



## Pathways to Economic Mobility:

Identifying the Labor Market Value of  
Community College in Massachusetts

**MassINC**  
RESEARCH. JOURNALISM. CIVIC LIFE.

The Boston  
Foundation **tBf**

**N** Northeastern University  
**Dukakis Center for  
Urban and Regional Policy**

**The Boston Foundation**, Greater Boston's community foundation, seeks to bring the collective power of our region's people and resources together to drive real change. Established in 1915, it is one of the largest community foundations in the nation—with net assets of \$1.3 billion. In 2020, the Foundation received \$169 million in contributions and the Foundation and its donors paid \$215 million in grants to nonprofit organizations. The Foundation has many partners, including its donors, who have established more than 1,000 separate charitable funds for the general benefit of the community or for special purposes. With support from the Annual Campaign for Civic Leadership, the Foundation also facilitates public discourse and action, commissions research into the most critical issues of our time and advocates for public policy that advances opportunity for everyone. The Philanthropic Initiative (TPI), a consulting unit of the Foundation, designs and implements customized philanthropic strategies for families, foundations and corporations around the globe. To learn more about the Foundation and its work, visit [TBF.org](http://TBF.org).

**The Kitty and Michael Dukakis Center for Urban and Regional Policy**, housed in the School of Public Policy and Urban Affairs at Northeastern University, is equally committed to producing state-of-the-art applied research and implementing effective policies and practices based on that research. The Center's collaborative research and problem-solving model uses powerful data analysis, multidisciplinary research and evaluation techniques, and a policy-driven perspective to address critical challenges facing urban areas. Our goal is to integrate thought and action to achieve social justice through collaborative data-driven analysis and practice. We prepare emerging practitioners and academicians to transcend the mysteries and frustrations of successful urban policymaking.

Founded in 1996, **MassINC**'s mission is to provide the people of Massachusetts with the information they need to participate fully in our democracy. We are a nonpartisan 501c3 and achieve impact through independent research, nonprofit journalism and civic engagement.

**UNDERSTANDING BOSTON** is a series of forums, educational events and research sponsored by the Boston Foundation to provide information and insight into issues affecting Boston, its neighborhoods and the region. By working in collaboration with a wide range of partners, the Boston Foundation provides opportunities for people to come together to explore challenges facing our constantly changing community and to develop an informed civic agenda. Visit [www.tbf.org](http://www.tbf.org) to learn more about *Understanding Boston* and the Boston Foundation.

*Design: Canfield Design Cover Photo: Middlesex Community College; Courtesy MCC*

© 2021 by the Boston Foundation. All rights reserved.

# Pathways to Economic Mobility:

## Identifying the Labor Market Value of Community College in Massachusetts

### AUTHORS

Alicia Sasser Modestino, Ph.D., Northeastern University

Benjamin Forman, MassINC

### WITH ASSISTANCE FROM

Phillip Rubin-Streit

Ioana Hulbert

Dylan Jacovo

### EDITORS

Antoniya Marinova and Sandy Kendall,  
The Boston Foundation

# Foreword

This is the last preface to an Understanding Boston report that I write in my capacity as President and CEO of the Boston Foundation. When asked what I am most proud of in my 21-year tenure, I often talk about how the community foundation was able to add to its historic role of philanthropy, going beyond grantmaking to harness research, convening and advocacy to engage in public policy discussions that improve our Commonwealth and the economic and social prospects of its residents. The Understanding Boston series of reports represents some of our most potent work in the research and advocacy sphere; it has also helped refine our own programmatic priorities and guide our donors' generosity.

This current report is a continuation of that work and our longstanding focus on our community college system. In 2011, we commissioned and published *The Case for Community Colleges: Aligning Higher Education and Workforce Needs in Massachusetts*, because we and many others in the business and civic communities were concerned about the mismatch between the middle-skilled jobs that were going unfilled and the opportunities that higher education—especially community colleges—held for workers preparing for those jobs. The report offered recommendations and called for community colleges to become true leaders in meeting the workforce needs of the Commonwealth.

So began our efforts to better align Massachusetts' 15 community colleges with economic opportunities and prepare their students for success.

The following year the Boston Foundation was proud to partner with more than 60 business and grassroots organizations to form the Coalition for Community Colleges, where we examined this unheralded and under-resourced set of institutions that had the potential to be gamechangers. At that time, I referred to the community college system as “the orphan of an orphan,” due to its lack of prominence in policy or budget discussions at the state and federal level. Working with Governor Deval Patrick and the legislature, the Coalition successfully advocated for reforms in the state budget that increased performance-based funding, mandated governance changes and increased collaboration among all 15 community colleges. A follow-up report in 2013, *Stepping Up for Community Colleges: Building on the Momentum to Improve Student Success in Massachusetts*, explored next steps community colleges could take to enhance the student experience and improve college persistence and completion.

Since 2015, the Foundation has awarded the annual Deval Patrick Prize for Community Colleges to promising partnerships between community colleges and local employers. Recently, we launched a new effort to connect more of these students with internship opportunities in STEM industries.



And for more than a decade, Success Boston coaches have supported nearly 3,000 community college students through their college journey. Last year, the legislature created the Community College SUCCESS fund to ensure that these institutions have the resources to provide more comprehensive advising and support services to their students.

This report combines a cohort-based analysis with longitudinal data to offer a comprehensive picture of the labor market payoff from community college experiences in Massachusetts. Much of what the researchers found is gratifying in showing the beneficial impact of community college on students' subsequent careers, but we cannot rest on those laurels. The findings themselves suggest our marching orders—if some community college experience improves outcomes over a terminal high school diploma, and a completed community college credential adds even more, our charge now is to make the acquisition of those credentials an accessible and reasonable goal for any who wish to take that path.

Today we know that too many students in our region, particularly low-income and students of color, face obstacles well beyond any academic challenge that make pursuit of these dreams a logistical steeplechase. As the authors put it, “Community college cannot be an equalizing force unless we close the large gaps in persisting and earning a credential.”

One of the great benefits of the Boston Foundation as a permanent institution is our ability to stay with an issue beyond an administration or election cycle. We've long believed that community colleges are an integral part of the Commonwealth's educational and economic future. Armed with the insights from this report, let us continue to help them shine.



Paul S. Grogan  
*President & CEO*  
The Boston Foundation

# Contents

<b>Executive Summary</b> .....	<b>5</b>
<b>I. Introduction</b> .....	<b>9</b>
<b>II. Background and Context</b> .....	<b>12</b>
<b>III. Data and Methods</b> .....	<b>18</b>
<b>IV. Employment and Earnings Gains</b> .....	<b>25</b>
<b>V. Labor Market Returns by Field of Study</b> .....	<b>29</b>
<b>VI. Labor Market Returns across Different Groups of Workers</b> .....	<b>33</b>
<b>VII. Conclusion and Policy Implications</b> .....	<b>38</b>
<b>Appendix</b> .....	<b>43</b>
<b>Endnotes</b> .....	<b>45</b>

## Acknowledgements

The authors would like to recognize a number of individuals for making this work possible. Matthew Deninger at the Department of Elementary and Secondary Education provided timely assistance and support throughout the project. John Papay, Aubrey McDonough and Alan Perez at Brown University made an enormous contribution by linking and cleaning data, allowing us access to files on their secure server, and offering insight on data questions as they arose. From beginning to end, Elizabeth Pauley and Antoniya Marinova at the Boston Foundation generously provided thoughtful guidance and encouragement.

We would also like to extend our appreciation to John Cook, Pam Eddinger, Ryan Forsythe, Lane Glenn, Jonathan Keller, Jean Kim, Joe McLaughlin, Valerie Roberson, Tom Sannicandro and Raija Vaisanen. These leaders lent their valuable time to an advisory group, which helped us understand the complexity of community colleges and contextualize the data findings.

We reserve a special thank you for Richard Murnane, who served as a steady research partner, meeting with us weekly over the past 18 months and selflessly contributing his vast knowledge and expertise.

While the assistance these individuals provided was invaluable, the authors bear all responsibility for the analysis and recommendations contained in this report.

# Executive Summary

This report provides a timely contribution to the growing public policy debate around how we combat structural inequality by quantifying the power of community college as a pathway to economic mobility. Until recently, it has been difficult to accurately estimate the return to a community college education in Massachusetts because numerous factors affect who enrolls, when they enroll, the rate at which they complete a credential, and the field of study that they pursue. The Commonwealth's State Longitudinal Data System (SLDS) allows us to build statistical models that untangle these patterns.

Utilizing this dataset, we can isolate increases in employment and earnings over and above what individuals would have experienced if they had not pursued community college studies. While community colleges serve many types of learners, with this first analysis, we focus on Massachusetts public school students who graduated from high school about a decade ago and enrolled in a community college within five years of high school graduation. These young adults represent a large segment of community college enrollment and a population for whom community college is often the highest level of educational attainment.

Our analysis consistently uncovers strong labor market returns to community college studies for young adults. The gains are greater for women than men. Students who obtain degrees or credit-bearing certificates in high-demand fields garner particularly large increases in employment and earnings. While we find that low-income students and students of color are less likely to persist in community college, those who do complete degrees and credit-bearing certificates enjoy returns that are at least as large as White and non-low-income students. As detailed below, the findings in this report suggest efforts to position more students for community college success can play a meaningful role in building a more equitable Commonwealth.

## Employment and Earnings Gains

Throughout this analysis, we present findings for students who enroll in community college immediately and those who delay one to five years after high school. As described in the full report, this approach allows us to more fully account for significant educational differences between these groups of young adults and employ a more robust statistical model that incorporates pre-enrollment earnings for those with post-high school employment. We estimate employment and earnings gains for these two groups as follows:

- Among students who enroll right away, women who complete an associate's degree are 18 percentage points more likely to be employed than terminal high school graduates. For men with an associate's degree, the employment boost is about 12 percentage points. Students who obtain credit-bearing certificates experience similar employment returns. Those who attend without earning a certificate or degree also see an employment boost. While this gain is small, it increases with the number of semesters attended.
- Among students who enroll one to five years after graduating from high school, the employment gains relative to terminal high school graduates are comparable to those enrolling right away when we utilize the same controls for demographic characteristics and academic preparation. In models incorporating their prior work history, the magnitude of the employment boost over terminal high school graduates is not as large, but there is still a strong increase. For men who earn an associate's degree, the employment returns are larger when we account for their prior earnings, suggesting that these men had less advantageous labor market characteristics before enrolling in community college.

- Women who earn a credit-based community college certificate or degree earn between 15 and 25 percent more than terminal high school graduates regardless of whether they enroll immediately or one to five years after graduation. If we combine the employment gains with these higher earnings, women earn \$1,550 more per year just for attending community college for two non-summer semesters and up to \$8,000 more per year after completing a community college certificate or an associate's degree.
- Men who enroll right away and eventually complete a credit-bearing certificate or an associate's degree receive a 10 to 15 percent earnings boost relative to terminal high school graduates. Controlling for prior work history among men who delay entry, the earnings gain is nearly 30 percent. Combining the employment gains and these higher earnings, we estimate men who complete an associate's degree or certificate earn between \$5,500 and \$9,000 more per year. However, men who attend a community college without completing a degree or credential do not increase their earnings relative to terminal high school graduates, despite the significant increases in employment that they gain after completing two or more semesters of study. We find some evidence that one potential reason for the lack of earnings gain without a credential is that men with a terminal high school degree may be more likely than women to have access to jobs in high-paying industries such as construction.

## Labor Market Returns by Field of Study

Consistent with a large body of research, we find significant variation in the labor market returns to community college credentials by field of study. Most notably:

- The employment boost for associate's degree holders among women enrolling in community college right away varies from 19 percentage points in STEM to 28 percentage points in health. For men, the employment gains reflect a similar pattern, although the magnitudes are lower (11 percentage points for STEM and 20 percentage points for health). Employment gains by gender and field of

study are similar for both men and women who delay entry, compared to students who enroll immediately.

- Variation by field of study is even wider when we estimate earnings gains for women. Among women who are working, those who enroll right away and obtain an associate's degree in health earn 61 percent more than terminal high school graduates. For those enrolling one to five years later, women with an associate's degree in business, health, or law enforcement earn an additional 30 to 40 percent more. If we combine both the employment and earnings gains from completing an associate's degree, women earn anywhere from an additional \$3,300 per year in STEM to upwards of \$14,100 more per year in health.
- Men also experience large differences in earnings gains by field of study, although less so than women. Among men who are working, those who complete an associate's degree in either a health or a STEM field earn 25 percent more than terminal high school graduates; however, men with an associate's degree in liberal arts earn 10 percent less. When we combine the employment and earnings benefits of earning an associate's degree, all fields except liberal arts yield a positive return ranging from \$2,500 per year in business to \$10,000 per year in STEM.
- Massachusetts community colleges award very few certificates, which makes it difficult to quantify returns by field of study beyond the relatively large health and trade-related programs. Obtaining a certificate in health boosts employment by more than 20 percentage points for women and 10 percentage points for men. This holds for both students who enroll right away and those who delay entry. Among those who are working, obtaining a health-related certificate increases earnings by more than 20 percent for men and women. Accounting for both the employment and earnings benefits, certificates in health yield an additional \$7,000 to \$8,000 per year for women and an additional \$9,000 to \$14,000 per year for men. Employment and earnings gains for students completing



trade-related certificates, a catchall bucket that ranges from automotive and cosmetology to culinary and early childhood education, are positive but much more modest.

## Labor Market Returns across Different Groups of Workers

By increasing access to postsecondary education for low-income students and students of color, community colleges can reduce inequality. However, large disparities in attainment inhibit the power of community college to serve as an equalizing force.

More specifically:

- While low-income students and Black and Hispanic students are nearly twice as likely to enroll in community college in Massachusetts compared to non-low-income students and White students, the latter are twice as likely to earn an associate's degree. Although Asian students are less likely to rely on community colleges as a source of postsecondary education compared to other groups, they are also less likely to complete an associate's degree than their White peers. It should also be noted that data limitations prevent us from disaggregating these findings further to recognize the important diversity within each of these racial and ethnic groups.
- For low-income students and Black and Hispanic students who complete associate's degrees, the employment and earnings benefits are equal to (or in some cases greater than) the gains of their White peers. Compared to terminal high school graduates, Black and Hispanic students with an associate's degree experience an employment boost that is 7 to 10 percentage points higher than their White peers. Combining the employment and earnings benefits from completing an associate's degree, Black and Hispanic students show slightly stronger earnings gains, although these differences by race and ethnicity are not statistically significant. For Asian students, there were no statistically significant differences relative to Whites.

## Policy Recommendations

Our findings demonstrate that the education provided by Massachusetts community colleges generates value for students and increases the productivity of the state's workforce. However, there is clearly much more that educators and policymakers can do to position community colleges to provide an even stronger contribution to equitable economic growth. Toward this end, we offer the following policy recommendations:

- **Utilize information on the returns to higher education by field of study to inform college and career advising.** Although we must always encourage students to follow their passions and intellectual curiosities when selecting majors, advisors can help inform the choices that students make by presenting accurate information on the career outcomes associated with degree and certificate programs within each field. Surveys show that students consistently overestimate earnings in some fields and underestimate the likelihood of employment in others.
- **Increase access to community college while accelerating completion.** Early College is a targeted evidence-based approach providing low-income and first-generation students with the opportunity to earn a significant number of college credits for free while in high school. Currently, there are 35 designated Early College high schools in Massachusetts that enroll more than 3,600 students. The Commonwealth should significantly expand access to such programs for high schools, particularly those serving low-income, first-generation, and youth of color.
- **Provide comprehensive student support to boost completion rates.** Low-income students in Massachusetts often struggle with economic insecurity in terms of even basic necessities such as food and housing. Assigning students to advisors with relatively small caseloads who can help them assess the unique challenges they face and find resources, including financial assistance to cover fees, transportation, or emergencies, has been shown to dramatically increase completion rates. Last year the legislature created a new Community

College SUCCESS fund to ensure that institutions have resources to provide these services and DHE recently convened a basic needs taskforce to develop a strategic plan to coordinate service delivery. To ensure these funds are used efficiently, the state should look to existing models like Success Boston that have supported community college students to persist and succeed.

- **Target financial assistance to students with the greatest need.** While President Biden and others have called for “tuition free” community college for all Americans, many community college leaders believe more targeted programs are needed to close completion gaps. For example, Boston’s Tuition Free Community College program is limited to Pell-eligible students and provides a stipend to help students meet expenses over and above tuition and fees. A more promising approach could be Biden’s proposal to increase the Pell grant—the first such increase since 2009—although proponents say that the proposal needs to go much further to doubling the size of the Pell grant, factoring in basic needs as part of the calculation, and indexing it to inflation.
- **Increase access to internships and other career exploration opportunities.** Offering paid internships and other experiential learning opportunities can help students align their academic studies with their career plans post-graduation, leading to stronger matches in the labor market. Developing these types of partnerships between community colleges and employers can help promote student accessibility, diversity, retention, and completion across occupations that are in high demand.

- **Enhance the state’s longitudinal student data system and provide broader public access.**

Massachusetts can position researchers to better understand how higher education contributes to success in the state’s ever-changing labor markets by continuing to invest in the SLDS system and providing a public portal that gives students, families, educators, and workforce development practitioners access to this information to make more informed decisions.

This more nuanced understanding of the payoff to community college comes at a time when these institutions are on the front line of the COVID-19 workforce crisis. Having suffered large drops in enrollment during the past year, largely due to fewer students from under-represented minority and low-income groups, community colleges will now be expected to ramp up operations and serve as one of the primary components of the nation’s workforce development recovery plan. In light of the positive labor market returns that we present in this report, additional investment appears to be well worth it. Investing in community colleges now will enable them to implement the right services and supports to bring students back and help them achieve better education and career outcomes.

