Creating Credentials of Value in Community Colleges

Correlates of High Performance




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Introduction

How do we prepare learners for high-wage, high-demand careers? Answering this question is more important than ever, given stagnating earnings and declining labor force participation among workers without bachelor's degrees (Nunn et al., 2019).[1] With more than one thousand community and technical colleges[2] across the United States, they are the only institutions that operate at sufficient scale to prepare millions of students for careers in high-demand occupations and industries. Yet, they have mixed records of success. Less than one third of community college students go on to earn a certificate or an associate degree. And those who do beat these odds often struggle to become employed in high-wage jobs (Holzer & Baum, 2017).

Research on community college student outcomes has traditionally focused on understanding the reasons so few students go on to complete degrees and the effectiveness of interventions meant to address low completion rates (see Bettinger & Feygin, 2025). We know much less about the practices colleges use to support students in earning credentials that translate into labor market value. We conducted this study as a first step toward understanding the characteristics and practices of community colleges that appear to be relatively successful at producing graduates with *workforce credentials of value*—that is, workforce credentials worth at least $45,000 to $50,000 in annual salary (see Box 1).[3] Whereas research on community college outcomes tends to focus on the demographic characteristics and academic preparation of students, this study focuses on the characteristics of colleges and the regional economies in which they operate.

Box 1. How did we define "credentials of value"?

"Credentials of value" are credentials linked to occupational fields in which full-time workers with associate degrees make at least $50,000 per year and those with certificates make at least $45,000 per year.

[1] Labor force participation among male workers aged 25 to 34 without bachelor's degrees has increased since the COVID-19 recession but continues on a downward trend overall. For women of the same age without bachelor's degrees, labor force participation has risen (Fry et al., 2024). In addition, since the COVID-19 recession, there has been pronounced wage growth among workers without a bachelor's degree, leading to a compression of the wage differential between workers with and without bachelor's degrees (Autor et al., 2024). However, wage inequality remains high.

[2] Hereafter, we use the term "community colleges" to refer to both community and technical colleges.

[3] In this brief, "value" refers specifically to wages. There are many ways to value credentials, and value may mean different things to different individuals. Workers may take into account other aspects of jobs when determining value, such as benefits and job satisfaction.

In this brief we describe trends in credential completion over the past decade and then present findings from an analysis of factors that are correlated with being relatively more successful at producing credentials of value. The research questions are as follows:

1. How did attainment of high-wage workforce credentials change between 2011 and 2021?
2. What college characteristics and contextual factors are associated with earning credentials of value?

Approach

This study focuses on community college workforce programs rather than general studies and liberal arts programs, which are designed to prepare students to transfer to 4-year colleges. In this section we provide definitions of community college workforce programs and credentials of value and then describe our approach for identifying the factors associated with producing credentials of value. Additional details about the methodological approach are in Appendix A.

We consider programs and credentials to be workforce-focused when they prepare students for direct entry to the labor market in specific occupations or industries. We use the U.S. Department of Education's Classification of Instructional Programs to identify these programs and credentials, which span a wide range of industries such as manufacturing; transportation, distribution, and logistics; information technology; and health care. We limit our analysis to credit-bearing programs—including those that grant associate degrees and certificates—due to lack of data on noncredit programs. Example occupations and programs are highlighted in Exhibit 1.

Exhibit 1. Example Workforce Industries, Occupations, Programs, and Credentials

Industry/occupation	College program	Credential	Program length	Median salary
Manufacturing				
Production operator	Manufacturing production and operations	Certificate[a]	31 credits (2–3 semesters)	$36,000
Transportation, distribution, and logistics				
Supply chain technician	Supply chain management and logistics	Certificate[a]	21 credits hours (2–3 semesters)	$57,000
Truck driver	Commercial driver's license	Certificate	18 credit hours (2 semesters)	$57,000
Information technology				

Industry/occupation	College program	Credential	Program length	Median salary
IT help desk specialist	Information technology help desk	Certificate	23 credit hours (2 semesters)	$46,000
IT technical support specialist	Information technology support	Certificate[a]	30 credit hours (2 semesters)	$55,000
Health care				
Pharmacy technician	Pharmacy technician	Certificate	19 credit hours (2 semesters)	$34,500
Phlebotomy technician	Phlebotomy technician	Certificate	18 credit hours (2 semesters)	$38,000
Clinical services specialist	Healthcare specialist—clinical support	Certificate	30 credit hours (2–3 semesters)	$72,000

Note. Example occupations and credential programs are based on programs offered at Indiana's Ivy Tech Community College (https://www.ivytech.edu/) and ZipRecruiter salary estimates for Indiana (https://www.ziprecruiter.com/).

