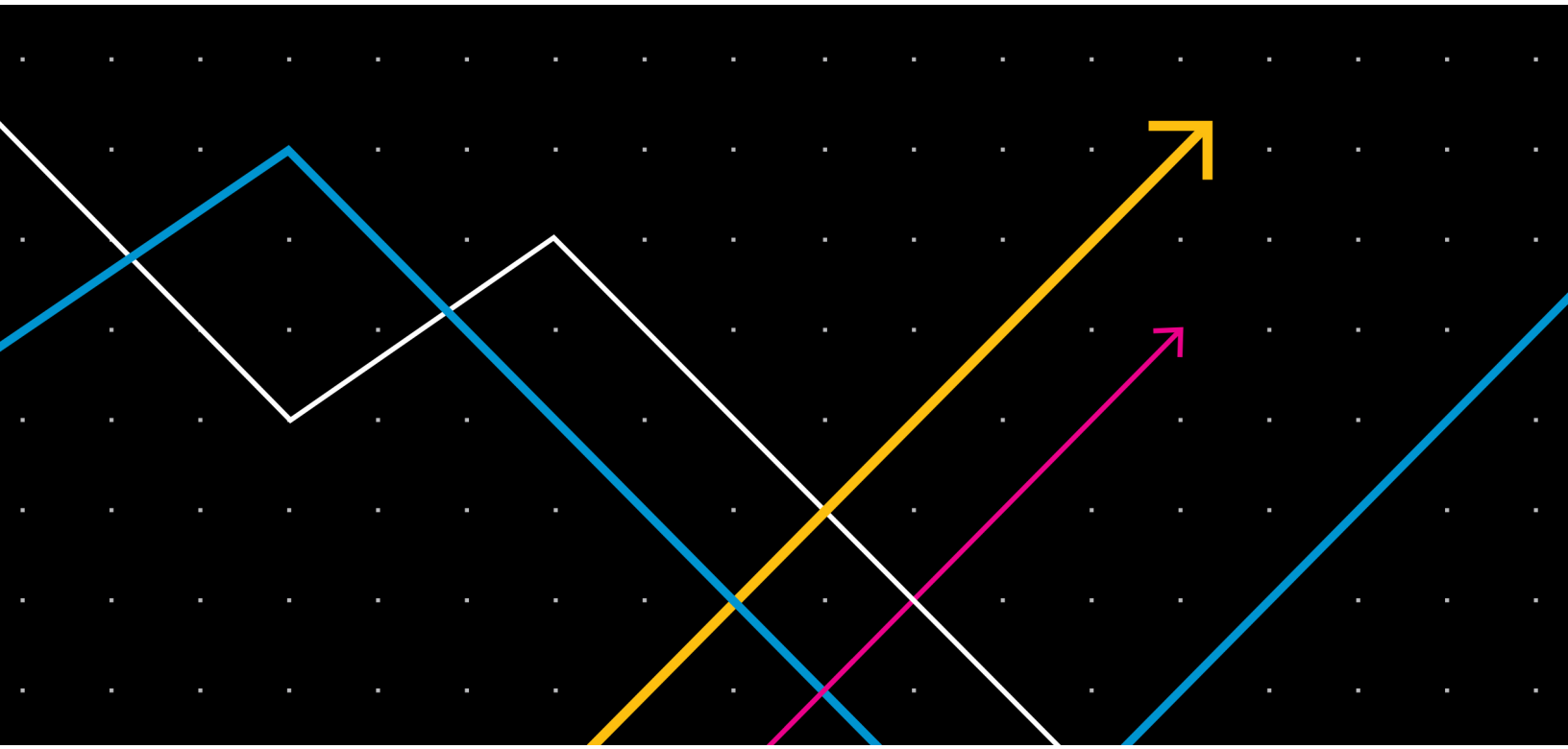

RESEARCH REPORT

Getting the Most Out of Short-Term Career and Technical Education (CTE) Credentials

What Explains Differences in Debt and Earnings?

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Executive Summary

To achieve a positive return on their education investment, students need to make enough money with the credential earned to pay down the debt taken out to complete it. This is even more crucial for "new majority learners," including adults returning to school, students from low-income or underrepresented communities who were historically marginalized, parents, returning citizens, and others.

Most of these learners attend institutions that offer certificates, certifications, or associate degrees and have relatively accessible entry requirements. These institutions award many short-term credentials in career and technical education (CTE) programs, which are meant to build skills that align with employer needs and lead directly to job opportunities. However, CTE programs do not guarantee good employment outcomes or a positive return on investment (ROI) for students.

We use data from the College Scorecard to take a closer look at CTE programs overall and the six fields of study with the most programs: health sciences, business and marketing, computer and information sciences, repair services, protective services, and personal and culinary services. We explore debt, earnings two years after graduation, and overall debt burden (debt as a share of earnings), as well as how each outcome is shaped by program, institution, and labor market characteristics.

CTE programs vary widely in terms of median debt, earnings, and overall debt burden.

- Median debt is roughly $16,000, but ranges from $3,700 to $45,000 across all short-term CTE credentials. Among the six largest fields of study, the highest median debt is for computer and information sciences at nearly $20,000. This contrasts with the repair programs and personal and culinary programs—both dominated by short-term certificates—which have the lowest median debt at around $13,000.
- Median earnings two years after graduation are about $32,000—twice the median debt—and range from $8,200 to $116,000. Health sciences and computer and information sciences have the highest earnings, and personal and culinary services programs tend to have the lowest earnings.
- A typical graduate's debt burden comes out to about 56 percent of second-year earnings. Debt burden is the highest for personal and culinary services because of the field's markedly low two-year earnings, despite low overall debt. Graduates of repair services programs—the other field of study besides personal and culinary services that mostly consists of certificates—have

the least difficulty paying off debt because of the combination of relatively low debt and high earnings.

CTE programs themselves do not all look the same.

- Short-term CTE programs are fairly evenly split between undergraduate certificates and associate degrees. Looking more closely at specific fields of study, we see the same even split among health sciences programs, but associate degrees dominate business and marketing, protective services, and computer and information sciences programs, whereas personal and culinary services and repair programs primarily consist of certificates.
- Women are the majority in most CTE programs, but very gendered trends exist when we look more closely at specific fields of study. Health sciences, business and marketing, and personal and culinary services have high shares of women, while repair, protective services, and computer and information sciences tend to graduate more men.
- People of color[1] make up more than one third of learners, and represent a similar share in most fields, except computer and information sciences where they are a smaller share.

Important differences also exist in institutions where CTE credentials are offered.

- Most programs are located at two-year public colleges.
- However, we see one notable exception. About two-thirds of personal and culinary services programs are based out of less-than-two-year institutions; and 79 percent of these programs are at private, for-profit institutions.

Not all factors contribute the same amount to our understanding of the differences we see in debt, earnings, and overall debt burden.

- Field of study and the credential level of CTE programs add the most to our understanding of outcomes across all CTE programs, particularly for earnings two years postgraduation.
- Institutional characteristics (e.g., type of institution, shares of students with financial need, spending on instruction, etc.) play a larger role in explaining student debt than they do in explaining earnings.
- Nonetheless, for five out of the six largest fields of study, we see that where students choose to study matters much more to students in terms of their overall debt burden than what they

[1] This includes all learners except those who are white and non-Hispanic.

study. Health sciences is the only field where the particular type of credential matters more than the institution and its characteristics.

- Together, program, institutional, and labor market characteristics explain a significant share of the differences we see in outcomes for graduates across CTE programs: nearly 70 percent for earnings, and 50 percent for debt and overall debt burden.
- These factors do a better job of explaining differences in debt burden for fields of study like protective services. They leave more to be explained in fields like repair and personal and culinary services.

The characteristics of CTE programs themselves shape graduate outcomes in various ways.

- Associate degree programs overall have 6 percent higher debt burden compared with certificate programs, because their added cost outpaces increased earnings. This trend was even more pronounced among the six largest fields of study, ranging from 11 percent higher debt burden in repair services to 39 percent for computer and information sciences programs.
- Significantly lower earnings make it more difficult for graduates of programs with large shares of women and people of color to pay off debt. Increased debt makes this effect even larger for women. Looking within fields of study, we find that gender differences are most pronounced in protective services programs, and racial disparities are most prominent in personal and culinary services, business and marketing, and repair services.

Institutional differences also underlie some of the differences we see in debt, earnings, and debt burden.

- Across all CTE programs, those located in institutions with large shares of adult learners tend to have relatively high debt burden because students tend to take out more in loans and their earnings don't sufficiently compensate. Within specific fields of study, this trend also holds true for health, repair, and personal and culinary programs.
- Similarly, CTE programs at schools serving more students with financial need tend to have greater debt burden. This is true within the six specific fields of study as well.
- Compared with CTE programs located at four-year institutions, programs at technical schools and two-year colleges have debt burden 11 percent and 4 percent lower, respectively, despite lower earnings because graduates take out less in loans. This same trend holds true for technical schools in all fields of study but repair.

- Across all CTE programs, graduates at public institutions tend to have less difficulty paying off their loans than graduates of programs at private-for-profit schools and colleges. However, trends are different within fields of study. Repair services and protectives services programs follow the general trend because of significantly lower debt at public institutions, but outcomes are better at private for-profit for personal and culinary services programs because of higher earnings.
- Greater institutional spending on instruction may make it less difficult for CTE graduates to pay off their debts. On average, CTE program graduates make an additional $168 for every $1,000 more institutions spend on instruction per FTE, and do not incur significantly more debt. Looking within fields of study, spending on instruction only matters in the health sciences.

Labor market conditions do matter, although their effects are modest.

- Graduates of programs located in higher-wage labor markets enjoy significantly higher earnings at the two-year mark—about 4 percent ($1,400) for every marginal increase of $10,000 in the area median income, and about 2 percent ($700) per $10,000 increase in median wages for the occupations that map to their field of study. This helps significantly lessen overall debt burden.
- All six specific fields of study follow this pattern in median income, but only health sciences and personal and culinary services benefit from additional wage premiums associated with higher local wages for their specific occupations.

These findings have important implications for how we think about bolstering the value of CTE programs for students.

- **Provide strong career guidance before learners enroll and change the narrative about high-value CTE careers**. This guidance can help them decide which school to attend and which credential to work toward to increase their odds of a positive financial outcome.
- **Be deliberate about equity.** Occupational segregation by gender and race is a strong structural barrier to enrolling in high-value CTE programs and finding good jobs after graduation. Institutions and program operators could monitor their outreach and recruitment, enrollment, completion, job placements, and resulting wages by gender and race, set equity goals, and design strategies to achieve them.
- **Expand the number of seats in high-value programs and remove barriers to accessing them**, like reducing costs and reevaluating entry procedures or requirements that limit access.

- **Assist adult learners and women by limiting debt accrual and provide debt relief**. Larger shares of these students are associated with higher debt, and providing targeted assistance could improve outcomes overall.
- **Implement strategies for accelerated learning to** reduce debt. Strategies for acceleration include dual enrollment and early college programs that allow high school students to take credit courses for free, prior learning assessments for adult learners, and moving toward competency-based models that value learning over "seat time."

Introduction

The number and types of postsecondary credentials have grown exponentially in the last decade, making the credential landscape more complex than ever. One estimate puts the total number of credentials in the US at nearly 970,000 (Credential Engine 2021). These trends present opportunities, but they also pose significant challenges to learners who are trying to map out their education and connect it to employment opportunities.

To achieve a positive return on their education investment, students need to make enough money with their new credential to offset the debt they took on to complete it. This is even more crucial for "new majority learners," a term coined by the Education Design Lab to capture the diversity of students engaged in education today, who were often excluded in the design of programs.[2] These include adults returning to school, students from low-income or underrepresented communities who were historically marginalized (including Black and Hispanic/Latinx students), parents, returning citizens, and other groups.[3] Many new majority learners may need financial assistance to pay for college, and they may face barriers to completing their education and connecting to good jobs that offer pathways to economic stability and long-term upward mobility. These challenges often stem from structural and institutional racism—the historical, institutional, and current policies and practices that prevent upward mobility of people of color.[4]

Most of these learners attend programs with relatively accessible entry requirements, and the programs offer certificates, certifications, or associate degrees. The majority of Black (56 percent) and Hispanic/Latinx (64 percent) new majority learners attend such programs (National Center for Education Statistics 2015–16). Institutions award many short-term credentials in CTE programs, which are meant to

[2] "Who Are New Majority Learners?" Education Design Labs, accessed August 25, 2022 https://eddesignlab.org/newmajoritylearners/.

[3] The Education Design Lab defines "new majority learners" to also include learners who speak English as a second language, undocumented learners, learners who are currently or formerly incarcerated, learners who live with a disability, learners without a high school diploma, learners who are only able to attend school part-time due to financial or life circumstances, learners who are fully financially independent, learners who are veterans or active duty members, and learners who are transgender or queer. "Who Are New Majority Learners?" Education Design Labs, accessed August 25, 2022 https://eddesignlab.org/newmajoritylearners/.

[4] Structural racism is the historic and current institutional and cultural racism that facilitates the social, political, and economic upward mobility of white people while perpetuating systemic barriers to the social, political, and economic upward mobility of people of color. Institutional racism includes the policies, programs, and practices that intentionally and unintentionally produce inequitable outcomes for people of color. Individuals within institutions take on the power of the institution when they reinforce racial inequities.

build skills that align with employer needs and lead directly to job opportunities.[5] However, institutions do not guarantee that CTE programs lead to good employment outcomes or a positive return on investment for students. In response, many colleges and training institutions are honing their programs to better align them with labor market needs, aiming to help new majority learners reliably use their credentials to connect to good jobs (Davidson et al. 2019). We need to better understand what factors matter in ensuring high-value short-term CTE credentials for students.

The purpose of this report is to provide evidence on the returns to short-term CTE programs, and the factors that help to explain improved outcomes for students, using data from the College Scorecard. Providing actionable knowledge on what factors influence debt burden can help institutions, in partnership with employers, design higher-value credentials, as well as assist new majority learners and their families in thinking strategically about what and where to study. This report is part of a larger project that seeks to build knowledge on these issues (see box 1).

BOX 1

Overview of the Workforce Alignment Study

The Workforce Alignment Study—funded by Ascendium Education Group—seeks to understand how colleges and other educational institutions can design short-term CTE programs to ensure students can get good jobs.

Most students who enroll in these programs—once described as nontraditional students—are the new majority in postsecondary programs today and need well-designed programs and enhanced support to help them overcome barriers to opportunity and improve their pathways to economic mobility. These learners include students from low-income and underrepresented communities, as well as students not coming directly from high school, like student parents, adults juggling work and school, returning citizens, and others.

The project features this brief describing a full range of market-aligned and student-centered program design options for college CTE programs, a report analyzing debt and earnings for a set of CTE programs, and a report profiling nursing, business, and welding programs and describing how program design options may shape student outcomes.

[5] National Center for Education Statistics defines CTE the high school–level courses and postsecondary sub-baccalaureate level programs that focus on the skills and knowledge required for specific jobs or fields of work. For more information, see "About CTE Statistics," National Center for Education Statistics, accessed August 25, 2022, https://nces.ed.gov/surveys/ctes/about.asp.

What We Know about Credentials, Debt, and Earnings

The majority of the literature on credential value is focused on high school and four-year degrees (Card 1999; Card 2001). In recent years, studies have started to include short-term credentials. Some of these studies look at the credentials alongside longer degrees (Clochard et al. 2022; Itzkowitz 2021). Other studies focus only on short-term credentials awarded specifically by community colleges. None of the studies break out CTE programs separately from academic ones, and most studies are descriptive in nature, ranking programs or institutions offering short-term credentials.

Multiple studies emphasize the field of study as one of the main determinants of a program's value. In a study using social profile records of adult learners, Clochard and colleagues (2022) find CTE fields like engineering, health, and computer and information sciences offer more upward economic mobility than most bachelors' degree programs. A study using individual-level longitudinal data for learners in Washington state community colleges finds associate degrees in nursing increasing learners' earnings more compared with those earning associate degrees in humanities, social sciences, information science, communication, and design (Dadgar and Trimble 2015). Descriptive studies using program-level data come to similar conclusions on the importance of the field of study. Christensen and Turner (2021) find programs' fields of study accounts for most of the variation in earnings and loan repayment. Similarly, Itzkowitz (2021) finds health, engineering, and computer programming are among the top programs for associate degrees compared with the majority of associate graduates in humanities and liberal arts who earn less than high school graduates without postsecondary education.

Between certificate programs and associate degree programs, the latter leads to higher earnings within any given field of study (Dadgar and Trimble 2015). The length of certificate programs is considered an important factor affecting earnings, with most short-term credentials not leading to any gains other than a few exceptions (e.g., protective services) with the caveat that gains were observed for male students only. One possible explanation is that people who opt for short-term credentials earnings could be those with greatest difficulty in the labor market (Dadgar and Trimble 2015). Jepsen and colleagues (2014) find in a student-level longitudinal study on programs at community and technical colleges in Kentucky that associate degrees and diplomas lead to higher earnings compared with certificates. Studies using program-level data show similar results. For example, one study shows that associate degree graduates are more likely to recoup the cost of their program within five years compared with certificate and bachelors' degree graduates (Itzkowitz 2021).

Among the different type of institutions (public, private, and for-profit), public institutions are consistently found to be the most beneficial across different learner-focused parameters. Clochard and colleagues (2022) find the average cost of attending for-profit institutions is more than twice the cost of

attending public institutions, and 58 percent of adult learners in public institutions had upward economic mobility compared with 54 percent in for-profit institutions. In a program-level study, Itzkowitz (2021) estimates that learners from public institutions have the highest chances of recouping their expenses within five years compared with private and for-profit institutions.

