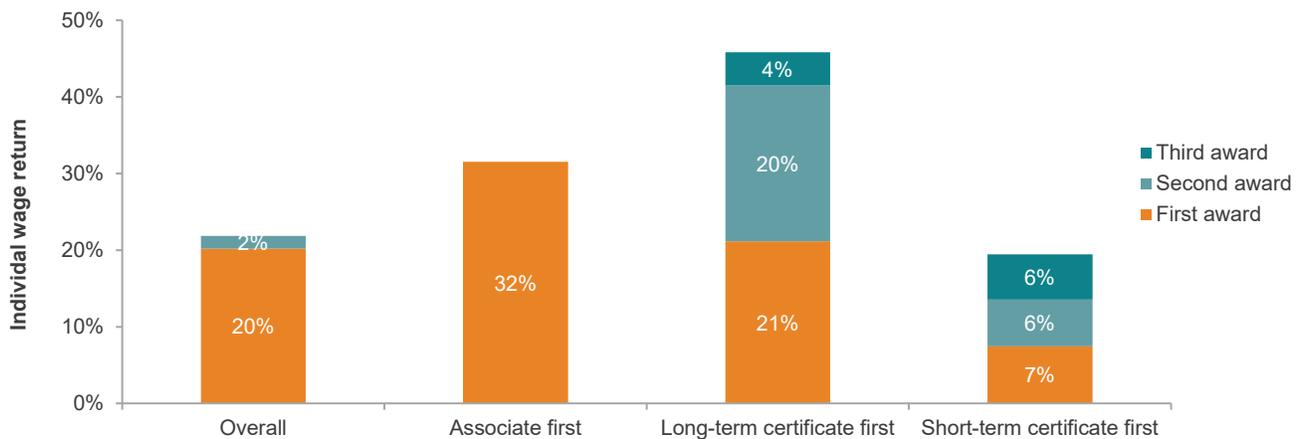
Clearly, different career education pathways have consequences for students' earnings over time. Individual characteristics and circumstances—such as career experience, family structure, and prior education—also likely contribute to subsequent earnings and long-term outcomes, regardless of any credentials they may earn.

Would students' earnings have gone up a similar amount even if they never earned a credential? To isolate the relationship between completing a career education credential and future earnings, while taking into account the fact that individuals' earnings tend to trend upwards over time, we use statistical models to compare an individual student's earnings before and after receiving a credential, essentially netting out individual characteristics that also affect earnings.⁶ We find that on average, students whose first award is an associate degree see a 32 percent increase in earnings after their first credential, compared to what they would have earned without it. Those who receive a single long-term or short-term certificate earn 21 percent and 8 percent more, respectively (Figure 2).

Figure 2 also shows that stacking credentials is particularly important for students who initially earn a long- or short-term certificate. Compared to students who stop after a single certificate, those who stack an additional credential see greater returns—a 20 percent additional gain for those who start with a long-term certificate and a 6 percent gain for those who start with a short-term certificate. Earning a third credential yields further gains for certificate holders.⁷

FIGURE 2

Stacking credentials yields greater returns, particularly for students who initially earn certificates



SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Includes students who earned their first career education credential between 2003 and 2010, observing additional credentials through 2016. Transfer students are not included. Coefficients are from regression models with age, year-quarter, and student fixed effects. See [Technical Appendix D](#) for more detail on the models and full regression details; coefficients are transformed to percent returns for this chart by exponentiation of the changes in log wages.

⁶ In addition, we control for whether a student is enrolled in community college during the quarter, which could dampen earnings, and the year-quarter in which earnings are recorded, which, depending on economic conditions, could also affect earnings. To account for the fact that earnings tend to increase over time due to accumulated experience, we employ student age effects. This strategy for estimating the returns to career education credentials follows typical approaches used in the research literature, except that we use age effects rather than individual time trends due to the complication of measuring multiple awards (Dynarski, Jacob, and Kreisman 2018; Stevens, Kurlaender, and Grosz 2018; Carruthers 2018). Although our model does a lot to isolate the relationship between a credential and earnings growth, there are a few caveats to interpreting the estimates causally. In particular, the ability to complete a credential may be associated with stronger earnings growth, and our model does not fully address that correlation. Other research that does so (Stevens, Kurlaender, and Grosz 2018) does not find large differences in estimated returns to credentials, though the returns tend to be slightly *larger*. In that sense, our estimates are likely to be conservative. Nonetheless, some caution is warranted in interpreting our results as causal. See [Technical Appendix D](#) for more details.

⁷ This is also reflected in the steeper line for students who stack credentials in Figure 1.

Table 1 illustrates the differences in returns across career education programs and pathways (highlighted cells indicate the programs and pathways with the highest returns). Health programs stand out as having by far the highest returns, particularly for associate degrees: students whose first award is a health associate degree earn 138 percent more in the six years following their graduation (60% of associate degrees in health are in registered nursing, one of the most remunerative occupations for middle-skill workers). However, not all students are able to initially pursue an associate degree due to job or family obligations, or because there are more students seeking to enroll in career education programs than there are open spots (this is the case with many nursing programs). Notably, the returns to an associate degree in public and protective services are much smaller than the returns to long- and short-term certificates in that program area.⁸

Some other program areas offer limited returns to graduates. While post-award earnings are at least 30 percent higher than pre-award earnings on average (see [Tables D3 through D9 in the technical appendices](#)), once we account for age, quarter, and student earning history, business management and IT show small or no returns for all pathways.⁹ The large returns in the program areas of health and public and protective services drive the overall wage gains we see in Figures 1 and 2.

TABLE 1

Estimated returns to career education credentials vary widely across program areas and pathways

	Associate	Long first		Short first	
	First award	First award	Second award	First award	Second award
Business	2.1%	3.0%	1.6%	3.2%	2.6%
Engineering	14.0%	3.7%	9.7%	2.5%	8.1%
Family and consumer	10.0%	7.1%	7.6%	7.9%	1.9%
Health	138.0%	62.9%	35.7%	4.9%	35.0%
IT	-0.2%	-5.6%	1.5%	0.1%	2.3%
Public and protective	7.8%	13.2%	2.0%	20.4%	2.8%

SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Includes students who earned their first career education credential between 2003 and 2010, observing additional credentials through 2016. Transfer students are not included. Results from Associate First, Long First, and Short columns (or pairs of columns) come from separate regressions. The second award earned matches the program (two-digit Taxonomy of Program codes) of the first award, but may be of any length. Bold values are statistically significant at the .05 level; highlighted cells indicate programs and pathways with the highest returns. See [Technical Appendix D](#) for full regression details; coefficients are transformed to percent returns by exponentiation of the changes in log wages.

Long-Term Earnings Trajectories

Increases in wage returns may not tell the whole story—for example, even a large percent increase in wages may not help students escape poverty if their prior earnings were very low. Conversely, a lower return may still help students earn good wages. Below, we assess how students’ earnings change after completing career education credentials across different programs and pathways. As described above, we use multiples of the poverty threshold from the California Poverty Measure to classify earnings as low income or middle income (Bohn et al. 2013).

⁸ The large returns to certificates in public and protective services is likely driven by the fact that the community college system partnered with state and local public and protective services departments to provide ongoing professional development that is directly tied to promotions and pay raises.