## I. Introduction:

# The importance of community college as a pathway to economic mobility

Community colleges offer a variety of pathways to economic mobility, from devising workforce development programs to providing open access to low-income students seeking a postsecondary credential, as well as offering a stepping-stone to a four-year college or university. The majority of students who initially enroll in community colleges (75 percent nationally and 61 percent in Massachusetts),<sup>1</sup> however, will receive all of their postsecondary education and training from a two-year institution, often the one that they started at. As such, it seems critically important to understand what the labor market return might be for attending and/or earning a credential from a community college, with no further education or training. For students and parents, knowing which types of community college credentials and which fields of study have the highest payoff can help guide enrollment decisions. For cities and states, knowing whether students are benefitting equally from two-year institutions across racial, ethnic, and socioeconomic status can help guide investment decisions in programs aimed at reducing inequality across these groups.

Yet we know little about the return to community college due to the wide variation in the types of credentials that are earned as well as the fields of study that are available. In Massachusetts, roughly one out of every five credentials awarded by community colleges is a certificate, with associate's degrees accounting for the remainder.<sup>2</sup> Moreover, we know even less about how community college certificates are valued by employers, with some workforce development practitioners questioning whether these credentials yield a positive net return on investment.<sup>3</sup> Similarly, liberal arts is the most frequent field of study, accounting for roughly 30 percent of all associate's degrees in Massachusetts, even among students who do not transfer. Yet there is a dearth of information about the labor market return to liberal arts degrees

from community colleges compared to other fields such as health, trade, and STEM.

Economic mobility varies for different subgroups by race, ethnicity, and socioeconomic status, with community colleges serving as an important point of access for under-represented racial groups and low-income students. In Massachusetts, community colleges serve a more diverse student body compared to four-year institutions, with students of color accounting for just over half (50.5 percent) of enrollment versus only one-third (33.2 percent) of the student body at four-year state colleges.<sup>4</sup> In addition, a greater share of non-traditional students are found at community colleges.<sup>5</sup> These typically are students who delay enrolling in community college one or more years after graduating from high school and are often older than the conventional first-time freshman.<sup>6</sup> They may attend only part time and/or work full time while enrolled, especially if they have family responsibilities. All these different circumstances related to their stage of life may affect their rate of completion and the subsequent payoff to attending and/or earning a credential.

And although overall success and completion rates have been rising at Massachusetts community colleges, we know that not everyone is benefitting equally. Over the past decade the share of students completing an associate's degree within three years has increased from 20.9 percent to 22.1 percent in Massachusetts.<sup>7</sup> Yet gaps in achievement between different racial/ethnic and socioeconomic groups of students persist—even when using broad measures of success that do not solely rely on completion.<sup>8</sup> For example, in 2018, 67 percent of White community college students had graduated, transferred, attained at least 30 credits, or remained enrolled within six years after starting community college compared to 65 percent of Black and 62 percent of Hispanic students (no data are

reported for Asian students). Similarly, 65 percent of students from higher income households that do not qualify for a Pell Grant meet one of the success metrics compared to only 58 percent of low-income students who are Pell-eligible.<sup>9</sup> Thus, even if all groups received a similar financial payoff to a particular community college experience, reducing income inequality across racial, ethnic, and socioeconomic status will not be possible if we do not close the gaps in who attains these experiences.

Equity has become an even greater concern as the COVID-19 pandemic has caused larger declines in community college enrollment among Black and Hispanic students across the U.S., including Massachusetts.<sup>10</sup> Between fall of 2019 and 2020, community college enrollment of first-time freshmen in Massachusetts declined by 33 percent among Blacks and by 25 percent among Hispanics compared to only 18.2 percent among Whites. These declines are particularly concerning given that college and university enrollment of Black and Hispanic students had been increasing prior to the pandemic, while enrollment of White students had been trending down for a decade, consistent with the underlying long-run demographic trends in the state.

This report aims to better understand the value of community college as a pathway to economic mobility for young adults. Until recently, it has been difficult to accurately estimate the return to a community college education in Massachusetts because of the large number of factors that affect who enrolls and when, the rate at which students complete their credentials, and the field of study that is chosen. But now the Commonwealth's State Longitudinal Data System (SLDS) links data across high schools, postsecondary institutions, and employers to allow researchers to track individuals as they graduate from high school, enroll in college, and enter the labor market. Drawing on this novel data source, this report will explore the following research questions:

1. What is the payoff in terms of increased employment and earnings relative to high school graduates for community college students who:

- Attend a community college without completing a credential or ever attending a four-year institution
- Earn a credit-bearing certificate without ever attending a four-year institution
- Earn an associate's degree without ever attending a four-year institution

2. How does this payoff to community college vary by:

- Timing of enrollment (e.g., right away versus one to five years after high school graduation)
- Field of study (business, health, law enforcement, liberal arts, STEM, or trade related)
- Individual characteristics (gender, race, ethnicity, socioeconomic status)

To explore these questions, we study recent cohorts of Massachusetts public high school graduates as they finish high school, choose to enroll in postsecondary education or not, and enter the labor force and move through the early stages of their career. This is a policy-relevant group (e.g., recent high school graduates) that is broader than those of prior research, which has often focused on a particular workforce intervention and/or a particular group of workers. Yet we also focus on a particular policy-relevant context: students who are residing in the same state, graduating from similar high schools, and are part of the same community college "system." Finally, we make use of the best available data to estimate the return to community college more precisely than previous studies by controlling for academic preparation and connection, and also examine differences across demographic groups. Combining a cohort-based analysis with longitudinal data enables us to provide a comprehensive picture of the labor market return to community college experiences in Massachusetts.

We examine the return to attending community college separately from earning either a credit-bearing certificate or an associate's degree for both first-time

freshmen as well as non-traditional students who enroll one to five years after graduating from high school. We also compare the labor market earnings associated with different fields of study for these credentials. Finally, we document differences in the rate at which community college credentials are conferred by race, ethnicity, and socioeconomic status and test whether the labor market return to such credentials varies across these groups. We hope that these findings will serve as a basis for ongoing policy discussions regarding state and municipal investments in both increasing access to college and closing achievement gaps across groups.

The remainder of the report proceeds as follows. In Section II we provide some background about prior research as well as some descriptive employment and earnings trends by educational attainment for Massachusetts workers. In Section III we describe the novel data that we use from the SLDS and how

we estimate the labor market return to community college accounting for the different demographic and academic characteristics of students who choose to attend a public two-year institution in Massachusetts. In Section IV we show how community college benefits individuals in the labor market based on our estimates of the employment and earnings gains for workers who attend community college and/or earn a credential relative to terminal high school graduates. In Section V we disaggregate these results by field of study to explore which community college degrees have the greatest potential for economic mobility. In Section VI we compare the labor market returns to community college across different groups of workers to better understand who benefits from getting a credential from a community college. Section VII concludes with a discussion of our findings and policy recommendations at the local, state, and national levels.



## II. Background and Context:

### What do we already know about the labor market return to community college credentials?

Isolating the increases in earnings that community college students gain through their studies presents a significant methodological challenge. Before we dive into describing how researchers typically tackle this challenge, we first need to define the concept. We can think about this “return” on investing in human capital in three different ways. First, we can think of the return as the difference in labor market employment and earnings across individuals with different educational credentials (e.g., high school degree versus community college certificate). While looking at these differences can be informative, they often fail to account for the factors that affect an individual’s decision to enroll in community college that may also affect their labor market earnings. For example, individuals with better academic preparation are more likely to enroll in postsecondary education and also more likely to earn higher wages in the labor market, making it difficult to disentangle how much of the difference between individuals can be attributed to having a postsecondary credential.<sup>11</sup>

A better way to measure labor market returns is to estimate the increase in labor market earnings over and above what individuals would have earned without the credential. One way to do this is to control for those factors that we think may have affected the decision to enroll and persist in community college. For example, we can compare differences across individuals with different levels of education but the same amount of academic preparation. Another way to do this is to compare the growth in earnings for each individual over time, if they have enough prior employment and earnings history before and after attending community college. For example, individuals who enroll one to five years after graduating from high school often have at least one year of employment and earnings that can be used as a baseline to measure changes over time.

Finally, we can also think about the labor market return to community college as the increase in labor market earnings net of the costs of obtaining the credential. In this report, we will not be measuring the net return on investment as this will require some additional information on college costs and student financial aid.

Below we describe the various approaches researchers employed in the past and the helpful insights various methods produced. We then describe the Massachusetts context and how we make use of the SLDS to improve our understanding of labor market outcomes for Massachusetts community college students.

### Lessons from Prior Research

Economists have long sought to quantify the returns to a community college education. A 2011 literature review found that nearly all of the research probing this question had detected sizeable earnings gains. On average, the earnings increases tied to completing an associate’s degree were 22 percent for women and 13 percent for men.<sup>12</sup>

However, most studies included in this frequently cited literature review did not utilize the longitudinal data available to us today. Without access to this valuable information, researchers largely relied on cross-sectional survey data comparing the earnings of high school graduates who never attended community colleges to those with varying levels of community college education. This approach makes it very difficult to fully eliminate selection bias. In other words, if those who choose to enroll in community colleges have innate differences from those who do not, and these differences are valued by employers, these older studies may overinflate the true labor market value of a community college education.

To reveal a causal connection between community college education and earnings, economists now turn to more readily available longitudinal datasets like ours. These data link information on an individual's postsecondary studies with their Unemployment Insurance (UI) filings. For those covered by the federal UI program, approximately 95 percent of workers, these records indicate quarterly earnings both pre- and post-enrollment.<sup>13</sup> Rather than simply comparing the earnings of community college students to those with high school degrees who did not pursue higher education, next generation studies employing UI data compare actual earnings growth among students receiving postsecondary education based on the coursework and credentials they have completed.

### **ESTIMATING THE LABOR MARKET RETURN TO COMMUNITY COLLEGE**

One of the first studies taking this approach examined community college students from Kentucky and found significantly larger returns to degree attainment than previous research. This result tells us that, if anything, previous research captured negative selection bias, meaning students enrolling in community colleges were actually less attractive to employers than their peers prior to enrollment. Women in the Kentucky study who obtained an associate's degree increased their earnings by more than 40 percent, while obtaining an associate's degree boosted earnings for men by almost 20 percent. The study also found returns to certificates, but they were far lower for both men (9 percent) and women (3 percent).<sup>14</sup>

The earnings gains Kentucky students realized varied widely by major. This pattern holds across all studies utilizing UI records. For instance, an analysis of community college students in Washington State found completing an associate's degree in the humanities boosted earnings by 5 percent for women, whereas an associate's degree in nursing led to a 37 percent increase.<sup>15</sup>

Research also shows earnings gains may vary more by program of study than by the level of the credential completed (i.e., certificate versus degree). A 2018 study focusing just on career and technical education (CTE) certificates granted by California community colleges

found that the earnings boost fluctuated wildly even within health certificate programs, ranging from 12 percent all the way up to a 99 percent increase.<sup>16</sup> Casting doubts on the assumption that students who leave without completing a degree have wasted resources, a recent analysis of Texas community college students found that those who finished a handful of courses were significantly more likely to be employed and earned considerably more than peers who did not go to college, when viewed over a 15-year period.<sup>17</sup>

This research is just one example of how time is an important dimension to consider. A 2016 study employing UI data from community college students in Virginia found that the majority of the positive returns tied to degree attainment came from increases in earnings growth over an extended period, rather than gains realized immediately upon receipt of a diploma. Some associate's degree fields of study that showed no returns or even negative returns after completion did provide positive returns after two or more years had elapsed.<sup>18</sup> A North Carolina study also found strong variation in returns over time, including the possibility that some skills quickly depreciate; in particular, certificates provided a temporary increase, but these gains evaporated and actually turned negative after just a few years.<sup>19</sup>

Few researchers have differentiated between those who continue to community college shortly after completing high school and those who enter much later. (As we describe further below, studying students who matriculate directly to community college immediately after high school is more challenging because they lack an earnings history). However, one recent study looked specifically at the question of delaying the transition to college and found that it results in a large earnings penalty. While delayers may have higher earnings in the short-term, ultimately they are significantly less likely to complete a degree, especially a four-year degree, which leads to a large loss in lifetime earnings.<sup>20</sup> This finding is consistent with a significant body of research that suggests maintaining "momentum" by continuing directly to higher education increases the likelihood of completion, independent of other factors, including socioeconomic status and academic preparation.<sup>21</sup>

Finally, the strength of the “sheepskin effect” is another central question prone to selection bias that next-generation UI studies have helped disentangle. Labor market economists want to know how much of the earnings gain comes from the acquisition of skills with productive value, as opposed to simply possessing a credential that signals one has those skills (this is known as the “sheepskin effect” because diplomas used to be printed on sheepskin).<sup>22</sup> From the perspective of the student, the nature of the earnings gain is less important; additional pay is a financial benefit. However, this question is relevant to policymakers; ideally, public investment in higher education yields measurable increases in labor productivity beyond that of signaling one’s abilities.

Pre-UI studies found no or very modest sheepskin effects in community college earnings gains.<sup>23</sup> The UI studies detect minimal sheepskin effects with credentials; however, findings are less consistent for associate’s degree holders.<sup>24</sup> While the strength of the sheepskin effect may vary across studies due to different labor market conditions across states and over time, the heterogeneity of the student populations examined in these studies is likely a major factor as well.

As we consider the magnitude of the return to community college in Massachusetts, it is important to keep in mind the variation in estimates across different studies depending on the characteristics of the workers including their age, stage of life, and labor market experiences. The studies described above relied on samples of either older workers looking to retool or all enrolled students. Our exclusive focus on younger community college students is unique and therefore the results are generally similar but not directly comparable to previous research.

### GENERATING ESTIMATES BY FIELD OF STUDY

Varying course-taking patterns produce significant earnings differences within majors. Some students concentrate heavily within their major, while others complete a large number of courses outside of it. Those who specialize tend to earn higher wages when they remain in a single occupation, while those with a more diversified course-taking pattern earn more when they gain experience in different roles.<sup>25</sup>

Studies on majors also find larger immediate earnings gains for those that impart a specific skill, such as nursing and engineering, and lower gains for more general majors, such as psychology and philosophy. However, graduates from specific majors are the least likely to hold management positions throughout their careers.<sup>26</sup> The benefits of specific skills may also be lower in tech, where innovation makes skills obsolete at an increasingly fast pace. College graduates with technology-intensive degrees see their earnings premium decline quickly and many move out of fast-changing occupations as a result.<sup>27</sup>

Some studies suggest students pick majors based on expected labor market returns and perceptions about their ability to complete these majors and thus garner the greatest monetary gain possible. Other studies find a student’s personal interests exert the most influence on choice of major.<sup>28</sup> However, more complex forces are also at play. Studies show how gender roles influence the decision and contribute to the gender pay gap; men are more likely to choose lucrative fields, as are women from low-income families.<sup>29</sup>

Most existing research on major choice examines students attending four-year colleges. A recent study of community college students in California found that their assumptions about labor market outcomes were overly optimistic. Low-income students were especially likely to err when asked to give the probability of graduates from their college obtaining employment in a given field.<sup>30</sup>

## The Massachusetts Context

As illustrated by the discussion above, there are several different ways to measure the labor market returns to education. The simplest is to just compare the differences in employment and earnings across people with different levels of educational attainment. **Table 1** shows the differences in employment rates and earnings during 2018 by different levels of sub-baccalaureate educational attainment for a cohort of students who took the 2008 MCAS. Note that these data come from employment records collected by the Division of Unemployment Insurance, which only capture information on individuals eligible for UI

TABLE 1

## How Do Employment and Earnings Vary by Educational Attainment?

### Annual Employment and Earnings by Sub-Baccalaureate Educational Attainment, 2018

	Employment		Earnings	
	Any quarter during the year	All quarters during the year	Conditional on working at all during the year	Not conditional on working
High school diploma, did not attend any postsecondary institution	66.7%	52.1%	\$34,216	\$22,643
At least two semesters of community college, no credential	79.9%	63.1%	\$29,150	\$23,091
Certificate, no other credential	86.0%	72.4%	\$33,643	\$28,606
Health	91.3%	80.4%	\$38,306	\$34,638
Trade	78.2%	64.1%	\$34,271	\$26,425
Associate's degree, no other postsecondary enrollment	85.2%	73.8%	\$35,029	\$29,713
Business	82.1%	71.8%	\$35,953	\$29,524
Health	89.9%	84.9%	\$43,573	\$39,178
Law enforcement	86.3%	70.6%	\$39,573	\$33,618
Liberal arts	83.5%	72.3%	\$30,713	\$25,636
STEM	80.6%	69.1%	\$46,014	\$36,643
Trade	85.3%	75.8%	\$31,812	\$27,049
<b>Difference between high school and...</b>				
At least two semesters of community college, no credential	13.1	11.1	-14.8%	2.0%
Certificate, no other credential	19.2	20.3	-1.7%	26.3%
Health	24.6	28.3	12.0%	53.0%
Trade	11.5	12.0	0.2%	16.7%
Associate's degree, no other postsecondary enrollment	18.5	21.8	2.4%	31.2%
Business	15.4	19.7	5.1%	30.4%
Health	23.2	32.8	27.3%	73.0%
Law enforcement	19.6	18.5	15.7%	48.5%
Liberal arts	16.8	20.2	-10.2%	13.2%
STEM	13.9	17.0	34.5%	61.8%
Trade	18.6	23.7	-7.0%	19.5%

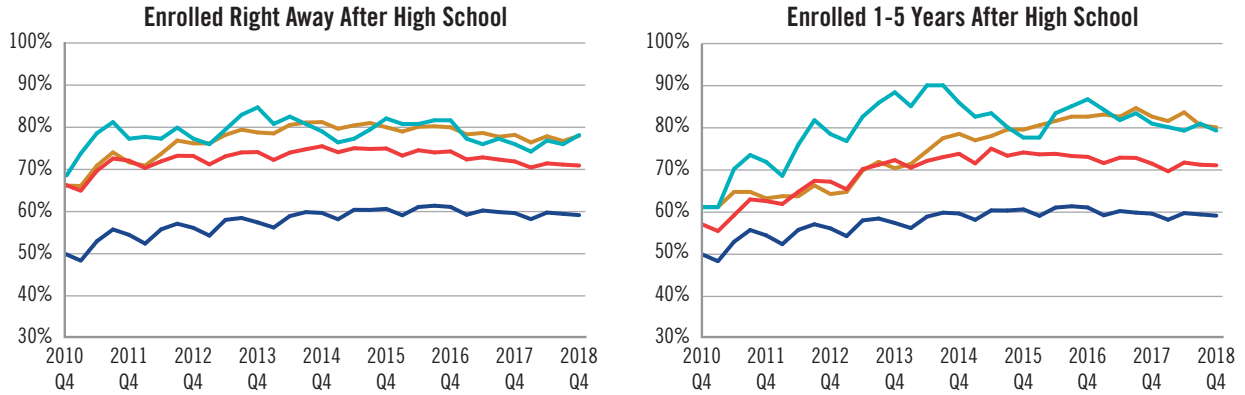
Source: Authors' calculations based on data supplied by the Massachusetts Department of Elementary and Secondary Education.