Few studies look beyond credential and institution type to understand factors that shape credential value or ROI for students. Several studies recognize that demographics matter. Male adult learners have higher chances for economic mobility compared with their female counterparts, even within the same field of study (Clochard et al. 2022). Certificate programs are likely to increase employment chances specifically for women, while academic degrees and diplomas improve chances for learners in general (Jepsen et al. 2014). In a program-level study, Christensen and Turner (2021) find that the proportion of students from underrepresented communities and the proportion of women in a program are negatively correlated with earnings level and loan repayment rates of graduates. But after controlling for field of study, institutional characteristics, and state-level factors, the correlation is reversed. From this, the study concludes that programs with low earnings have a higher proportion of students from underrepresented communities. This reflects historical patterns of steering of these students to lower-value credentials in post-secondary as well as persistent occupational segregation (Anderson et al. 2021; Biu, Famighetti, and Hamilton 2021).

BOX 2

Helpful Definitions

Post-secondary **career and technical education (CTE)** programs provide knowledge and training with the aim of developing job-ready skills that directly lead to gainful employment. These are typically short-term credentials taking two or fewer years to complete.

Short-term credentials as defined in this study are **credit-bearing college programs taking two or fewer years to complete**. These include an associate degree and other undergraduate diplomas and certificate programs.

Overview of the Approach

In this study, we contribute new evidence to the existing literature on short-term credentials by focusing exclusively on short-term CTE programs and examining both debt and earnings. We also explore the role of multiple factors that could shape the debt burden experienced by graduates, such as program, institution, and labor market characteristics.

Using program-level data on credentials issued, this study addresses research gaps by answering the following questions:

1. How much of the variation in debt, earnings, and debt burden (debt as a share of earnings) for short-term CTE credentials can be explained by general field of study and degree type, program demographics, and other institutional characteristics?
2. How much is potentially left to be explained by factors like program design?
3. What factors are associated with greater value for learners?
4. To what extent do these trends change when we look at differences in programs *within* fields of study?

FIGURE 1

Outcomes and Analysis Factors

Outcomes: Debt, Earnings, and Debt Burden (Debt as a Share of Earnings)

Program characteristics	Program demographics	Institution characteristics	Labor market
▪ Field of study (e.g., health sciences ▪ Credential (associate degree or certificate)	▪ Percentage of people of color ▪ Percentage of women	▪ Percentage of adult learners ▪ Percentage receiving Pell or federal loans ▪ Level of institution ▪ Type of institution ▪ Spending on instruction per full-time equivalent ▪ Urbanicity (urban, town, suburban, or rural) ▪ Enrollment	▪ Median income ▪ Median income for occupations mapping to specific CTE fields of study

Sources: Publicly available data from the 2021 College Scorecard, Integrated Postsecondary Education Data System, Occupational Employment Statistics, accessed spring 2022.

Notes: Under institutional characteristics, "level of institution" includes less-than-two-year, two-year, and four-year institutions. "Type of institution" includes public, private not-for-profit, and private for-profit. See box 3 below for additional information about institution levels and types. Under program demographics, "people of color" includes all learners except those who are white and non-Hispanic.

The analyses employ data from several different sources:

- The College Scorecard (2021) provides program-level data on degree (associate or certificate), general field of study, specific field of study,[6] and median debt among graduates in 2017–18 and 2018–19. The earnings data are for the cohort of students who completed their program in the two previous years. The College Scorecard also has institution-level data on the share of students who are adult learners (ages 25 or older), the level of the institution (less than two years, two years, or four years), institution type (public, private not-for-profit, private for-profit), spending on instruction per full-time equivalent (FTE), the type of locale in which the institution is located (city, rural, town, suburbs), the share of students receiving Pell grants or federal student loans, and the total number of students enrolled.
- **Integrated Postsecondary Education Data System (IPEDS) Completion Survey 2021** provides information on race and ethnicity and gender of people completing specific programs. We use these data to calculate the share of women and people of color[7] for each program with the College Scorecard described above.
- **Occupational Employment Statistics (OES)** is used to extract the overall median annual income and calculate the median for all the occupations mapping to each field of study in each metropolitan and nonmetropolitan area where CTE programs are located.

The College Scorecard dataset includes data on 223,510 individual programs, 68,143 of which issue associate degrees or other undergraduate credentials in CTE fields of study. A total of 8,071 of these have data on our outcome variables, earnings and debt, representing only 12 percent of programs, but 41 percent of the students studying in them (table 1).

[6] Throughout this report, we use "general" field of study to refer to any program included in a two-digit classification of instruction code. We use "specific" field of study to refer to any program included in a four-digit code. For example, health sciences is a general field of study, while allied health and medical assisting services is a specific field of study contained within health sciences.

[7] This includes all learners except those who are white and non-Hispanic.

TABLE 1

Analyses Include a Small Share of CTE Programs Nationwide but a Substantial Share of the Students Pursuing These Kinds of Credentials

			With Debt and Earnings Data			
	Programs	Students	Programs	Programs (%)	Students	Students (%)
All Programs	68,143	2,727,634	8,071	12	1,126,520	41
Six Largest General Fields of Study						
Health sciences	15,017	923,756	3,888	26	524,789	57
Business and marketing	11,343	409,603	870	8	133,421	33
Computer and information sciences	6,342	148,474	389	6	33,182	22
Repair	3,838	209,849	425	11	72,559	35
Protective services	3,309	148,533	394	12	53,053	36
Personal and culinary services	3,053	243,657	863	28	150,370	62

Source: Publicly available data from the 2021 College Scorecard, accessed spring 2022.
Notes: To protect privacy, the College Scorecard suppresses debt and earnings data for small programs. Therefore our analyses include a small share of career and technical education programs nationwide, but because it is larger programs that are not censored our analysis include a substantial share of the students pursuing these kinds of credentials. Fields of study are at the general level. All programs confer either certificates or associate degrees.

Note that much of the data in the scorecard is missing because of the large number of programs with small enrollment. The data for some fields of study is more representative than others. For example, 62 percent of personal and culinary services students and 57 percent of health sciences students are reflected in the data, while only 22 percent of computer and information sciences students are reflected.

We use the institution identification in the College Scorecard data to link to the IPEDS data. Then, we use information on the county where each institution is located to associate each with a distinct metropolitan or nonmetropolitan area. The statistics on median earnings overall and for the occupations mapping to each field of study is then merged using the unique combination of classification of instruction (CIP) code and metropolitan or nonmetropolitan area code.

To analyze the data, we first run descriptive statistics on our program and institutional characteristics as well as our dependent variables:

- Debt
- Earnings
- Debt burden[8]

[8] We define debt burden as debt as a share of earnings (debt-to-earnings ratio). Lower values are more favorable and higher values are less favorable. A similar formulation of debt-to-earnings ratio or debt burden is found in Gillen (2021).

Because of substantial skew in the dependent variables, we log transform them before running multilevel regression models. In our overall models, all short-term CTE programs are pooled together and clustered within institutions. Because of lower statistical power, we use ordinary least squares regression (OLS) models for analyses of trends within the six largest fields of study. We use Snidjers and Boskers (2012) formula to calculate the share of additional variance explained by the multilevel models and standard R-squared statistics for the OLS regressions.

Limitations

Before beginning to describe short-term CTE credentials and trends in their value, we highlight the study's limitations below:

- **Trends are only representative of relatively large, for-credit programs.** As described in the prior section, data on smaller programs are not publicly released to protect student privacy. Moreover, only for-credit programs are included in College Scorecard data, even though many CTE credentials are noncredit.
- **The data reflect short-term results.** Earnings are reported two years after completion of the credential. Some CTE occupations have long-term wage growth that will not be captured in our analyses.[9]
- **Debt and earnings come from separate cohorts**. Ideally, we would look at debt and earnings for the same people at the same point in time, but the College Scorecard compiles the data from different sources and cohorts. We would expect that the types of learners would remain largely the same year to year, but earnings may fluctuate with changing economic conditions.
- **Data on debt does not capture students who graduate without any debt or who take out loans other than federal Stafford loans.** Estimates of median debt might be artificially high if they exclude students who did not take out federal Stafford loans in their calculations. These students might be learners who pay strictly out of pocket, receive only Pell grants, or seek other sources of educational funding.
- **The data cannot tell us what happens to learners who start a program and do not complete it.** Many of these learners take out debt and have even greater difficulty seeing a return on their investment.

[9] Prior analyses have indicated sensitivity to the earnings time period when using the College Scorecard to assess institutional value (Mabel et al. 2020).

- **Programs may not look the same as their institutions.** The share of adult learners, percentage of students with financial need, and spending on instruction are *only* available for institutions, not programs. However, individual CTE programs within institutions likely attract different types of learners and are financed in different ways from their parent institutions and are therefore not reflected in our analysis.
- **Results for individual students may vary.** We can only say whether completers of certain programs tended to have higher or lower debt and earnings compared with other *programs*. Without student-level data, we cannot say how students with different demographics, backgrounds, or circumstances tend to fare in a given program.

Despite the above limitations, the data we use allow us to account for many factors and to explore CTE debt burden in depth. We believe the factors we control for provide a better context for a comparison of debt burden across fields of study. Educators, students, and policymakers would benefit from even more detailed data collection at the program level, but the College Scorecard nevertheless represents a step forward with its program-level outcomes.

Overview of Short-Term CTE Programs

Before delving into more in-depth analyses, we first describe what short-term CTE programs look like, the institutions offering these programs, and what we know about debt, earnings, and debt burden regarding these programs.

BOX 2

Overview of Short-Term CTE Programs: Key Takeaways

- Short-term CTE programs are fairly evenly split between undergraduate certificates and associate degrees.
- Women are the majority in most CTE programs, and people of color make up more than one-third of learners.
- Most programs are at two-year public colleges.
- Earnings in local labor markets vary substantially by field of study.
- Median CTE program debt is $16,077 but ranges from $3,700 to $45,000, depending on the field of study.
- Median CTE program annual earnings are $32,234 and range from $8,200 to $116,000.

What Do Career and Technical Education Programs Look Like?

The 8,071 programs in this analysis represent 134 specific fields of study,[10] which are clustered into 26 general fields of study.[11] Some general fields of study include more specific fields than others. For example, business and marketing's 874 programs are divided into 15 specific fields of study, but personal and culinary services programs are only divided into four. (See appendix A for frequencies of the specific fields of study within each general field of study).

[10] For the purposes of this study, specific fields of study are defined by the four-digit CIP codes available in the College Scorecard data for each program.

[11] General fields of study are defined by two-digit CIP codes.

Overall, short-term CTE programs are fairly evenly split between certificates and associate degrees (table 2). Certificates are undergraduate certificates or diplomas other than associate degrees and are usually shorter than associate degree programs. We see the same even split among health science programs, but associate degrees dominate business and marketing, protective services, and computer and information science programs. Personal and culinary services and repair programs primarily consist of certificates.

Women are the majority in most programs, and people of color make up more than one-third of all CTE learners. The share of people of color in CTE programs is fairly consistent overall and within individual fields of study, hovering around 40 percent, although computer and information science programs have slightly lower shares. On average, about two-thirds of CTE graduates are women, but we see gendered trends when we look more closely at specific fields of study. Health sciences, business and marketing, and personal and culinary services have high shares of women, and more men tend to graduate from repair, protective services, and computer and information sciences.

TABLE 2

Fields of Study, Type of Credentials, and Demographics in CTE Programs

Characteristic	All	Health Sciences	Business and Marketing	Personal and Culinary	Repair	Protective Services	Computer and Information Sciences
Programs and detailed fields of study (N)							
Programs	8,071	3,888	870	863	425	394	389
Specific fields of study	134	21	15	4	6	4	11
Type of credential (%)							
Certificate	43	44	11	88	64	27	13
Associate	57	56	89	12	36	73	87
Demographics (%)							
People of color	39	39	40	46	41	39	35
Women	66	84	64	86	7	41	23

Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.

What Kind of Institutions Offer Career and Technical Education Programs?

Most programs are located at two-year public colleges (table 3). However, one notable exception exists. About two-thirds of personal and culinary services programs run out of less-than-two-year institutions, and 79 percent of these programs are at private, for-profit institutions. These programs are also less frequently found in small towns and rural areas. They tend to be at institutions with smaller enrollments and have higher shares of students with Pell grants or federal loans than programs in other fields of study.

BOX 3

College-Type Distinctions

- **Two-year colleges** offer only programs of two years or less, such as associate degree or certificate programs. This contrasts with **four-year colleges** that offer bachelor's degrees, but may also offer two-year and shorter degree programs.
- **Technical colleges or less-than-two-year institutions** offer only programs of less than two years and that do not exceed 1,800 contact hours; they tend to provide career-focused education and training in specific sectors.
- **Public colleges** receive government funding in addition to student loan dollars, tuition, and fees. Because of public subsidy, these institutions are *usually* more affordable than private colleges.
- **Private for-profit colleges** are privately owned and operated educational institutions. They are managed as business entities through investor and shareholder interests.
- **Private not-for-profit colleges** are required to reinvest their revenue in the college.

Despite little difference in overall median income among institutions' local labor markets, we see that earning potential varies substantially for different fields of study. For example, median earnings are around $90,000 for computer and information science occupations and are about $30,000 for local personal and culinary service occupations.

TABLE 3

Differences in Institutions and Labor Markets Where Programs are Offered

	All	Health Sciences	Business and Marketing	Personal and Culinary Services	Repair	Protective Services	Computer and Information Sciences
Institutions (N)	1,987	1,345	426	633	245	283	218
Level of institution (%)							
Four years	23	23	36	5	13	30	42
Two years	60	64	59	28	70	66	54
Less than two years	17	14	4	67	17	4	3
Type of institution (%)							
Public	59	61	70	18	49	80	64
Private, nonprofit	6	6	7	3	8	2	4
Private, for-profit	35	33	23	79	43	18	32
Student financial need (%)							
Receiving Pell Grant	45	46	42	52	48	41	43
Receiving federal loans	39	38	35	47	46	30	39
Spending on instruction per full-time-equivalent ($)	6,250	6,337	6,189	5,381	5,983	6,757	6,256
Enrollment (N)	5,371	4,648	7,831	1,703	4,460	8,242	7,905
Institution urbanicity							
City	51	51	49	56	49	46	53
Suburban	29	27	30	36	37	28	31
Town	11	12	11	5	8	13	9
Rural	9	10	10	2	6	12	7
Labor markets (N)	462	448	285	259	162	196	170
Median earnings for all occupations ($)	37,910	37,518	38,286	38,564	38,787	37,634	38,452
Median earnings for corresponding CTE occupations ($)	66,518	73,409	74,735	34,346	49,996	69,351	90,813

Source: 2021 College Scorecard Institution and Occupational Employment Statistics labor market data, accessed spring 2022.
Notes: Program N = 8,071; institution N = 1,987. By field of study, the institution number ranges from 1,345 in health sciences to 218 in computer and information sciences. Adult learners are student enrollees ages 25 and older.

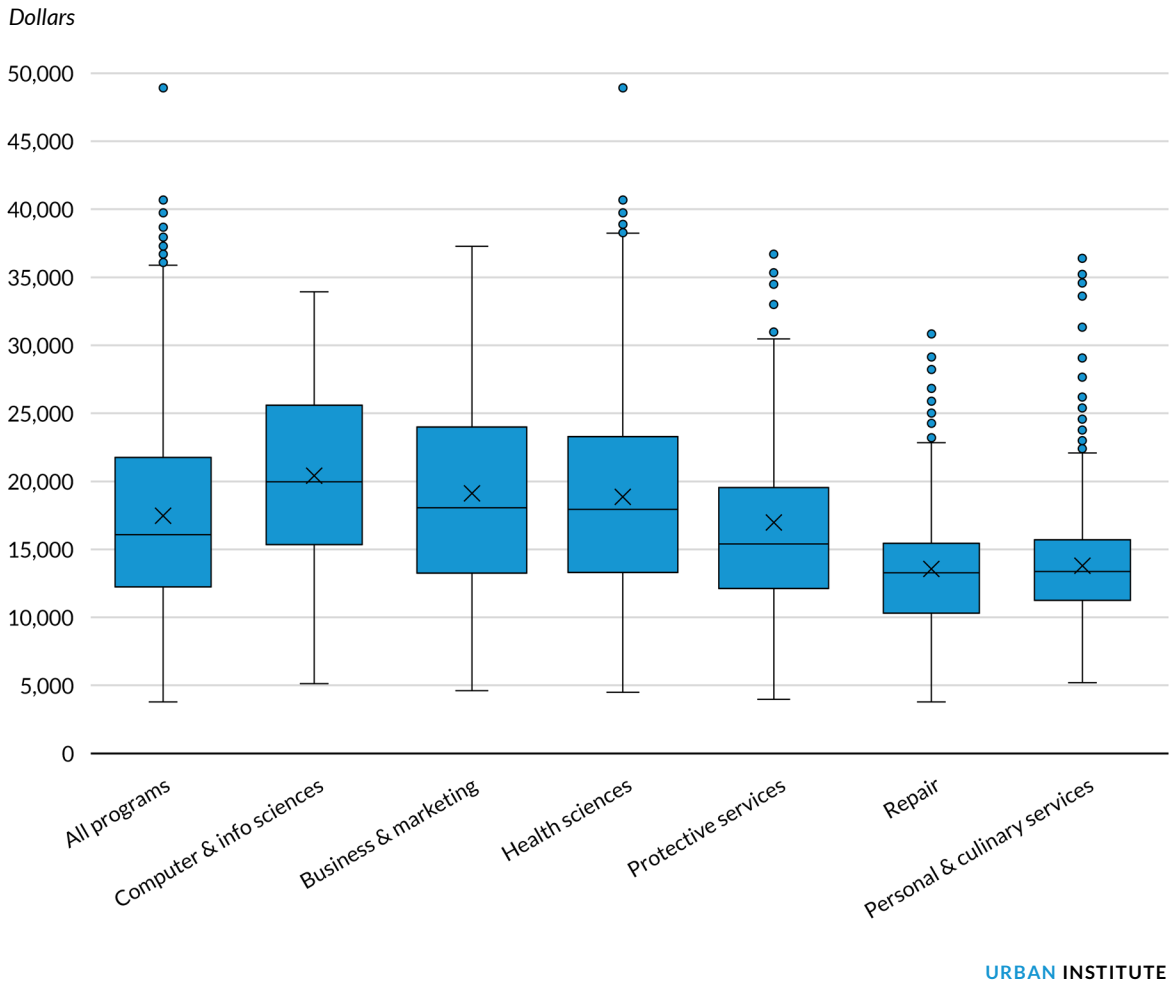
How Much Debt Do CTE Graduates Incur?