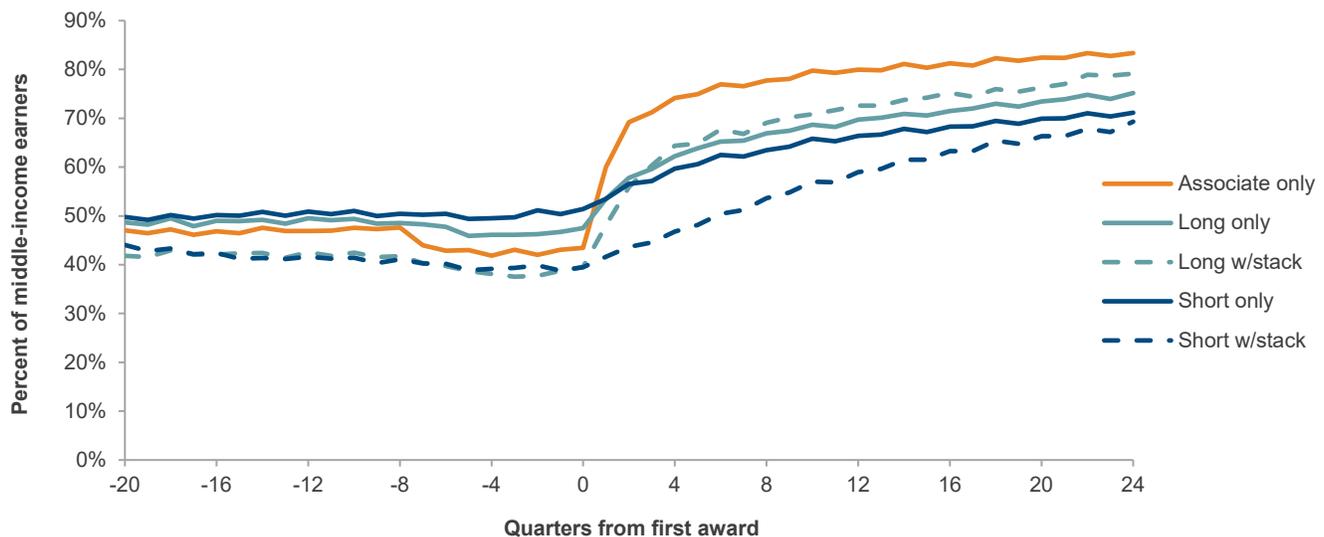
⁹ These results are similar in direction and scale, generally speaking, to previous work (Bohn, McConville, and Gibson 2016a; Stevens, Kurlaender, and Grosz 2018). However, exact point estimates differ. While the approach is generally similar, there are slight differences in the regression models, sample, and time period. The most notable difference is perhaps our attempt to model the return to multiple credentials.

Figure 3 shows the share of students earning at least middle-income wages (two times the poverty threshold), before and after earning a credential.¹⁰ For example, by the time they earn an associate degree, about 43 percent of students earned at least middle-income wages; a year after earning that degree, 74 percent of students had achieved that mark. As noted above, what constitutes a middle-income wage varies across the state because it accounts for the local cost of living.

Since student earnings tend to increase over time, most credential holders see their first quarter with at least middle-income earnings sometime within six years of receiving their first credential. Overall, the average student achieves middle-income earnings about two quarters after their first credential.

Similar to Figure 1, those who earn associate degrees generally see a very quick ascent into earning middle-income levels. In contrast, those who complete short- or long-term certificates usually take longer to achieve middle-income earnings. For those who only earn a short-term certificate, the average student takes three quarters to earn that amount, and those who stack take longer, about seven quarters. But those who initially earn long-term certificates and stack credentials are more likely to earn middle incomes within six years compared to those who only earn a single certificate. Those who begin with a short-term certificate and stack one or more additional awards are about as likely after six years to make middle-income wages, despite very different income levels, on average, before earning a certificate.

FIGURE 3
Students’ likelihood of earning middle-income wages—and how long it takes—varies by pathway



SOURCE: Author calculations from COMIS and EDD UI data.

NOTE: Includes students who earned their first career education credential between 2003 and 2010, and who did not transfer. Earnings and subsequent credentials are observed for four years prior to and six years after the first credential. Wages are inflation adjusted to 2017 dollars using the consumer price index (CPI-U) and then compared to the California Poverty Measure threshold for the region in which they earned a credential. Middle income represents twice the California Poverty Measure for the region in which the students earn their first award. See [Technical Appendix D](#) for more details.

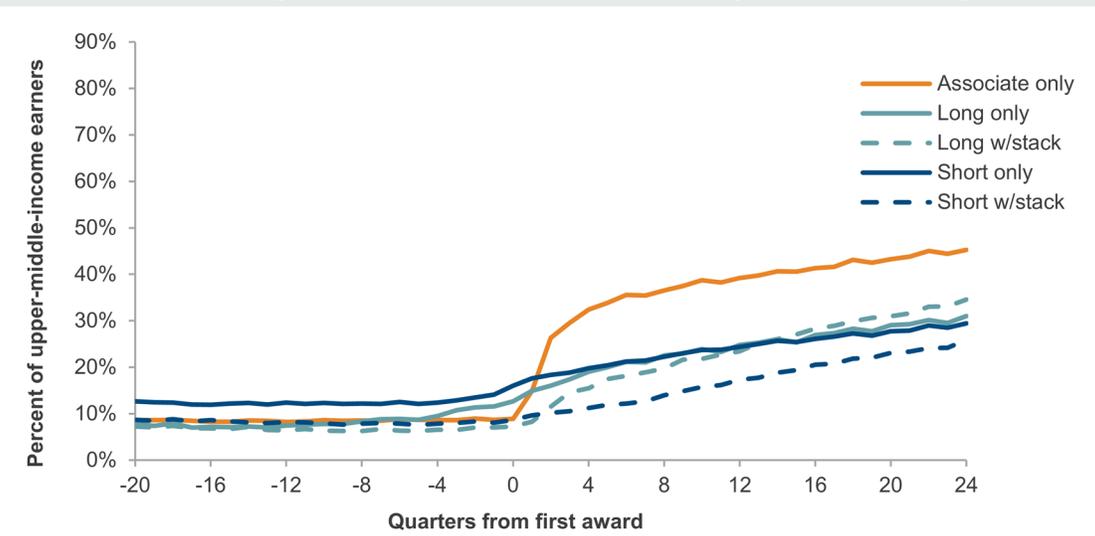
¹⁰ It is important to note that the threshold of earnings varies across the state, and we assign students to regions based on the location of the community college where they earned their first observed career education credential. We do not have information on where in the state people work from our earnings data. That said, to the extent that community colleges design career education programs based on local labor market needs, assessing the value of credentials based on the region of the college is still an important consideration.

A Look at Upper-Middle-Income Wages

This report gauges the resources a single person would need to reach the lower end of what we consider to be middle-income earnings. Below, we show how long it takes for students to achieve upper-middle-income earnings (at least five times the regional poverty threshold)—what might be considered well-paying jobs. Upper middle-income earnings range from a low of \$58,500 to \$82,000 in the Central Valley to a high of between \$81,900 and \$114,800 in the San Jose region. This cutoff is likely to be more relevant for credential holders who are supporting other members of their household.

Student trajectories are similar when we use upper-middle income earnings as the marker, but most students who receive credentials do not achieve upper-middle-paying jobs within six years. Those who earn associate degrees are far more likely to be earning upper-middle-income wages than those who have a short-term credential. Notably, students earning short-term certificates are about twice as likely to be earning upper-middle-income wages upon entering their program than most other students, suggesting there are major differences in which students choose each pathway.

Students take much longer to reach upper-middle-income earnings, and most do not get there



SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Includes students who earned their first career education credential between 2003 and 2010, and who did not transfer. Earnings and subsequent credentials are observed for four years prior to and six years after the first credential. Wages are inflation adjusted to 2017 dollars using the consumer price index (CPI-U) and then compared to the California Poverty Measure threshold for the region in which they earned a credential. Upper middle income represents five times the California Poverty Measure for the region in which the students earn their first award. See [Technical Appendix D](#) for more details.

The time it takes students to achieve middle-income earnings differs considerably by pathway and the program of study. Table 2 shows the number of quarters it takes before at least half of credential holders in each pathway have earned middle-income wages for at least one quarter of a year (highlighted cells indicate programs and pathways where at least half of students earn middle-income wages within one year). At least half of students who earn an associate degree or long-term certificate in IT, engineering, health, and public and protective services see

middle-income earnings within the first year (four quarters) of receiving their first award. More than half of those who earn associate degrees in business see middle-income earnings one and a half years (six quarters) following their first credential.

Comparing these results with the returns presented in Table 1 above suggests that even though family and consumer sciences shows relatively large percentage returns, those returns are still likely to result in low-income wages for most students until two or more years out. Students who stack often take longer to eclipse the low-income threshold than students who earned a single award—likely due to being enrolled in order to complete another credential. But as Figure 3 shows, students who stack credentials are generally as likely or more likely to achieve middle-income earnings after six years, compared to those who only earn a single short-term or long-term certificate.

TABLE 2

The time it takes students to earn middle-income wages varies across programs and pathways

	Number of quarters for at least half of students to earn middle-income earnings				
	Associate only	Long only	Long w/stack	Short only	Short w/stack
Business	6	4	5	5	7
Engineering	2	0	4	1	5
Family and consumer	6	12	11	18	16
Health	1	2	2	5	8
IT	2	4	4	2	4
Public and protective	3	2	4	0	2
All	2	3	3	3	7

SOURCE: Author calculations from COMIS and EDD data.