[a] Associates of Applied Science (AAS) degree also offered, which is 60 credits (4 semesters).

To identify the value of a credential, we used data from the American Community Survey to calculate the average wage of individual workers associated with the credential. Because the American Community Survey contains information about workers' wages and occupations but not credentials, we used a crosswalk from the Bureau of Labor Statistics and the National Center for Education Statistics to link workers' occupations to education programs and credentials. We calculated average earnings (adjusted to 2021 dollars) for each program type, credential level, and state. We defined a *high-wage workforce credential* as a credential in a workforce field where graduates earned an average annual income of more than $45,000 for certificates or more than $50,000 for associate degrees.

For each community college in the United States, we calculated a measure of their relative success at producing high-wage workforce credentials, also referred to as credentials of value. The measure we used is a college's "fixed effect," which is a coefficient for each college derived from a regression model where the dependent variable is the number of graduates in high-wage workforce fields in a given college and year. The regression model (Model 1 in Appendix A) controls for the population of the county, the unemployment rate of the county, and a college's full-time equivalent enrollment. Colleges with larger fixed effects are relatively more successful at producing graduates in high-wage workforce fields given their county's size and unemployment rate.

Finally, to better understand the contextual factors associated with completing credentials of value, we examined how college fixed effects vary across a range of characteristics of community colleges and the contexts in which they operate. In addition to descriptive averages, we used a regression model (Model 2 in Appendix A) that includes the college fixed effect produced by the previous regression model as the dependent variable and college characteristics as covariates. To explore the sensitivity of the regression model to the state context, we estimated the model without (Model 2a) and with state fixed effects (Model 2b).

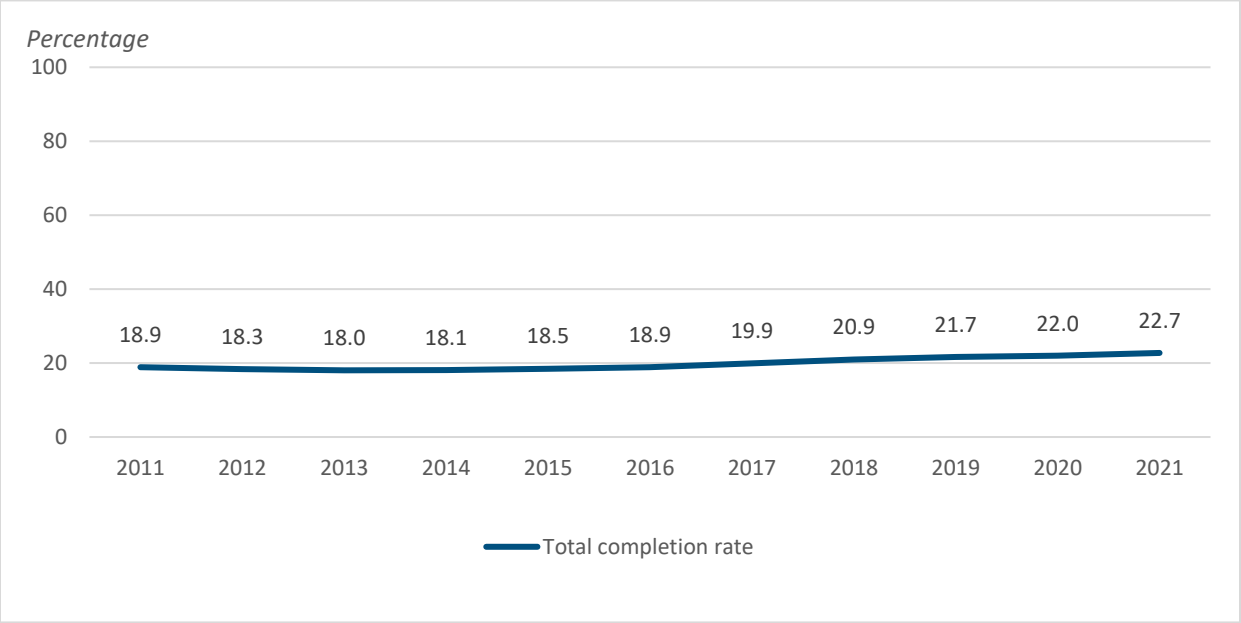
The findings from this study are correlational and not causal. They provide a starting point for further research on factors that may explain higher completion rates in workforce programs. In addition, we focused on a specific definition of success, but community colleges have a variety of goals and there may be other ways to measure success.