Overall, median debt for short-term credentials is $16,077, but ranges from about $3,700 to $45,000 (figure 2). The highest median debt is for computer and information sciences at $19,955 followed by business and marketing and health sciences. This contrasts with the repair and personal and culinary

programs, which are dominated by short-term certificates and have the lowest median debt at $13,277 and $13,367, respectively.

FIGURE 2

Debt Tends to Be Lower in Fields of Study Like Repair Services and Personal and Culinary Services Where Most Graduates Are Earning Certificates



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed Spring 2022.
Notes: N = 8,071 programs; X = mean for that category. The range of the middle 50% of the data is contained within the box and the central line indicates the median.

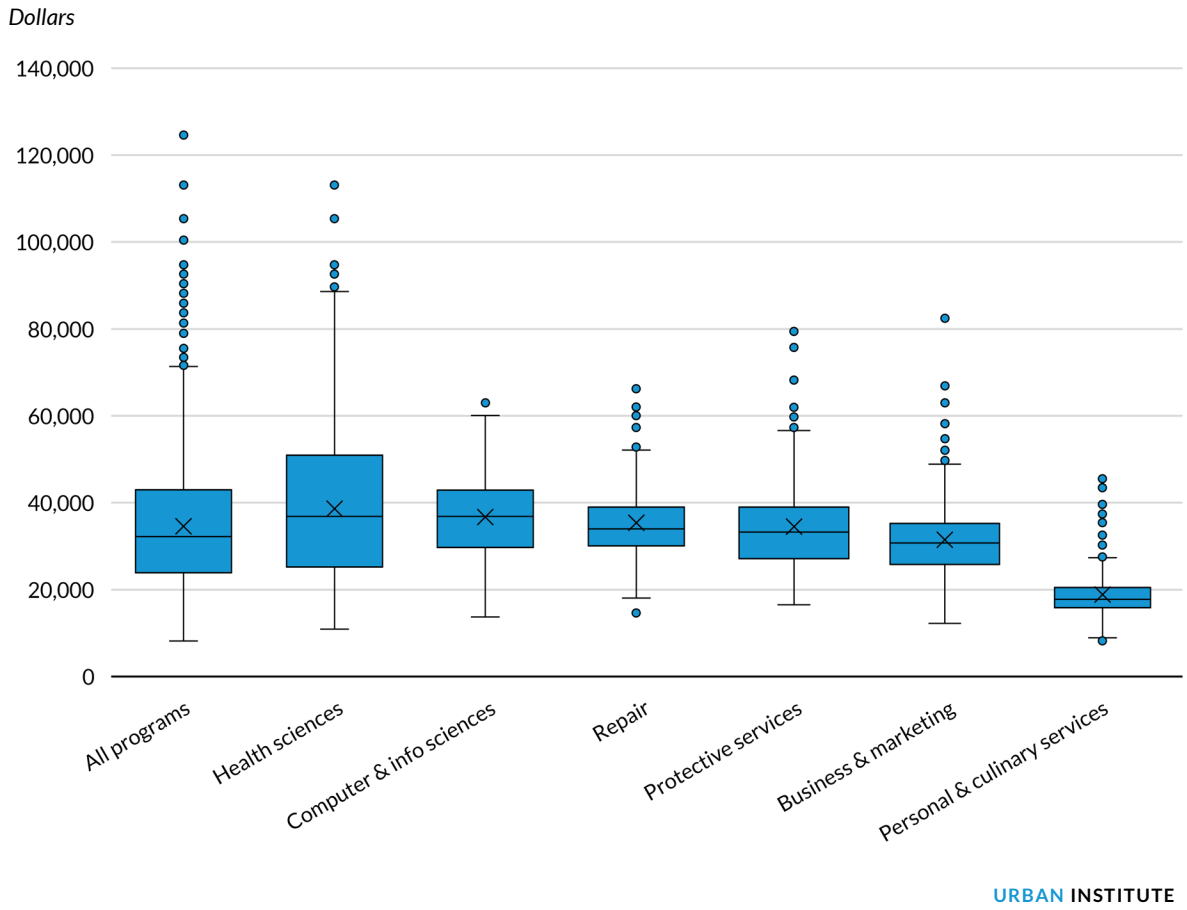
How Much Do CTE Graduates Earn?

Median annual earnings across all short-term CTE programs are $32,234—about twice the median debt—and range from about $8,200 to $116,000 (figure 3). Health sciences and computer and information sciences have the highest earnings, but the former has a much wider range compared with the latter.

Personal and culinary services programs tend to have the lowest earnings and much less variation than other fields of study.

FIGURE 3

Annual Earnings after Two Years Are Highest in Health Sciences and Computer and Information Sciences Programs



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Notes: N = 8,071 programs; X = mean for that category. The range of the middle 50% of the data is contained within the box and the central line indicates the median.

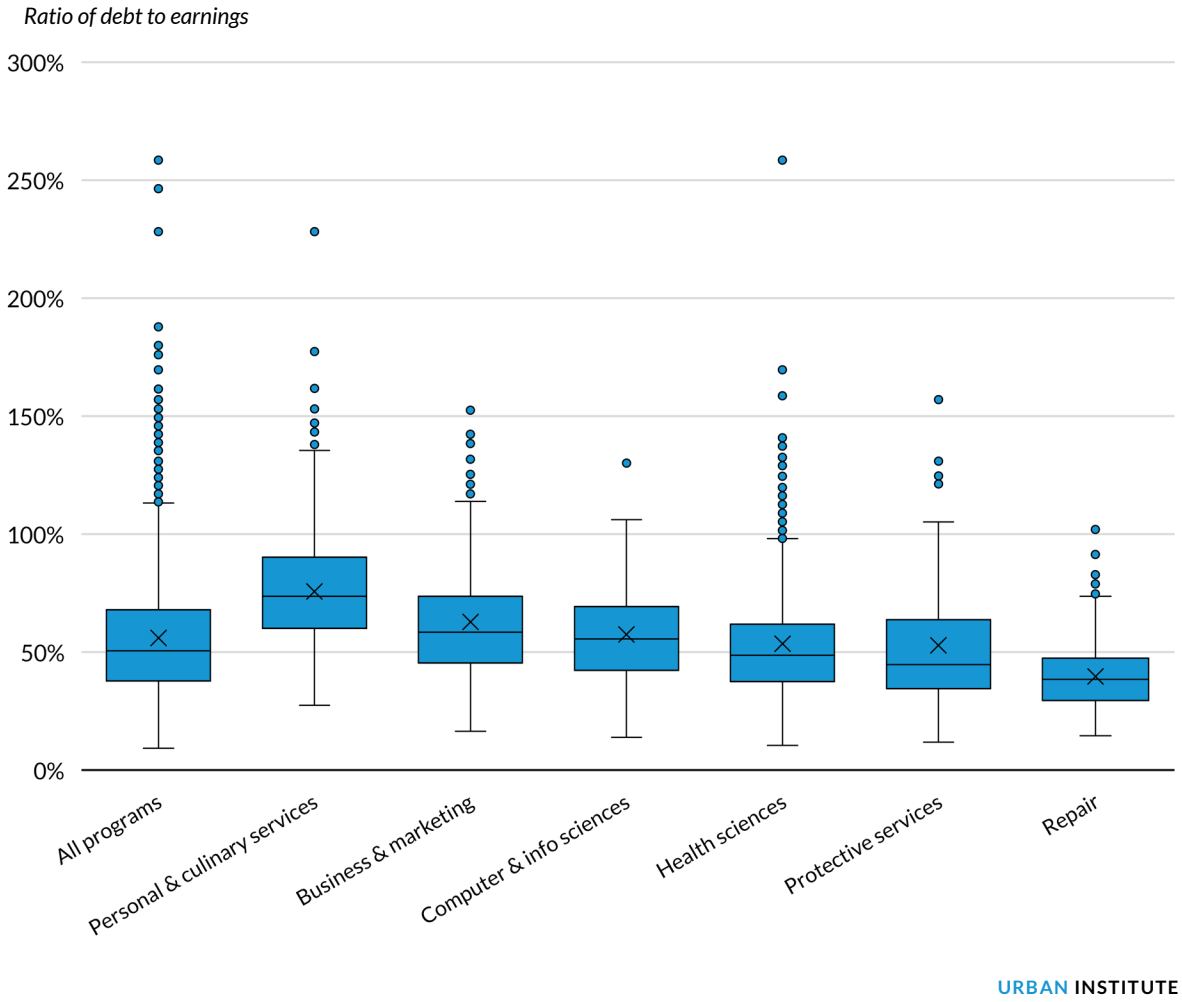
How Much Difficulty Do Graduates Have Paying Off Their Debt?

A typical graduate's debt burden would be the equivalent of 56 percent of their annual earnings two years after graduation (figure 4). Despite the field of study's low debt, personal and culinary services has the highest debt burden because of its markedly low two-year earnings. Graduates of repair services

programs—the other field of study that mostly consists of certificates—have the least difficulty paying off debt because of the combination of relatively low debt and high earnings.

FIGURE 4

Graduates of Personal and Culinary Services Programs Have the Greatest Debt Burden



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Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Notes: N = 8,071 programs; X =mean for that category. The range of the middle 50% of the data is contained within the box and the central line indicates the median.

Understanding Drivers of Debt Burden

We start this chapter by examining how various factors contribute to our overall understanding of differences in debt, earnings, and overall debt burden. We then look more closely at individual program, institution, and labor market factors to identify how they shape outcomes for graduates.

BOX 4

Understanding Drivers of Debt Burden: Key Takeaways

- Together field of study and credential level add the most to our understanding of the outcomes.
- Institutional characteristics play a larger role in explaining student debt than they do in explaining earnings.
- Associate degree programs have a debt burden 6 percent higher compared with certificate programs.
- Significantly lower earnings make it more difficult for graduates of programs with large shares of women and people of color to pay off debt.
- Compared with programs at four-year institutions, programs at technical schools have 11 percent better value and those at two-year colleges have 4 percent better value.
- Public institutions offer more value than private-for-profit schools and colleges.

What Matters More: What or Where Students Study?

General field of study and credential level add the most to our understanding of the outcomes—particularly earnings (figure 5). These two factors alone explain an additional 60 percent of differences we see across CTE programs in earnings and an additional 29 percent of differences in debt.[12]

Institutional characteristics play a larger role in explaining student debt than they do in explaining earnings. Adding institutional factors accounts for an additional 19 percent of differences in debt, and 18

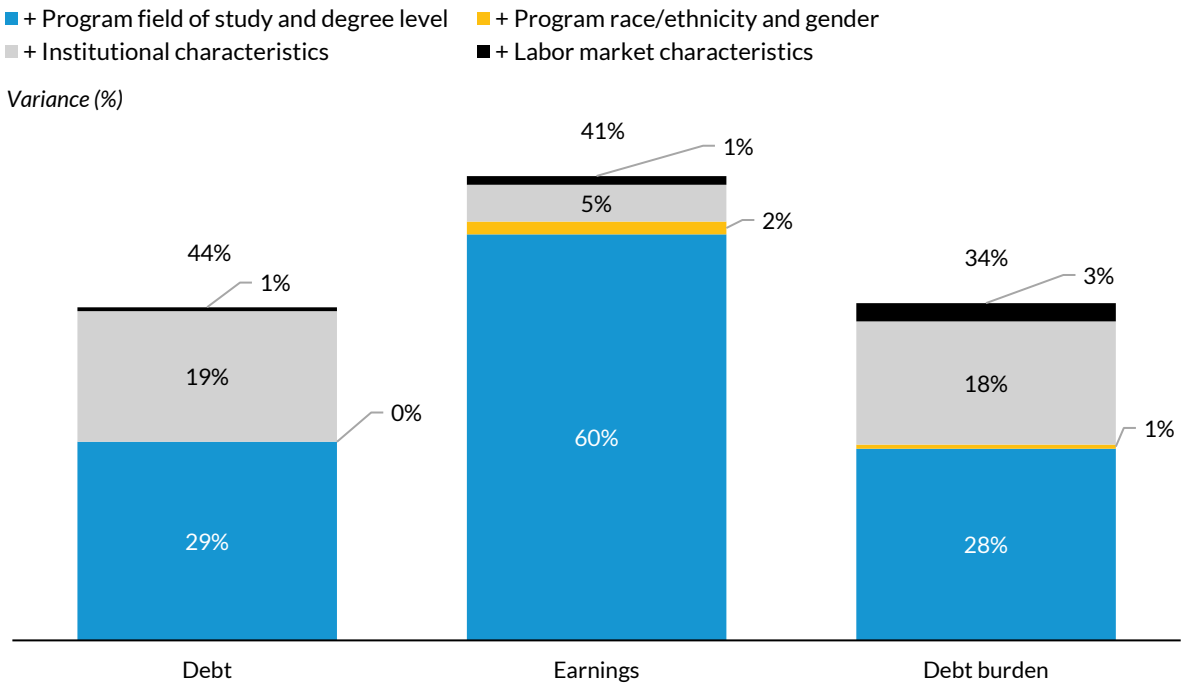
[12] Note that this is a measure of "additional" explanatory power after controlling for clustering of programs within institutions, our baseline model.

percent of debt burden differences. In contrast, program demographics and labor market characteristics make only marginal contributions to our understanding of debt, earnings, or debt burden.

Together, the four types of factors in our model (program field of study and degree level, program demographics, institutional characteristics, and labor market characteristics) explain upwards of 68 percent of the differences in *earnings*, leaving only about a third left to be explained by program design and other factors.

FIGURE 5

Field of Study and Degree Strongly Shape Earnings and Debt Burden



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Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Notes: N = 8,071 programs. Percentages represent the share of additional variance each set of factors helped explain over the intercept-only model as they were added in one by one. Calculations made using Snijders & Bosker (2012).

What Types of Career and Technology Education Programs Tend to Have Better Outcomes?

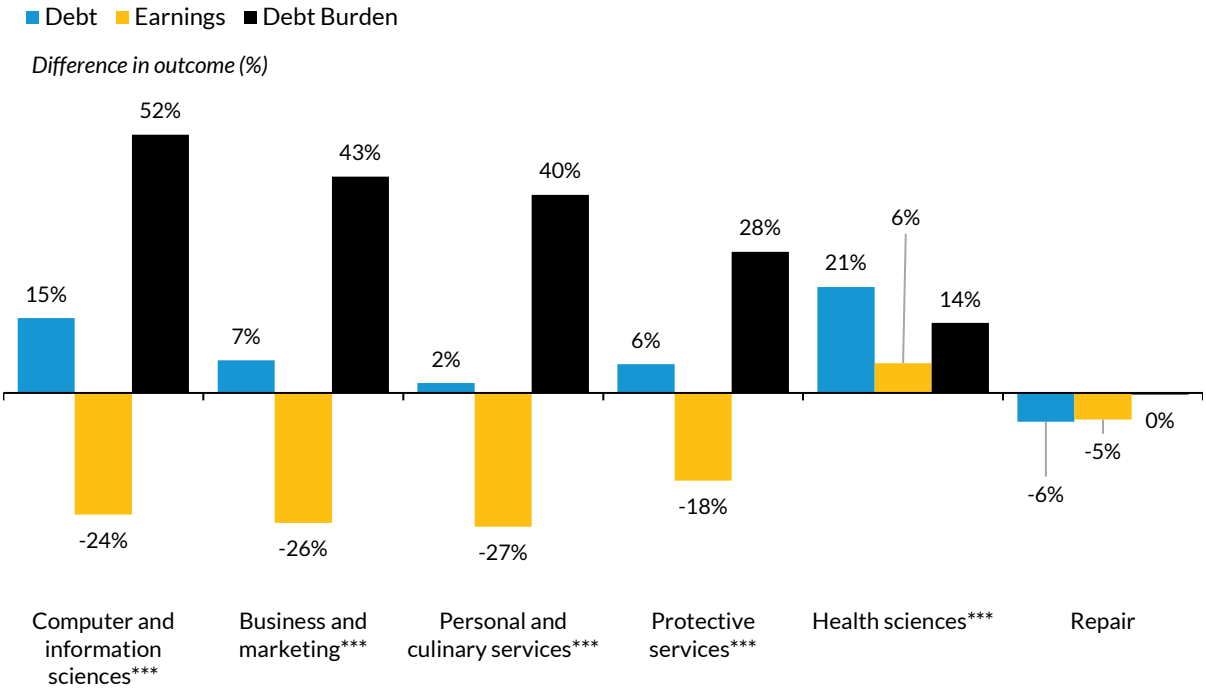
As we saw in the last section, program characteristics contribute a substantial amount to our understanding of student outcomes—particularly when it comes to earnings two years after graduation. We highlight how individual program factors—including field of study, level of degree, and program demographics—are

related to debt, earnings, and overall value for students. (The detailed results from the analyses can be found in appendix B.)

When it comes to CTE fields of study, programs in five of the six largest fields of study have higher debt burden than engineering technology programs (figure 6).[13] Students in business and marketing and computer and information science programs have a harder time paying back their loans because of a combination of significantly higher debt and lower earnings at the two-year mark. Health programs have significantly higher earnings than engineering programs, but they also have 21 percent higher debt, which leads to a higher debt burden. For personal and culinary services and protective service programs, debt is comparable to debt acquired in engineering programs, but earnings are much lower.