NOTES: Middle-income wages are twice the California Poverty Measure, which is a poverty measure adjusted for regional differences in costs. Wages can fluctuate from quarter to quarter, but this table counts the first instance of a student earning above twice the poverty threshold after attaining their first career education credential, essentially measuring their potential to do so. About half of students who reach the middle-income earnings threshold remain there the rest of the year. About 20 percent more earn middle-income wages again at least one other quarter of that year. Highlighted cells indicate programs and pathways where at least half of students earn middle-income wages within one year of attaining their first credential.

How Do Economic Benefits Vary Across Student Groups?

Whether these long-term earnings trajectories also apply for disadvantaged student groups is critical information for assessing the efficacy of career education. To examine this issue, we begin by looking at patterns in economic returns across age, gender, and racial/ethnic groups.

Economic Returns

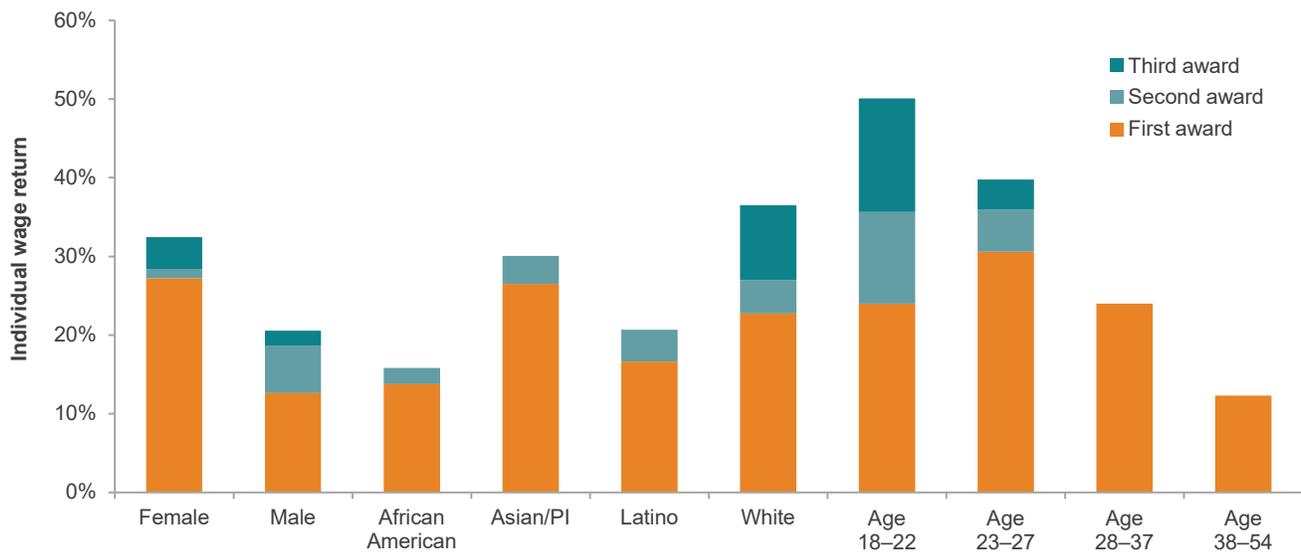
Female students who complete career education credentials see larger returns, as do Asian/Pacific Islander (PI) students and those who earn their first credential between the age of 23 and 27 (Figure 4). Female students, on average, earn 27 percent more after their first career education credential than they would have earned without it

(as above, these estimates take into account an individual’s earnings trajectory before and after the credential). The comparable earnings increase for male students is 13 percent.

Asian/Pacific Islander (27%) and white students (23%) also see larger returns than Latino (17%) and African American students (14%). When comparing different age groups, students age 23–27 have the highest earnings growth (31%) after their first career education credential, followed by those age 18–22 (24%) and those age 28–37 (24%); the oldest student group (age 38–54) sees the lowest returns (12%). For most students, earning second or third credentials in the same field supplements wage gains—in some cases enough to compensate for differences in earnings potential associated with the first award.

FIGURE 4

Asian and white students generally see larger returns than Latino and African American students



SOURCE: Author calculations from COMIS and EDD UI data.

NOTE: Includes students who earned their first career education credential between 2003 and 2010, observing additional credentials through 2016. Transfer students are not included. Coefficients are from regression models with age, year-quarter, and student fixed effects. Each set of stacked bars is from a separate regression model. See [Technical Appendix D](#) for more detail on the models and full regression details; coefficients are transformed to percent returns for this chart by exponentiation of the changes in log wages. Statistically insignificant and negative returns are not shown on this chart; small sample sizes for multiple credential earners in these demographic subgroups limits our ability to detect effects in some cases.

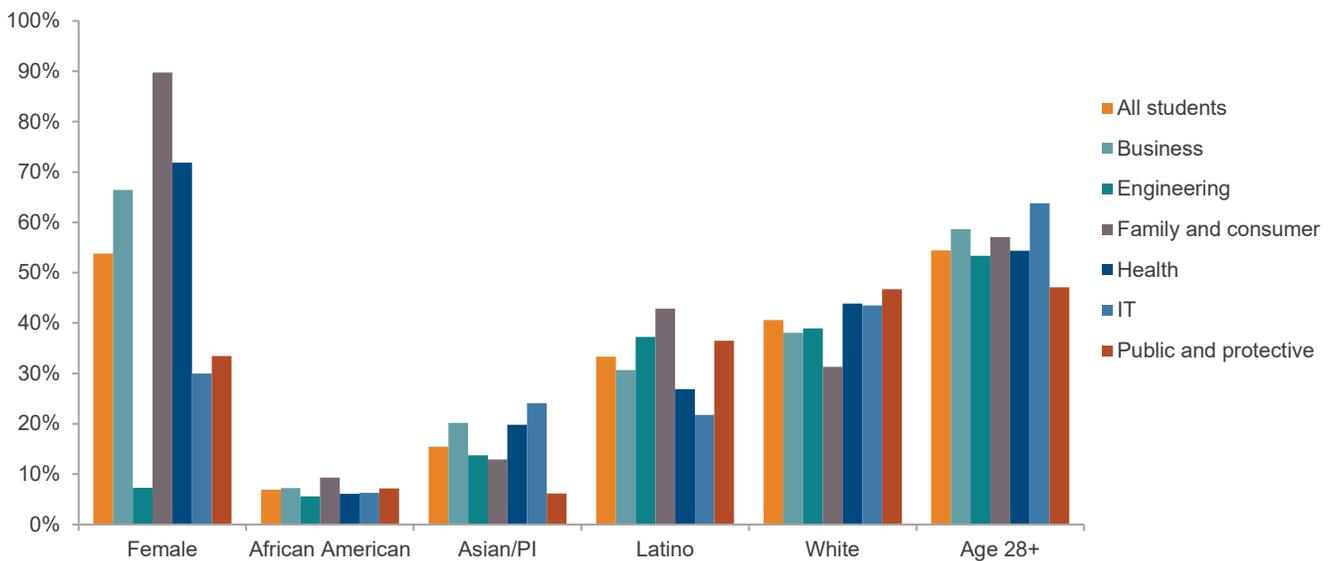
These differences in earnings returns across demographic groups reflect disparities in economic opportunity that result from a number of factors—including the programs in which students earn their credential and variation in economic returns across and within programs.¹¹

¹¹ However, as noted above, these differences in economic returns account for individual earnings trajectory before and after earning a credential and do not reflect individual characteristics other than age, gender, and race.

Figure 5 examines the percentage of different student groups earning a career education credential overall and in each program area. We see large differences in awards by gender, and to a lesser degree by race/ethnicity and age. Overall, 53 percent of students who earn a career education credential are female, but only 7 percent of engineering credentials are earned by women, compared to 90 percent of family and consumer sciences credentials. Similarly, Latino and African American students are overrepresented in family and consumer sciences, compared to their share of all credential earners. Older students are overrepresented in IT but underrepresented in public and protective services. This variation could be driven by differences in the programs students choose to enroll in and/or different completion rates across demographic groups for the same program.

FIGURE 5

The demographics of students who earn career education credentials vary across programs of study



SOURCE: Author calculations of COMIS data.

NOTES: Includes students age 18–54 who earned a credential in one of the six disciplines between 2001 and 2017. Excludes students who transfer to a four-year college within six years of earning their first career education credential. Age is measured at the time students earn their first career education credential. For additional demographic breakdowns across programs see [Table C1 in the technical appendices](#).