Note: Sample is 2008-10 MCAS test takers who subsequently graduated from a Massachusetts public high school.

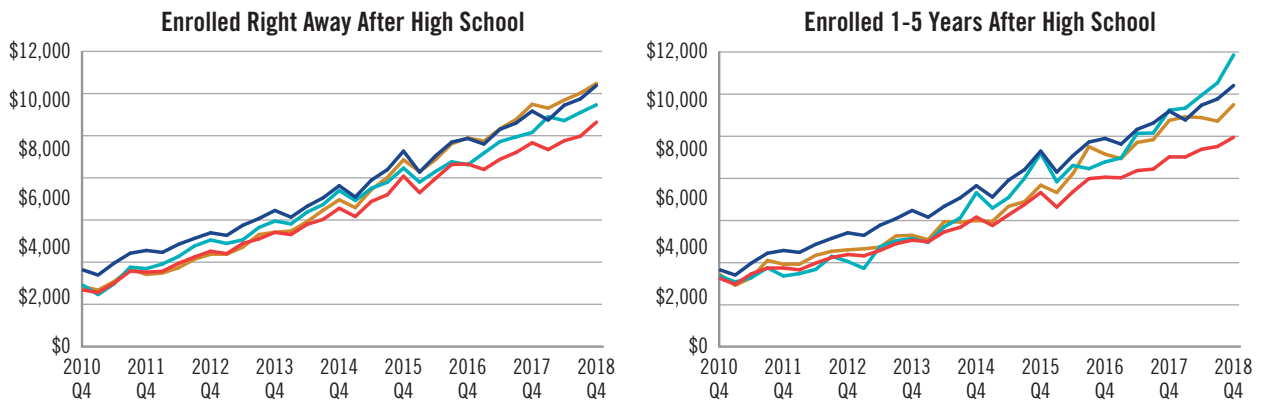
FIGURE 1  
**How Do Employment and Earnings Stack Up over Time?**  
 Community College Students Relative to Terminal High School Graduates

— HS Only — Attend — Cert. — Assoc.

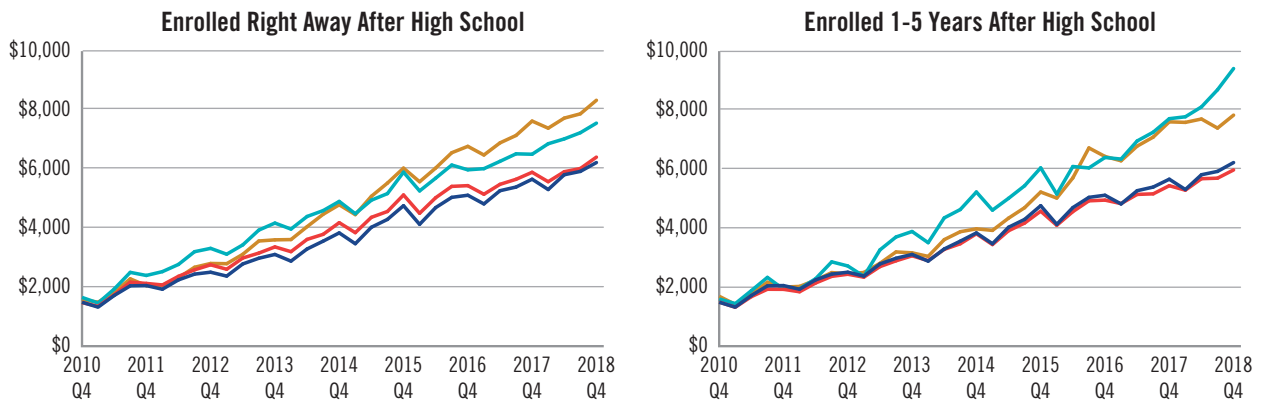
**Panel A. Percent Employed**



**Panel B. Earnings from Wages Conditional on Working**



**Panel C. Earnings from Wages Not Conditional on Working**



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: The sample is 2008-2010 MCAS test takers who subsequently graduated from a Massachusetts public high school. Earnings are inflation adjusted to represent real \$2018 dollars.



benefits. As such, these data likely underestimate the level of employment for all groups, but nonetheless can be used to measure relative differences across groups.

This simple comparison shows that the greatest economic benefit to attending and/or earning a credential appears to be from boosting employment. Only 67 percent of terminal high school graduates were employed at any point during 2018 compared to 80 percent of students who attend community college without earning a credential and 85–86 percent of those who earn a credit-bearing certificate or an associate’s degree.

The last two columns of Table 1 compare the labor market earnings by educational attainment in two ways. First, we look at wages from earnings conditional on employment—meaning that we only compare wages across individuals who are currently working (and have an employment record reported to the state) in 2018. At first glance, it appears that only individuals who completed an associate’s degree had higher labor market earnings (+2.4 percent). Yet there is substantial variation in earnings depending on both the type of credential (e.g., certificate versus associate’s degree) and the fields of study. For example, conditional on working, individuals obtaining a community college credential in health earn 12 to 27 percent more than terminal high school graduates depending on whether they hold a certificate or an associate’s degree.

Second, we also calculate earnings not conditional on being employed by assigning zero to those who are not currently working. While this might sound like an odd thing to do, we view this as a summary measure that simultaneously values both the greater likelihood of employment and the higher earnings associated with having been enrolled in a community college. Combining both of these positive impacts, this simple comparison shows that individuals who obtain a certificate (+26 percent) or an associate’s degree (+31 percent) have labor market returns that are considerable relative to terminal high school graduates. Using this metric, even the labor market return to attending community college without obtaining a credential is also positive, albeit much smaller (2 percent).

Yet these simple comparisons do not take into account a host of important factors that affect the decision to enroll in community college as well as one’s chances for success once enrolled. For example, **Figure 1** shows that among the 2008 MCAS test taker cohort the trajectories of individuals who choose to enroll right away versus one to five years after graduation look quite different. Students who choose to enroll right away have higher employment rates than terminal high school graduates throughout the observation period, perhaps reflecting that individuals with characteristics that are positively rewarded in the labor market are also those who are likely to enroll in postsecondary education (**Panel A**). However, conditional on working, students who enroll right away initially have lower quarterly earnings than terminal high school graduates, presumably because they are still enrolled in school (**Panel B**). If we combine the employment and earnings gains, students who earn a credential quickly begin to surpass those with only a high school degree, starting with certificate holders who are then later surpassed by associate’s degree recipients when they graduate (**Panel C**).

In contrast, students who choose to enroll one to five years after high school graduation have initial employment rates that are more similar to terminal high school graduates. Yet these employment rates diverge over time, with those earning a community college credential experiencing the largest gains. These groups are also very similarly situated in terms of the starting points for their earnings trajectories, but again they fan out over time. Conditional on employment, certificate holders are the only group whose earnings eventually surpass terminal high school graduates. When we account for both the employment and earnings gains, both certificate and associate’s degree holders experience strong positive returns but the timing is delayed compared to students who enroll right away. Yet even these illustrative trajectories conceal how the lived experiences of individuals vary across fields of study as well as different groups of workers who might have different levels of academic preparation or resources available. In the next section we describe how we will use the SLDS to account for these factors when assessing labor market returns.

### III. Data and Methods:

## Estimating the labor market return to community college

Through a forward-thinking effort that involved an unprecedented level of collaboration, leaders at several state agencies have linked administrative records. Researchers can now follow Massachusetts students as they move from public K–12 schools to public and private colleges throughout the nation, and into the state’s workforce. The state’s longitudinal dataset allows us to follow students over time, charting their earnings before, during, and after attending community college.

With detailed information on a large number of students, we can reliably estimate the impact that attending community college has on earnings and employment. The SLDS includes post enrollment information by semester that allows us to better capture student experiences in terms of the timing of enrollment, number of semesters, and completion that can be matched to quarterly information on employment and earnings. Specifically, we received a group of data files from the Massachusetts Department of Elementary and Secondary Education (DESE) that included person-level data from 2010 through 2018 covering:

- Demographic characteristics, MCAS scores, high school attendance, and high school graduation collected by DESE
- Postsecondary enrollment for any private or public college in the U.S. each semester, degree earned including type, date, and field collected by the National Student Clearinghouse (NSC)
- Employment, labor market earnings, and industry each quarter collected by the Division of Unemployment Insurance (DUA)

Although the SLDS is a wonderfully rich dataset, there are some important limitations that should be recognized. First, we do not have any information on the number of credits earned or the courses taken by students while enrolled in community college

due to our inability to link the SLDS to institutional data collected by the Massachusetts Board of Higher Education. This means that we must rely on the number of semesters of enrollment as a proxy for these intermediary outcomes. Second, we have a short window (seven years) during which to observe student postsecondary outcomes after high school due to the number of years of NSC data that we have access to. This means that we cannot assess the complete experiences of students who transfer from a two-year to a four-year institution and so we limit our analysis to students who do not transfer. Third, employment and wage record data do not include people who are not eligible for Unemployment Insurance benefits. This means that we will not be able to observe students working through work-study, internship, or workforce development programs, nor will we observe individuals who are self-employed, 1099 contractors, gig workers, federal employees, or those who work for an employer in a different state. According to the U.S. Bureau of the Census, the data cover 95 percent of individuals working in a given quarter, although that percentage may vary by educational attainment to some degree.<sup>31</sup> Finally, the data only include information on quarterly earnings from wages earned from an employer, which are some combination of hours worked and the rate of pay. Thus, we cannot distinguish whether the earnings premium for community college graduates stems from working more hours or a higher hourly rate of pay. Nor do we capture labor market earnings from other sources such as additional gig work or net profits.

#### STUDYING COHORTS OF HIGH SCHOOL GRADUATES OVER TIME

We study three cohorts of students who took the MCAS as 10th graders in either 2008, 2009, or 2010 who subsequently graduated from a Massachusetts public high school, roughly during the years 2010, 2011, and 2012. We chose to follow the 2008–2010 MCAS test

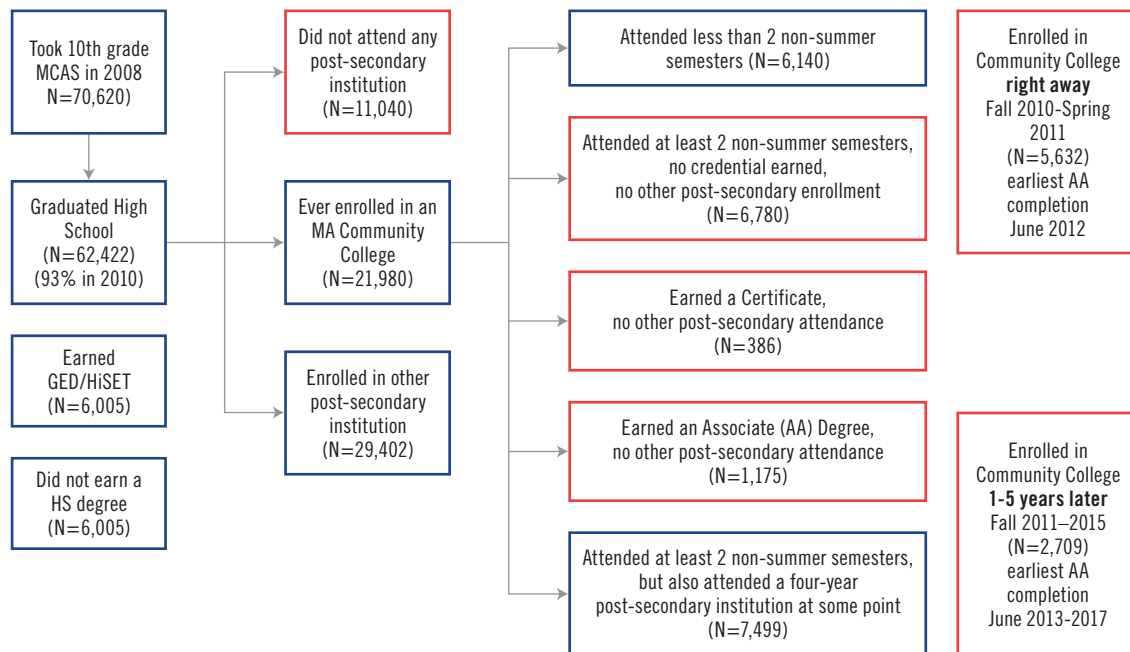
taking cohorts for the following reasons. First, having graduated from high school after 2010, their labor market outcomes would be less impacted by the Great Recession than earlier cohorts. Second, this timing allows for the opportunity to enroll in postsecondary education up to five years after high school graduation and still yields several years of earnings history to provide a meaningful estimate of the return to community college compared to later cohorts.

We impose several additional restrictions on the cohort sample to ensure that we are making appropriate comparisons across educational groups, but none of these restrictions affect the magnitude of our estimates nor the conclusions that we draw from our results. First, we exclude those who dropped out of high school or who earned a GED or HiSET rather than a traditional high school degree, since it's unclear how many of these students would be expected to gain admission to a community college (e.g., for the dropouts) or what the anticipated timing of enrollment might be (e.g., for the GED or HiSET recipients). Second, among students

who only attend community college without earning a credential, we also drop those who attend for fewer than two non-summer semesters since it's unlikely that these students had gained enough community college experience to affect their labor market outcomes. Third, we drop students who first enroll in a community college more than five years after graduating from high school or who transfer from a two-year to a four-year institution because they do not have enough earnings data to study within our observation window. Finally, as a robustness check we exclude from our regressions years during which the individual's earnings fell below the minimum wage for tipped workers (\$2.63 in 2010) working only 20 hours per week (\$3,366 per year) as this would suggest that the individual did not have a strong attachment to the labor market.

**Figure 2** illustrates how we follow each cohort over time using the 2008 MCAS test taker cohort as an example. Among that group of 70,620 students, 88 percent (N=62,422) graduated from high school. Of those who graduated, 18 percent (N=11,040) never

FIGURE 2  
**How Do We Compare Outcomes by Educational Attainment within Cohorts over Time?**  
 Example: The 2008 MCAS test taker cohort



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

attended any postsecondary education, 35 percent (N=21,980) had ever enrolled in a Massachusetts community college and the remainder had enrolled in some other postsecondary institution. Among those who ever enrolled in a Massachusetts community college, 31 percent (N=6,780) attended for at least two non-summer semesters without earning a credential, 5 percent (N=1,175) earned an associate's degree, and just under 2 percent (N=386) earned a certificate.

In our analysis, we compare both employment and earnings for the groups highlighted in red in Figure 2, which include terminal high school graduates, individuals who attended community college for two or more non-summer semesters but did not earn a credential, and those who obtained either a certificate or an associate's degree from a community college. We exclude from our analysis students who attended community college for less than two non-summer semesters (N=6,140) since they did not have a strong attachment to the institution. We also exclude students who ever attended a four-year institution at some point (N=7,499) of whom 35 percent had earned either a certificate or an associate's degree.

To account for differences in the timing of enrollment, we further divide each community college study cohort into the following sub-samples:

1. Those who enroll immediately after completing high school (e.g., fall or spring after graduation)
2. Those who enroll one to five years after completing high school (e.g., any semester)

Note that other research showing the very long time that it takes to complete a community college credential<sup>32</sup> would suggest that Figure 2 should be viewed as somewhat of an incomplete snapshot in time. This is because it is likely, if we were able to observe this cohort for a longer period of time, that more students would be able to persist and earn a postsecondary credential.

## DESCRIPTIVE STATISTICS FOR STUDY COHORTS

Before we can even begin to assess the labor market returns to either attending or earning a credential at a community college, we first need to understand who chooses to do so. This is because while secondary

schooling is largely compulsory (up to a point), postsecondary is voluntary and the decision to attend can be affected by a variety of factors. These include academic preparation,<sup>33</sup> attendance,<sup>34</sup> and financial circumstances<sup>35</sup> to name a few. **Table 2** reports descriptive statistics for the combined comparison groups of young adults across our three MCAS cohorts who are terminal high school graduates versus those who attended community college without earning a credential, earned a certificate only, or earned an associate's degree only.