FIGURE 6

Programs in Five of the Six Largest Fields of Study Have Higher Debt Burdens Than Engineering Technology Programs



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Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: N = 8,071 programs; difference in the debt burden of the field of study in comparison to engineering technologies.
*/**/***: p < .10, p < .05, p < .01

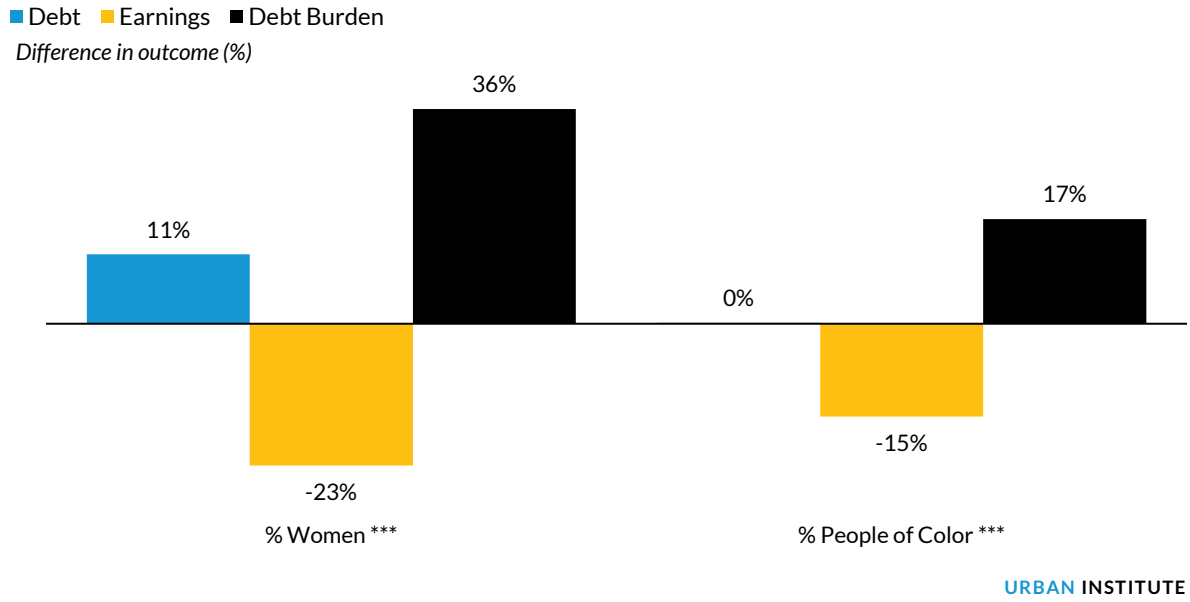
[13] Engineering technologies was used as a reference category because it was the field of study with the largest number with which to compare the six example fields of study.

Associate degrees are associated with higher debt burden than certificates. Graduates of associate programs tend to earn about 28 percent ($8,900) more at the two-year mark than graduates of certificate programs, but this is not enough to completely offset the 35 percent ($5,600) higher debt. As a result, graduates of associate degree programs have a debt burden about 6 percent higher than graduates of certificate programs.

Significantly lower earnings make it more difficult for graduates of programs with large shares of women and people of color to pay off debt (figure 7). For example, a program with only female graduates would have two-year earnings that are 23 percent ($7,600) lower than an all-male program; and one with only people of color would have 15 percent ($5,000) lower earnings than an all-white program. Moreover, programs with all women would have 11 percent more debt ($1,800).

FIGURE 7

Earnings for Graduates of Programs with More Women and People of Color Tend to Be Lower, Drive Greater Difficulty Paying Off Debt



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: N = 8,071 programs; percent changes in outcomes are displayed per percentage point increase in women and people of color.
*/**/***: p < .10, p < .05, p < .01

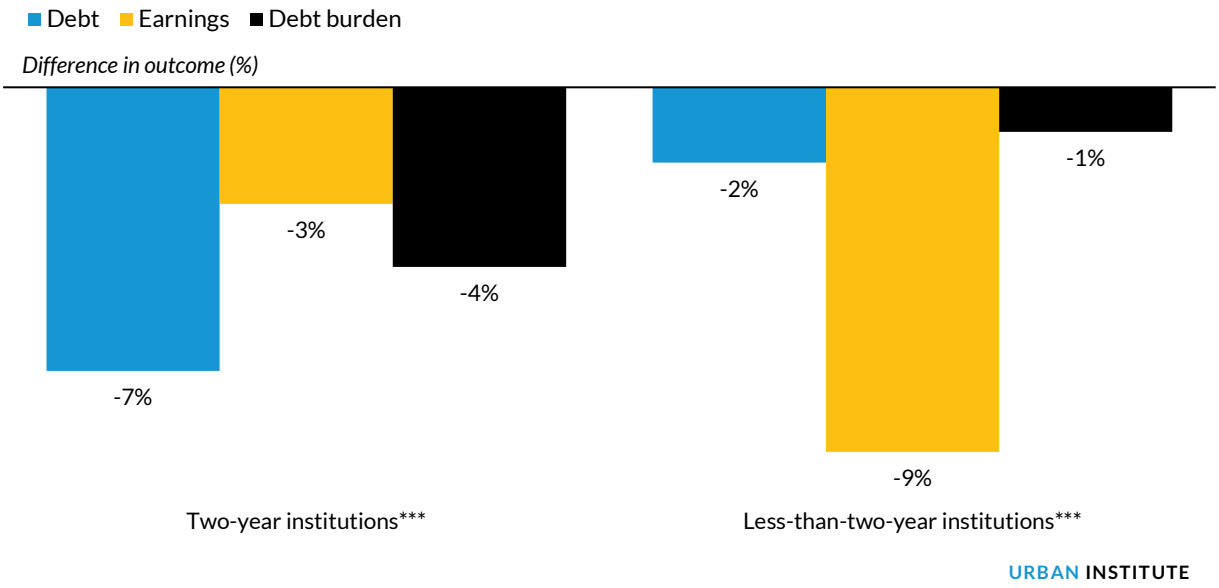
What Types of Institutions Do Better?

Institutional characteristics help explain a substantial amount of the differences in outcomes we see for graduates, largely in terms of debt and debt burden. Some institutional factors are more influential than others and shape outcomes in different ways.

CTE programs offered at technical schools and two-year colleges have lower debt burden than those offered at two-year institutions (figure 7). Despite lower earnings than programs at two-year institutions, significantly lower debt make the debt burden 11 percent lower for technical schools and about 4 percent lower at two-year institutions (figure 8).

FIGURE 8

Graduates of Programs Housed at Two-Year or Less Than Two-Year Institutions Tend to Do Better Than Those at Four-Year Institutions Because of Less Debt Than Graduates in Similar Programs at Four-Year Colleges



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Notes: N = 8,071 programs; difference in the debt burden of two-year and less-than-two-year institutions compared with four-year institutions.
*/**/***: p < .10, p < .05, p < .01

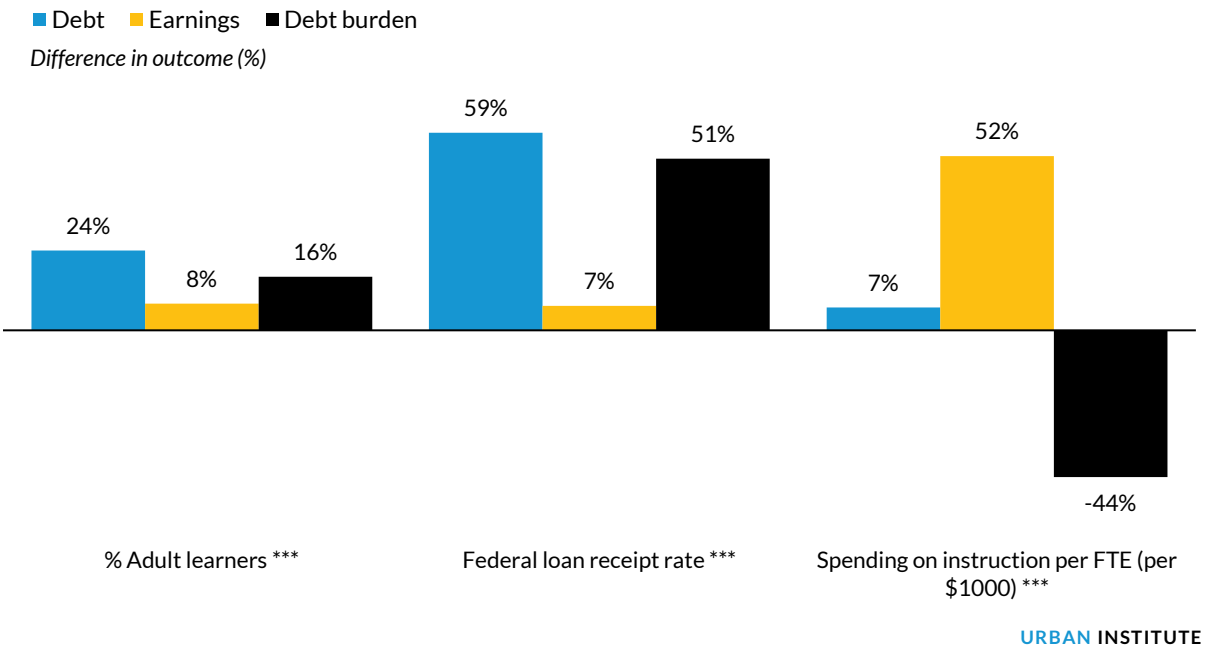
Public institutions offer lower debt burden than private for-profit schools and colleges. This association is from higher earnings for graduates of programs at public institutions, roughly 14 percent ($4,600) higher than those of graduates at for-profit institutions. This more than compensates for the relatively higher debt burden (7 percent, $1,200) of students at public schools (not shown).

Programs at institutions that serve more adult learners also tend have worse outcomes for students (figure 9). For example, a program at a college that exclusively serves students older than 24 would tend to have a 16 percent higher debt burden than colleges that only serve younger students. This is because of significantly higher debt—about 24 percent ($3,800)—which does not fully offset higher earnings (8 percent, $2,600). Programs at colleges with greater shares of students with federal loans follow the same trend, where debt outpaces earnings. We also explore how the share of students receiving Pell grants at an

institution—a marker for the highest level of financial need—relates to program outcomes (not shown). Pell receipt rates are associated with lower levels of debt for graduates, but graduates also tend to earn less money after two years, nullifying any net reduction in debt.

FIGURE 9

Programs at Institutions with Higher Shares of Adult Learners and Federal Loan Receipt Have Relatively High Debt Burdens



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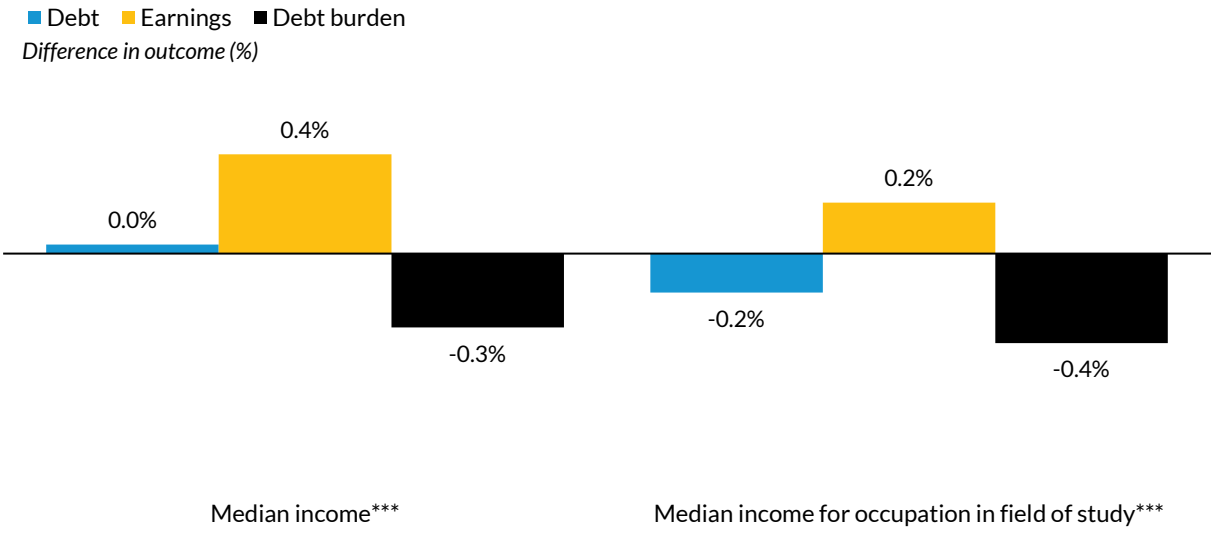
Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: FTE = full-time equivalent; N = 8,071 programs. Percentage changes in outcomes are displayed per percentage point increase in adult learners and federal loan receipt; they are per $1,000 in spending on instruction. Difference in the debt burden per unit change in adult learners, federal loan receipt, and instructional spending.
*/**/***: p < .10, p < .05, p < .01

Greater institutional spending on instruction may make it a little less difficult for CTE graduates to pay off their debts. On average, CTE program graduates make an additional $168 for every $1,000 more institutions spend on instruction per FTE, and do not incur significantly more debt.

Market conditions matter (figure 10). Graduates of programs located in higher-wage labor markets enjoy significantly higher earnings at the two-year mark—about 4 percent ($1,400) for every marginal increase of $10,000 in the area median income. Graduates enjoy an additional earnings premium when the median wages for the occupations that map to their field of study are higher—about 2 percent ($700) per $10,000 increase. This translates into less difficulty repaying loans for those who complete programs in higher-wage labor markets.

FIGURE 10

Higher Local Wages Make It Easier for Graduates of CTE Programs to Pay Down Their Debt



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Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: N = 8,071. Percentage changes in outcomes are displayed per $1,000 increase in median income measures.
*/**/***: p < .10, p < .05, p < .01

A Closer Look at Programs within General Fields of Study

The prior section examined trends in debt burden among all short-term CTE programs nationwide. However, we recognize that individual fields of study may follow different patterns because of different occupations, labor markets, and credential requirements. To understand how the narratives around debt, earnings, and debt burden might diverge for different general fields of study, we looked more closely at the six largest fields: business and marketing; computer and information sciences, personal and culinary services, health sciences, repair, and protective services.

Although many trends exist within these fields of study that are consistent with trends across CTE programs, unique realities emerge. This section explores how graduates' experiences may differ depending on which field of study they choose. We start by describing how program, institution, and labor market factors differ in shaping student outcomes for debt, earnings, and debt burden. We then describe how individual factors contribute to the narrative.

BOX 5

A Closer Look at Programs within General Fields of Study: Key Takeaways

- In health sciences, what you study matters more than where you study.
- For the rest of the fields of study, where you study matters more than what specific credential you pursue.
- Within the six largest fields of study, similar factors generally shape debt burden, although the magnitude of their impact varies substantially.
- Graduates of personal and culinary services programs fare worse in public institutions than in private for-profit ones, but graduates from repair and protective services do better in public settings.
- Programs in less urban locations tend to be less financially burdensome for five of the largest fields of study.
- Expenditures on instruction only make a difference in health sciences.

Within a Field of Study, What Matters More: The Credentials or Where Students Go?

Once students have chosen a general field of study, we see different trends in what shapes debt burden (figure 11).[14] **Within health sciences, what you study matters more than where you study.** Roughly 27 percent of the differences we see in debt as a share of two-year earnings are accounted for by the specific type of credential (the combination of specific field of study and level of credential). When we look at debt and earnings separately, we find a similar trend in which credential type matters much more in health sciences than in other fields, explaining 34 percent of differences in debt and 71 percent of differences in earnings (see appendix C).

For the rest of the fields of study, where you go matters more than what specific credential students pursue. Institutional characteristics account for 29 percent and 20 percent of the debt burden differences in the business and marketing and health sciences fields, respectively.

Protective services is unique because demographics matter more to overall debt burden than the type of credential or institution. Together, the share of graduates who are women or people of color explain 20 percent of the differences we see across programs in debt burden. Gender and race are also important in fields like business and marketing, computer and information sciences, and personal and culinary services, where they often contribute as much or more than credential type and labor market conditions to our understanding of debt burden.