These patterns in program completion are consistent with overall differences across groups in economic returns. However, the programs in which students earn their credential is not the only factor affecting earnings growth. We also see variation in economic returns within programs for different student groups.

Table 3 isolates differences in earnings returns across programs by examining how the gains to an associate degree—in general, one of the highest-return credentials—vary by demographic group (highlighted cells show the student groups and program areas with the highest returns). We might expect returns to an associate degree in health, for example, to be quite similar regardless of age, gender, or race. However, women earning an associate degree in health see substantially greater returns than men do. In addition, returns for white students are much larger than for African American students, and younger students experience greater returns than older students.

TABLE 3

Some demographic groups see higher returns from the same program credential than others

	Increase in earnings post-associate degree					
	Business	Engineering	Family and consumer	Health	IT	Public and protective
Age group						
18–22	11.3%	50.7%	25.1%	217.1%	19.5%	17.2%
23–27	2.3%	18.6%	15.6%	210.8%	9.0%	7.8%
28–37	3.7%	5.9%	12.9%	140.6%	-3.9%	6.0%
38–54	-2.0%	1.6%	2.9%	98.6%	-6.8%	6.0%
Gender						
Female	1.8%	9.0%	10.7%	146.5%	-4.9%	9.6%
Male	2.5%	14.7%	0.0%	108.3%	1.2%	6.6%
Race/Ethnicity						
Latino	1.2%	15.4%	10.4%	127.0%	0.0%	6.3%
Asian/Pacific Islander	3.3%	19.4%	13.9%	125.5%	-3.0%	6.3%
African American	0.0%	6.6%	1.4%	76.8%	-4.9%	3.5%
White	2.7%	12.5%	10.0%	159.3%	1.3%	9.3%

SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Measures increase in earnings from the first career education credential, for students whose first credential was an associate degree. Includes students who earned their first career education credential between 2003 and 2010. Transfer students are not included. Each return is estimated from a separate fixed effects regression that also accounts for additional earnings gains due to second and third stacked credentials, student-, year-quarter-, and age-fixed effects. Coefficients are transformed to percent returns by exponentiation of the changes in log wages. Bold values are statistically significant at the .05 level; highlighted cells show the student groups and program areas with the highest returns. See [Tables D18, D23, and D28 in the technical appendices](#) for more details.

Although the differences in returns for an associate degree in health are larger than for other program areas, we see similar patterns for other program areas. For example, African American students generally see smaller returns than their peers do for an associate degree in the same program area, and older students typically see smaller returns than younger students. Though female students see larger returns in some program areas, male students see larger earnings gains for an associate degree in some other program areas, such as engineering. The patterns are similar for other credentials as well (see [Technical Appendix D](#) for additional results).

Why do we see different returns across demographic groups for the same credential in the same program area, which should arguably reflect similar skills gains?¹² Labor market opportunities for a new credential holder may vary due to individual preferences (e.g., working part time or full time), regional conditions, discrimination, the depth or quality of skills, and other economic realities.

Many of the factors that drive differences in earnings gains across student groups are outside of the control of community college practitioners. Even the fact that certain disadvantaged student groups are overrepresented in programs that net smaller earnings growth depends critically on individual students' needs and preferences. However, it is important that faculty, counselors, and others working directly with community college students are aware that program choice can result in equity gaps in earnings growth across students. While colleges work to reduce equity gaps in completion and other realms, advising students on the expected returns of various programs and pathways may help address gaps in economic mobility.

¹² Recall that by including student fixed effects, these estimates control for the skills and experience students bring into college, as reflected by their prior earnings trajectory.

Long-Term Earnings Trajectories

Program area and differential returns affect long-term earnings gains across racial/ethnic groups. Table 4 shows that, in general, at least half of students earn middle-income wages within a year of completing their associate degrees (highlighted cells indicate student groups and pathways where at least half of students earn middle-income wages within a year after award receipt). A notable exception is among the youngest students, who earn their first award when they are age 18–22; these students generally take more than a year to achieve middle-income earnings, across all pathways. The estimates in Table 4 reflect the likelihood of achieving middle-income wages regardless of their field of study. We see bigger differences across race/ethnicity for students who complete long- or short-term certificates. For example, white students who earn a short-term certificate are likely to earn middle-income wages three quarters after their credential, while African American students take twice as long.

Most of the variation in earnings trajectories across ages is between the youngest students and the rest of the age groups. It should be noted that despite the slower growth for the youngest associate degree holders, the students in the youngest age group are almost as likely to earn middle-income wages as the older age groups by the end of six years.

By gender, while male and female students typically achieve middle-income wages within a year if they have pursued associate degrees or stackable credentials starting with long-term certificates, there are big differences for other pathways. As we saw above, high-return short-term certificates are almost exclusively in the public and protective service field, which is dominated by men. This, along with potentially higher earnings before earning their first college credential, contribute to the overall gender differences.

TABLE 4

Young, African American, and female students generally take longer to earn middle-income wages

	Number of quarters for at least half of students to earn middle-income wages				
	Associate only	Long only	Long w/stack	Short only	Short w/stack
Age group					
18–22	9	10	5	9	10
23–27	2	2	3	3	6
28–37	1	1	3	1	5
38–54	1	2	3	2	7
Gender					
Female	2	6	3	8	10
Male	1	1	3	1	4
Race/Ethnicity					
African American	3	5	4	6	11
Asian/Pacific Islander	3	3	9	4	9
Latino	2	3	3	4	7
White	2	3	3	3	6

SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Includes students who earned their first career education credential between 2003 and 2010, observing additional credentials through 2016. Transfer students are not included. Middle-income wages are twice the California Poverty Measure, which is a poverty measure adjusted for regional differences in costs. Wages can fluctuate from quarter to quarter, but this table counts the first instance of a student earning above twice the poverty line threshold after attaining their first career education credential, essentially measuring their potential to do so. About half of students who reach the middle-income earnings threshold remain there the rest of the year. About 20 percent more earn middle-income wages again at least one other quarter of that year. Highlighted cells indicate programs and pathways where students earn middle-income wages within one year of attaining their first credential.

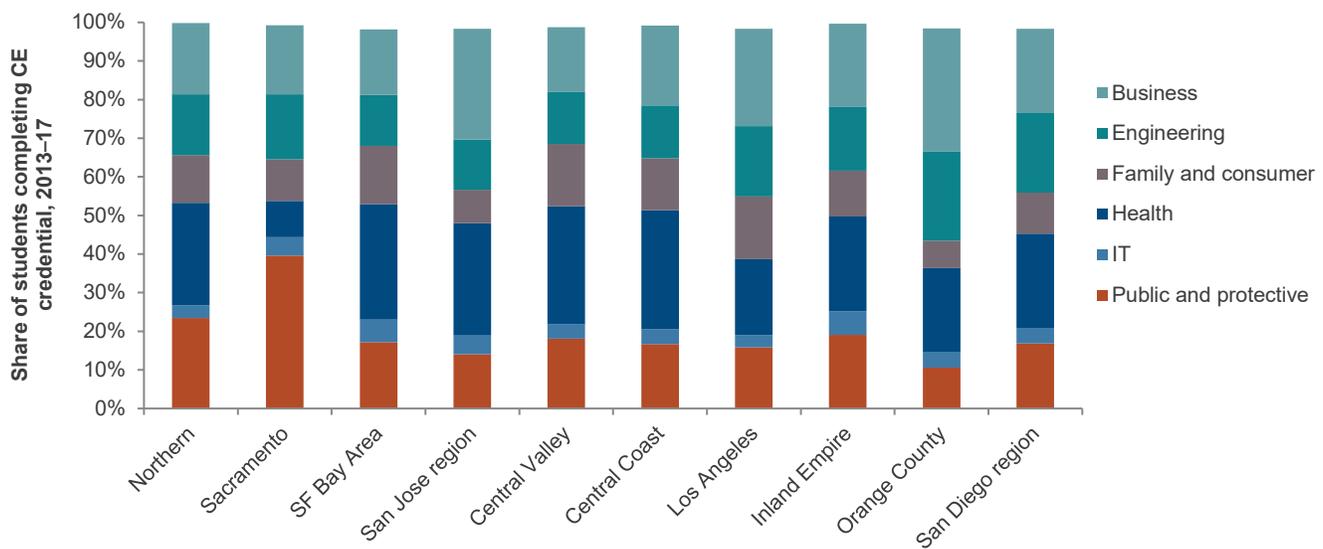
How Do Economic Benefits Vary Across Regions?