Findings

How did attainment of high-wage workforce credentials change between 2011 and 2021?

Consistent with the literature on community college completion, overall 3-year completion rates in the sample colleges were low, hovering around 20% and reaching a high of nearly 23% in 2021 (Exhibit 2).

Exhibit 2. Three-Year Associate Degree or Certificate Completion Rate, 2011–2021

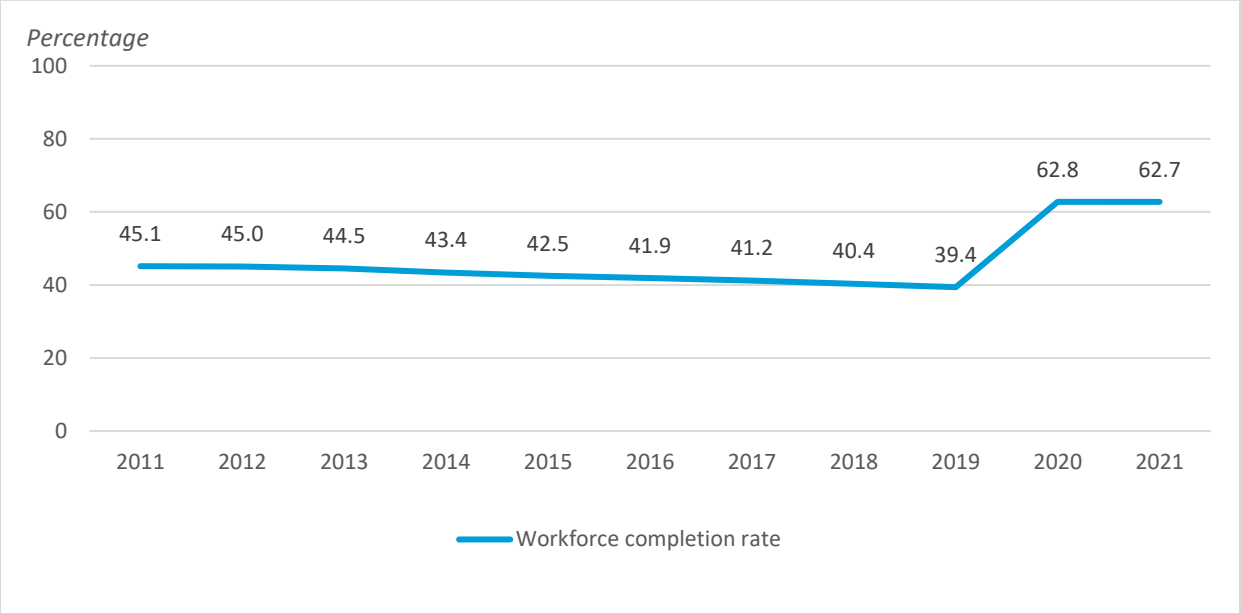


Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. On average there were 1,075 colleges in the sample each year.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

Before 2019, fewer than half of students who completed an associate degree or certificate completed a degree or certificate in a workforce field (Exhibit 3). Moreover, there was a clear negative trend, with the percentage of students completing an associate degree or certificate in a workforce field declining by more than five percentage points between 2011 and 2019. However, after 2019—during the Covid pandemic—there was a remarkable increase of more than 20 percentage points.