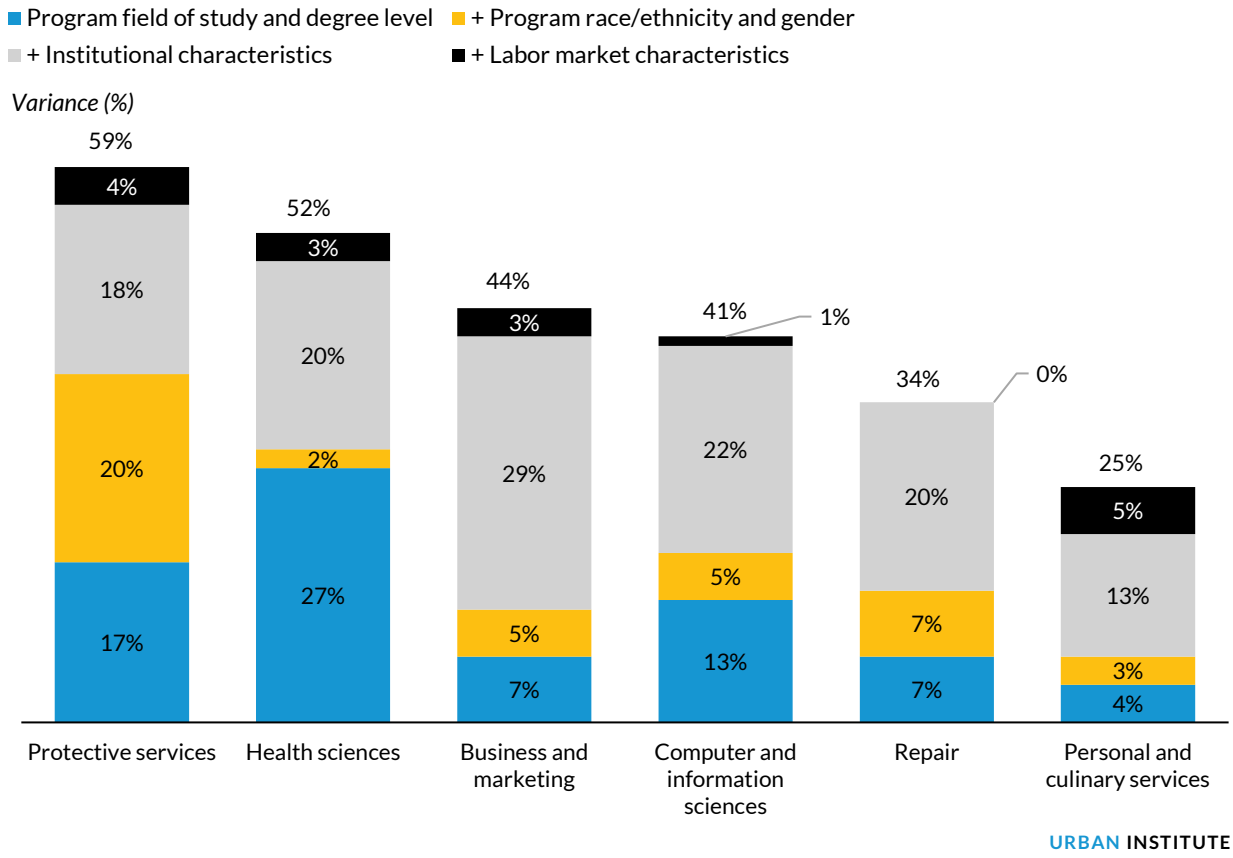
Overall, the four types of factors (program field of study and degree level, program demographics, institutional characteristics, and labor market characteristics) considered together explain more about the differences we see in debt burden for some fields of study than others. For example, for protective services, these factors account for 59 percent; this share is only 25 percent for personal and culinary services.

Looking more closely at just earnings, all factors combined explain a larger share of the differences than for our measure of debt burden, ranging from 38 percent in repair services to 78 percent in health sciences.

[14] Note that because of smaller sample size within fields of study, we cannot account for the clustering of similar programs within institutions like we did with the analyses of all CTE programs.

FIGURE 11

For All Fields of Study Except Health Sciences, *Where* You Study Matters More Than *What* You Study



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Values represent the share of variance explained by the model by adding successive sets of factors. The share is computed from the R-square statistics in ordinary least squares regression.

How Does Field of Study Shape What Matters about a Program?

The field of study students pursue matters for all six fields of study. Within health sciences, 21 specific fields of study[15] exist compared with 4 in protective services. A wider range of specific credentials within a field of study often translates into a wider range of differences in debt, earnings, and debt burden.

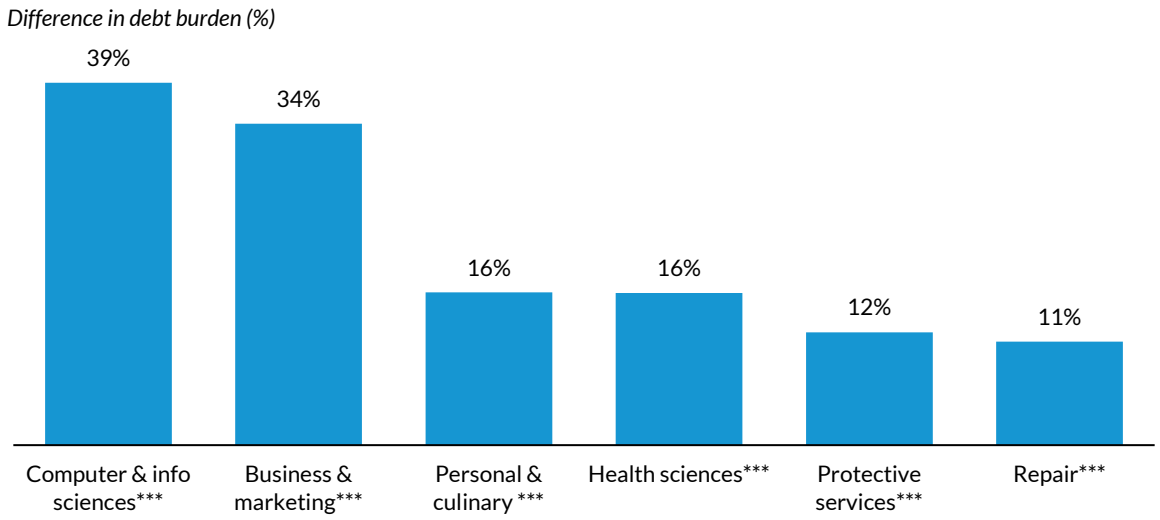
Associate degrees are consistently tied to greater difficulty paying off debt compared with certificates, although the size of the association varies by general field of study (figure 12). The debt burden is nearly 40 percent higher for computer and information sciences programs, but only about 12

[15] Specific field of study credentials often have different skill requirements at entry and lead to different occupations, some of which have substantially higher or lower pay (e.g., registered nursing vs. medical assisting).

percent higher for repair services programs. In the previous chapter, we see that the added burden of associate programs stems from higher debt that outpaces higher earnings. This holds true for three of the six largest fields of study: personal and culinary services, health sciences, and repair services. Business and marketing and computer and information sciences associate programs have less favorable outcomes because of a combination of increased debt coupled with earnings that are lower or the same as those in certificate programs in those same fields. In contrast, programs yielding an associate degree in protective services tend to have lower debt than certificate programs but graduates also earn significantly less.

FIGURE 12

Associate Degree Programs' Significantly Higher Debt in All Six of the Largest Fields of Study Makes It More Difficult to Reap the Benefits of More Earnings Than in Certificate Programs



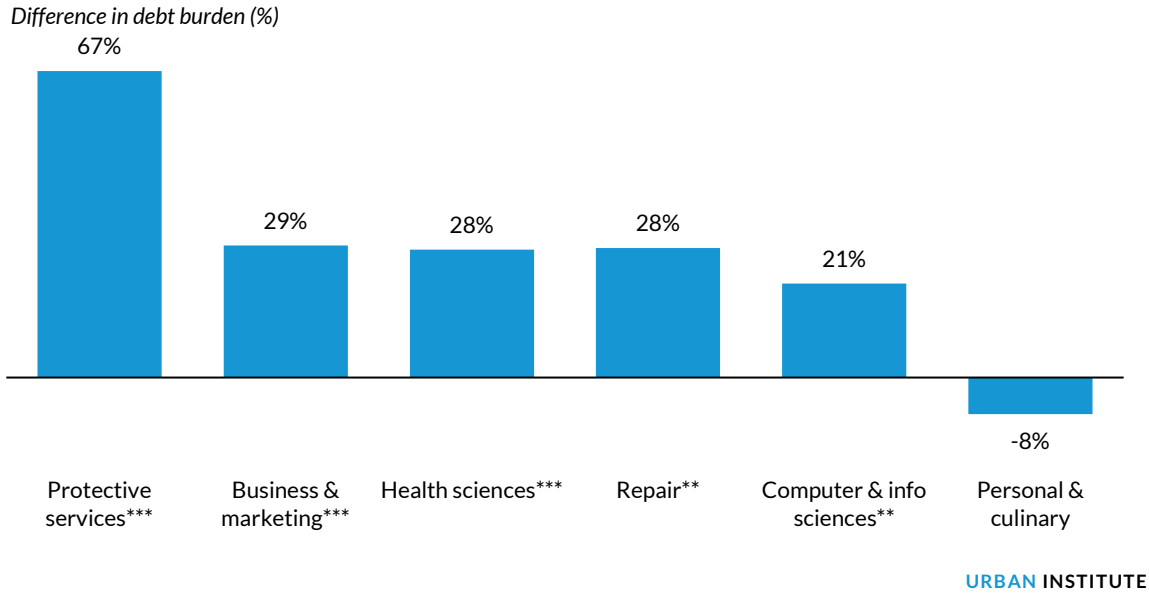
Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Difference in the debt burden of associate degree programs compared with shorter credentials.
*/**/***: p < .10, p < .05, p < .01

For most fields of study, gender and race make modest contributions to our understanding of debt burden. The associations tend to be fairly small for both, although they are larger and more consistent across fields of study for gender.

Similar to analyses of gender in CTE programs, we see that programs in five of the six largest fields of study tend to have higher debt burdens when they have more women graduates. This is generally driven by the combination of greater debt and lower earnings. It is most pronounced in protective services programs where gender explains a substantial share of additional difference (25 percent over the model with just type and level of credential) and large increases for every percentage point increase in women.

FIGURE 13

Higher Shares of Women Are Associated with Greater Difficulty Paying off Debt for Programs in Five of Six of the Largest Fields of Study

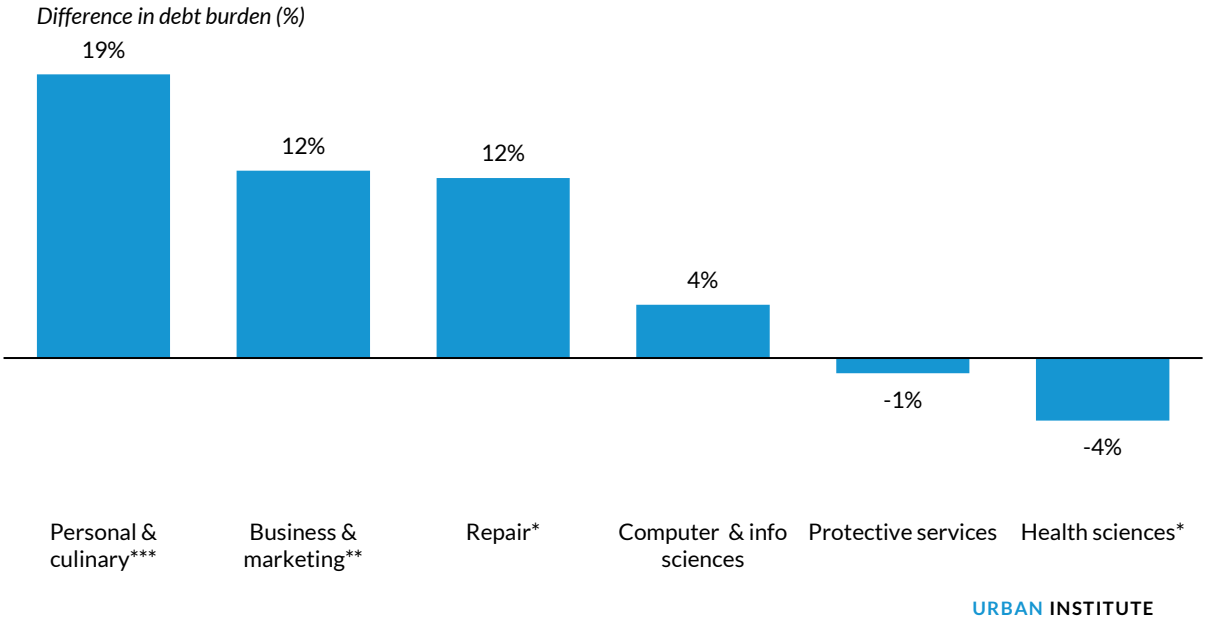


Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Percentage changes in debt burden are displayed per percentage point increase in women in the programs.
*/**/***: p < .10, p < .05, p < .01

In the pooled analyses, we find lower earnings for programs with more people of color, which translate into more difficulty repaying debt. When we look within general fields of study, the story is more complicated. In personal and culinary service programs, those with more students of color tend to have *both* higher debt and lower earnings—corresponding to the largest changes in debt burden (figure 14). Business and marketing and repair service programs also have less favorable outcomes for graduates of color, but the underlying drivers are different. For the former, the main factor is significantly greater debt, and for the latter, it is lower earnings. Notably, all three of these fields of study are ones with the highest shares of students of color, about 40 percent.

FIGURE 14

Personal and Culinary Services Programs with More Diverse Graduates Have the Most Difficulty Paying Down Debt



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Percentage changes in debt burden are displayed per percentage point increase in people of color in the programs.
*/**/***: p < .10, p < .05, p < .01

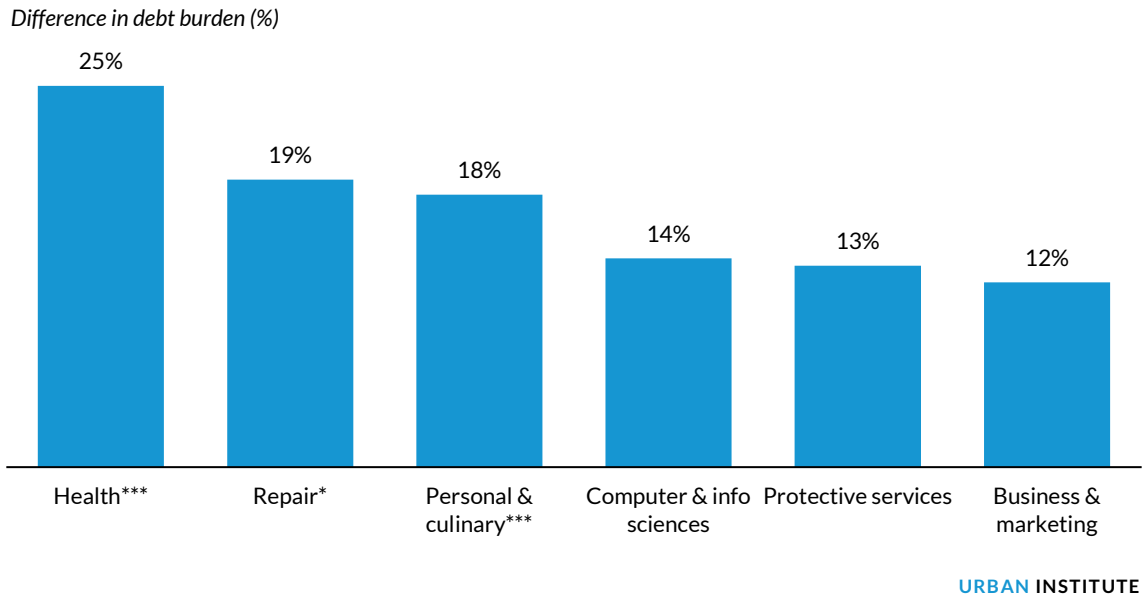
How Does Field of Study Shape What Matters about the Institutions Students Attend?

The beginning of the chapter explained that *where* rather than *what* people study matters more in determining debt burden for many fields of study. We now describe how institutional factors shape outcomes for different CTE fields.

Debt continues to be significantly higher for programs at institutions with larger shares of adult learners; this occurs across the board for all the largest fields of study. Coupled with only modestly higher earnings at the two-year mark for four out of the six types of programs, the average student will have a significantly higher debt burden overall in at least half of these fields (figure 15). This plays out most notably for health science programs. Those located in purely adult-serving institutions would have a ratio 25 percent higher.

FIGURE 15

For Three of the Largest Fields of Study, Programs at Institutions with More Adult Learners Have Higher Debt Burdens

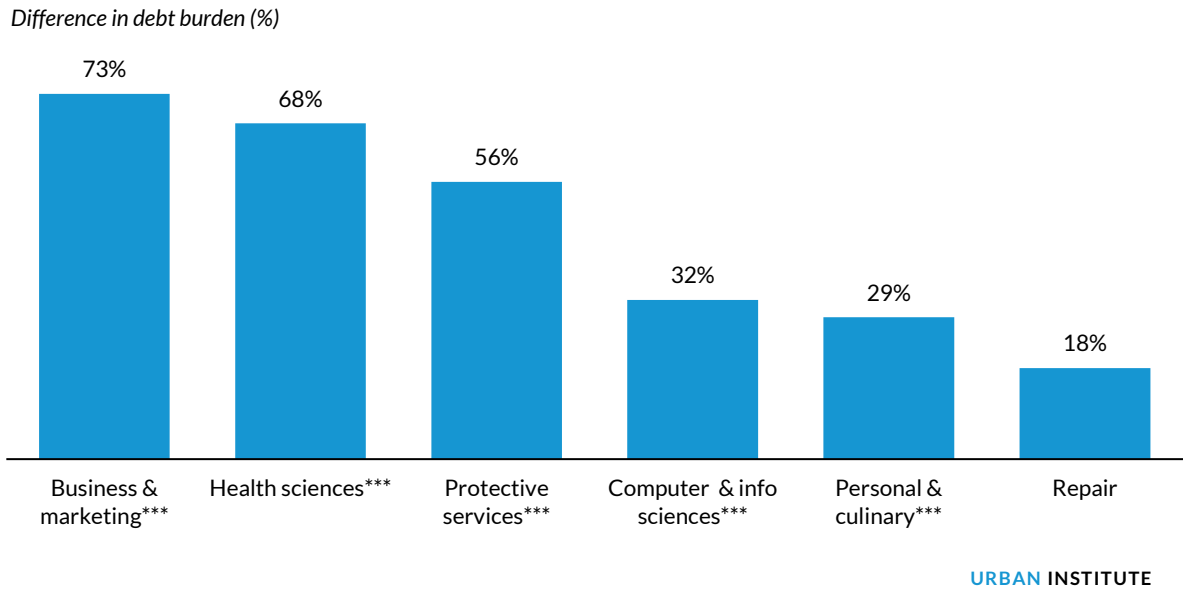


Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Percentage changes in debt burden are displayed per percentage point increase in adult learners at the institutions where programs are offered.
*/**/***: p < .10, p < .05, p < .01

Generally, all six fields of study follow larger trends when we look at markers of socioeconomic status at educational institutions and their relationships with program debt and earnings. Higher institutional rates of federal loan receipt are related to higher debt, which swamps modestly higher earnings for five of the six fields of study to yield significantly higher debt burden (figure 16). Personal and culinary programs and repair services programs—fields of study dominated by certificates—do not tend to have higher debt when students at their schools' have high financial need and receive Pell grants; but programs at these schools have significantly lower earnings (not shown).