Broadly speaking, geography affects economic outcomes because both labor markets and community college programs operate at the regional level. Since job opportunities and wages depend on local conditions, community colleges rely on regional collaboration, local employers, workforce investment boards, and regional workforce projections to inform their career education program offerings.

While nearly all community colleges offer courses and credentials in the major career education fields presented in this study, there are variations in the types and levels of credentials students earn across regions.¹³ The fact that community college districts across the state determine the structure and intensity of their own career education programs may drive differences in the benefits of career pathways across regions.

Health—one of the highest-return career education fields—and business—one of the lowest—are the most prevalent fields of study across all regions, although there is some variation (Figure 6). In recent years, the Sacramento region seems to have had an outsized share of credentials in public and protective services and a much smaller share of health credentials relative to other regions. Orange County and the San Jose region stand out as having had higher proportions of business credentials.

FIGURE 6
Health and business are among the most popular career education programs across regions



SOURCE: Author calculations from COMIS data.

NOTE: Students are assigned to a particular career education discipline based on the highest level of their first career education credential. Students who transfer to a four-year college within six years of completing their first career education credential are excluded. Regions are made up of county groups. See [Technical Appendix B](#) for details on which counties belong to which regions.

¹³ In our earlier examination of career pathway programs, we observed fairly large differences in the number and type of career education credentials offered across colleges even within the same career education disciplines (Bohn et al. 2018).

Economic Returns to Earning Credentials

Returns to career education credentials vary across different regions in California.¹⁴ As with race and gender, longer pathways generally yield higher returns, regardless of region. We also note, however, regional differences within the same program area.

When we focus on associate degrees, which generally have the largest economic returns, we see returns vary considerably within program areas across regions (Table 5; highlighted cells indicate regions and programs with the highest returns). For example, an associate degree in family and consumer sciences ranges from a low of a 3.6 percent return in the Los Angeles region to a high of 17.2 percent in the nearby Orange County region. However, on average the differences between programs are bigger than the differences between regions. For instance, the returns for family and consumer sciences associate degrees are generally much bigger than the returns to a business degree—but much less than the returns in health, no matter the region.

TABLE 5

Differences in returns across programs areas are generally larger than differences across regions

	Increase in earnings post-associate degree					
	Business	Engineering	Family/Consumer	Health	IT	Public/Protective
Northern	1.1%	17.8%	13.4%	174.6%	3.7%	3.4%
Sacramento	6.2%	23.2%	9.9%	146.5%	9.5%	8.3%
SF Bay Area	4.2%	13.3%	17.0%	163.8%	1.5%	7.1%
San Jose region	0.5%	6.1%	14.3%	119.2%	0.3%	1.0%
Central Valley	1.8%	16.3%	14.1%	177.6%	6.9%	8.1%
Central Coast	6.2%	1.4%	11.1%	145.7%	5.9%	15.0%
Los Angeles	1.3%	16.5%	3.6%	121.0%	-3.5%	4.9%
Inland Empire	0.9%	13.3%	12.4%	136.6%	-8.2%	6.6%
Orange County	1.0%	9.8%	17.2%	134.7%	-0.1%	13.3%
San Diego region	0.5%	4.5%	6.1%	105.2%	-0.1%	11.9%

SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Each cell contains an estimate of the return to the first associate award from a student fixed effects model for each program of study and region. Includes students who earned their first career education credential between 2003 and 2010, observing additional credentials through 2016. Transfer students are not included. Each return is estimated from a separate fixed effects regression. Bold values are statistically significant at the .05 level; highlighted cells indicate regions and programs with the highest returns. See [Technical Appendix D](#) for full regression details; coefficients are transformed to percent returns by exponentiation of the changes in log wages.

Long-Term Earnings Trajectories

Below we compare students' earnings against what it takes to make ends meet across the state, which varies considerably. Overall, Table 6 shows that the move to middle-income wages is not systematically quicker for any region across all pathways (highlighted cells show regions and pathways where at least half of students earn middle-income wages within a year of attaining their first credential). A typical student earns middle-income wages within a year, regardless of region.

¹⁴ Students are assigned to regions based on the location of the college where they completed their first career education credential. We define the 10 regions used in this report based on counties or groups of counties. In constructing the 10 regions included in this analysis, we took into account the availability of sub-state estimates in the American Community Survey Public Use Microdata Sample, the EDD occupational employment projections by metropolitan areas, and the career education workforce regions used by the Chancellor's Office—and how these could be best aligned. For more details, refer to [Technical Appendix B](#).

However, there are some regional differences within each pathway. For example, a typical student who earns a long-term certificate achieves middle-income wages within a year in most regions—except for in Orange County and Los Angeles, where it takes just over a year. There is also notable variation by region for short-term certificate earners. For example, in the San Jose region, more than half of students earn middle-income wages by their second quarter, while it takes two full years in Sacramento. As with the race, age, and gender differences above, some of this regional variation is likely due to the programs in which students earn awards.

TABLE 6

A typical student earns middle-income wages within a year, regardless of region

	Number of quarters for at least half of students to earn middle income wages				
	Associate only	Long only	Long w/stack	Short only	Short w/stack
Northern	2	4	3	4	6
Sacramento	2	2	2	8	6
SF Bay Area	2	3	4	3	6
San Jose region	3	1	5	2	7
Central Valley	1	2	3	3	7
Central Coast	2	4	3	6	8
Los Angeles	2	5	3	4	9
Inland Empire	2	3	4	3	8
Orange County	2	5	3	3	3
San Diego region	2	1	3	4	7
All	2	3	3	3	7

SOURCE: Author calculations from COMIS and EDD UI data.

NOTES: Middle-income wages are twice the California Poverty Measure, which is a poverty measure adjusted for the regional differences in costs. Wages can fluctuate from quarter to quarter, but this table counts the first instance of a student earning above twice the poverty line threshold, essentially measuring their potential to do so. About half of students who reach the middle-income earnings threshold remain there the rest of the year. About 20 percent more earn middle-income wages again at least one other quarter of that year. Highlighted cells indicate regions and pathways where students earn middle-income wages within one year of attaining their first credential.

Future Opportunities for Middle-Skill Workers

The findings above are driven at least in part by how well career education programs are aligned with local labor force needs, and how well regional job openings pay. Assessing future jobs for middle-skill workers, particularly those that pay good wages, is essential to developing effective career education pathways. Indeed, the community college system has technical assistance resources located in seven key regions of the state to provide colleges with labor market information to support program development. And current legislative efforts are looking to better connect career education at community colleges with local workforce planning efforts.¹⁵

¹⁵ For example, AB 23 (Burke) proposes to devote additional resources at the state level to engage industry and business on ways to better align career education courses, workforce training programs, and apprenticeship programs with regional and local labor market demand.

About 30 percent of future jobs in California will be middle skill in that they will require some college training but less than a bachelor’s degree. Many of these occupations are currently filled by workers who report having some type of professional certification or license for their current job. In fact, workers with some college training but less than a bachelor’s degree are more likely to report having job licenses or certifications than workers with bachelor’s degrees or high school educations.¹⁶