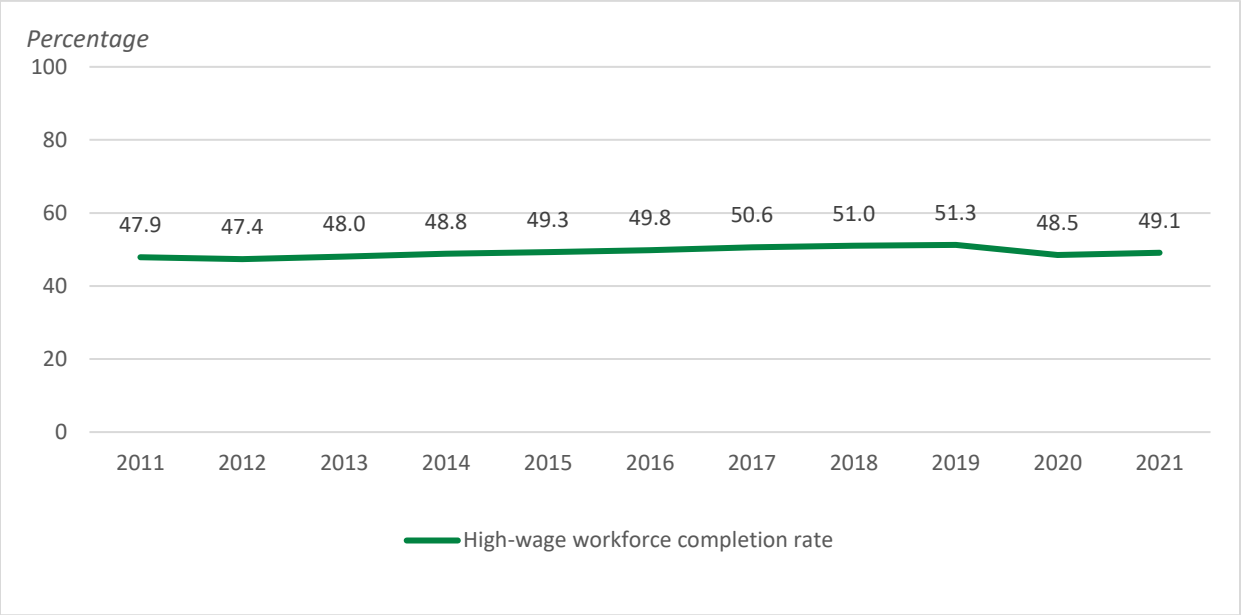
Although we find a dramatic increase in the percentage of students completing associate degrees or certificates in workforce fields after 2019, the percentages completing associate degrees or certificates in *high-wage* workforce fields are roughly constant at about 50 percent (Exhibit 4).

Exhibit 3. Among Students Completing an Associate Degree or Certificate within Three Years, Percent Completing an Associate Degree or Certificate in a Workforce Field, 2011–2021



Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. On average there were 1,075 colleges in the sample each year.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

Exhibit 4. Among Students Completing an Associate Degree or Certificate in a Workforce Field, Percentage Completing a High-Wage Associate Degree or Certificate, 2011–2021

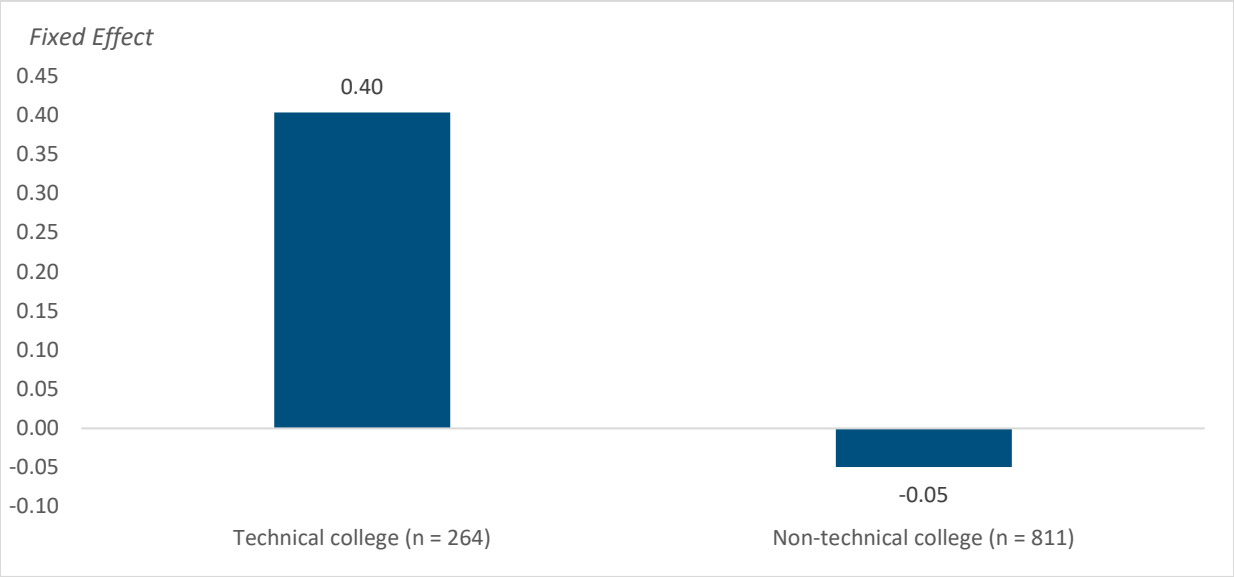


Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. On average there were 1,075 colleges in the sample each year.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

What college characteristics and contextual factors are associated with earning credentials of value?