Comparing the characteristics of these groups illustrates some of the factors that affect the decision to enroll in community college as well as the ability to complete a credential within our observation window. For example, women account for only 35.9 percent of terminal high school graduates. This is largely because they are more likely than men to earn a certificate from a community college, often in a health or trade related field as we noted earlier. Black and Hispanic students account for a higher share of students attending community college than among those who are terminal high school graduates, yet they are less likely to complete a community college credential compared to their White peers.

The same is true of low-income students and students with limited English proficiency (LEP). Students designated as a special education student are less likely to both enroll in and complete community college. These descriptive observations suggest that there are both opportunities (e.g., better jobs in healthcare) as well as barriers (e.g., financial resources and language proficiency) that affect young people's decisions regarding postsecondary enrollment and completion. It will be important to not only control for these factors but also to disaggregate our results across these different characteristics to understand how the return to community college differs across these groups.

Not surprisingly, students who are better prepared academically and have demonstrated greater connection to the education system tend to be more likely to earn credentials from community colleges. They have both higher MCAS test scores and higher attendance rates than either terminal high school graduates or students who only attend community

TABLE 2  
**Who Chooses to Attend Community College?**  
Demographic Characteristics by Sub-Baccalaureate Educational Attainment

	Attended a MA Community College			
	Graduated high school, no postsecondary enrollment	Attended for at least 2 non-summer semesters, no credential earned	Earned a certificate, no other post-secondary enrollment	Earned an associate's degree, no other post-secondary enrollment
Total number	33,346	19,996	1,071	3,563
<b>Gender</b>				
Female	35.9%	50.4% +++	71.1% ***	54.1% ***
Male	63.8%	49.6% +++	28.9% ***	45.9%***
<b>Race/Ethnicity</b>				
Asian	3.5%	3.8%	2.9%	2.7% ***
Black	8.4%	12.6% +++	7.8% ***	7.0% ***
Hispanic	15.8%	20.8% +++	18.8% *	13.5% ***
White	69.9%	60.6% +++	69.2% ***	75.0% ***
Other/mixed race	2.3%	2.2%	1.3%	1.7%
<b>Other Characteristics</b>				
Free and reduced-price lunch	59.9%	64.8% +++	53.7% ***	51.4% ***
Limited English proficient	5.2%	5.6% ++	4.6% **	4.1% ***
Special education	27.1%	21.6% +++	19.0% *	18.5% ***
<b>Standardized MCAS Scores</b>				
Math	-0.51	-0.57 +++	-0.47 ***	-0.33 ***
ELA	-0.54	-0.48 +++	-0.33 ***	-0.25 ***
<b>High School Attendance</b>				
Attendance rate during MCAS test year (mean)	90.7%	91.1% +++	92.2% ***	93.7% ***
Percent with attendance rate<90%	31.8%	30.2% +++	23.3% ***	16.7% ***
<b>Community College Experience</b>				
Enrolled right away during first year after high school	NA	76.4%	64.2% ***	84.9% ***
Persistence to the second year	NA	50.4%	58.1% ***	82.0% ***

Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample is 2008–2010 MCAS test takers who subsequently graduated from a Massachusetts public high school.

Characteristics relative to high school graduates are statistically significant at the one percent (+++), five percent (++) and ten percent (+) levels.

Characteristics relative to community college attenders are statistically significant at the one percent (\*\*\*), five percent (\*\*), and ten percent (\*) levels.



college without having earned a degree. Note that the average Grade-10 MCAS mathematics score and ELA score for the students in our sample were below the state average. For example, terminal high school graduates had scores that were -0.51 (math) and -0.54 (ELA) standard deviations below the average scores for all students in the state. Students obtaining a community college credential had scores that were also below the state average, but not by as much.

Those completing a community college credential are more likely to have persisted in their enrollment from the first to the second year. Yet students who attend community college have test scores and attendance rates that are only slightly better (and in some cases slightly worse) than terminal high school graduates. These findings confirm that of prior research indicating that postsecondary success is highly correlated with high school preparation.<sup>36</sup> As such, it will be important to account for both academic preparation and connection in our analysis, since these attributes affect both postsecondary enrollment as well as one's earnings potential in the labor market. In other words, people with greater academic preparation and/or connection will have higher earnings than their less academically prepared peers regardless of whether they attend community college, so we will need to estimate the return to obtaining a credential net of those attributes.

The decision to pursue higher education is also a dynamic one that may lead a student to enroll immediately after high school graduation or not be arrived at until sometime later. Again, the timing of enrollment is also affected by pre-existing characteristics of the students. As **Table 3** shows, students who enroll one to five years after high school graduation are more likely to be female, Black or Hispanic, low-income, and limited English proficient compared to those who enroll immediately after high school. They also have lower MCAS test scores and high school attendance rates and are less likely to persist from the first year of community college to the second. Whether the delay in enrolling and lower persistence is due to academic preparation or limited

financial resources is difficult to assess. Yet, while 13 percent of students who enroll right away have no work experience, over 80 percent of all students who enroll one to five years after graduating from high school have at least eight quarters of prior work experience.

## ESTIMATING THE LABOR MARKET RETURN TO COMMUNITY COLLEGE

As discussed earlier in the literature review, estimating the return to any educational credential is difficult to do because of the issue of positive self-selection. This is where individuals who are more skilled or motivated or who have had more preparation are more likely to seek a postsecondary degree than those who are less so. When this is the case, we do not know whether their subsequently higher earnings are due to having attended and/or completed higher education or their unobserved characteristics that would make them high wage earners regardless.

This is especially true when estimating the return to community college since there is a greater degree of heterogeneity across students in terms of their socioeconomic status, academic preparation, timing of enrollment, and field of study. For example, individuals who earn associate's degrees in particular fields, especially the high-paying fields, may differ in skill levels from individuals who aspire to the same credential but do not succeed in earning it.

We will take two approaches to address this challenge.\* First, we will use proxies to control for academic preparation (e.g., MCAS test scores) and connection (e.g., high school attendance rates) that can address some of the selection issues with respect to completion. This is particularly important for estimating the return to community college for students who enroll immediately after high school graduation. For these students there is very little earnings history prior to enrolling in community college and what little there is typically represents part-time jobs held as a student, which are unlikely to reflect the individual's lifetime earnings potential. Thus, a simple comparison of earnings before and after attending community college would not be very meaningful. Instead, we will use an

\* See the appendix for the exact regression specification and a full list of variables and their definitions.

TABLE 3

## Who Chooses to Enroll Right Away versus Delay Entry into Community College?

Demographic Characteristics by Timing of Initial Enrollment into Community College

	Enrolled right away	Enrolled 1 to 5 years later	Difference: 1 to 5 years - right away
Total number	16,975	5,633	
<b>Gender</b>			
Female	50.67%	52.71%	2.03**
Male	49.33%	47.29%	-2.03**
<b>Race/Ethnicity</b>			
Asian	3.62%	3.80%	0.18
Black	11.15%	12.92%	1.78***
Hispanic	18.58%	23.27%	4.69***
White	64.63%	57.82%	-6.81***
Other/mixed race	2.027%	2.18%	0.16
<b>Other characteristics</b>			
Free and reduced-price lunch	60.07%	68.08%	8.01***
Limited English proficient	5.13%	6.22%	1.09***
Special education	21.52%	20.92%	-0.60**
<b>Standardized MCAS scores</b>			
Math	-0.51	-0.57	-0.06***
ELA	-0.43	-0.47	-0.04
<b>High school attendance</b>			
Attendance rate during MCAS test year (mean)	92.34%	89.44%	-2.90***
Percent with attendance rate < 90%	24.64%	37.03%	12.39***
<b>Persistence in community college</b>			
Persistence to the second year	62.01%	43.65%	-18.36%
<b>Quarters of work experience prior to enrolling</b>			
Number of quarters	4.20	12.50	8.30***
Percent with zero quarters	12.76%	0.00%	-12.76***
Percent with at least 4 quarters (1 year)	85.43%	96.47%	11.04***
Percent with at least 8 quarters (2 years)	71.13%	79.89%	8.76***

Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample is the cohort of students who took the 2008 MCAS test and subsequently graduated from a Massachusetts public high school. Differences are statistically significant at the one percent (\*\*\*), five percent (\*\*), and ten percent (\*) levels.

OLS regression model to compare the employment and earnings trajectories of students with similar MCAS scores who entered community college immediately after high school and earned a credential versus those who did not enroll in any postsecondary education.

In contrast, students who enroll one to five years after graduating from high school often have sufficient earnings histories to be able to make these pre/post comparisons. This provides some baseline earnings before entering a Massachusetts community college to examine the extent to which reaching a particular milestone or getting a credential in a particular field increased their earnings. We will use a fixed effects model to look at changes over time in employment and earnings so that the return to community college is based on the progress made by each individual relative to their pre-enrollment starting point. In this way, we can net out unobservable time-invariant characteristics of individuals that might be correlated with the motivation to finish a credential or reach a particular milestone.

Finally, whether we use either approach we will run separate regression models for men versus women to account for differential changes in labor force participation by gender over time. We will also estimate returns separately for those who enroll immediately versus those who delay entry into community college for one to five years to account for the different factors affecting the timing of enrollment. Finally, we will also compare estimates across worker groups by race/ethnicity and socioeconomic status as well as by field of study.

## IV. Employment and Earnings Gains:

### How does community college benefit individuals in the labor market?

Whether students enroll in community college right away or delay entry within the first one to five years after high school graduation, the employment returns to attending community college are strong and positive.

**Figure 3** shows our estimates of the increase in the probability of being employed for women versus men who attend community college compared to terminal high school graduates, controlling for observable factors such as demographic characteristics, MCAS test scores, and high school attendance.

In **Panel A** in **Figure 3**, we find that women who earn an associate's degree are 18 percentage points more likely to be employed than terminal high school graduates. For men earning an associate's degree, the employment boost is about 12 percentage points over high school graduates. If we exclude construction workers from the analysis, the lighter tinted bars indicate that the return for men rises to about 16 percentage points. This is because the construction industry provides some of the highest paying jobs for individuals (mostly men) with only a high school degree. Note that individuals who earn a certificate also experience employment returns that are similar to those of associate's degree holders with the employment rates that are 13 (men) to 15 (women) percentage points higher than those of terminal high school graduates. Even students who attend as few as two non-summer semesters without earning a credential experience an employment boost over high school graduates, although the magnitude of the benefit is smaller compared to those who earn a credential. The return for those individuals who attend community college without completing a credential also increases with the number of semesters attended, indicating the potential for a "dosage" effect where greater attendance yields greater benefits.

**Panel B** in **Figure 3** shows that among students who enrolled one to five years after graduating from high school, the increase in the likelihood of being employed relative to terminal high school graduates

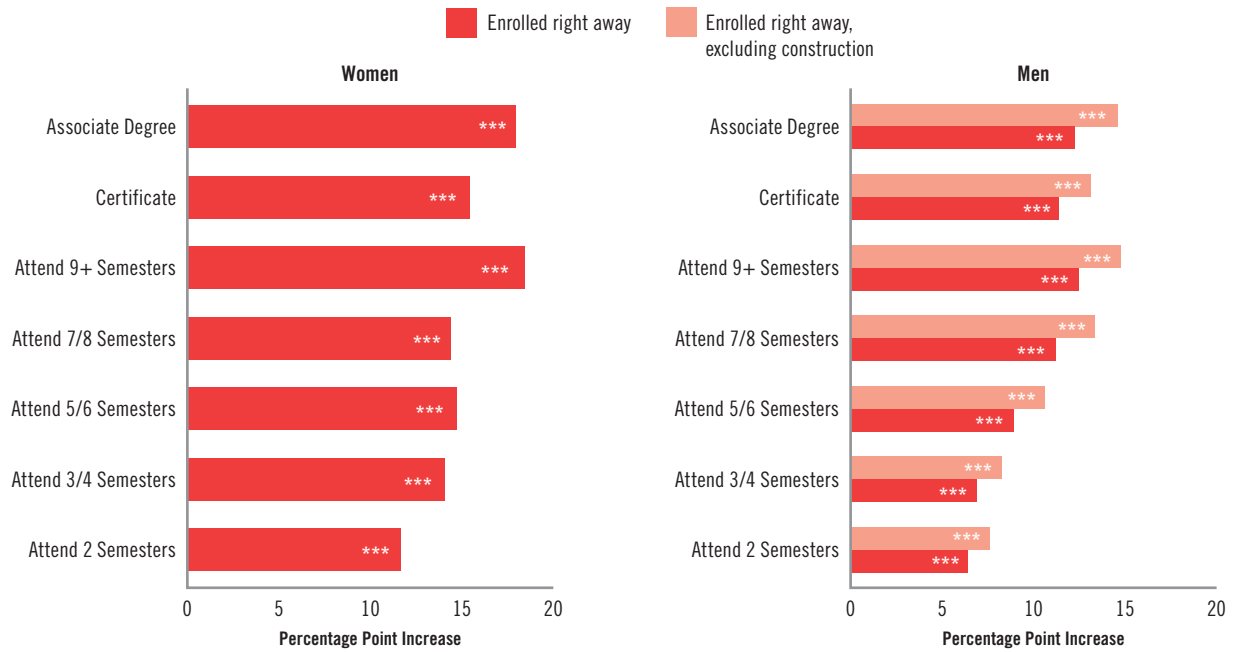
is quite similar in magnitude to those enrolling right away when we include a similar set of controls for demographic characteristics as well as academic preparation and attendance. However, when we also control for their prior employment history, the magnitude of the employment boost falls among women but increases among men. The likelihood that women who enroll in community college one to five years after graduation and earn an associate's degree are employed relative to a high school graduate falls from 14 to 8 percentage points. This means that women who delay entry into community college and earn an associate's degree have more advantageous unobservable characteristics (e.g., persistence) that are also rewarded in the labor market, regardless of their educational attainment. Yet among men, the employment advantage increases from 12 to 16 percentage points when we control for their prior employment history, indicating that among men who delay enrollment into community college, it is those individuals with fewer advantageous labor market characteristics who are more likely to earn an associate's degree, perhaps because they have been unable to access the higher-paying opportunities (e.g., in construction). Regardless, all community college attenders who delay enrollment after graduating high school still benefit to some degree in terms of employment relative to terminal high school graduates, even if they only attend for two semesters.

What about the labor market return to community college in terms of earnings? **Figure 4** shows that the experiences of women versus men diverge even further. Women who earn a community college credential (or even those who come close to one by attending nine or more semesters) have consistently positive returns in terms of earnings that are 15 to 25 percent higher than terminal high school graduates regardless of whether they enroll immediately or one to five years after graduation. This is true even when we measure

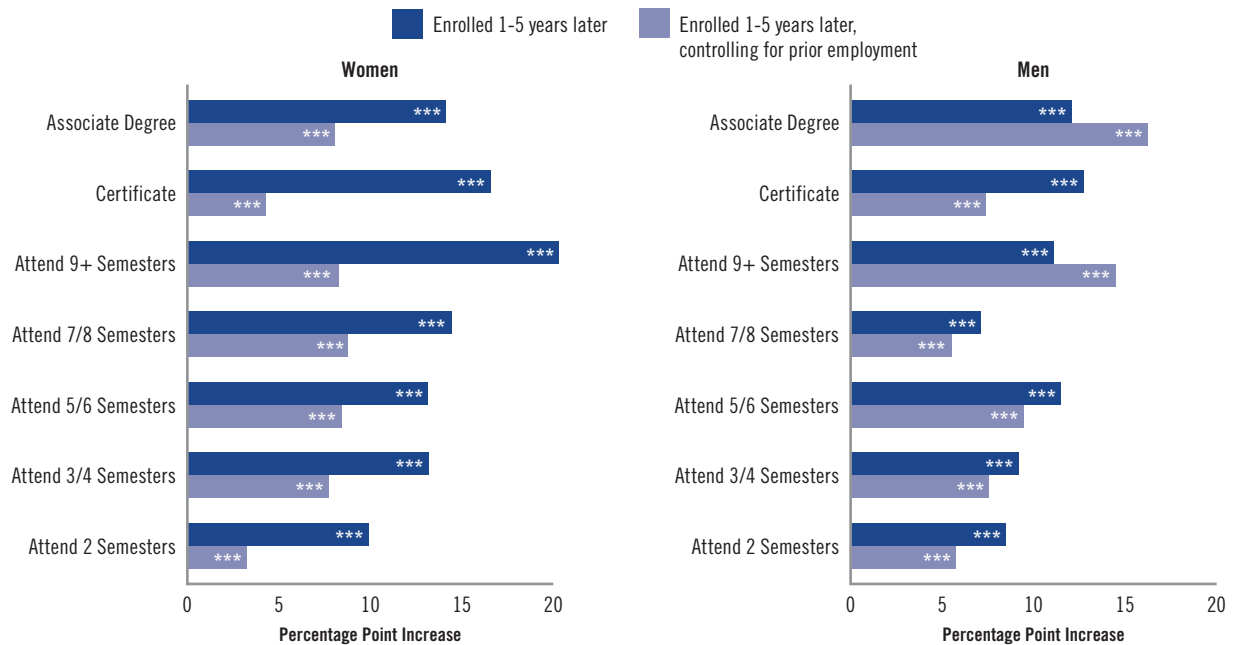
FIGURE 3

## Increase in Annual Employment for Community College Students Relative to Terminal High School Graduates, 2011-2018

### Panel A. Enrolled in a Community College Right Away after High School Graduation



### Panel B. Enrolled in a Community College 1-5 Years after High School Graduation



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample includes 2008–2010 MCAS test takers who subsequently graduated from a Massachusetts public high school. Estimates reflect the increase in the probability of being employed at least one quarter during the year relative to terminal high school graduates controlling for observable characteristics. Additional controls for prior employment history are included for those enrolling in community college one to five years after high school graduation (light blue bars only). Estimates are statistically significant at the one percent level (\*\*\*)