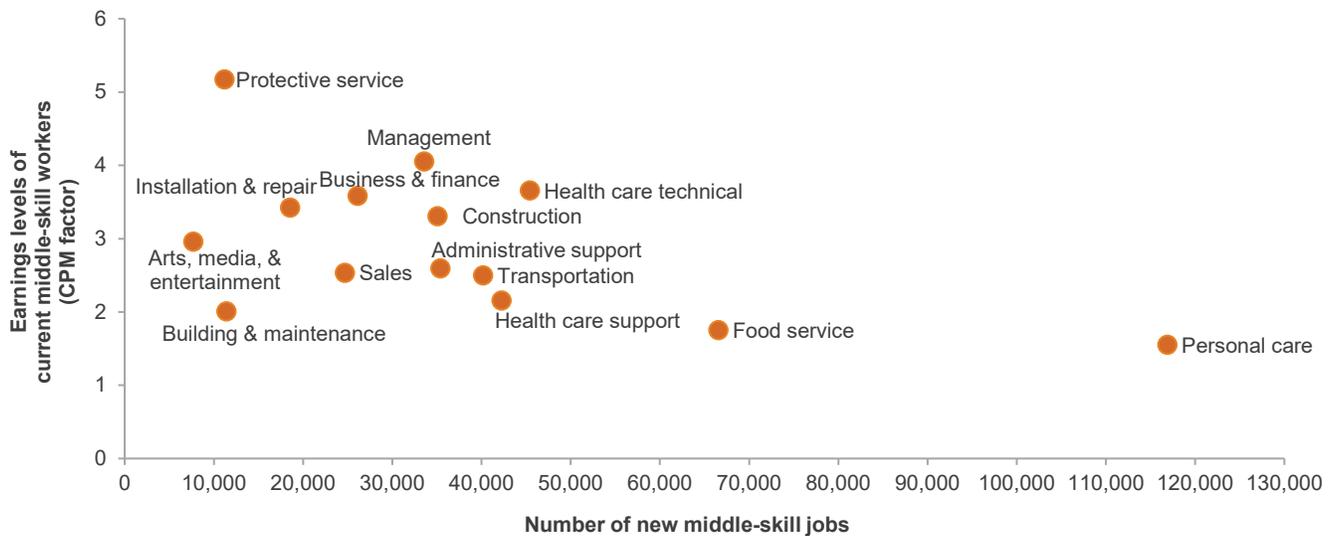
Differences across Occupations

Based on available employment projections, some middle-skill jobs are likely to grow much more slowly than others over the next five years. Figure 7 plots major occupational categories based on statewide projected job growth and the earnings of current middle-skill workers—those with some college training but less than a bachelor’s degree—in those jobs. Earnings levels are again scaled, as we did above when examining earnings trajectories, so a 2 on the vertical axis means that the median worker in the given occupation earns less than two times the poverty threshold and is considered low income (see [Technical Appendix A](#) for more information).

We see solidly upper-middle-income earnings levels—around five times the poverty threshold—for middle-skill workers in protective service occupations, consistent with the positive returns to career education credentials in that field. Occupations in health care technical, installation and repair, business and finance, and construction fields also offer relatively higher wage levels—about three to four times the poverty threshold—notably higher than earnings for middle-skill workers in health care support, food service, or personal care occupations. However, the projected growth in higher-paying fields such as protective services and installation and repair is much lower, at least at the state level, than the projected growth in lower-paying occupations, especially in personal care.

FIGURE 7

High job growth does not always mean high earnings for middle-skill workers



SOURCE: Author calculations from American Community Survey (ACS) merged with EDD occupational projections by region.

NOTE: Occupational categories are based on two-digit standard occupation classification (SOC) codes. Only major occupation groups that have at least one-quarter of their current workforce at the middle-skill level are displayed. Number of new middle-skill jobs indicate the difference between base employment estimates for 2016 and projected employment estimates for 2026. See [Technical Appendix E](#) for more details.

¹⁶ We use the Current Population Survey (2015–18) to estimate the share of workers who report having some type of professional certification or government-issued license by education level. This survey does not allow for regional comparisons due to small sample sizes. See [Technical Appendix E](#) for more information.

When we drill down to more specific jobs within these broad occupational categories, we find several examples of alignment between career education programs and occupations associated with relatively high earnings. Table 7 highlights some of the job opportunities that align well with career education credentials while providing sizable wage returns statewide. In some cases, these programs can train students for occupations with high future job growth (e.g., health technologists and technicians). However, in other cases, the demand for workers over the near term may not be very great (e.g., firefighters and law enforcement workers).

TABLE 7

Examples of occupations with available career education credentials in the community colleges

Career education programs	Estimated wage returns	Detailed occupational groups	Number of new jobs	Share of middle-skill workers	Median wage for middle-skill workers
Business					
Office management	10%	Supervisors of office and administrative support workers	10,800	42%	\$48,000
Engineering					
Electro-mechanical technology; engineering technology; industrial systems technology and maintenance	10%–35%	Engineering technicians	7,800	50%	\$54,000
Aeronautical and aviation technology	12%	Vehicle and mobile equipment mechanics, installers, and repairers	14,000	39%	\$43,000
Appliance repair	15%	Other installation, maintenance, and repair occupations	27,800	41%	\$50,000
Health					
Paramedic; dental assistant and dental hygienist; psychiatric technician, radiological technology, respiratory therapy, orthopedic assistant	25%–150%	Health technologists and technicians	51,300	61%	\$44,500
Administrative medical assisting; health information coding	15%–20%	Other health care support occupations	48,600	57%	\$30,000
Public and protective					
Fire technology	25%–30%	Firefighting and prevention workers	1,500	66%	\$91,000
Administration of justice (probation, corrections, police academy)	15%–20%	Law enforcement and protective service workers	0	55%	\$82,000

SOURCES: Author calculations from COMIS and EDD data; EDD employment projections linked to ACS.

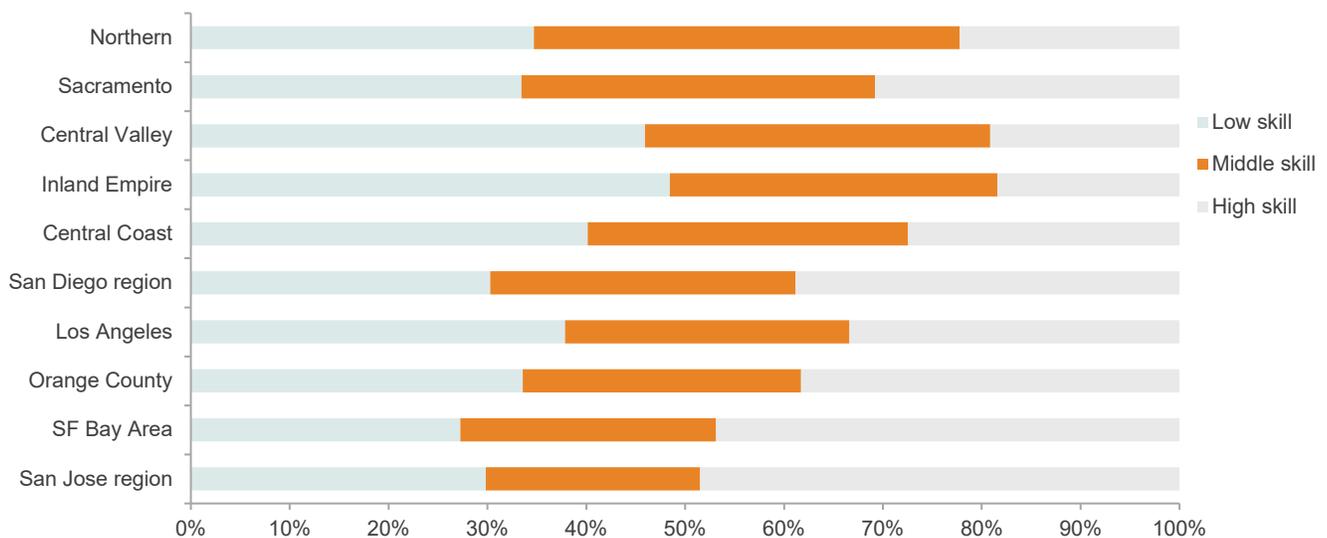
NOTES: Career education programs are linked to detailed occupational codes using a crosswalk file from the Chancellor’s Office. The share of middle-skill workers and median wages are estimated from the ACS based on education level and annual salary earnings for full-time, full-year workers. Estimated wage returns to career education credentials in these fields are from student fixed effects models at the four-digit TOP code level.

Differences across Regions

Figure 8 shows that in the far northern regions of the state, more than 40 percent of future jobs will be filled by middle-skill workers. Likewise in the Sacramento, Central Valley, and Inland Empire regions, at least one-third of projected new jobs will likely require some college training but less than a bachelor’s degree. These regions are also projected to have fewer high-skill new jobs that require at least a bachelor’s degree. In some regions, like the San Francisco Bay Area and San Jose area, there are projected to be more low-skill jobs that require a high school education or less than middle-skill jobs; in these regions, more than half of new jobs will be high skill.

FIGURE 8

Northern and inland regions are projected to have relatively high shares of new middle-skill jobs



SOURCE: Author calculations from American Community Survey (ACS) merged with EDD occupational projections by region.