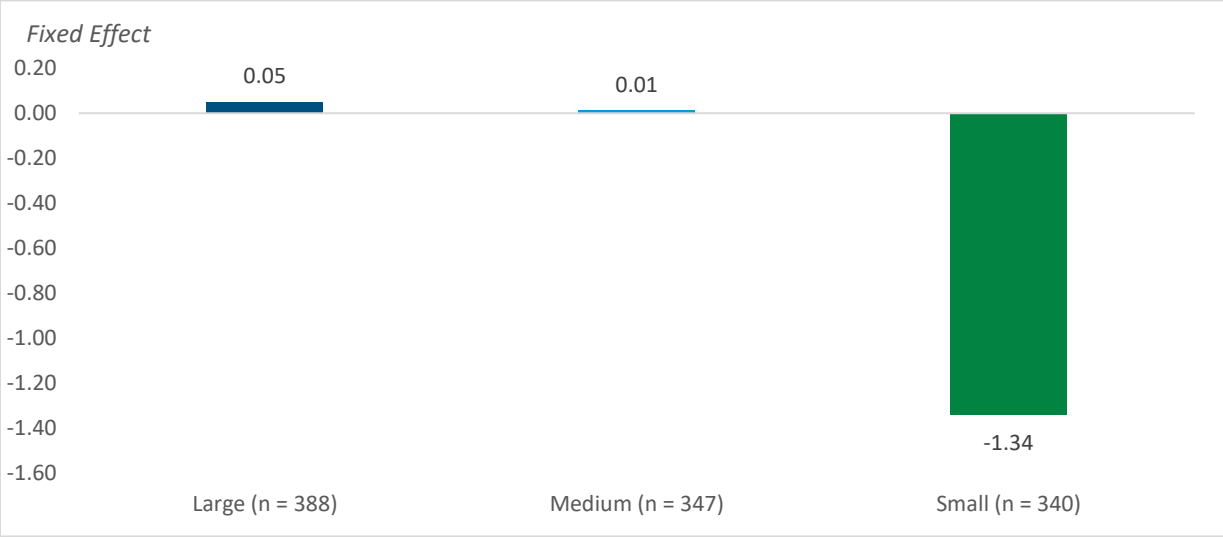
Using college fixed effects as our measure of success in producing high-wage workforce credentials, we examined average differences between technical and nontechnical colleges (Exhibit 5) and colleges of different sizes (Exhibit 6), weighted by enrollment. On average, technical colleges had larger fixed effects than nontechnical colleges (0.41 versus -0.06). Large colleges had the largest average fixed effects (0.05), followed by medium colleges (0.02), and small colleges (-1.18).

Exhibit 5. Average Fixed Effect for Technical and Non-Technical Colleges, 2011–2021



Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. College fixed effects are weighted by the square root of enrollment.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

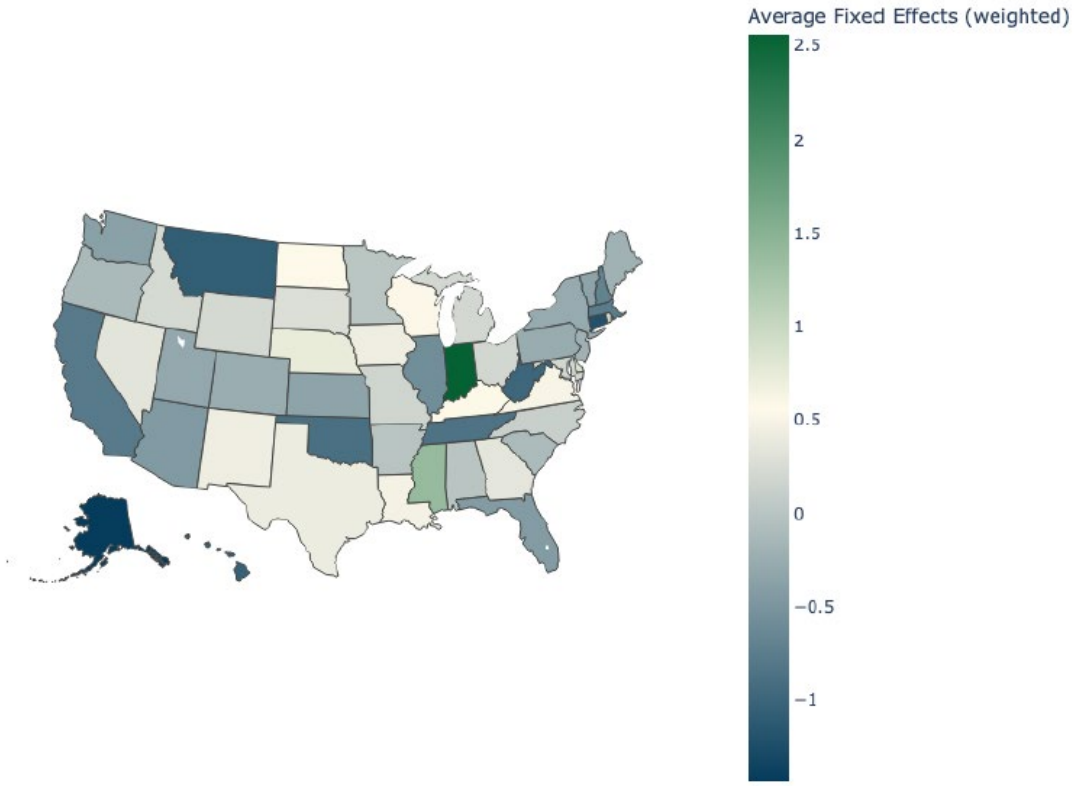
Exhibit 6. Average Fixed Effect by Enrollment Size, 2011–2021



Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. Small refers to colleges with fewer than 2,700 students; medium refers to colleges with 2,700–8,999 students; and large refers to colleges with 9,000 or more students. College fixed effects are weighted by the square root of enrollment.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

We also examined variation in average fixed effects by state (Exhibit 7). Darker shades of blue indicate states that are relatively less successful at producing credentials of value whereas lighter shades of gray, white, and green indicate states that are relatively more successful at producing credentials of value. Indiana and Mississippi stand out among states that are most successful at producing credentials of value. By region, the South does better on average at producing credentials of value (though there is variation across states), while the Northeast does worse.

Exhibit 7. Average Fixed Effects by State, 2011–2021



Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. On average there were 1,075 colleges in the sample each year. College fixed effects are weighted by the square root of enrollment.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

Using the second regression model (Model 2a and Model 2b, Exhibit 8), we examined whether differences in average college fixed effects between technical and nontechnical colleges (see Exhibit 5) and across colleges of different sizes (see Exhibit 6) persist after controlling for these college characteristics and others simultaneously. Model 2b includes an indicator variable for each state (also called *state fixed effects*), which accounts for potential differences in state

policies. Model 2a does not include these indicator variables. The results for the two models are similar.

Similar to above, we found that technical colleges are relatively more successful at producing credentials of value than non-technical colleges. Also, we found that size of the college was related to the size of the fixed effect: large colleges are relatively more successful and small colleges are relatively less successful at producing credentials of value. In contrast to our previous results, we observe more differentiation in success between large and medium size colleges.

The regression model allowed us to observe the relationship between additional college characteristics and fixed effects. Across Model 2a and Model 2b, colleges with more adults with bachelor's degrees in the county produce fewer credentials of value, as do colleges with higher percentages of Hispanic individuals within the commuting zone. After including state fixed effects, there is no association between percentages of White and Black individuals in the commuting zone and credentials of value. Towns had higher fixed effects than urban areas. Colleges with more revenue from state and local grants and more faculty with tenure produce fewer credentials of value, but this relationship is no longer statistically significant after adding state fixed effects.

Exhibit 8. Regression Model Predicting Community College Fixed Effects, With and Without State Fixed Effects, 2011–2021

Characteristic	Model 2a Outcome: Fixed effect *Coefficient (SE)*	Model 2b Outcome: Fixed effect *Coefficient (SE)*
Intercept	-0.607 (0.579)	-0.664 (0.775)
Percent of county with a bachelor's degree	-2.402 (0.443)***	-1.893 (0.538)***
Percent Hispanic in commuting zone	-0.976 (0.190)***	-1.052 (0.262)***
Percent Black in commuting zone	1.300 (0.620)*	0.552 (0.853)
Percent White in commuting zone	1.567 (0.619)*	1.420 (0.769)
College type: Technical	0.243 (0.087)**	0.240 (0.120)*
Suburban	-0.024 (0.064)	0.016 (0.061)
Town	0.350 (0.092)***	0.246 (0.089)**
Rural	0.190 (0.087)*	0.162 (0.086)
Enrollment size: Small	-0.761 (0.117)***	-0.644 (0.117)***
Enrollment size: Large	0.622 (0.072)***	0.569 (0.073)***

Percent of college revenue from state/local grants	-0.006 (0.001)***	-0.002 (0.002)
Perfect of faculty with tenure	-0.005 (0.000)***	-0.001 (0.001)
State fixed effects	No	Yes
Observations	845	845
R-squared	0.36	0.48
Adjusted r-squared	0.35	0.44