FIGURE 16

Programs Tend to Have Higher Debt Burdens in Institutions Where Students Have More Financial Need

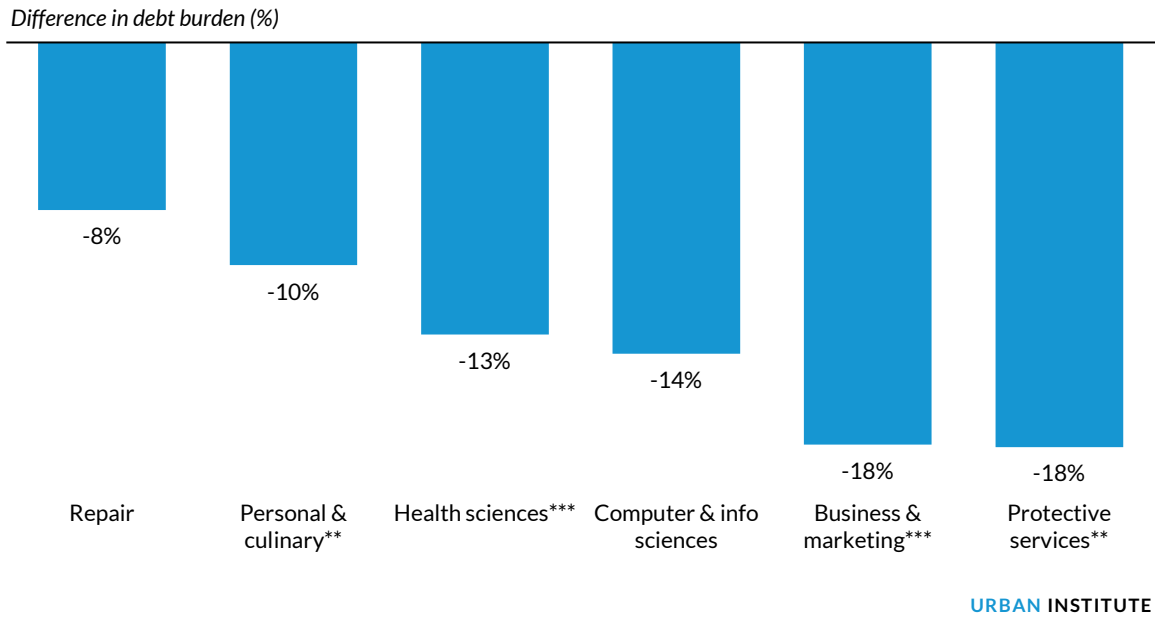


Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Percentage changes in debt burden are displayed per percentage point increase in federal loan receipt at the institutions where programs are offered.
*/**/***: $p < .10$, $p < .05$, $p < .01$

Consistent with findings from the overall analyses, programs at technical schools in five of the six largest CTE fields of study have significantly lower debt burdens than programs located at four-year institutions because of significantly lower debt that compensates for their corresponding lower earnings (figure 17). Whether programs are offered at two-year or four-year institutions makes little difference within fields of study, with one notable exception. For computer and information sciences programs, it is two-year colleges where students get the most value not only because of lower debt but also because of higher earnings than they would receive at the same program at a four-year college.

FIGURE 17

For Most of the Fields of Study, Programs Located at Less Than Two-Year Institutions Graduate Students Who Have Less Difficulty Paying Back Their Loans

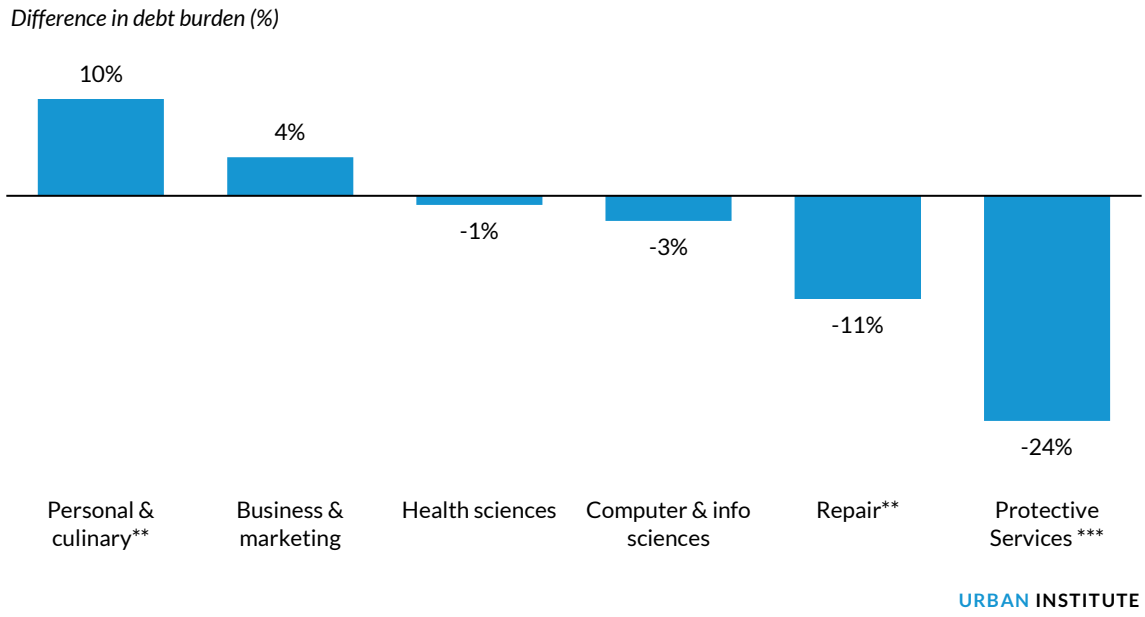


Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Difference in the debt burden of less than two-year institutions compared with four-year colleges and universities.
*/**/***: p < .10, p < .05, p < .01

In general, programs at public institutions have lower debt burdens because of higher earnings that offset higher debt (figure 18). However, within fields of study, the trends look different. For repair services and protectives services—where graduates have less difficulty paying off their loans if they are at a program based at a public institution rather than a private for-profit—-- it has nothing to do with earnings. Students in these particular fields take out less debt at public institutions, which improves their outcomes. At the other end of the spectrum, personal and culinary services graduates have greater difficulty if they choose to study at a public institution than if they were at a private for-profit because of lower earnings.

FIGURE 18

Graduates of Personal and Culinary Services Programs Fare Worse in Public Institutions Than in Private For-Profit Ones, but Graduates from Repair and Protective Services Do Better in a Public Settings



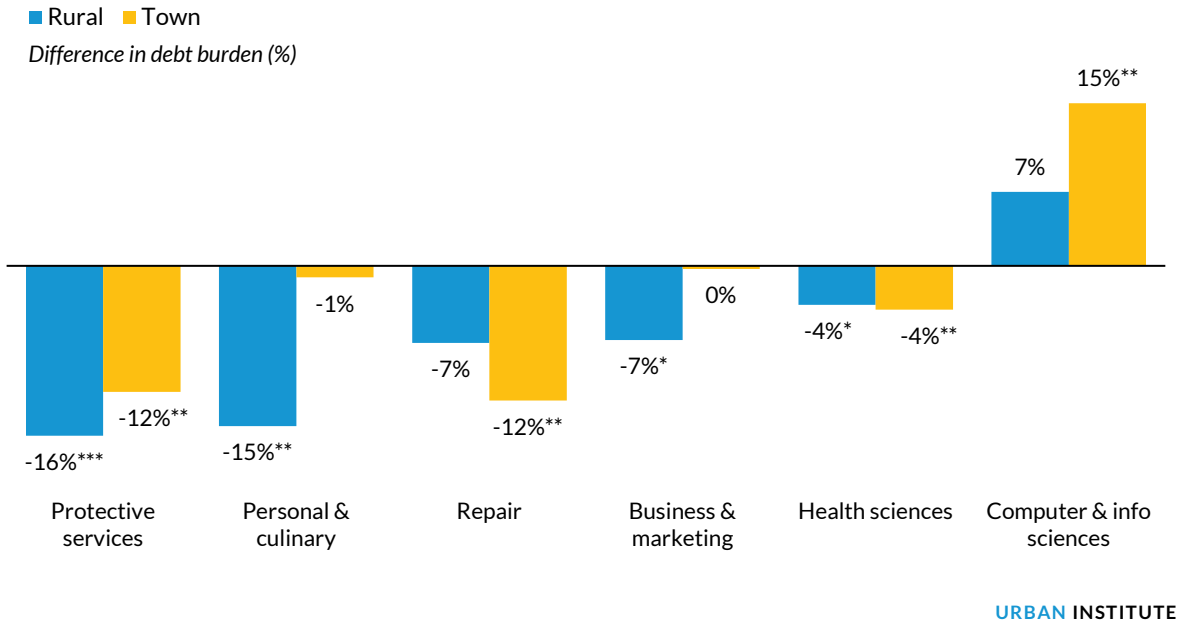
Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Difference in the debt burden of public institutions compared with four-year colleges and universities.
*/**/***: p < .10, p < .05, p < .01

Expenditures on instruction only make a difference in health sciences. Higher expenditures are associated with significantly higher earnings at the two-year mark, without translating into higher debt. However, the association is only about a third of a percent per $1,000 in additional spending per FTE (not shown).

Location matters when it comes to balancing debt and earnings for the largest fields of study—perhaps more than it does when examining all CTE programs together. Except for computer and information science programs, graduates in the other five fields tend to do better when they study at institutions located outside of cities and suburbs, in towns and rural areas. Earnings lag in these geographic areas, but students have less debt, leading to an overall more positive outcome for the average student.

FIGURE 19

Programs in Less Urban Locations Tend to Be Less Financially Burdensome for Five Out of the Six Largest Fields of Study



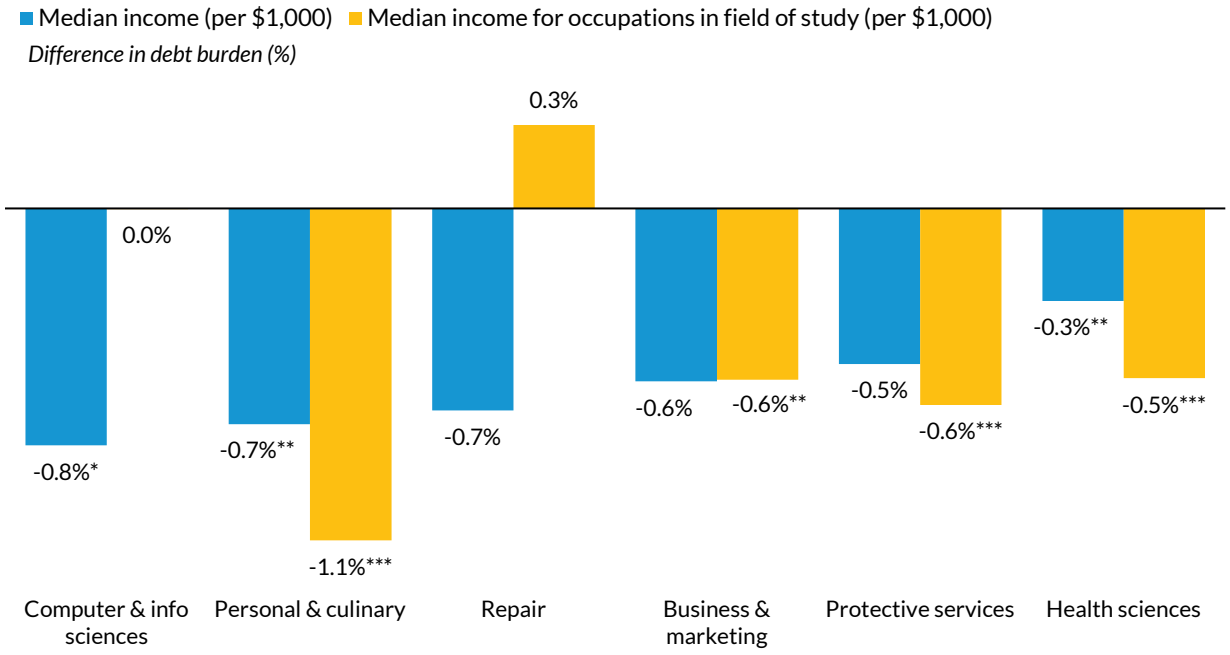
Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Difference in the debt burden of programs at institutions in rural areas and towns compared with cities and suburban areas.
*/**/***: p < .10, p < .05, p < .01

How Does Field of Study Shape the Relationship between Labor Markets and Debt Burden?

The size of the relationships are modest, but local labor markets do shape outcomes for all six fields of study. Two-year earnings are significantly higher in areas with higher median earnings overall, ranging from 6.8 percent per additional $10,000 increase in the median for health sciences to nearly 10 percent for computer and information sciences and personal and culinary service programs. This drives lower debt burdens in programs located in higher-paying labor markets.

FIGURE 20

Program Outcomes Tend to Be Better When Wages in Their Local Markets Are Higher



Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.
Note: Percent changes in debt burden are displayed per $1,000 increase in median income in the labor markets where institutions are located.
*/**/***: p < .10, p < .05, p < .01

Only two fields of study—health sciences and personal and culinary services—tend to have higher earnings when local wages for their specific occupations are higher. Debt burden is about 5 and 10 percent lower respectively per $10,000 increase in median income for the occupations aligned with those two fields of study. In contrast, more favorable outcomes for business and marketing and protective services programs are more related to reduced debt in areas that have higher wages for those occupations.

Discussion

The analyses illuminated many themes related to the factors that shape the debt burden of short-term CTE credentials. These insights help provide actionable knowledge to institutions, in partnership with employers, to design higher-value credentials and assist new majority learners in thinking strategically about what and where to study. Below we summarize a few key takeaways from the analysis, as well as implications for policy and practice, and directions for future research.

Key Takeaways

- **Which credential learners pursue is important.** Across all programs, field of study strongly shaped the debt burden, mostly through its strong relationship to earnings. The level of credential (whether it is an associate degree or certificate) also matters. These findings align with other research showing that the field of study has a strong role in predicting labor market outcomes (Carnevale et al. 2015; Carnevale et al. 2020; Dadgar and Trimble 2015).
- **In the short term, associate degrees appear to have higher debt burdens relative to certificates.** However, graduates from associate degree programs may see larger increases in their earnings over time that improve the value proposition. Several other studies have found that associate degrees deliver higher returns and value than short-term certificates (Belfield and Bailey 2017; Jepsen et al. 2014). Students who earn an associate degree have better chances of recovering their investment over time compared with those earning certificates only (Dadgar and Trimble 2015; Itzkowitz 2021). However, in some fields of study, certificates may indeed be preferable to associate degrees even in the long term. Computer science is a notable example, where we find that certificates appear to have lower debt burden than associate degrees. It may be that these certificates are linked to tech-based providers, for example Google or Microsoft, which gives them more currency in the labor market and ensures that programs are updated to align with fast-paced changes in skills demanded because these providers play such a dominant role in the tech industry.
- **Where you study matters, and generally public institutions offer more value than private institutions.** This is especially true in repair and protective services. This finding aligns with prior research, which has shown that for-profit institutions are "the least likely to pay off quickly and the most likely to offer no ROI to their graduates" (Itzkowitz 2021). Similarly, it aligns with other studies that have shown the returns to attending a for-profit college for an associate degree are less than the returns to an associate program at a public community college (Cellini and Chaudhary 2012).

That said, learners might fare well getting a certificate from a private institution in specific fields of study like personal and culinary services.

- **We find persistently higher debt burden for programs with higher percentages of women and people of color, although the size of these associations overall is modest.** A likely explanation for these disparities is that fields of study are highly segregated, with people of color and women more concentrated in programs that lead to lower earnings (Christensen and Turner 2021). This can happen even within fields of study. The Health Profession Opportunity Grants evaluation shows that longer (and higher-level) healthcare trainings, such as registered nurse training (which can last two years), lead to better employment and earnings outcomes than shorter entry-level healthcare trainings, such as home health aide or certified nursing assistant training, which can take under eight weeks to complete (Sick and Loprest 2021). That same analysis showed that a higher share of people of color were concentrated in the shorter entry-level training programs with lower earnings. Nevertheless, studies also show that despite gender disparities, all short-term credentials make a bigger impact on earnings for women than they do for men, likely because they enroll with lower incomes to begin with (Dadgar and Trimble 2015; Jepsen et al. 2014).

- **Higher debt for programs with more women and institutions with more adult learners may lead to higher debt burden for these students.** One market study indicates that about seven in ten working adult learners say cost is the biggest obstacle to pursuing additional education.[16] Those concerns often are not limited to tuition. Working adult learners face a wide variety of financial priorities and pressures. Those may include paying for housing, transportation, food, child care, and other costs of supporting a household, in addition to tuition, books, and course fees. Prior research has also shown that female students, especially those with children, have a higher probability of defaulting on their student loans.[17]

- **Higher institutional spending on instruction may generally boost earnings and reduce debt burden, although not for all CTE programs.** Across all fields of study, programs at institutions with higher spending on instruction (per FTE equivalent) had graduates with slightly higher earnings with no significant change in debt, leading to a lower debt burden. Nevertheless, spending on instruction does not have the same associations with the outcomes for all fields of study. Notably health sciences was the only one of the largest six fields where spending on instruction was associated with a decrease in debt burden.

[16] "Three Key Challenges to Meeting Adult Learners' Needs – And How to Solve Them," Guild Education, accessed August 25, 2022, https://biz.guildeducation.com/HigherEdDiveReport.html.

[17] "Financial Aid and Adult Students; the Elephant in the Room," CAEL (blog), April 10, 2018, https://www.cael.org/news-and-resources/financial-aid-and-adult-students-the-elephant-in-the-room.