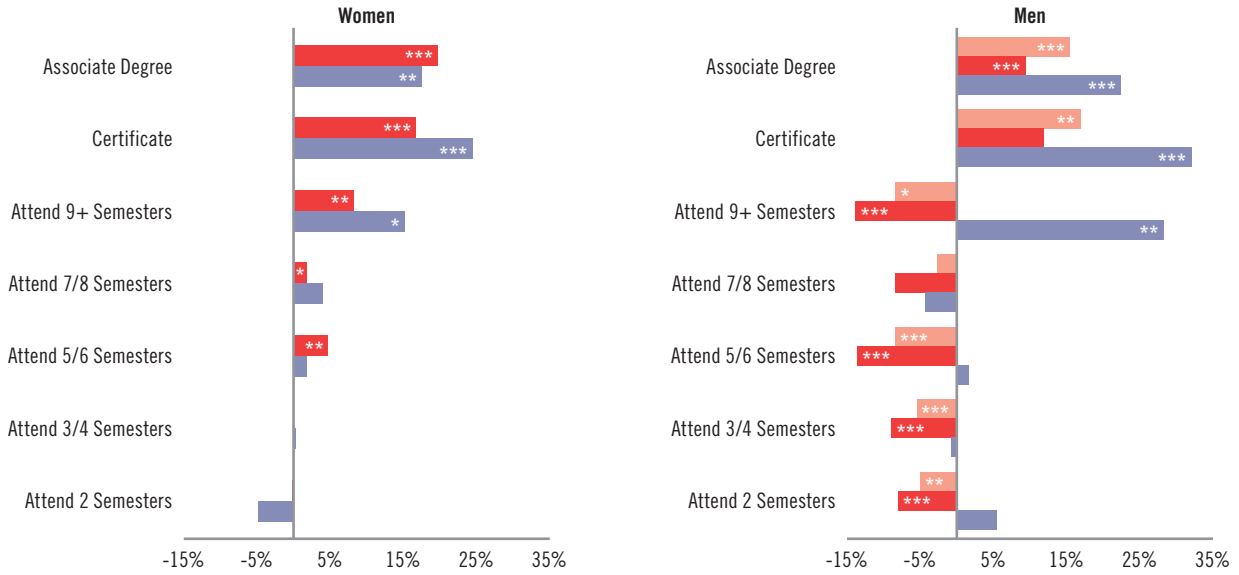


FIGURE 4

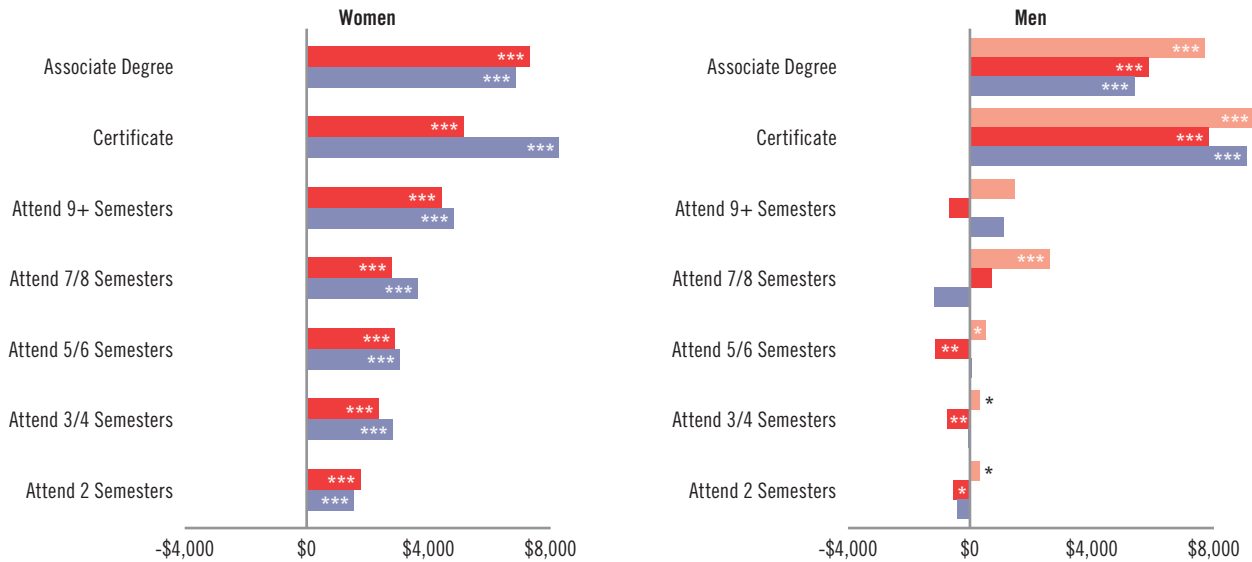
## Increase in Annual Earnings from Wages for Community College Students Relative to Terminal High School Graduates, 2011-2018

■ Enrolled right away    
 ■ Enrolled right away, excluding construction    
 ■ Enrolled 1-5 years later, controlling for prior earnings history

### Panel A. Percent Increase, Conditional on Employment



### Panel B. Dollar Increase, Not Conditional on Employment



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample includes 2008–2010 MCAS test takers who graduated from a Massachusetts public high school. Estimates reflect the percentage increase in annual earnings from wages post community college attendance relative to terminal high school graduates controlling for observable characteristics. Additional controls for prior employment history are included for those enrolling in community college one to five years after high school graduation (blue bars only). Estimates are statistically significant at the one percent (\*\*\*) , five percent (\*\*), and ten percent (\*) levels.

the earnings gain only among those women who were working (e.g., conditional on employment). If we measure the earnings gains among all individuals regardless of employment status, which combines both the gains to being employed as well as the higher earnings, women receive strong labor market returns in terms of annual earnings of \$1,550 more per year just for attending community college for two non-summer semesters to upwards of \$8,000 more per year for earning a community college credential (e.g., certificate or an associate's degree).

In contrast, men only receive an annual earnings boost if they obtain a credential, no matter how we measure

it. Among those who were working, men who enroll right away and eventually obtain a certificate or an associate's degree receive a 10 to 15 percent earnings boost relative to terminal high school graduates. Taking into account their prior earnings history, the annual labor market return relative to terminal high school graduates is even larger (e.g., 20 to 30 percent) for men who delay entry and enroll in community college one to five years after graduating from high school. Combining the employment and earnings gains shows that men earn \$5,500 to \$9,000 more per year for having an associate's degree, depending on whether they enroll right away or delay entry. Yet men who attend a community college without earning a credential do not experience any wage gains over terminal high school graduates, unless we exclude construction workers from the comparison.

## V. Labor Market Returns by Field of Study: Which community college degrees have the greatest potential for economic mobility?

Our earlier discussion of the literature revealed that there are important differences in labor market returns to different fields of study for both baccalaureate as well as sub-baccalaureate (e.g., community college) credentials. While one might argue that the non-monetary value of postsecondary education is similar across fields, prior studies have shown that the labor market returns to different skills can vary, with more specific technical skills in industries such as healthcare or STEM and in trade-related occupations being in higher demand than general skills that can be learned on the job.<sup>37</sup> This would suggest that credentials in some fields of study would yield a higher return than others. These differences were showed in our simple comparisons from Table 1, which revealed that individuals with community college credentials in health had higher earnings premiums relative to high school graduates compared to those in other fields. Moreover, our comparisons of labor market returns by

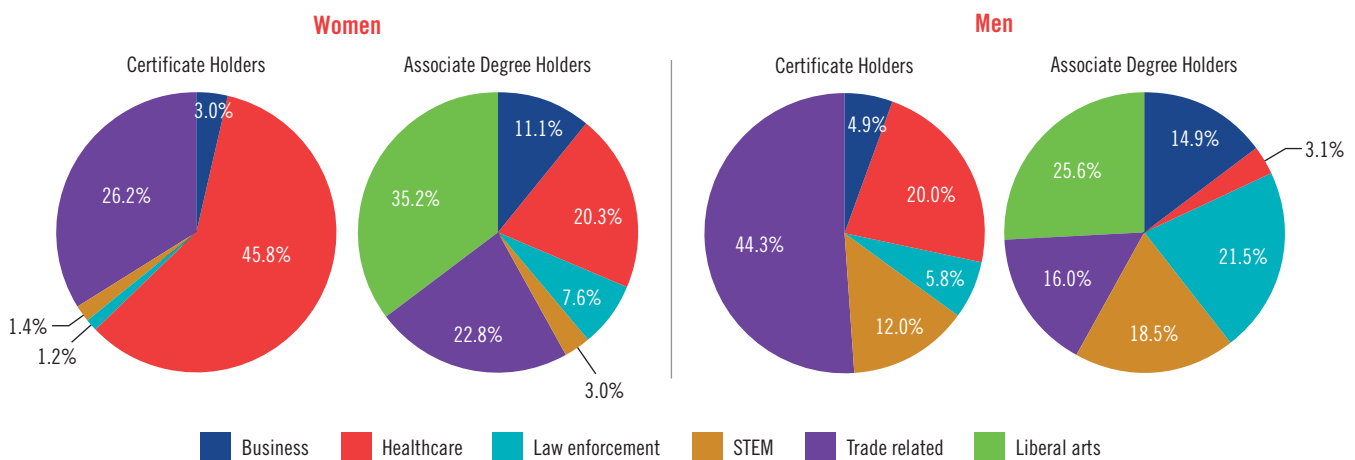
gender suggested that there were potential underlying differences in occupational segregation by field, with male high school graduates potentially having more lucrative options available to them than females.

Given all of these considerations, perhaps it is not surprising that there are large differences in the frequency with which individuals earn a credential in a particular field of study by both degree type and gender. For example, Table 2 indicated that women account for 70 percent of certificate holders while the gender distribution for associate’s degrees is more evenly balanced, with women accounting for only a slight majority (54 percent). As **Figure 5** shows, the distribution of credentials by field is also skewed by gender, with women much more likely to earn a certificate or an associate’s degree in health while men are more likely to obtain a credential in law enforcement or a STEM-related field. Given these

FIGURE 5

### Who Gets What Type of a Credential and in Which Field?

Distribution of community college credentials by field of study for women versus men



Source: Authors’ calculations based on data provided by the Department of Elementary and Secondary Education.

differences, it's natural to ask whether credentials are equally valued in the labor market across fields and whether individuals might be choosing fields that yield a high return on their investment.<sup>38</sup>

## ASSOCIATE'S DEGREES

Both women and men who earn an associate's degree enjoy meaningful increases in the likelihood of being employed compared to terminal high school graduates regardless of field, although some fields do have a higher payoff than others. For example, **Figure 6** shows that employment boost for associate's degree holders among women enrolling in community college right after graduating from high school varies from 19 percentage points (STEM) to 28 percentage points (health). For men, the employment advantage shows a similar pattern, although the magnitudes are lower (11 percentage points for STEM and 20 percentage points for health). We see these same trends by gender and field when we estimate the employment returns for associate's degree holders who delayed enrolling in community college for one to five years after high school graduation.

There is far more variation in earnings when we estimate the return to an associate's degree by field of study, even within groups of workers. Among women who are working (e.g., conditional on employment), those who enroll right away after high school and obtain an associate's degree in health earn 61 percent more than terminal high school graduates. Surprisingly, women enrolling right away and earning an associate's degree in STEM earn wages that are no different from those of terminal high school graduates among those who are working, although there are few women in our dataset who earn these degrees. For those enrolling one to five years later, women with an associate's degree in business, health, and law enforcement earn an additional 30 to 40 percent more compared to having only a high school degree. If we combine both the employment and earnings gains from obtaining an associate's degree, women with an associate's degree earn anywhere from an additional \$3,300 per year in STEM to upwards of \$14,100 in health relative to terminal high school graduates.

Stark differences also emerge by gender when we examine the extent to which associate's degree holders earn more than terminal high school graduates. Conditional on employment, men with an associate's degree in either a health or a STEM field receive an earnings premium of 25 percent over terminal high school graduates but suffer an earnings *gap* of 10 percent if their degree is in a liberal arts field. This could again reflect prior research that shows that technical skills are more highly valued in the labor market compared to general ones, particularly for men where construction is a well-paying alternative career among high school graduates. When we combine the employment and earnings benefits of having an associate's degree, all fields except liberal arts yield a positive return ranging from \$2,500 per year in business to \$10,000 per year in a STEM-related field.

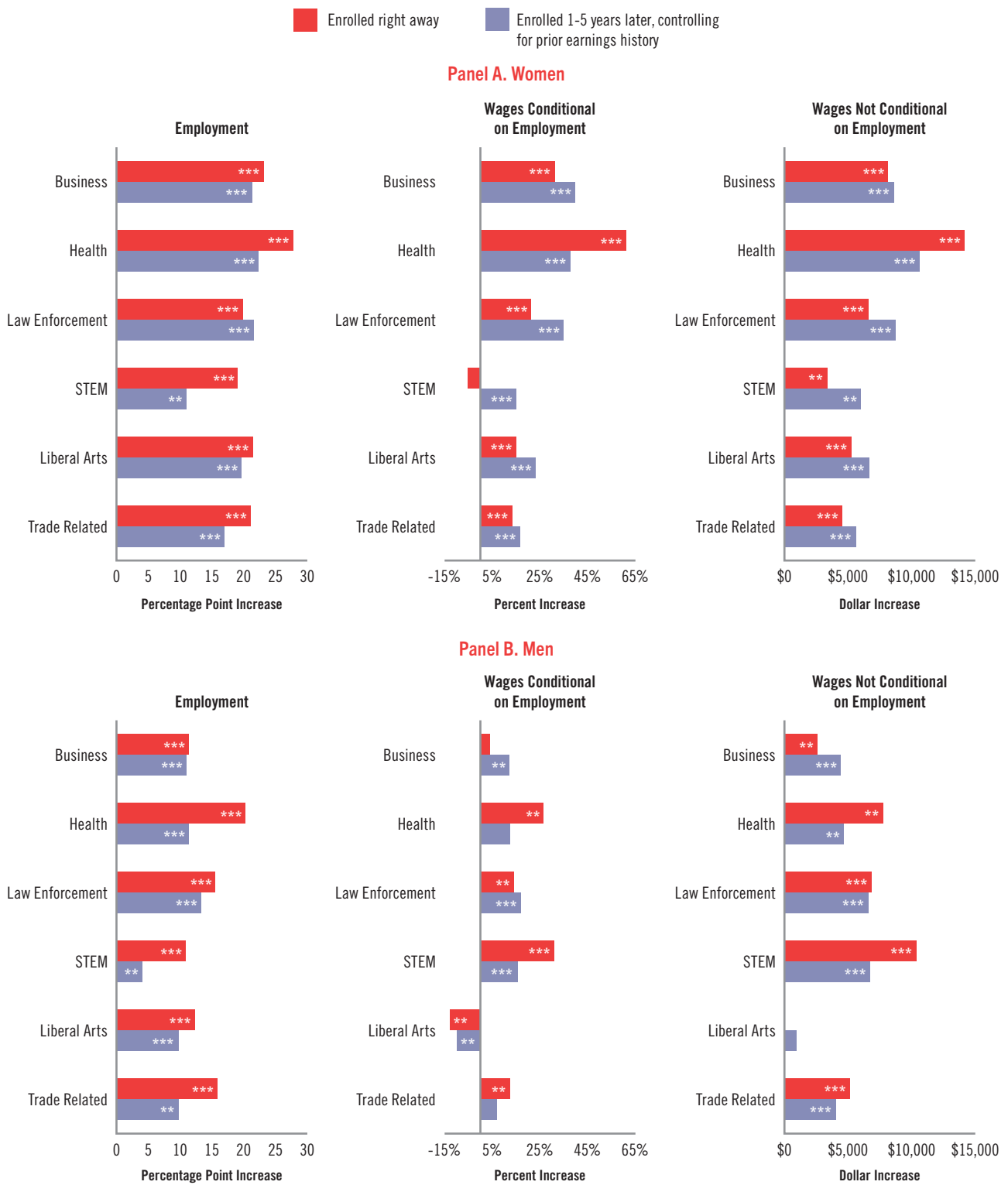
Prior research from other states has also found that terminal associate's degrees in liberal arts are a helpful, but not strong, labor market entry credential—instead, the greatest appeal of the liberal arts associate's degree appears to be in facilitating the transfer into a four-year program.<sup>39</sup> One study found that liberal arts associate's degree holders with no further postsecondary credential are no more likely to find employment than non-completers and accrue only slight financial gains beyond those without degrees.<sup>40</sup> Moreover, although those with a bachelor's degree in liberal arts eventually see their earnings surpass those of other fields decades later (by mid-to-late 50s), this is driven by individuals who obtain a graduate degree.<sup>41</sup>

## CERTIFICATES

Unfortunately, the data are quite limited to be able to explore the labor market returns to certificates by field of study because of the small number that are awarded, as indicated earlier in **Figure 2**. However, we are able to confirm that the positive employment and earnings impacts from obtaining a certificate are in fact driven by the two most common fields that individuals pursue: health and trade-related.