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
SE is standard error.
Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. Enrollment size: Small refers to colleges with fewer than 2,700 students, and Enrollment size: Large refers to colleges with 9,000 or more students. Enrollment size: Medium is the omitted category. Robust standard errors are clustered at the county level.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

Discussion

The study finds a substantial increase in workforce credentials as a percentage of all credentials attained from 2019 to 2021. One explanation is that students shifted from liberal arts to high-demand workforce fields during the COVID-19 pandemic. However, the timeframe for this study is likely not long enough to have captured such shifts. Moreover, we did not see a similar increase in the percentage of workforce credentials completed in high-wage fields, suggesting that any increases in students completing degrees in high-wage fields were offset by students completing degrees in workforce fields that were not classified as high-wage. Another potential explanation is the dramatic increase in reverse transfer and auto-award policies enacted by states during the pandemic to allow colleges to award students credentials for prior learning (Mowreader, 2025). More research is needed to understand if the shift to workforce fields was sustained after the pandemic, the types of workforce fields students entered, and the effects of this shift on student outcomes, such as employment and earnings.

Further, with the study finding that more students entered workforce fields between 2019 and 2021, it is critical to understand the characteristics and practices of community colleges that are associated with producing a larger share of credentials of value. The current study takes a first step in addressing that need by looking at characteristics of community colleges in publicly-available datasets. The prevalence of technical colleges in a state appears to explain at least some of the differences across states, which is expected because the top priority of technical colleges is to generate such credentials. Further, large community colleges might outperform

smaller ones simply due to economies of scale in providing both liberal arts and workforce credentials, or perhaps in support services for students. On the other hand, colleges in communities with large percentages of adults with bachelor's degrees might produce fewer credentials of value due to higher demand for more advanced degrees in local industry. And some states appear to be much more successful than others in producing workforce credentials of value, though we are not sure why (and the extent to which specific policies or practices that they implement generate these results).

A companion study (Holzer et al., 2026) examined data from qualitative interviews with leaders from dozens of colleges with varying levels of success at producing credentials of value. The findings identified a range of practices that appear to be more prevalent in colleges that are most successful at producing credentials of value. However, neither the current study nor the companion study is causal. Future research is needed to answer causal questions about the state policies and community college practices that may explain why some colleges are more successful at producing credentials of value than others—perhaps by using quasi-experimental methods to examine the effect of a state policy or particular college practice on completion of associate degrees or certificates in high-wage workforce fields.

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Appendix A. Methodological Approach to Creating College Rankings

Identifying the College Sample

The sample for this study included all public, community and technical colleges in the United States between 2011 and 2021. Using data from the Integrated Postsecondary Education Data System (IPEDS; National Center for Education Statistics, 2011–2021), we selected on the following variables and values:

- public;
- institutional sector of either "degree-granting not primarily baccalaureate or above" or "degree-granting associate's and certificates"; and
- Title IV postsecondary institution.

IPEDS does not perfectly identify community colleges. Some community colleges offer a small number of bachelor's degrees, which may result in them being misclassified as a four-year college. Analyst judgement was used to reclassify approximately 50 colleges as community colleges. For example, University of Wisconsin–Oshkosh grants a large number of certificates and associate degrees, but is classified as primarily four-year.

The final sample included 11,831 observations, or approximately 1,075 community colleges per year.

Identifying High-Wage Workforce Credentials

We identified high-wage workforce credentials using data from the American Community Survey (ACS) from IPUMS (Ruggles et al., 2025), which includes data on worker's incomes. The sample was restricted to workers ages 18–39, who worked 35 or more hours per week, and who reported 1 or 2 years of postsecondary education. After removing records with invalid wage data and missing Standard Occupational Classification (SOC) codes, there were approximately 1,300,000 records from 2011 to 2021.

Next, we used a crosswalk provided by the Bureau of Labor Statistics and the National Center for Education Statistics (2025) to map occupation as identified by SOC codes to program type as identified by Classification of Instructional Program (CIP) codes. This concordance is many to many (each CIP can be associated with many SOC codes and vice versa), is not empirically defined, and has no weights. Although 30% of SOC codes have exactly one CIP code and the median number is three, there are as many as 337 CIP codes associated with a single SOC code.