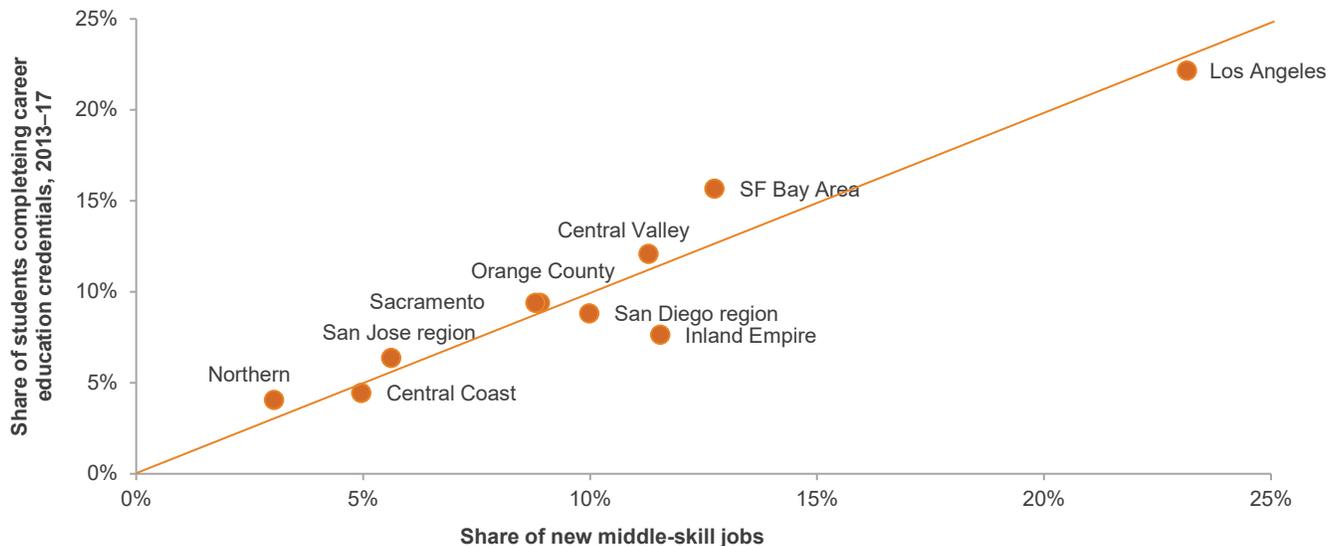
NOTES: Figure shows projected new jobs in 2024 according to skill level. We use education levels from the ACS of current workers age 18–54 to define the skill level of future jobs. Low skill refers to workers with a high school education or less, middle skill to workers with some college or an associate degree, and high skill to workers with at least a bachelor’s degree. Number of new middle-skill jobs indicate the difference between base employment estimates for 2014 and projected employment estimates for 2024. See [Technical Appendix E](#) for more details.

Do current programs align with future job openings for middle-skill workers in each region? Responding to workforce needs will be a key facet to broadening economic opportunities. In general, it appears that the share of recent career education credentials produced in the community college system matches up with the regional distribution of projected new jobs (Figure 9). All regions are quite close to the diagonal line—which signals that the share of career education credentials conferred in that region aligns with the share of new middle-skill jobs projected for the region.¹⁷ However, there are a few mismatches. The San Francisco Bay Area stands out as producing a higher share of the state’s career education credentials relative to projected middle-skill jobs, while the Inland Empire appears to produce a smaller share of career education credentials compared to future middle-skill jobs.

¹⁷ Again, it is important to note that students who complete career education credentials in one region may move to seek job opportunities, but community colleges still take into account their local labor market when designing their programs.

FIGURE 9

Recent career education credential production generally aligns with regional distribution of future middle-skills jobs



SOURCE: COMIS and the ACS linked with statewide EDD occupational employment projections.

NOTE: Figure shows the regional share of students completing career education credentials between 2013 and 2017 relative to the regional share of projected new middle-skill jobs. Students who transfer to a four-year college within six years of earning their first career education credential are excluded.

When we examine workforce opportunities and earnings for middle-skill workers in each region, we see that protective services and health care technical occupations appear to provide middle-skill workers with solidly middle-income earnings across most regions (Figure E1 in the technical appendices). For example, aside from Los Angeles and Orange Counties, the average earnings for protective services workers is about five times the poverty threshold or higher in all other regions. And while statewide job growth for protective service occupations is relatively low, in certain regions of the state there does appear to be higher growth; for example, the Central Valley and northern regions of the state are projected to have 10 percent growth for middle-skill workers in protective service occupations. Construction and installation/repair occupations—which align most closely with career education programs offered in engineering—also stand out as having middle-income earnings (between three and four times the poverty threshold) and relatively high growth across most regions for middle-skill workers.

However, the highest-growth occupations across all regions, such as health care support and personal care services, are also those that tend to provide low-income earnings. Personal care services include child care workers, which align with training in family and consumer sciences for early childhood education. Likewise, there are several short-term certificates offered in health career education fields, including home health aides and certified nursing assistants, which can prepare workers for jobs in health care support occupations.

The large projected job growth for health care support and personal care services reflects California’s need for workers in these occupations—across all regions. However, the low earnings for these occupations warrant attention, especially for students who need a pathway to upward mobility. In past work, we found that students in health could advance to higher earnings if they stacked from short-term, lower-value credentials to higher-level credentials in health—while that approach may benefit students, the need for low-wage health support workers remains.

The long-term, low-income trajectories among students completing career education credentials in family and consumer sciences—70 percent of which are in early childhood education—represent an industry sector where overall earnings are low, even among students who complete higher-level credentials. Upcoming increases in the minimum wage may offer some help, but additional policy efforts will likely be required to improve earnings for workers in preschool and child care settings. Community colleges and policymakers should take the realities of workforce opportunities and wages into account when counseling students on career choices and investing in career education programs.

There are a number of ways that career education pathways might improve outcomes given these realities. Encouraging students to enroll in career education programs that train them for higher-paying jobs in regions where there may be more growth is the most obvious implication. For many workers, this might mean switching industries. Other recent studies focused on career education and opportunities for middle-skill workers suggest that switching industries is often necessary to improve earnings trajectories (Carruthers 2018; Lamback, Gerwin, and Restuccia 2018; Shearer and Shah 2018).

In our data, about half of all students who earn career education credentials change industries within three years of completing their award. Coming into career education programs, the top industry of employment among students is food and beverage services, where common occupations are fast food workers, waiters and waitresses, and cooks. After earning a career education credential, students tend to shift away from food services to industries in health care, government, and professional/technical fields, which on average appear to offer well-paying jobs for middle-skill workers.¹⁸ Importantly, the first job in a new industry for a student with a career education credential may not be an immediate path to middle-income wages. Indeed, as our data show, students who return to college and stack relevant credentials can meaningfully improve their earnings trajectory. For this reason, even a relatively low-paying job in an industry that offers more room for advancement could be the start of a fruitful career pathway. Understanding what industries and employers may offer the best opportunities for career growth among middle-skill workers will be the focus of our future work in this area.

Recommendations

Career education pathways are a promising strategy to improve upward mobility for individuals without a four-year degree. Though these credentials generally offer lower economic payoffs than bachelor's degrees in California (Johnson, Cuellar Mejia, and Bohn 2018), most do offer positive returns. The program area and length of the credential have a substantial impact on typical wage gains—from virtually zero gains to increases that more than double future earnings.

Roughly 300,000 individuals per year enroll in career education programs, and currently just over half complete credentials or transfer within six years. Given the long-term economic benefits of earning a credential, improving completion rates for career education programs could improve the economic prospects of individual students and the state as a whole. In particular, workers with limited education or those in need of retraining stand to benefit from enrolling in and completing career education credentials.

¹⁸ [Technical Appendix E](#) provides some additional information on primary industries and industry switching among students who earn career education credentials in the community college system.

While most students—even older students—who earn a career education credential start with relatively low earnings, within two quarters, the typical credential holder is earning middle-income wages. Students who start with low-return credentials (often short-term certificates) take slightly longer to reach middle-income wages and have lower long-term earnings trajectories. Those who stack credentials take even longer, but they tend to catch up quickly and sometimes surpass the earnings trajectories of students who stop after earning a single short- or long-term certificate.

Importantly, we see positive economic outcomes for students who earn career education credentials across racial/ethnic groups. However, there are important differences as well: male, African American, Latino, and older students tend to see smaller returns to career education credentials. This is largely driven by differences in the programs in which they earn credentials as well as the earnings potential across occupations. These differences—combined with students’ earning levels when they enter career education programs—affect students’ long-term earnings trajectories. For example, white students who earn a short-term certificate are likely to earn middle-income wages within three quarters after their first career education credential, while African American students take twice as long. To improve outcomes for career education students, our findings support the following recommendations.