- **Local labor markets do matter for program value, but they are less important than other factors.** All else being equal, graduates in labor markets with higher incomes in general, or for their specific field of study, tend to earn more, with approximately the same debt as counterparts in lower-wage markets. This confirms other research that finds colleges in areas where incomes are higher have better value than colleges where per capita incomes are lower (Carnevale et al. 2020).
- **Program design may have a bigger potential role to play in some fields of study than others.** Good market-aligned program design has the potential to increase earnings for graduates. And yet, when we look at all CTE programs together, our model already explains a large share of the differences that we see in earnings and debt burden. Even so, it may be that program design is essentially captured already by the combination of field of study and degree level, particularly for credentials that have strong licensing and requirements for work-based learning like certain careers in health sciences (see appendix C for detail on credentials' role in explaining earnings by field of study).

Implications for Programs and Policy

These trends have important implications for the ways educational institutions and policymakers might think about better supporting CTE students and ensuring they maximize the value gained from these credentials.

- **Provide strong career guidance before learners enroll, and change the narrative about high-value CTE careers**. This guidance can help them decide which school to attend and which credential to work toward to increase their odds of a positive financial outcome. Many high-value CTE credentials are stigmatized or perceived as programs only for a certain type of student. Institutions can elevate those that may provide the best value and ensure proper "advertisement" and education for potential learners. Blagg and colleagues (2017) indicate that information on career options alone is not enough to influence career choices, which indicates the importance of information, strong guidance, and other efforts to change the narrative about certain fields of study through campaigns in schools that can reach students, parents, and the public.
- **Be deliberate about equity.** Occupational segregation by gender and race is a strong structural barrier to enrolling in high-value CTE programs, particularly in fields of study like protective services and repair, and earnings are systematically lower for these graduates even within their chosen field of study because of systemic inequities in hiring and promotion practices (Dadgar and Trimble 2015). Institutions and program operators should monitor their outreach and recruitment, enrollment, completion, job placements, and resulting wages by gender and race; set equity goals; and design strategies to achieve them.

- **Remove barriers to accessing high-value programs**, like reducing costs and reevaluating entry procedures or requirements that limit access. Hidden costs of programs, like additional fees or the expectations that students purchase their own supplies or materials, may limit access. Program application procedures, when too cumbersome or complicated, may deter some students from enrolling. Finally, training prerequisites and skillset requirements may prevent some learners from easily accessing higher-level education. In the case of registered nursing programs, they may provide more value than health aides, attendants, or orderlies programs, but many who start the latter might not be academically prepared for the former. Programs can consider whether all entry requirements are necessary and what skills and knowledge can be built with adequate support along the way.
- **Assist adult learners and women by limiting debt accrual and provide debt relief**. In certain fields that are female dominated and have low wages but offer high social good, efforts exist to lessen education costs. For example, in the early child care and education field, the TEACH Early Childhood Scholarship program aims to address some of the issues with low compensation and the need for skilled workers by making college more accessible.[18] Some states and local areas are trying to prevent students from incurring debt and incentivizing college by providing robust financial assistance for postsecondary education. For example, Michigan Connect provides last-chance funding to support community college attendance.[19] Programs trying to bring back adult learners who did not complete their degrees are offering debt forgiveness and targeted financial support to meet their needs.[20]
- **Implement strategies for accelerated learning.** By accelerating the time that students need to spend in programs, it is possible to lower the cost of education and reduce debt. Strategies for acceleration include dual enrollment and early college programs that allow high school students to take credit courses for free, thus lowering the number of credits required to complete a degree.[21] Credit for prior learning can be a good strategy for adult learners, whereby an assessment allows students to test or place out of certain degree requirements if they can demonstrate that they have

[18] Amy Duffy, "The T.E.A.C.H. Early Childhood® Scholarship Program: Moving the Needle on Student Success for the Past 30+ years," *Child Care Services Association* (blog), February 28, 2022, https://www.childcareservices.org/2022/02/28/the-t-e-a-c-h-early-childhood-scholarship-program-moving-the-needle-on-student-success-for-the-past-30-years/.

[19] For more information, see https://www.michigan.gov/reconnect.

[20] Terri Taylor, "College Finances: Going Back to School Complicated for Some Adults," *Medium* (blog), September 20, 2018, https://medium.com/todays-students-tomorrow-s-talent/addressing-adult-learners-financial-concerns-past-present-and-future-cc916bce7c1e.

[21] See https://www.urban.org/policy-centers/cross-center-initiatives/building-americas-workforce/projects/accelerated-learning for more information

already mastered certain skills (Lane and Leibrandt 2021). Similarly, competency-based models allow students to make progress toward a degree based on the achievement of competencies rather than "seat time" (Scott et al. 2020). Finally, accelerated learning strategies combined with robust college and career advising can ensure that students are not "overcredited," or taking more credits and incurring more costs than required to complete their degree (Hodara and Pierson2018).

Directions for Future Research

Further research on short-term CTE credentials and their value is contingent on the creation of the data and systems to support this work. Some of these new frontiers for research include the following:

- **The role of market-aligned program design**
  - Although where and what one studies has a large role in determining the value of short-term credentials for students, other factors exist in the design of programs not captured in this analysis, which may make a difference to outcomes. These include how programs partner with employers, how curricula are designed, what instruction looks like, and how students are supported on their path to a credential and a job. To understand the role of program design factors, the Urban Institute is conducting a survey in 2022 for three to four different types of credentials across fields of study, which will examine the relationship of design to earnings and debt burden.
- **Understanding debt and earnings that include students who do not complete CTE programs**
  - Beyond that survey, expansion of reporting and data collection on student- and program-level outcomes is important. Although reporting needs to be balanced with the effort it requires of students and educators, certain additional data could lead to broadly beneficial program-design decisions. Furthermore, we should better understand the dynamics of all students—not only those who graduate. This can help programs design for persistence, providing value to more students by helping those who might have otherwise stopped their education for any reason.
- **Longer-term debt and earnings**
  - Students who engage in further education may accrue more debt (but also obtain more credentials), and those who continue to work may eventually change their debt burden. Programs that appear to have poor value two years after graduation could have good value

with longer-term data collection. Although work looking at longer-term returns is emerging,[22] opportunities also exist to further explore the factors that are associated with positive outcomes for students over the long term, so that institutions and policymakers can provide students quality workforce preparation and supports to achieve economic security and mobility.

- **Capturing more holistic elements of job quality beyond earnings**
  - Lastly, connection to more detailed employment outcomes is another component of understanding program value. These data could include other metrics of employment success, such as job stability, flexibility, overall job satisfaction, benefits, and more. It is also important to know whether students succeed in finding employment in their field of study.

[22] Preston Cooper, "Is College Worth It? A Comprehensive Return on Investment Analysis," *Medium* (blog), October 19, 2021, https://freopp.org/is-college-worth-it-a-comprehensive-return-on-investment-analysis-1b2ad17f84c8.

Appendix A. Specific Fields of Study

TABLE A-1

Specific Fields of Study Included in Analyses of Debt, Earnings, and Debt Burden

	N	Percent (%)
Business and marketing		
Business administration, management, and operations	393	45
Accounting and related services	165	19
Business/commerce, general	138	16
Business Operations support and assistant services	72	8
Human resources management and services	34	4
Hospitality administration/management	17	2
Marketing	16	2
Management information systems and services	14	2
Specialized sales, merchandising and marketing operations	7	1
General sales, merchandising and related marketing operations	5	1
Construction management	4	0
Business, management, marketing, and related support services, other	3	0
Entrepreneurial and small business operations	3	0
Real estate	2	0
Finance and financial management services	1	0
Total	874	100
Computer information sciences		
Computer/information technology administration and management	110	28
Computer systems networking and telecommunications	80	21
Computer and information sciences, general	77	20
Computer programming	48	12
Computer software and media applications	24	6
Information science/studies	22	6
Data processing	18	5
Computer and information sciences and support services, other	4	1
Computer science	3	1
Computer systems analysis	2	1
Data entry/microcomputer applications	1	0
Total	389	100
Personal and culinary services		
Cosmetology and related personal grooming services	735	85
Culinary arts and related services	108	12
Funeral service and mortuary science	22	3
Personal and culinary services, other	1	0
Total	866	100
Health sciences		
Registered nursing, nursing administration, nursing research and clinical nursing	828	21
Allied health and medical assisting services	822	21

	N	Percent (%)
Allied health diagnostic, intervention, and treatment professions	574	15
Health and medical administrative services	468	12
Practical nursing, vocational nursing and nursing assistants	468	12
Dental support services and allied professions	351	9
Somatic bodywork and related therapeutic services	159	4
Clinical/medical laboratory science/research and allied professions	100	3
Mental and social health services and allied professions	51	1
Health services/allied health/health sciences, general	16	0
Health/medical preparatory programs	14	0
Public health	9	0
Health professions and related clinical sciences, other	7	0
Ophthalmic and optometric support services and allied professions	7	0
Health aides/attendants/orderlies	6	0
Rehabilitation and therapeutic professions	6	0
Dietetics and clinical nutrition services	4	0
Alternative and complementary medicine and medical systems	2	0
Communication disorders sciences and services	1	0
Medical illustration and informatics	1	0
Movement and mind-body therapies and education	1	0
Total	3895	100
Repair		
Vehicle maintenance and repair technologies	225	53
Heating, air conditioning, ventilation and refrigeration maintenance technology/technician (HAC, HACR, HVAC, HVACR)	121	28
Electrical/electronics maintenance and repair technology	42	10
Heavy/industrial equipment maintenance technologies	30	7
Precision systems maintenance and repair technologies	7	2
Mechanic and repair technologies/technicians, other	1	0
Total	426	100
Protective services		
Criminal justice and corrections	363	92
Fire protection	28	7
Homeland security, law enforcement, firefighting and related protective services, other	2	1
Homeland security	1	0
Total	394	100

Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.

Appendix B. Results for All Short-Term CTE Programs

TABLE B-1

Full Model Results for Analyses of Debt, Earnings, and Debt Burden Across all Short-Term CTE Programs

	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
Factor	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
General field of study (ref = engineering technologies)									
Business and marketing	6.53	$1,049	0.00	-26.08	-$8,415	0.00	43.45	21.99	0.00
Computer and information sciences	15.04	$2,417	0.00	-24.39	-$7,872	0.00	51.86	26.24	0.00
Health sciences	21.30	$3,421	0.00	6.00	$1,935	0.01	14.05	7.11	0.00
Personal and culinary services	1.98	$318	0.47	-26.85	-$8,666	0.00	39.77	20.13	0.00
Protective services	5.80	$932	0.01	-17.63	-$5,690	0.00	28.32	14.33	0.00
Repair	-5.81	-$933	0.00	-5.35	-$1,728	0.01	-0.29	-0.15	0.90
Level of credential, Associate Degree (ref = credential)	35.01	$5,625	0.00	27.60	$8,908	0.00	5.74	2.91	0.00
Program demographics (percentage points)									
Female	0.11	$18	0.00	-0.23	-$76	0.00	0.36	0.18	0.00
People of Color	0.00	$0	0.93	-0.15	-$50	0.00	0.17	0.09	0.00
Level of Institution (ref = four-year)									
Two-year	-7.02	-$1,128	0.00	-2.88	-$930	0.01	-4.45	-2.25	0.00
Less than two years	-18.67	-$3,000	0.00	-9.02	-$2,912	0.00	-11.03	-5.58	0.00
Type of institution (ref = private, for profit)									
Private, nonprofit	10.24	$1,646	0.00	10.01	$3,229	0.00	-1.30	-0.66	0.64
Public	7.32	$1,176	0.00	14.27	$4,604	0.00	-7.44	-3.77	0.00
Student financial need (percentage points)									

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Pell receipt	-0.35	-$57	0.00	-0.30	-$96	0.00	-0.08	-0.04	0.06
Federal loan receipt	0.59	$95	0.00	0.07	$24	0.01	0.51	0.26	0.00
Spending on instruction per FTE (per $1,000)	0.07	$11	0.60	0.52	$168	0.00	-0.44	-0.22	0.00
Enrollment (per 100 students)	0.00	-$1	0.54	0.00	-$2	0.38	0.01	0.00	0.27
Adult learners (percentage points)	0.24	$38	0.00	0.08	$26	0.00	0.16	0.08	0.00
Institution urbanicity (ref = suburbs)									
City	0.73	$117	0.45	-1.26	-$408	0.14	1.84	0.93	0.10
Town	-1.17	-$188	0.49	0.69	$221	0.64	-0.85	-0.43	0.66
Rural	-1.42	-$229	0.42	-0.02	-$5	0.99	-0.69	-0.35	0.73
Labor markets (per $1,000)									
Median income	0.04	$6	0.69	0.43	$140	0.00	-0.32	-0.16	0.00
Median income for occupations in field of study	-0.17	-$27	0.00	0.22	$72	0.00	-0.39	-0.20	0.00

Source: Authors' calculations using publicly available data from the 2021 College Scorecard, accessed spring 2022.

Notes: N = 8,071 programs.

Appendix C. Added Factor Value by General Field of Study

TABLE C-1

Successive Student Outcome Variance Accounted for with Added Model Components

Outcome and Model Components	Business and Marketing	Computer and Information Sciences	Personal and Culinary Services	Health Sciences	Repair	Protective Services
Debt						
Specific field of study and degree level	0.12	0.14	0.20	0.34	0.08	0.03
+ Race/ethnicity and gender	0.16	0.17	0.20	0.35	0.10	0.21
+ Institutional characteristics	0.61	0.52	0.36	0.53	0.37	0.51
+ Labor market characteristics	0.62	0.52	0.36	0.53	0.37	0.54
Earnings						
Specific field of study and degree level	0.18	0.11	0.47	0.71	0.21	0.25
+ Race/ethnicity and gender	0.19	0.13	0.54	0.72	0.25	0.40
+ Institutional characteristics	0.44	0.41	0.61	0.76	0.37	0.52
+ Labor market characteristics	0.47	0.43	0.66	0.78	0.38	0.54
Debt Burden						
Specific field of study and degree level	0.07	0.13	0.04	0.27	0.07	0.17
+ Race/ethnicity and gender	0.12	0.18	0.07	0.29	0.14	0.37
+ Institutional characteristics	0.41	0.40	0.20	0.49	0.34	0.55
+ Labor market characteristics	0.44	0.41	0.25	0.52	0.34	0.59

Sources: College Scorecard, Integrated Postsecondary Education Data System, and Occupational Employment Statistics.

Notes: Numbers represent R-squared values from ordinary least squares regressions after adding each set of factors (+). Field of study contains all specific fields of study within each general category. "Race/ethnicity and gender" is at the program-level.

TABLE C-2

Results for Business and Marketing Programs

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Specific field of study (ref = business/commerce, general)									
Business operations support and assistant services	-2.3	-$420	0.60	-16.5	-$5,091	0.00	17.0	0.10	0.00
Accounting and related services	13.5	$2,446	0.00	2.2	$681	0.37	11.1	0.06	0.01
Finance and financial Management services	-20.3	-$3,674	0.37	-2.1	-$651	0.91	-18.6	-0.11	0.50
Construction management	28.4	$5,130	0.06	63.8	$19,619	0.00	-21.6	-0.13	0.13
Real estate	85.2	$15,386	0.00	-32.0	-$9,856	0.01	172.5	1.01	0.00
Marketing	-0.4	-$64	0.96	-9.6	-$2,962	0.05	10.3	0.06	0.24
Business, management, marketing, and related	14.2	$2,567	0.36	-5.7	-$1,750	0.60	21.1	0.12	0.28
Support services, other entrepreneurial and small business operations	13.0	$2,339	0.41	3.6	$1,106	0.75	9.0	0.05	0.63
Hospitality administration/management	6.9	$1,242	0.31	-14.6	-$4,481	0.00	25.1	0.15	0.01
Human resources management and services	4.9	$887	0.36	6.7	$2,049	0.11	-1.6	-0.01	0.80
Specialized sales, merchandising and Marketing operations	-3.3	-$594	0.74	-9.4	-$2,879	0.20	6.7	0.04	0.59
General sales, merchandising and related marketing operations	33.4	$6,023	0.01	-2.9	-$889	0.74	37.3	0.22	0.02
Management information systems and services	26.3	$4,749	0.00	14.2	$4,366	0.02	10.6	0.06	0.27
Business administration, management, and operations	11.5	$2,084	0.00	-0.4	-$120	0.85	12.0	0.07	0.00
Level of credential - Associate Degree (ref = certificate)	17.3	$3,126	0.00	-12.6	-$3,886	0.00	34.3	0.20	0.00

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Program demographics (percentage points)									
Female	0.4	$65	0.00	0.1	$21	0.16	0.3	0.00	0.00
People of color	0.1	$13	0.09	-0.1	-$16	0.11	0.1	0.00	0.02
Level of institution (ref = four-year)									
Less than two years	-41.7	-$7,521	0.00	-28.6	-$8,814	0.00	-18.2	-0.11	0.01
Two-year	-2.2	-$390	0.39	-5.2	-$1,607	0.01	3.2	0.02	0.30
Type of institution (ref = private, for-profit)									
Private, non-profit	8.1	$1,472	0.06	-1.8	-$544	0.57	10.1	0.06	0.06
Public	15.6	$2,818	0.00	11.1	$3,415	0.01	4.1	0.02	0.50
Student financial need (percentage points)									
Pell receipt	-0.5	-$83	0.00	-0.6	-$179	0.00	0.1	0.00	0.25
Federal loan receipt	1.0	$186	0.00	0.3	$91	0.00	0.7	0.00	0.00
Spending on instruction per FTE (per $1000)	-1.0	-$186	0.00	-0.3	-$94	0.23	-0.7	0.00	0.07
Institution size (per 100 students)	0.0	$1	0.45	0.0	$0	0.89	0.0	0.00	0.59
Adult learners (percentage points)	0.5	$94	0.00	0.4	$122	0.00	0.1	0.00	0.16
Institution urbanicity (ref = suburbs)									
City	-3.6	-$646	0.09	-2.7	-$844	0.08	-0.9	0.00	0.74
Town	-5.5	-$989	0.09	-5.2	-$1,597	0.04	-0.3	0.00	0.94
Rural	-7.1	-$1,273	0.03	-0.2	-$54	0.95	-6.9	-0.04	0.07
Labor markets (per $1,000)									
Median income	0.3	$49	0.37	0.8	$256	0.00	-0.6	0.00	0.13
Median income for occupations in field of study	-0.5	-$88	0.01	0.1	$21	0.65	-0.6	0.00	0.02

Source: College Scorecard,.