SOC codes that are associated with fewer CIP codes are more specific than SOC codes that map to many CIP codes. To account for this, we weighted each record by the inverse of the number of CIP codes it is associated with, multiplied by the person weight from the ACS. For example, the SOC code 29-1123 (Physical Therapists) maps to two CIP codes: 51.2308 (Physical Therapy/Therapist), and 51.2311 (Kinesiotherapy/Kinesiotherapist). Each person with a SOC code of physical therapist would be included in the average, at their relevant education level, for both of the associated CIP codes, but with half their total sample weight per CIP code.

In the resulting file, each ACS respondent has a record for each CIP code associated with their SOC code. We then calculated average income by CIP code at the 2 through 6 digit level by state and nationally, and by degree level (associate degree or certificate). We inflated average income, which is at constant 2010 dollars, to 2021 dollars. We then classified a CIP code as high wage if graduates with a certificate had an average annual income of more than $45,000 and graduates with an associate degree had an average annual income of more than $50,000.

Identifying Completions

We identified college completions as the percentage of students in a college who graduated within three years of beginning an instructional program. We further identified workforce graduates as those with career and technical education CIP codes (National Center for Education Statistics, 2002) with an associate degree or certificate. We then calculated a graduation count for high-wage workforce degrees by counting graduates in high-wage CIP codes. When a CIP code has fewer digits in the school's records (is less specific), then the less specific CIP codes are used from IPUMS data.

Estimating College Fixed Effects

After constructing the file of community college completers by CIP code, we estimated a fixed effect (β_i) for each community college using the following regression model:

Model 1: $$\ln(y_{it}) = \alpha + \beta_i + \gamma \cdot \ln(\mathrm{p_{i,t-1}}) + \delta u_{t-1} + \xi r_{i,t-1} + \zeta_t + \epsilon_{it}$$

Where,

- y_{it} is the number of workforce graduates of school *i* in year *t* in high-wage career and technical education CIP code;
- α is the intercept term;
- β_i is the college fixed effect;
- $p_{i,t-1}$ is the population of 18–39 year olds in the county in the previous year with associated coefficient γ;

- u_{t-1} is the unemployment rate in the county in the previous year with associated coefficient δ;
- $r_{i,t-1}$ is the enrollment at school *i* in the previous year with associated regression coefficient ξ;
- ζ_t is the regression coefficients for year *t*; and
- ϵ_{it} is a residual term.

The regression is weighted by the square root of enrollment as an approximate precision weighting.

The population size is at the county level and comes from the U.S. Census Bureau's county level projections from 2010 to 2020 (which extend to 2024) estimates.

The unemployment rate comes from the Bureau of Labor Statistics' local area unemployment statistics (LAUS) program, which makes county-level unemployment rates by year.

The results from the regression model are in Exhibit A1.

Exhibit A1. Estimated High-Wage Workforce Completions, 2011–2021

Variable	ln (High-wage workforce completion 2011–2021+1)
ln(lagged area 18–39 population)	0.50 (0.17) **
Area lagged unemployment rate	-0.04 (0.01) ***
ln(lagged FTE enrollment +1)	-0.01 (0.02)
Constant	0.25 (1.56)
Year Fixed Effects	Yes
Observations	11,780
R-squared	0.93
Adjusted R-squared	0.92

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
FTE is full-time equivalent.
Note. The sample included public, degree-granting community and technical colleges in the United States between 2011 and 2021. Robust standard errors clustered at the county level.
Source. Authors' analysis of data from the Integrated Postsecondary Education Data System and the American Community Survey.

Analytic Approach to Addressing the Research Questions

To answer the primary research question about the factors associated with producing credentials of value, we estimated a regression model in which the college fixed effect was the outcome.

Model 2a: $\beta_i = \alpha + X\gamma + \epsilon$

Where,

- β_i is the college fixed effect (derived in the regression model above);
- X is a list of covariate factors with associated coefficient vector γ; and
- ϵ is a residual term.

The covariates in the X matrix include the following variables drawn from the U.S. Census Bureau:

- percentage of individuals in a county with a bachelor's degree;
- percentages of individuals in a commuting zone who are Black, Hispanic, or White;
- an indicator for being a technical college (versus a nontechnical college, based on the name of a college);
- an indicator for being a suburban, town, or rural college (versus an urban college);

The X matrix also includes the following variables drawn from IPEDS:

- an indicator for being a small college (fewer than 2,700 students) or large college (9,000 or more students) versus a medium-sized college;
- the percentage of college revenue from state or local grants;
- and the percentage of faculty with tenure.

A second version of the model (Model 2b in Exhibit 8) also includes an indicator variable for each state (also referred to as state fixed effects) in the *X* matrix.

Missing Data

Missing data was handled using listwise deletion. A total of 230 observations were missing at least one covariate.

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