Advise students on the expected economic returns, timeframe, and future job opportunities in the career area of their choice. Though over time most students achieve middle-income earnings, program area and credential type are the most important factors in improving mobility. The community college system is in the midst of several major initiatives, including the development of an online college and implementation of the guided pathways framework to improve outcomes for students through clearer pathways and stronger support services. For these to be successful, information on career pathways—including their earnings potential, the time they take to complete, and job availability—must be made clear to students and to the teachers, counselors, and administrators guiding students and designing career education programs and pathways.

Shorten credential pathways, particularly for stackable credentials. The time it takes for students to experience sufficient wage gains is an important consideration for all students, but most critical for economically disadvantaged students and those supporting families. Our findings indicate that stackable credentials do appear to offer long-term payoffs, but they also take longer to improve students’ economic standing. One concern is that the pathway programs may be unnecessarily long or not clearly laid out, as prior work shows (Bohn and McConville, 2018).

Improve access to high-return credentials. To shorten the time it takes to achieve middle-income earnings, students could be encouraged to pursue the highest-return credentials—in most but not all career areas, that would mean associate degrees. But earning an initial associate degree may not be possible for some students. The costs (both in time and money) of attending college are a barrier for many; current efforts to expand financial aid could assist more students in pursuing and completing high-return career education credentials. Likewise, ongoing efforts to reform remedial education in the community colleges could assist students who are less prepared for college-level work in completing an associate degree.

Engage with employers and industries to support career development and advancement. Aligning career education programs with future labor force needs is crucial to improve opportunities for students completing career education credentials and to ensure students are gaining the skills and competencies required for jobs. The community colleges and local workforce agencies have several resources devoted to this goal, but efforts could be more coordinated and systematized. Understanding the role employers can play in helping workers advance along a career pathway to better-paying jobs is a crucial component to improving economic outcomes for workers. Current efforts underway in the IT sector to assist colleges in developing pathways for stackable credentials that are aligned with employer needs and available third-party certifications are another promising approach.

Despite opportunities to improve student outcomes, labor market realities mean that even some well-designed career pathways may not lead to jobs that offer middle-income earnings. Responding to these near-term labor market realities and refining program offerings will be critical to making career education more effective for students and the workforce. The challenges of doing so should not be understated. However, California's labor market needs are likely to continue to shift as our economy incorporates new ways of working through automation, artificial intelligence, and other technological changes. The flexibility of our institutions in training workers for in-demand, high-value careers will be an attribute that can enhance California's competitiveness and promote economic mobility into the future.

REFERENCES

- Autor, David. 2010. *The Polarization of Job Opportunities in the US Labor Market: Implications for Employment and Earnings*. Center for American Progress and the Hamilton Project.
- Bahr, Peter. 2016. “The Earnings of Community College Graduates in California.” Columbia University Teachers College, Center for Analysis of Postsecondary Education and Employment. Working paper.
- Bohn Sarah, Caroline Danielson, Matt Levin, Mary Beth Mattingly, and Christopher Wimer. 2013. *The California Poverty Measure: A New Look at the Social Safety Net*. Public Policy Institute of California.
- Bohn, Sarah, Caroline Danielson, and Tess Thorman. 2018. “**The Working Poor in California**.” Just the Facts. Public Policy Institute of California.
- Bohn, Sarah, and Shannon McConville. 2018. *Stackable Credentials in Career Education at California Community Colleges*. Public Policy Institute of California.
- Bohn, Sarah, Shannon McConville, and Landon Gibson. 2016a. *Career Technical Education in Health: An Overview of Student Success at California’s Community Colleges*. Public Policy Institute of California.
- Bohn, Sarah, and Eric Schiff. 2011. *The Great Recession and Distribution of Income in California*. Public Policy Institute of California.
- Carruthers, Celeste. 2018. “Way Station or Launching Pad? Unpacking the Returns to Adult Technical Education.” *Journal of Public Economics* 165 (September) 146–159.
- Chetty, Raj, David Grusky, Maximilian Hell, Nathaniel Hendren, Robert Manduca, and Jimmy Narang. 2017. “The Fading American Dream: Trends in Absolute Income Mobility since 1940.” *Science* 356 (6336): 398–406.
- Dadgar, Mina, and Madeline Joy Trimble. 2014. “Labor Market Returns to Sub-Baccalaureate Credentials: How Much Does a Community College Degree or Certificate Pay?” *Educational Evaluation and Policy Analysis* 37 (4): 399–418.
- Deming and Dynarski. 2009. “Into College, Out of Poverty? Policies to Increase the Postsecondary Attainment of the Poor.” National Bureau of Economic Research. Working paper 15387.
- Dynarski, Susan, Brian Jacob, and Daniel Kreisman. 2018. “How Important Are Fixed Effects and Time Trends in Estimating Returns to Schooling? Evidence from a Replication of Jacobson, Lalonde, and Sullivan, 2005.” *Journal of Applied Econometrics* 33 (4): 1098–1108.
- Heckman, James, Robert LaLonde, and Jeffrey Smith. 1999. “The economics and econometrics of active labor market programs.” In *Handbook of Labor Economics*, volume 3 part A, edited by Orley Ashenfelter and David Card, 1865–2097. Amsterdam: Elsevier Science.
- Jepsen, Christopher, Kenneth Troske, and Paul Coomes. 2014. “The Labor-Market Returns to Community College Degrees, Diplomas, and Certificates.” *Journal of Labor Economics* 32 (1): 95–121.
- Johnson, Hans, Marisol Cuellar Mejia, and Sarah Bohn. 2018. *Higher Education as a Driver of Economic Mobility*. Public Policy Institute of California.
- Lamback, Sarah, Carol Gerwin, and Dan Restuccia. 2018. *When Is a Job Just a Job—and When Can It Launch a Career? The Real Economic Opportunities of Middle-Skill Work*. Jobs for the Future.
- Minaya, Veronica, and Judith Scott-Clayton. 2017. “Labor Market Trajectories of Community College Graduates: New Evidence Spanning the Great Recession.” Columbia University Teachers College, Center for Analysis of Postsecondary Education and Employment. Working paper.
- Reed, Deborah. 1999. *California’s Rising Income Inequality: Causes and Concerns*. Public Policy Institute of California.
- Reed, Deborah. 2004. *Recent Trends in Income and Poverty*. *California Counts: Population Trends and Profiles* 5 (3). Public Policy Institute of California.
- Shearer, Chad, and Isha Shah. 2018. *Opportunity Industries: Exploring the Industries that Concentrate Good and Promising Jobs in Metropolitan America*. Brookings Institution.
- Stevens, Ann Huff, Michal Kurlaender, and Michel Grosz. 2018. “Career Technical Education and Labor Market Outcomes: Evidence from California Community Colleges.” *Journal of Human Resources* 1015-7449R2 (published online before print).

ABOUT THE AUTHORS

Sarah Bohn is director of research and a senior fellow at the Public Policy Institute of California, where she holds the John and Louise Bryson Chair in Policy Research. She is also a member of the PPIC Higher Education Center. As director of research, she works with PPIC staff to bring high-quality, nonpartisan research to important policy issues in California. Her own research focuses on the role of social safety net policy and education policy in alleviating poverty and enhancing economic mobility. Her other areas of expertise include immigration policy, the workforce skills gap, and California's economy. Her work has been published in major academic journals, including the *American Economic Review*, *Demography*, *American Economic Journal: Economic Policy*, and *The Review of Economics and Statistics*. She holds a PhD in economics from the University of Maryland, College Park.

Jacob Jackson is a research fellow at the PPIC Higher Education Center. His research includes work on college costs, college readiness, access to higher education, and college completion. Before joining PPIC, he was a postdoctoral scholar at the University of California, Davis, and a middle school and high school mathematics teacher in Sacramento, California, and Columbia, Missouri. He holds a PhD in education from the University of California, Davis, and a master's degree in education from the University of Missouri.

Shannon McConville is a senior research associate at the Public Policy Institute of California. Her research interests include health care access, utilization, and outcomes among vulnerable populations and the impact of vocational training programs on economic mobility. Her current work focuses on examining safety net programs, assessing the effects of Medicaid coverage expansions on individuals involved with the criminal justice system, and analyzing the employment outcomes and economic returns of career technical education. Before joining PPIC, she was a research training fellow in the Health Services and Policy Analysis doctoral program at the University of California, Berkeley; a senior research associate at the Department of Health Research and Policy at Stanford University; and a project manager at the Lewis Center for Regional Policy Studies at the University of California, Los Angeles. She holds a master's in public policy from the University of California, Los Angeles.

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