Not surprisingly, health certificates provide strong positive labor market returns for workers. **Figure 7** shows that obtaining a certificate in health boosts employment by more than 20 percentage points for

FIGURE 6  
**Labor Market Returns to Associate's Degrees by Field of Study**

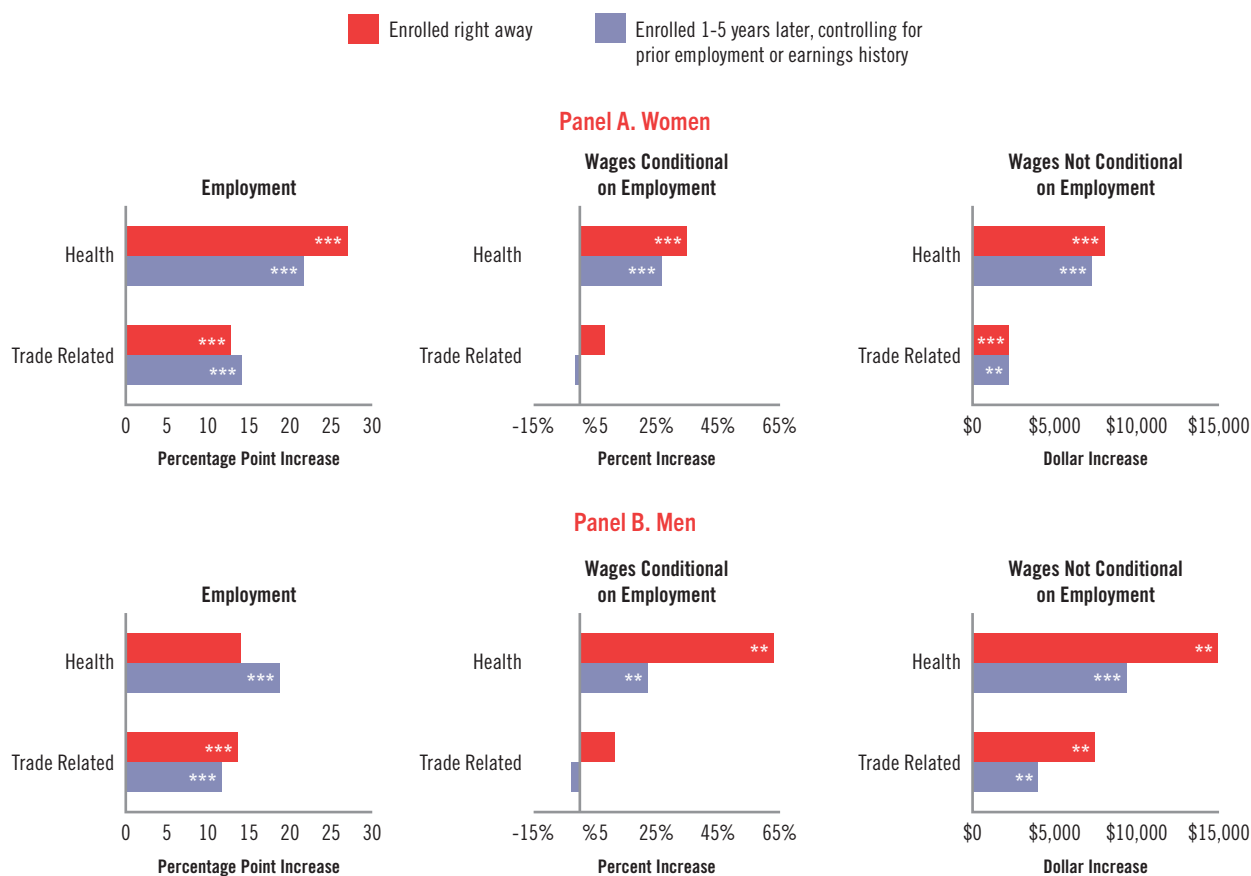


Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample includes 2008, 2009, and 2010 MCAS test takers who subsequently graduated from a Massachusetts public high school. Estimates reflect the increase in employment or earnings for associate's degree holders relative to terminal high school graduates controlling for observable characteristics. Additional controls for prior employment or earnings history are included for those enrolling in community college one to five years after high school graduation (blue bars only). Estimates are statistically significant at the one percent (\*\*\*) , five percent (\*\*), and ten percent (\*) levels.



FIGURE 7  
**Labor Market Returns to Certificates by Field of Study**



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample includes 2008–2010 MCAS test takers who graduated from a Massachusetts public high school. Estimates reflect the increase in employment or earnings for certificate holders relative to terminal high school graduates controlling for observable characteristics. Additional controls for prior employment or earnings history are included for those enrolling in community college one to five years after high school graduation (red bars only). Estimates are statistically significant at the one percent (\*\*\*) , five percent (\*\*), and ten percent (\*) levels.

women and by more than 10 percentage points for men compared to terminal high school graduates—regardless of whether the individual enrolled in community college right away or delayed entry by one to five years. Conditional on employment, obtaining a health certificate confers a boost in earnings of more than 20 percent for either men or women. Accounting for both the employment and earnings benefits, certificates in health yield an additional \$7,000 to \$8,000 per year for women and an additional \$9,000 to \$14,000 per year for men relative to having only a high school degree.

Most of the benefit from a trade-related certificate seems to come from an increase in the likelihood of being employed. In our data, these certificates

cover a wide range of fields including cosmetology (25 percent), culinary (10 percent), energy/utility (10 percent), early childhood education (10 percent), and automotive (5 percent). Both men and women obtaining these certificates have employment rates that are 10 percentage points higher, no matter whether they enrolled right away or one to five years after high school graduation. However, conditional on employment, earnings are not any higher compared to terminal high school graduates. Yet, the higher employment rate alone resulted in an additional \$2,000 to \$7,000 per year relative to having only a high school degree.

## VI. Labor Market Returns across Different Groups of Workers: Who benefits from getting a credential from a community college?

By increasing access to postsecondary education for low-income students and those from under-represented racial groups, community colleges might serve as a vehicle to reduce inequality and/or increase economic mobility across racial/ethnic and socioeconomic groups. For example, under-represented racial groups often attend high schools that have fewer resources and may offer less academic preparation for college. Similarly, low-income students might find tuition and fees a barrier to obtaining a postsecondary credential. Community colleges are designed to address these constraints by providing a lower-cost open-access alternative to four-year postsecondary institutions.

However, while community colleges reduce barriers to access, important gaps remain across groups in terms of outcomes. **Figure 8** shows that Black and Hispanic as well as low-income students in our 2008–2010 MCAS cohort sample are nearly *twice* as likely to enroll in community college in Massachusetts compared to White or high-income students, who are more likely to attend four-year colleges and universities. Yet despite this greater reliance on two-year institutions for access to postsecondary education, the percentage of Black, Hispanic, and low-income youth earning an associate’s degree from a community college, with no further postsecondary enrollment, is roughly *half* that of White or high-income students. Barriers that create an opportunity gap for historically under-represented groups have already limited the degree to which these students can benefit from a community college education in the labor market simply because they are less likely to earn a credential.

But what about the students from less advantaged backgrounds who do complete their degree? Do they experience the same labor market returns as other students? So far, what little we know about these experiences comes from prior research examining bachelor’s degree recipients. These earlier studies show that 60 percent of Black, Hispanic, and Native

American students who graduate from four-year colleges annually start their post-graduation careers unemployed or “underemployed” in jobs that don’t require a college degree.<sup>42</sup> And among the 40 percent who do obtain college-degree jobs, their median salary one year after graduating is 5 to 10 percent below that of their White peers. This earnings discrepancy grows to roughly 13-18 percent within just a few years.<sup>43</sup>

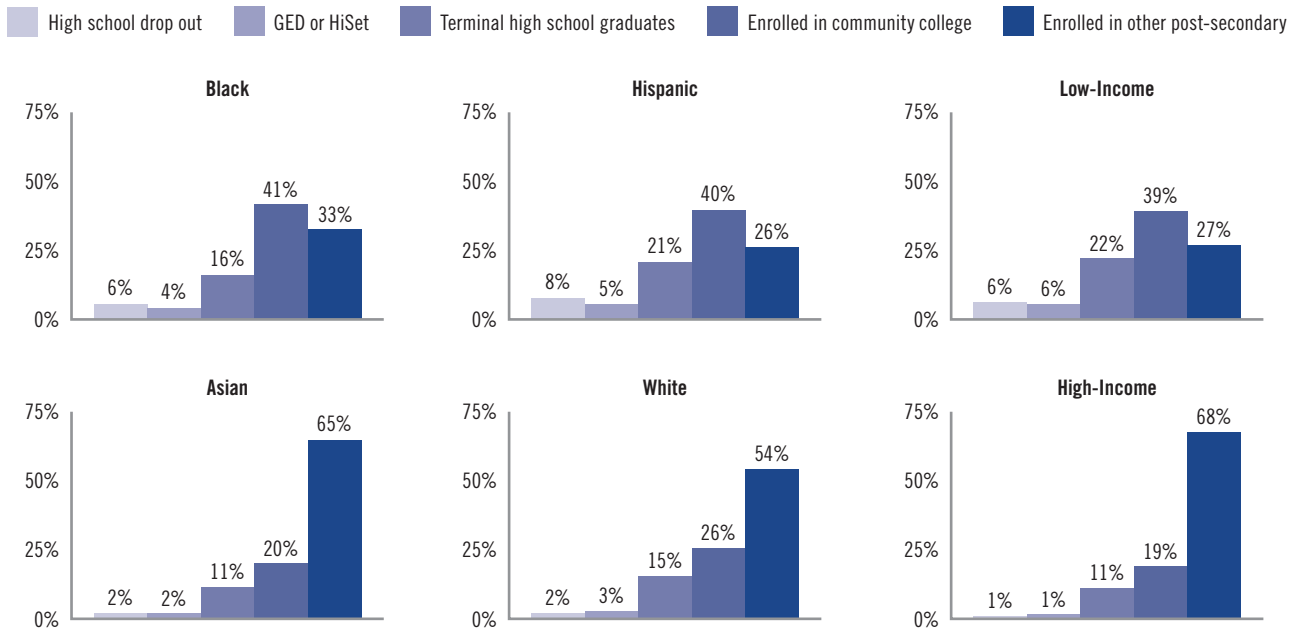
To test this, we compare the returns to community college by race and socioeconomic status to determine whether more advantaged groups get more “bang for their buck” by investing in an associate’s degree compared to less advantaged groups. For example, in **Figure 9**, each bar shows the return for each group’s associate’s degree holders: Asian female associate’s degree holders receive a 20.9 percentage point employment benefit over Asian female terminal high school graduates. We then compare the return to Asian female associate’s degree holders (20.9 percentage points) to that of White associate’s degree holders (16.4 percentage points) and test whether the difference is statistically significant (as indicated with a \*).

We find that the employment and earnings benefits of obtaining an associate’s degree for under-represented students of color and low-income students are largely equivalent to, or even exceed, those benefits experienced by their White and higher income peers, respectively. In **Figure 9**, all groups experience labor market returns to having an associate’s degree that are statistically significant and strongly positive over terminal high school graduates, ranging from 10.8 percentage points for White males to 26.0 percentage points for Black females. Yet the employment gains over terminal high school graduates for Black and Hispanic students who earn an associate’s degree are 7 to 10 percentage points higher than for their White peers. Moreover, the boost in earnings from wages relative to high school graduates, conditional on employment, exceeds that of Whites but the difference is not

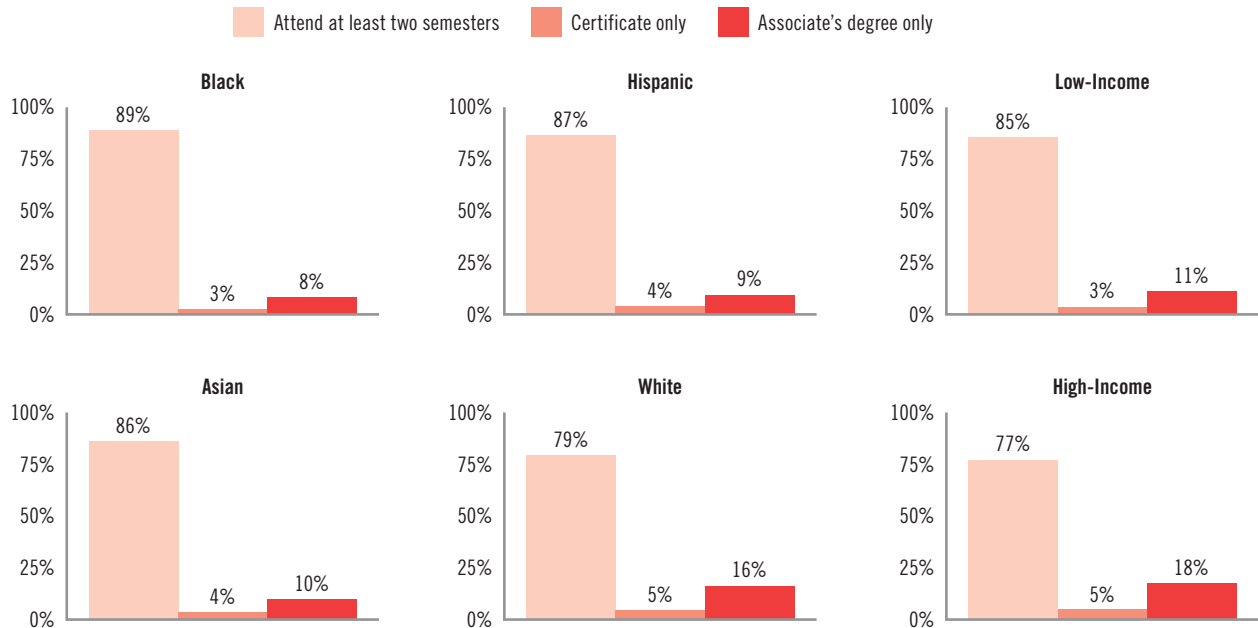
FIGURE 8

## Who Is Most Likely to Enroll versus Succeed in Community College?

### Panel A. Post-Secondary Enrollment by Race/Ethnicity and Socioeconomic Status



### Panel B. Post-Secondary Outcomes by Race/Ethnicity and Socioeconomic Status

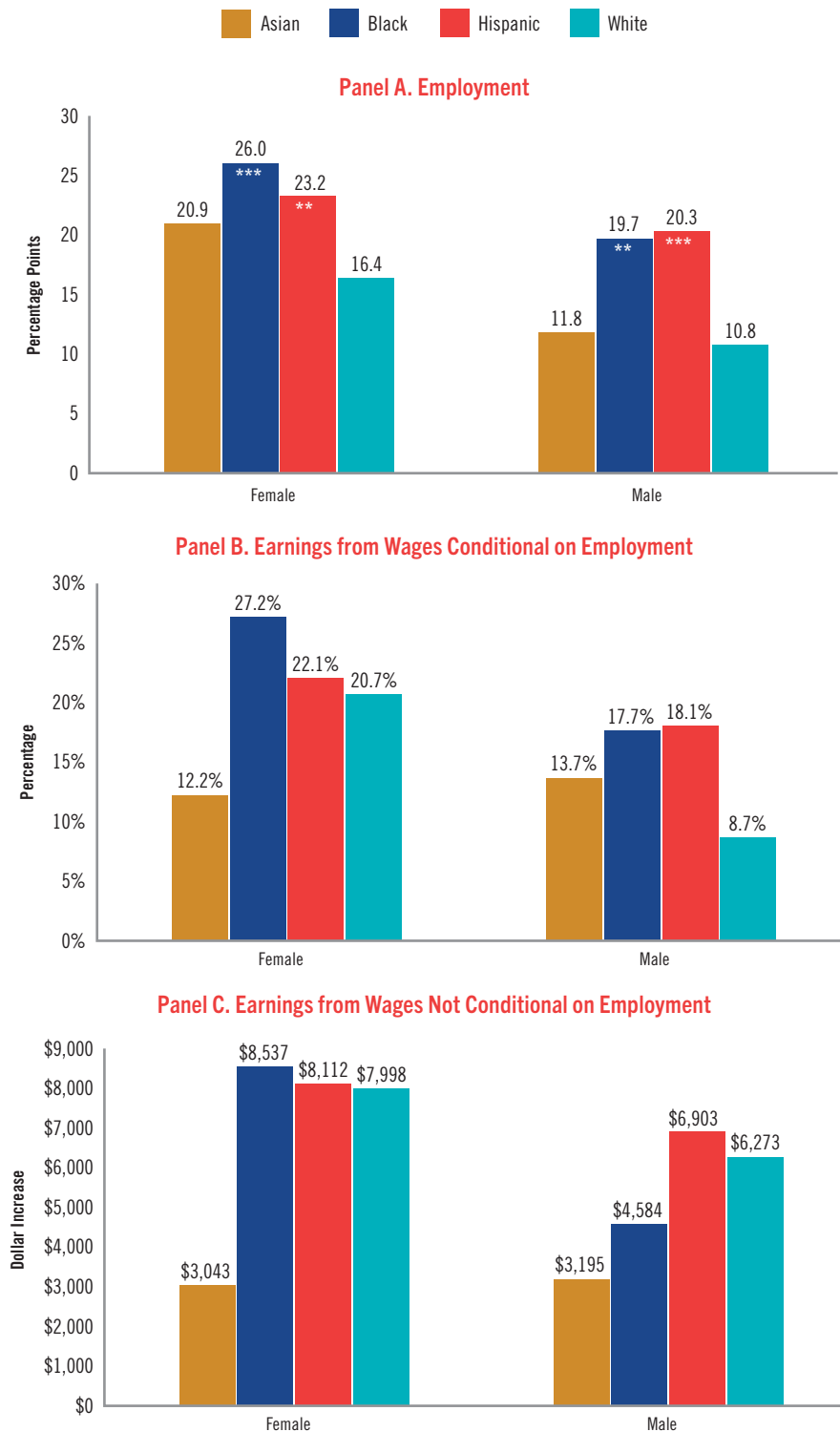


Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: For Panel A the sample is 2008–2010 MCAS test takers. For Panel B, the sample is restricted to 2008–2010 MCAS test takers who graduated from a Massachusetts public high school and were enrolled in community college for at least two non-summer semesters with no further post-secondary enrollment.

FIGURE 9

## Labor Market Returns to Associate's Degrees by Race and Ethnicity



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample includes 2008–2010 MCAS test takers who graduated from a Massachusetts public high school. Estimates reflect the increase in employment or earnings for associate degree holders relative to terminal high school graduates controlling for observable characteristics. All estimates are statistically significant at the one percent level. We further test whether the returns for Asian, Black, and Hispanic graduates are statistically different from those of Whites at the one percent (\*\*\*) , five percent (\*\*), and ten percent (\*) levels.

statistically significant. Adding up the employment and earnings benefits from obtaining an associate's degree in Panel C shows that all groups experience strong positive gains. Although the earnings gains for Asian graduates are smaller than those of other groups, the difference is not statistically significant.

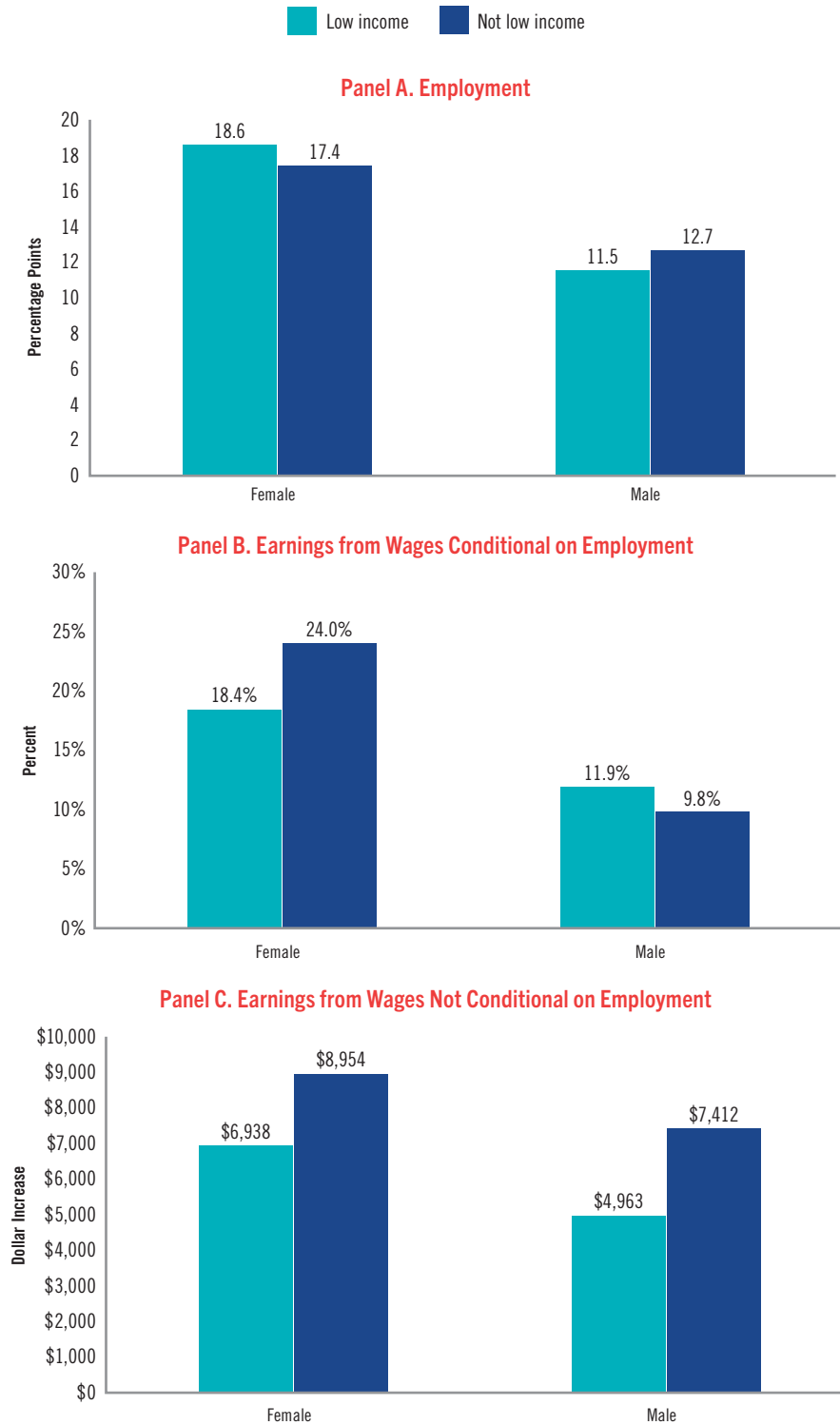
In contrast, the labor market returns by socioeconomic background are all strongly positive but show little difference in the return to community college across low- versus high-income students who earn an associate's degree (see **Figure 10**). Among females, both low- and high-income students who complete an associate's degree experience employment gains of 17 to 18 percentage points over terminal high school graduates. For men the employment gains are slightly lower, on the order of 11 to 13 percentage points, but again similar by level of income. The same is true in terms of earnings from wages with no significant differences between low- and high-income graduates. Conditional on working, high-income females appear to gain more benefit over terminal high school graduates from getting an associate's degree (24 percent) than their low-income peers (18 percent), but the difference is not statistically significant. High- and low-income males earn much more similar returns of 10 to 12 percent over high school graduates for obtaining an associate's degree. Combining the employment and wage gains, although high-income females and males who obtain an associate's degree appear to have a higher return on their investment of about \$2,000 compared to their low-income peers, these differences are not statistically significant.

In summary, if one could close the achievement gap by race or socioeconomic status, then all groups would be equally likely to benefit from having these credentials in the labor market. It should also be noted that data limitations prevent us from disaggregating these findings further to recognize the important diversity within each of these racial and ethnic groups.



FIGURE 10

## Labor Market Returns to Associate's Degrees by Socioeconomic Status



Source: Authors' calculations based on data provided by the Department of Elementary and Secondary Education.

Note: Sample includes 2008–2010 MCAS test takers who graduated from a Massachusetts public high school. Estimates reflect the increase in employment or earnings for associate degree holders relative to terminal high school graduates controlling for observable characteristics. All estimates are statistically significant at the one percent level. We further test whether the returns for low-income graduates are statistically different from those of graduates who are not low-income at the one percent (\*\*\*), five percent (\*\*), and ten percent (\*) levels.

## VII. Conclusion and Policy Implications: What can we say about economic mobility?

This report clearly demonstrates that the labor market return to community college in Massachusetts is strong and positive. Below we put our findings in the policy context of identifying potential pathways to economic mobility and offer some policy recommendations for the local, state, and national levels.

### Discussion of Findings

The labor market returns are greatest for those who earn a credential—either a certificate or an associate’s degree—which boosts employment by 10 to 15 percentage points over that of terminal high school graduates, depending on whether one enrolls in community college right away or delays entry. This is true even when we control for an individual’s demographic characteristics, academic preparation, or prior employment history. Conditional on being employed, workers with a community college credential earn 10 to 20 percent more per year than terminal high school graduates. If we combine the increased likelihood of employment with the wage gains, obtaining a community college credential boosts an individual worker’s labor market earnings by \$5,000 to \$9,000 per year.

We also find positive labor market returns among those who attend community college without earning a credential, even for as few as two non-summer semesters. Most of the benefit from just attending community college comes from greater employment stability, boosting the likelihood of employment by 3 to 10 percentage points for those who attend for only two non-summer semesters to upwards of 5 to 15 percentage points for those who attend for seven semesters or more. Conditional on employment there is little, if any, gain in earnings for those who attend without obtaining a credential. Yet the higher likelihood of simply having a job does boost the annual earnings of those who attend, at least for women.

Even without any additional earnings gains, this is beneficial to both workers and taxpayers, particularly during recessions and periods of technological change when less-credentialed workers typically experience higher rates of unemployment. For workers, steady employment means a steady income, which then also opens doors to being able to borrow, acquire assets, or accumulate wealth. For taxpayers, fewer workers on UI and other public benefits means that more public funds can be spent on further investments in education, health, and other public goods.

Not surprisingly, our estimates confirm that obtaining a community college credential in certain fields such as healthcare, STEM, and trade-related occupations yields the highest payoffs relative to terminal high school graduates. This is true for both associate’s degrees as well as certificates, with healthcare providing the highest annual earnings boost—of \$10,000 to \$15,000 per year. The latter is a significant finding given that most workforce development programs are targeted toward providing such short-term credentials; understanding which ones are valued by employers can help guide practitioners. Yet it should also be recognized that associate’s degrees in liberal arts do not provide much of an earnings gain unless students are able to transfer to a four-year institution.

Overall, women seem to experience greater returns compared to men, although some of this is driven by the choice of field (e.g., healthcare) as well as having fewer lucrative alternatives compared to men (e.g., construction). This gender difference has also been found in prior studies of the returns to community college and is also reflected in the general trends around women pursuing higher education.<sup>44</sup> For example, as of 2019, 69.8 percent of females who had recently graduated from high school were enrolled in a two-year or four-year college, compared to 62.0 percent of men. That’s a big difference from 1967, when 57 percent of recent male high-school grads

were in college, compared to 47.2 percent of women.<sup>45</sup> This is particularly true of women from low-income and minority families, who have made great strides in obtaining a college degree in recent decades. Just 14.7 percent of men from low-income families who were high-school sophomores in 2002 had received a community college credential by 2013, compared to 22.5 percent of women.<sup>46</sup> As of 2020, Black and Hispanic women were respectively 13.7 and 6.3 percentage points more likely to have an associate's degree or higher compared to their male peers.<sup>47</sup> Prior research has suggested that some portion of this gender gap stems from boys in low-income families struggling more in school than their sisters such that they lag behind as early as kindergarten,<sup>48</sup> perhaps because of differences in how disadvantage in one's childhood environment manifests for boys versus girls.<sup>49</sup>

Although Black and Hispanic and low-income students receive the same returns to obtaining an associate's degree as their White and more affluent peers, community college cannot be an equalizing force unless we close the large gaps in persisting and earning a credential. Despite a greater reliance on public two-year institutions as the means by which under-represented minorities and low-income students access postsecondary education, our cohort analysis shows that these students are half as likely to earn a credential from a community college compared to their White or more affluent community college peers. Yet these students receive the same labor market returns, or even higher with regards to the employment boost, as compared to White and higher income students. For example, our estimates show that Black and Hispanic and low-income students who earn an associate's degree from a community college experience employment gains over terminal high school graduates that are 7 to 10 percentage points higher than their White peers. The longstanding hurdles faced by historically under-represented groups in pursuing postsecondary education persist, and limit the extent to which these groups can benefit in the labor market from a community college education simply because they are less likely to earn a credential.

Finally, we should not overlook that there are also non-pecuniary benefits to community college if attending and/or earning a credential also enables individuals to access better quality jobs. This could be in terms of working conditions (e.g., IT versus construction) or stable hours (e.g., healthcare versus services) or better benefits (e.g., health insurance or paid leave) and other "perks" that are typically provided by employers to attract more highly educated workers. Most economists expect the labor market to continue to recover from the COVID-19 pandemic over the next several years. But we need to focus on the quality, as well as the quantity, of jobs that are created. By providing individuals with the skills necessary to perform higher-quality jobs, we can not only ensure that they have access to these benefits but also give employers incentive to create more of these types of job opportunities.

In addition, terminal two-year degrees might be a stepping-stone to a better career trajectory even if they are not a stepping-stone to a four-year college degree. Some occupations, like nursing or IT, are structured so that individuals with entry-level credentials can gain on-the-job experience that allows them to move up a well-defined job ladder, enhancing the labor market return to their community college credential. For example, a report by analytics firm Burning Glass Technologies showed that help-desk/entry-level computer support jobs that pay on average \$44,000 per year, also act as a "springboard" for accessing higher-level positions through additional experience and certifications, leading to positions such as help-desk manager or network support specialist with annual salaries ranging from \$61,000 to \$78,000.<sup>50</sup> Finally, it remains to be seen whether community college graduates further engender intergenerational mobility by creating an expectation for postsecondary education among their children.

## Policy Recommendations

Community colleges are often viewed as an opportunity to increase economic mobility by providing open access to postsecondary education at a lower cost than four-year institutions. Although this report shows that it is indeed the case that attending and/or earning a credential from a community college provides positive labor market returns compared to terminal high school graduates, there are certainly opportunities for policymakers and practitioners to ensure that students, parents, and taxpayers get the most return on their investment.

One recommendation is to make better use of emerging findings like these in grounding college and career advising in more rigorous and reliable evidence about the labor market returns to various fields of study. Although students should always be encouraged to follow their passions and intellectual curiosities in selecting a major, college advising should also balance those explorations with better information on the career outcomes associated with a particular credential. Indeed, there is a clear need to increase awareness among community college students about outcomes associated with particular programs of study, including information on average earnings and employment opportunities by major and degree. A recent survey of community college students finds that students “overestimate salaries by 13 percent and underestimate the probability of finding employment by almost 25 percent in almost all fields.”<sup>51</sup> The authors conclude that providing community college students with more information on labor market outcomes could improve their labor market prospects.

In addition to better career advising, providing students with experiential learning opportunities, such as paid internships, can also help students align their academic experiences with their career plans post-graduation. According to a recent survey by Strada, only half of college graduates feel it was “worth it” to take out loans to attend college, with even lower levels of satisfaction from Black and Hispanic alumni. But borrowers who said their college gave them resources and support to get a good job were eight times more likely to feel that their student loans were worth it.<sup>52</sup>

For example, Bunker Hill’s “Learn and Earn” program was launched in partnership with the Massachusetts Competitive Partnership (MACP) in 2012 and now places 150 students in paid internships for 16 to 40 hours per week with large employers, small businesses, nonprofits, and civic organizations for a hands-on experience.<sup>53</sup> Developing these types of partnerships across the Commonwealth, with private and/or public funding for student wages, can help promote student accessibility, diversity, retention, and completion across occupations that are in high-demand.

Second, there is clear recognition that providing more comprehensive supports for students throughout their community college enrollment can help close achievement gaps by race/ethnicity and socioeconomic status—thereby ensuring that all students are able to maximize the labor market returns to community college equally. This goes far beyond academic supports to addressing basic needs given a landscape with 42 percent of community college students experiencing food insecurity and 26 percent reporting housing insecurity, including 12 percent who were homeless, according to a national survey.<sup>54</sup> The most promising evidence comes from evaluations of ASAP, which was initially developed by the City University of New York (CUNY) and provides full-time, low-income community college students comprehensive support for up to three years. Students are assigned to an advisor with a relatively small caseload who works closely with them to assess the unique challenges they face and find resources, including financial assistance to cover fees, transportation, or emergencies, to help them stay on track. Rigorous evaluations of ASAP show that the intervention nearly doubled graduation rates after three years from 25 to 40 percent.<sup>55</sup> Locally, for more than a decade, Success Boston—Boston’s citywide college completion initiative—has supported students in their transition to and through postsecondary education. Transition coaches work closely with Boston students for the first two years of their college journeys. Since the initiative’s launch in 2009, coaches have supported 7,000 students, more than 40 percent of whom were enrolled at community colleges. Impact evaluations have linked coaching to increased persistence and FAFSA renewal rates and improved academic performance.<sup>56</sup>

In light of the positive labor market returns that we present in this report, additional investment in these supports appear to be well worth it. Drawing from lessons from ASAP, the Massachusetts legislature appropriated \$7.1 million to a new Community College SUCCESS fund last year. The fund provides institutions with resources for wraparound support including peer mentors, academic skills workshops, field trips to four-year colleges, and intensive advising.

There are other hopeful signs that Massachusetts will mount a more aggressive response to reduce the numerous obstacles hindering under-represented students. In December 2020, the Department of Higher Education convened a 22-member advisory committee to develop a strategic plan for addressing basic needs security—including food, housing, technology access, and childcare—among students attending Massachusetts public colleges and universities.<sup>57</sup> The goal is to move beyond pilot programs to a broader, more integrated approach but it remains to be seen how the state will pay for it. Typically, schools that enroll students with the greatest need get the fewest resources, with national figures showing that about \$10,000 is spent annually per full-time community college student, compared to \$14,000 for public four-year college students and \$45,000 for students at private universities.<sup>58</sup>

Naturally, there is a lot of buzz about President Biden’s proposal to provide “tuition free” community college for all students under his \$1.8 trillion American Families Plan. The details are still to come but some experts have suggested that targeting such a program toward low-income students, rather than making it universal, can help ensure that community colleges are not oversubscribed by higher-income students seeking to reduce the price tag of their four-year educations.<sup>59</sup> Indeed, Boston instituted a Tuition Free Community College program in 2016 that is targeted to students who are Pell-eligible and provides a stipend each semester to help students meet expenses. A more promising approach could be Biden’s proposal to increase the Pell grant by \$400 per year<sup>60</sup>—the first such increase since 2009—although proponents say that the proposal needs to go much further to doubling the size of the Pell Grant, which currently maxes out at \$6,345

per year.<sup>61</sup> Others have suggested tying the Pell Grant award amount to the inflation index and also factoring in basic needs as part of the calculation.<sup>62</sup> Moreover, we would be building on the existing program that has a longstanding track record of distributing funding to students in a targeted and efficient way: Around 75 percent of Pell dollars go to students whose family incomes are below \$30,000, and 95 percent of recipients have family incomes below \$60,000.<sup>63</sup> Finally, Pell Grants can be used at any institution and so are less likely to distort the choices of low-income students who could benefit more by attending the institution of their choice—whether it be a two- or four-year institution.

Early College is another targeted evidence-based approach. Several studies show that providing low-income and first-generation students with the opportunity to earn a significant number of college credits for free while in high school boosts completion of both two- and four-year degrees. By marshaling and coordinating resources, these high school–college partnerships provide a cost-effective strategy to ensure that students are on a firm path to college success well before they matriculate to postsecondary studies. The Massachusetts boards of Higher Education and Elementary and Secondary Education jointly created an Early College Initiative in 2016. Currently, 35 designated Early College high schools enroll more than 3,600 students and there are numerous efforts underway to significantly expand access.<sup>64</sup>

Of course, policymaking is always enhanced when it can draw on evidence-based research, which is why the state should continue to build the robustness of the SLDS system. For example, this work could be greatly improved by connecting coursework and credit data collected by the Board of Higher Education and linking to other sources of employment and earnings data (e.g., U.S. census) to capture data on actual wages earned and hours worked for all workers, not just those with UI benefits in the state. And finally, there is an urgent need to increase access to these data both for researchers and for the general public in a way, such as an online data dashboard like in other states,<sup>65</sup> that helps individuals, families, education administrators, and workforce development practitioners make more informed decisions about postsecondary options.



This all comes at a time when community colleges are on the front line of the COVID-19 workforce crisis. Having suffered large drops in enrollment during the past year, largely due to fewer students coming from under-represented racial and low-income groups, they will now be expected to ramp up operations and serve as one of the primary components of the nation's workforce development plan during the economic recovery. According to a survey by Strada, millions of Americans still say they intend to enroll within the next two years and demand is strong at the national, state, and regional levels.<sup>66</sup> Investing in community colleges now will enable them to implement the right services and supports to bring students back and help them achieve better education and career outcomes.

# Appendix

## List of Variables

### OUTCOMES OF INTEREST

EMP = employed in a given quarter

EMP\_ANNUAL = employed in any quarter during the year

EARN = real inflation-adjusted earnings in a given quarter

EARN\_ANNUAL = real inflation-adjusted earnings in a given year

### INDEPENDENT VARIABLES

GENDER

BLACK

WHITE

ASIAN

HISPANIC

FRPL = free and reduced price lunch eligible in any year of high school

ATTEND\_RATE = attendance rate during MCAS testing year

MCAS\_ELA\_SCALE = ELA MCAS scaled score

MCAS\_MATH\_SCALE = MATH MCAS scaled score

ENROLLED = enrolled at all (F, Q, H, L, A, W)

ENROLL\_RIGHTAWAY = enrolled in either the fall or spring after high school graduation

ENROLL\_1to5YRLATER = enrolled one to five years after high school graduation

FINISHED = finished with enrollment

2QBEFORE = two quarters before enrollment

1QBEFORE = one quarter before enrollment

HSGRAD = terminal high school grad, no post-secondary enrollment

ATTEND = attended community college for at least two semesters

CERT = earned a certificate

ASSOC = earned an associate's degree

LIBERAL\_ARTS = credential is in liberal arts

STEM = credential is in STEM

BUSINESS = credential is in business

HEALTH = credential is in health

LAW\_ENFORCEMENT = credential is in law enforcement

TRADE = credential is in trade

# Regression Models

## 1. OLS REGRESSION MODEL

To control for selection bias into who enrolls and completes a community college degree, we use an OLS regression model to compare the employment and earnings trajectories of students with similar MCAS scores who entered community college immediately after high school and earned a credential versus those who did not enroll in any postsecondary education. Standard errors are clustered at the individual level.

$$EARN_{it} = \alpha + \beta AWARD_i + \delta MCAS_i + \delta DEMOG_i + T_t + \varepsilon_{it}$$

Where

- AWARD = set of dummy variables for ATTEND, CERT, ASSOC
- MCAS = both ELA and math MCAS adjusted raw scores including squared and cubed terms
- DEMOG = set of dummy variables for age, gender, race/ethnicity, free and reduced-price lunch, limited English proficiency, and special education
- T= year and cohort dummies

## 2. FIXED EFFECTS MODEL

For those with one to five years of prior work experience, we can net out unobservable time-invariant characteristics of individuals that might be correlated with the motivation to finish a credential or reach a particular milestone. This provides some baseline earnings before entering a Massachusetts community college to examine the extent to which reaching a particular milestone or getting a credential in a particular field increased their earnings. We use a specification similar to Jepsen et al (2014):

$$EARN_{it} = \alpha + \beta AWARD_{it} + \zeta ENROLL_i + \eta_i + \tau_t + \varepsilon_{it}$$

Where

ENROLL<sub>i</sub> = set of four dummy variables for ENROLL, FINISHED, and 1QBEFORE (to account for any potential earnings dip right before enrolling).

$\eta_i$  = person fixed effects

$\tau_t$  = year and cohort dummies

We also compare the fixed effects to the OLS results to determine the direction and magnitude of the selection bias.

## 3. SUBSAMPLES

### *Subsamples*

We run separate regressions for:

- Men and women to account for different labor force participation by gender.
- Those who delay entry into community college for one to five years to account for different intentions.
- By SES and race/ethnicity.

### *Field of Study*

We also interact AWARD with degree field for those with certificates or associate's degrees to capture the return to business, healthcare, etc. and test whether the returns are significantly different.

# Endnotes

1. Davis Jenkins and John Fink. "What We Know about Transfer." (New York, NY: Columbia University, Teachers College, Community College Research Center, 2015); data retrieved April 29, 2021 from <http://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-transfer.pdf> <https://www.mass.edu/datacenter/pmrs/>
2. Data retrieved April 29, 2021 from <https://www.mass.edu/datacenter/success/CCDegreesConferred.asp> Note that this does not include certificates that are non-credit-bearing such as those issued by a community college through a workforce development program.
3. John Marcus. "A College Certificate May Not Be a Clear Pathway to a Job." *NBC News* (October 24, 2017).
4. Data retrieved April 29, 2021 from <https://www.mass.edu/datacenter/access/>
5. Data retrieved April 29, 2021 from <https://www.mass.edu/datacenter/2017adultlearners.asp>
6. Data retrieved April 29, 2021 from <https://nces.ed.gov/pubs2002/2002012.pdf>
7. Data retrieved April 29, 2021 from <https://nces.ed.gov/ipeds/TrendGenerator/app/answer/7/21?f=6%3D25>
8. Data retrieved April 29, 2021 from <https://www.mass.edu/datacenter/pmrs/reports/2019/Success-Completion.asp>
9. Data retrieved April 29, 2021 from <https://www.mass.edu/datacenter/pmrs/berkshire.asp>
10. Data retrieved April 29, 2021 from <https://www.mass.edu/datacenter/2020enrollmenttrends.asp>
11. Susan Therriault. "Predictors of Postsecondary Success." (Washington, DC: American Institutes for Research, 2013).
12. Clive Belfield and Thomas Bailey. "The Benefits of Attending Community College: A Review of the Evidence." *Community College Review* 39.1 (2011).
13. See <https://www.bls.gov/cew/overview.htm>
14. Christopher Jepsen and others. "The Labor-Market Returns to Community College Degrees, Diplomas, and Certificates." *Journal of Labor Economics*, 32.1 (2014).
15. Mina Dadgar and Madeline Joy Trimble. "Labor Market Returns to Sub-Baccalaureate Credentials: How Much Does a Community College Degree or Certificate Pay?" *Educational Evaluation and Policy Analysis*, 37.4 (2015).
16. Ann Stevens and others. "Career Technical Education and Labor Market Outcomes: Evidence from California Community Colleges." *Journal of Human Resources*, 54.4 (2018).
17. Matt Giani and others. "The Value of an Incomplete Degree: Heterogeneity in the Labor Market Benefits of College Non-Completion." *The Journal of Higher Education*, 91.4 (2020).
18. Shanna Smith Jaggars and Di Xu. "Examining the Earnings Trajectories of Community College Students Using a Piecewise Growth Curve Modeling Approach." *Journal of Research on Educational Effectiveness*, 9.3 (2016).
19. Vivian Liu and others. "The Medium-Term Labor Market Returns to Community College Awards: Evidence from North Carolina." *Economics of Education Review*, 44 (2015).
20. Yuxin Lin and Vivian Liu. "Timing Matters: How Delaying College Enrollment Affects Earnings Trajectories." (New York, NY: Community College Research Center, 2019).
21. Clifford Adelman, a pioneering higher education researcher at the US Education Department, developed momentum theory. In recent years, it has been refined by researchers employing more sophisticated methods to control for selection. See: Clifford Adelman. "Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment." (Washington, DC: US Department of Education, 1999); Paul Attewell and others. "What Is Academic Momentum? And Does It Matter?" *Educational Evaluation and Policy Analysis* 34.1 (2012); William Doyle. "Effect of Increased Academic Momentum on Transfer Rates: An Application of the Generalized Propensity Score." *Economics of Education Review* 30.1 (2011); and Xueli Wang. "Toward a Holistic Theoretical Model of Momentum for Community College Student Success." *Higher education: Handbook of theory and research*. Springer, Cham, 2017.

22. Kathy Sawyer. "That Old Sheepskin Nowadays Probably Isn't-Baa." *Washington Post* (June 16, 1979).
23. Belfield and Thomas Bailey (2011).
24. Jepsen and others (2014); Peter Bahr. "The Labor Market Returns to a Community College Education for Noncompleting Students." *The Journal of Higher Education* 90.2 (2019); Clive Belfield and Thomas Bailey. "The Labor Market Returns to Sub-Baccalaureate College: A Review." *A CAPSEE Working Paper*. (New York, NY: Center for Analysis of Postsecondary Education and Employment, 2017).
25. Audrey Light and Sydney Schreiner. "College Major, College Coursework, and Post-College Wages." *Economics of Education Review* 73 (2019); Pedro Silos and Eric Smith. Human capital portfolios. *Review of Economic Dynamics* 18.3 (2015).
26. Margaret Leighton and Jamin Speer. "Labor Market Returns to College Major Specificity." *European Economic Review* 128 (2020).
27. David Deming and Kadeem Noray. "Earnings Dynamics, Changing Job Skills, and STEM Careers." *The Quarterly Journal of Economics* 135.4 (2020).
28. Lars Kirkeboen and others. "Field of Study, Earnings, and Self-Selection." *The Quarterly Journal of Economics* 131.3 (2016); Matthew Wiswall and Basit Zafar. "Determinants of College Major Choice: Identification Using an Information Experiment." *The Review of Economic Studies* 82.2 (2015).
29. Yingyi Ma. "Family Socioeconomic Status, Parental Involvement, and College Major Choices—Gender, Race/Ethnic, and Nativity Patterns." *Sociological Perspectives* 52.2 (2009).
30. Rachel Baker and others. "The Effect of Labor Market Information on Community College Students' Major Choice." *Economics of Education Review* 65 (2018).
31. See <https://www.bls.gov/cew/overview.htm>
32. "Latest Research Shows 6-Year College Completion Slows Down for Full-Time and Part-Time Students." (Herndon, VA: National Student Clearinghouse, 2021).
33. Edward Warburton and others. "Bridging the Gap: Academic Preparation and Postsecondary Success of First-Generation Students." (Washington, DC: National Center for Education Statistics, 2001).
34. Jing Liu and others. "The Short- and Long-Run Impacts of Secondary School Absences." EdWorkingPaper No. 19-125. (Providence, RI: Brown University).
35. Pedro Carneiro and James Heckman. "The Evidence on Credit Constraints in Post-Secondary Schooling." *The Economic Journal* 112.482 (2002).
36. John Papay and others. "Lifting All Boats? Accomplishments and Challenges from 20 Years of Education Reform in Massachusetts." (Providence, RI: Brown University, 2020).
37. David Autor and Michael Handel. "Putting Tasks to the Test: Human Capital, Job Tasks, and Wages." *Journal of Labor Economics* 31.S1 (2013).
38. Adams, Susan. "New Study: Is No Degree Better than a Liberal Arts Degree?" *Forbes*. May, 2014. <http://www.forbes.com/sites/susanadams/2014/05/20/new-study-is-no-degree-better-than-a-liberal-arts-degree/>
39. Hanover Research. The Value of an Associate's Degree in Liberal Arts. 2014. See <https://www.hanoverresearch.com/wp-content/uploads/2017/08/The-Value-of-an-Associates-Degree-in-Liberal-Arts.pdf>
40. Debra Humphreys and Patrick Kelly. "How Liberal Arts and Sciences Majors Fare in Employment: A Report on Earnings and Long-Term Career Paths." Association of American Colleges and Universities. Available for purchase at: <http://www.aacu.org/leap/nchems/>
41. Allie Grasgreen. "Liberal Arts Grads Win Long-Term." *Inside Higher Ed*. January 2014.
42. Janelle Jones and John Schmitt. "A College Degree Is No Guarantee." (Washington, DC: Center for Economic and Policy Research, 2014).
43. Emily Forrest Cataldi and others. "Baccalaureate and Beyond: A First Look at the Employment Experiences and Lives of College Graduates, 4 Years On." (Washington, DC: National Center for Education Statistics, 2014).

44. Jepsen et al. 2014.
45. Data retrieved April 29, 2021 from [https://nces.ed.gov/programs/digest/d20/tables/dt20\\_302.10.asp?current=yes](https://nces.ed.gov/programs/digest/d20/tables/dt20_302.10.asp?current=yes)
46. Data retrieved April 29, 2021 from [https://nces.ed.gov/programs/digest/d19/tables/dt19\\_104.91.asp?current=yes](https://nces.ed.gov/programs/digest/d19/tables/dt19_104.91.asp?current=yes)
47. Data retrieved April 29, 2021 from [https://nces.ed.gov/programs/digest/d20/tables/dt20\\_104.20.asp?current=yes](https://nces.ed.gov/programs/digest/d20/tables/dt20_104.20.asp?current=yes)
48. Rebekah Snyder. "Understanding the 'Boy Problem' in Educational Achievement." *Inquiry* (Evanston, IL: Northwestern University, 2016).
49. Raj Chetty and others. "Childhood Environment and Gender Gaps in Adulthood." *American Economic Review* 106.5 (2016).
50. See: Jennifer Burrowes and others. *Bridge the Gap: Rebuilding America's Middle Skills*. (Cambridge, MA: Harvard University, 2013).
51. Rachel Baker and others. "The Effect of Labor Market Information on Community College Students' Major Choice." *Economics of Education Review* 65 (2018).
52. Paul Fain. "How to Improve Value of Higher Education? Increase Career Support." (Indianapolis, IN: Strada, April 2021).
53. See <https://www.bhcc.edu/learnandearn/>
54. Sara Goldrick-Rab and others. "Still Hungry and Homeless in College." (Madison, WI: Wisconsin Hope Lab, 2018).
55. Susan Scrivener and others. "Doubling Graduation Rates: Three-Year Effects of CUNY's Accelerated Study in Associate Programs (ASAP) for Developmental Education Students." (New York, NY: MDRC, 2015).
56. Linkow, T., B. Gamse, F. Unlu, E. Bumgarner, H. Didriksen, J. Furey, M. Meneses, M. Sami, and A. Nichols. 2017a. *The Power of Coaching: Interim Report on the Impact of Success Boston's Transition Coaching on College Success*. Report prepared by Abt Associates. Boston, MA: The Boston Foundation. Retrieved from <https://www.tbf.org/-/media/tbforg/files/reports/sb-317-interim-outcomes-report-final.pdf>, and Linkow, T., E. Bumgarner, H. Didriksen, K. Lack, A. Nichols, E. Dastrup, S. Dastrup, and B. Gamse. 2019. *The Story of Scaling Up: Interim Report on the Impact of Success Boston's Coaching for Completion*. Report prepared by Abt Associates. Boston, MA: The Boston Foundation. Retrieved from <https://www.tbf.org/news-and-insights/reports/2019/october/scaling-up-success-boston>
57. See <https://www.mass.edu/strategic/studenthunger.asp>
58. Matthew Dembicki. "Wraparound Services and Student Success." *Community College Daily* (May 9, 2019).
59. Harry Holzer. "Free Community College? A Few Words of Caution." *The Hill* (May 1, 2021).
60. Greg Iacuri. "Biden Seeks Extra \$400 a Year in Pell Grants for College and to Expand Aid to Dreamers." *CNBC* (April 9, 2021).
61. Shelbe Klebs. "Why We Should Double the Pell Grant." (Washington, DC: Third Way, July 2020).
62. Matthew Dembicki. "Wraparound Services and Student Success." *Community College Daily* (May 9, 2019).
63. Sharon Parrott and Spiros Protopsaltis. "Pell Grants—a Key Tool for Expanding College Access and Economic Opportunity—Need Strengthening, Not Cuts." *Center on Budget and Policy Priorities*, 27 Jul 2017, <https://www.cbpp.org/research/federal-budget/pell-grants-a-key-tool-for-expanding-college-access-and-economic-opportunity>.
64. Kristina Zeiser and others. "The Impact of Early Colleges on Students' Postsecondary Education Trajectories: Can Early Colleges Overcome the (Supposedly) Diversionary Role of Community Colleges?" *Research in Higher Education* (2020); Clarisse Haxton and others. "Longitudinal Findings from the Early College High School Initiative Impact Study." *Educational Evaluation and Policy Analysis* 38.2 (2016); Drew Atchison and others. "The Costs and Benefits of Early College High Schools." *Education Finance and Policy* (2019).
65. See <https://www.gadoe.org/Technology-Services/Enterprise-Systems-and-Applications/SLDS/Pages/SLDS.aspx>
66. Melissa Leavitt and others. "Powering Purpose: Invest Now in Community Colleges to Fuel Economic Opportunity." (Indianapolis, IN: Strada, April 2021).