Notes: N = 844; R^2 debt = 0.615; R^2 earnings = 0.468; R^2 debt burden = 0.436.

TABLE C-3

Results for Computer and Information Sciences Programs

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Specific field of study (ref = computer systems networking and telecommunications)									
Computer software and media applications	-2.1	-$429	0.75	-18.1	-$6,664	0.00	19.5	0.11	0.02
Data entry/microcomputer applications	-5.8	-$1,152	0.82	-12.9	-$4,752	0.50	8.2	0.05	0.79
Information science/studies.	-12.1	-$2,421	0.15	-14.8	-$5,467	0.02	3.2	0.02	0.75
Computer and information Sciences, general	-6.1	-$1,219	0.18	-7.8	-$2,889	0.03	1.9	0.01	0.72
Computer science	12.8	$2,555	0.43	6.7	$2,460	0.59	5.7	0.03	0.74
Computer systems analysis	24.4	$4,868	0.24	10.4	$3,823	0.50	12.7	0.07	0.57
Computer and information sciences and support services, other	-0.5	-$101	0.97	-3.1	-$1,131	0.76	2.6	0.01	0.86
Data processing	7.4	$1,478	0.32	-5.0	-$1,824	0.37	13.0	0.07	0.13
Computer/information technology administration and management	-2.5	-$490	0.55	-2.7	-$1,005	0.40	0.3	0.00	0.95
Computer programming.	0.7	$145	0.88	5.0	$1,852	0.21	-4.1	-0.02	0.45
Level of credential - Associate Degree (ref = certificate)	45.1	$8,991	0.00	4.6	$1,705	0.26	38.6	0.21	0.00
Program demographics (percentage points)									
Female	0.1	$12	0.50	-0.1	-$53	0.04	0.2	0.00	0.04
People of color	0.0	-$7	0.61	-0.1	-$25	0.18	0.0	0.00	0.64
Level of institution (ref = four-year)									
Less than two years	-16.9	-$3,371	0.05	-3.2	-$1,197	0.65	-14.1	-0.08	0.15
Two-year	-12.2	-$2,434	0.00	3.3	$1,229	0.26	-15.0	-0.08	0.00

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Type of institution (ref = private, for-profit)									
Private, non-profit	-4.6	-$921	0.54	-1.1	-$405	0.86	-3.6	-0.02	0.68
Public	12.7	$2,543	0.13	15.8	$5,827	0.02	-2.6	-0.01	0.76
Student financial need (percentage points)									
Pell receipt	-0.7	-$135	0.00	-0.8	-$312	0.00	0.2	0.00	0.29
Federal loan receipt	0.8	$166	0.00	0.5	$188	0.00	0.3	0.00	0.03
Spending on instruction per FTE (per $1000)	-1.0	-$201	0.05	-0.4	-$139	0.35	-0.6	0.00	0.27
Institution size (per 100 students)	0.0	$1	0.60	0.0	$10	0.01	0.0	0.00	0.13
Adult learners (percentage points)	0.6	$117	0.00	0.5	$166	0.00	0.1	0.00	0.26
Institution urbanicity (ref = suburbs)									
City	0.6	$115	0.86	-1.1	-$399	0.67	1.7	0.01	0.65
Town	6.5	$1,294	0.25	-7.5	-$2,757	0.07	15.1	0.08	0.02
Rural	-10.3	-$2,059	0.06	-16.1	-$5,926	0.00	6.9	0.04	0.31
Labor markets (per $1,000)									
Median income	0.2	$42	0.56	1.0	$363	0.00	-0.8	0.00	0.06
Median income for occupations in field of study	-0.2	-$45	0.14	-0.2	-$82	0.06	0.0	0.00	0.99

Sources: College Scorecard, Integrated Postsecondary Education Data System, and Occupational Employment Statistics.

Notes: N = 371; R^2 debt = 0.520; R^2 earnings = 0.430; R^2 debt burden = 0.411.

TABLE C-4

Results for Personal and Culinary Service Programs

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Specific field of study (ref = culinary arts and related services)									
Cosmetology and related personal grooming services	-1.5	-$202	0.73	-24.9	-$4,427	0.00	31.1	0.23	0.00
Personal and culinary services, other	-0.2	-$27	0.99	-3.4	-$596	0.81	3.3	0.02	0.90
Funeral service and mortuary science	37.4	$4,995	0.00	45.2	$8,042	0.00	-5.4	-0.04	0.39
Level of credential - Associate Degree (ref = certificate)	31.5	$4,216	0.00	13.1	$2,333	0.00	16.3	0.12	0.01
Program demographics (percentage points)									
Female	0.1	$15	0.05	0.2	$34	0.00	-0.1	0.00	0.24
People of color	0.1	$9	0.07	-0.1	-$21	0.00	0.2	0.00	0.00
Level of institution (ref = four-year)									
Less than two years	-14.1	-$1,888	0.00	-4.5	-$797	0.10	-10.1	-0.07	0.03
Two-year	-5.7	-$758	0.14	0.7	$116	0.80	-6.3	-0.05	0.16
Type of institution (ref = private, for-profit)									
Private, non-profit	-10.5	-$1,407	0.03	-3.0	-$531	0.36	-7.8	-0.06	0.17
Public	5.7	$757	0.14	-4.1	-$726	0.09	10.2	0.07	0.03
Student financial need (percentage points)									
Pell receipt	0.0	$3	0.75	-0.3	-$46	0.00	0.3	0.00	0.00
Federal loan receipt	0.4	$60	0.00	0.2	$29	0.00	0.3	0.00	0.00
Spending on instruction per FTE (per $1000)	0.5	$68	0.03	0.2	$37	0.18	0.3	0.00	0.28
Institution size (per 100 students)	0.0	-$1	0.65	0.0	$0	0.99	0.0	0.00	0.70

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Adult learners (percentage points)	0.1	$16	0.05	-0.1	-$11	0.12	0.2	0.00	0.01
Institution urbanicity (ref = suburbs)									
City	1.9	$255	0.25	1.4	$244	0.21	0.5	0.00	0.79
Town	-6.1	-$820	0.08	-5.1	-$912	0.03	-1.1	-0.01	0.81
Rural	-15.9	-$2,127	0.00	-1.2	-$220	0.73	-14.9	-0.11	0.01
Labor markets (per $1,000)									
Median income	0.3	$37	0.24	1.0	$174	0.00	-0.7	-0.01	0.01
Median income for occupations in field of study	-0.7	-$96	0.01	0.4	$64	0.06	-1.1	-0.01	0.00

Sources: College Scorecard, Integrated Postsecondary Education Data System, and Occupational Employment Statistics.

Notes: N = 863. R^2 debt = 0.363; R^2 earnings = 0.664; R^2 debt burden = 0.250.

TABLE C-5

Results for Health Sciences Programs

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Specific field of study (ref = practical Nursing, vocational nursing and nursing assistants)									
Communication disorders sciences and services	-43.56	-$7,819	0.03	-39.54	-$18,688	0.01	-6.65	-0.03	0.81
Rehabilitation and therapeutic professions	-17.35	-$3,115	0.08	-6.68	-$3,157	0.38	-11.44	-0.06	0.30
Public health	-8.91	-$1,599	0.30	-26.51	-$12,528	0.00	23.95	0.12	0.03
Dental support services and allied professions	-32.98	-$5,919	0.00	-12.72	-$6,012	0.00	-23.21	-0.11	0.00
Ophthalmic and optometric support services and allied professions	-35.89	-$6,442	0.00	-14.30	-$6,757	0.04	-25.19	-0.12	0.01
Clinical/medical laboratory science/research and allied professions	-22.50	-$4,038	0.00	-18.45	-$8,720	0.00	-4.96	-0.02	0.12
Somatic bodywork and related therapeutic services	-31.10	-$5,583	0.00	-41.96	-$19,832	0.00	18.71	0.09	0.00
Health services/allied health/health sciences, general	-34.80	-$6,247	0.00	-32.81	-$15,504	0.00	-2.98	-0.01	0.68
Alternative and complementary medicine and medical systems	0.21	$38	0.99	-59.65	-$28,190	0.00	148.34	0.72	0.00
Health aides/attendants/orderlies	-43.04	-$7,725	0.00	-45.01	-$21,273	0.00	3.58	0.02	0.76
Allied health and medical assisting services	-26.68	-$4,788	0.00	-23.90	-$11,293	0.00	-3.65	-0.02	0.05
Dietetics and clinical nutrition services	-12.94	-$2,322	0.29	-38.59	-$18,240	0.00	41.78	0.20	0.02
Medical illustration and informatics	5.86	$1,052	0.83	-19.68	-$9,301	0.25	31.80	0.16	0.33

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
mental and social health services and allied professions	-18.02	-$3,234	0.00	-42.04	-$19,867	0.00	41.44	0.20	0.00
Health professions and related clinical sciences, other	-34.71	-$6,230	0.00	-39.64	-$18,736	0.00	8.18	0.04	0.47
Registered nursing, nursing administration, nursing research and clinical nursing	-13.63	-$2,446	0.00	23.78	$11,237	0.00	-30.22	-0.15	0.00
Health and medical administrative services	-17.82	-$3,199	0.00	-29.17	-$13,788	0.00	16.03	0.08	0.00
Health/medical preparatory programs	-40.25	-$7,224	0.00	-42.48	-$20,076	0.00	3.88	0.02	0.63
Movement and mind-body therapies and education	-33.77	-$6,062	0.12	-45.63	-$21,566	0.00	21.82	0.11	0.49
Allied health diagnostic, intervention, and treatment professions	-20.06	-$3,600	0.00	-1.59	-$751	0.30	-18.77	-0.09	0.00
Level of credential - Associate Degree (ref = certificate)	51.73	$9,285	0.00	30.57	$14,447	0.00	16.21	0.08	0.00
Program demographics (percentage points)									
Female	0.12	$21	0.01	-0.16	-$76	0.00	0.28	0.00	0.00
People of color	-0.10	-$18	0.00	-0.06	-$27	0.00	-0.04	0.00	0.07
Level of institution (ref = four-year)									
Less than two years	-16.44	-$2,951	0.00	-3.69	-$1,742	0.00	-13.24	-0.06	0.00
Two-year	-1.06	-$190	0.36	-1.14	-$541	0.17	0.09	0.00	0.94
Type of institution (ref = private, for-profit)									
Private, non-profit	6.09	$1,092	0.01	5.55	$2,623	0.00	0.51	0.00	0.83
Public	10.34	$1,856	0.00	11.42	$5,397	0.00	-0.97	0.00	0.65
Student financial need (percentage points)									
Pell receipt	-0.33	-$59	0.00	-0.27	-$125	0.00	-0.06	0.00	0.14

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Federal loan receipt	0.72	$129	0.00	0.04	$19	0.07	0.68	0.00	0.00
Spending on instruction per FTE (per $1000)	0.07	$12	0.61	0.35	$166	0.00	-0.29	0.00	0.04
Institution size (per 100 students)	0.02	$3	0.01	0.02	$8	0.00	0.00	0.00	0.83
Adult learners (percentage points)	0.36	$64	0.00	0.10	$49	0.00	0.25	0.00	0.00
Institution urbanicity (ref = suburbs)									
City	1.27	$227	0.23	0.42	$198	0.58	0.84	0.00	0.46
Town	-3.45	-$619	0.04	0.64	$301	0.60	-4.06	-0.02	0.02
Rural	-4.24	-$760	0.01	-0.63	-$299	0.61	-3.63	-0.02	0.05
Labor markets (per $1,000)									
Median income	0.38	$68	0.00	0.68	$322	0.00	-0.30	0.00	0.01
Median income for occupations in field of study	-0.24	-$43	0.00	0.31	$147	0.00	-0.55	0.00	0.00

Sources: College Scorecard, Integrated Postsecondary Education Data System, and Occupational Employment Statistics.

Notes: N = 3,855; R^2 debt = 0.534; R^2 earnings = 0.776; R^2 debt burden = 0.518.

TABLE C-6

Results for Repair Programs

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Specific field of study (ref = heating, air conditioning, ventilation, and refrigeration maintenance technology/technician)									
Vehicle maintenance and repair technologies	15.1	$2,000	0.00	-5.7	-$1,946	0.01	22.0	0.08	0
Mechanic and repair technologies/technicians, other	-46.1	-$6,115	0.03	4.6	$1,552	0.82	-48.4	-0.19	0.04
Heavy/industrial equipment maintenance technologies	11.0	$1,461	0.08	15.4	$5,240	0.00	-3.8	-0.01	0.56
Electrical/electronics maintenance and repair technology	5.3	$707	0.33	-5.0	-$1,691	0.17	10.8	0.04	0.08
Precision systems maintenance and repair technologies	21.8	$2,889	0.09	-10.9	-$3,694	0.15	36.6	0.14	0.02
Level of credential - Associate Degree (ref = certificate)	20.9	$2,774	0.00	8.9	$3,020	0.00	11.0	0.04	0.00
Program demographics (percentage points)									
Female	0.1	$20	0.22	-0.1	-$46	0.11	0.3	0.00	0.04
People of color	0.0	$2	0.79	-0.1	-$34	0.02	0.1	0.00	0.10
Level of institution (ref = four-year)									
Less than two years	-24.1	-$3,194	0.00	-17.8	-$6,057	0.00	-7.6	-0.03	0.24
Two-year	1.8	$243	0.69	-3.9	-$1,316	0.22	5.9	0.02	0.26
Type of institution (ref = private, for-profit)									
Private, non-profit	-4.6	-$610	0.42	-0.2	-$81	0.95	-4.4	-0.02	0.49
Public	-10.8	-$1,430	0.03	0.1	$31	0.98	-10.9	-0.04	0.05

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Student financial need (percentage points)									
Pell receipt	-0.2	-$22	0.29	-0.5	-$175	0.00	0.4	0.00	0.05
Federal loan receipt	0.4	$57	0.00	0.2	$83	0.00	0.2	0.00	0.17
Spending on instruction per FTE (per $1000)	-0.4	-$56	0.31	0.2	$74	0.45	-0.6	0.00	0.17
Institution size (per 100 students)	0.0	-$3	0.30	0.0	-$5	0.27	0.0	0.00	0.79
Adult learners (percentage points)	0.3	$33	0.01	0.1	$21	0.37	0.2	0.00	0.08
Institution urbanicity (ref = suburbs)									
City	-1.5	-$202	0.62	-2.6	-$895	0.21	1.1	0.00	0.74
Town	-11.2	-$1,485	0.05	1.5	$508	0.72	-12.5	-0.05	0.04
Rural	-13.5	-$1,795	0.02	-6.9	-$2,330	0.09	-7.2	-0.03	0.27
Labor markets (per $1,000)									
Median income	0.1	$11	0.86	0.7	$252	0.03	-0.7	0.00	0.23
Median income for occupations in field of study	0.1	$18	0.82	-0.1	-$45	0.75	0.3	0.00	0.68

Sources: College Scorecard, Integrated Postsecondary Education Data System, and Occupational Employment Statistics.

Notes: N = 424; R^2 debt = 0.369; R^2 earnings = 0.380; R^2 debt burden = 0.339.

TABLE C-7

Results for Protective Service Programs

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Specific field of study (ref = fire protection)									
Criminal justice and corrections	19.6	$3,025	0.00	-7.5	-$2,483	0.09	29.3	0.13	0.00
Homeland security	-1.8	-$273	0.95	-6.2	-$2,052	0.75	4.7	0.02	0.88
Homeland security, law enforcement, firefighting, and related protective services, other	8.7	$1,338	0.68	-23.2	-$7,697	0.07	41.5	0.19	0.13
Level of credential - Associate Degree (ref = certificate)	-12.9	-$1,990	0.00	-22.3	-$7,402	0.00	12.0	0.05	0.00
Program demographics (percentage points)									
Female	0.4	$54	0.00	-0.3	-$105	0.00	0.7	0.00	0.00
People of color	-0.2	-$26	0.03	-0.2	-$53	0.01	0.0	0.00	0.92
Level of institution (ref = four-year)									
Less than two years	-36.6	-$5,628	0.00	-22.3	-$7,414	0.00	-18.3	-0.08	0.03
Two-year	2.6	$408	0.46	-2.1	-$685	0.42	4.8	0.02	0.24
Type of institution (ref = private, for-profit)									
Private, non-profit	2.0	$314	0.85	10.3	$3,412	0.21	-7.5	-0.03	0.53
Public	-17.5	-$2,698	0.01	8.1	$2,673	0.17	-23.7	-0.11	0.00
Student financial need (percentage points)									
Pell receipt	-0.4	-$68	0.00	-0.4	-$128	0.00	-0.1	0.00	0.74
Federal loan receipt	0.6	$94	0.00	0.1	$17	0.53	0.6	0.00	0.00
Spending on instruction per FTE (per $1000)	-0.3	-$44	0.45	0.3	$100	0.27	-0.6	0.00	0.17
Institution size (per 100 students)	0.0	$2	0.29	0.0	$4	0.25	0.0	0.00	0.85

Factor	Debt (Log $)			Earnings (Log $)			Debt Burden (Log)		
	Estimate	Median effect	Probability	Estimate	Median effect	Probability	Estimate	Median effect	Probability
Adult learners (percentage points)	0.5	$79	0.00	0.4	$127	0.00	0.1	0.00	0.33
Institution urbanicity (ref = suburbs)									
City	-3.2	-$498	0.34	0.2	$63	0.94	-3.4	-0.02	0.37
Town	-10.1	-$1,551	0.03	1.8	$606	0.62	-11.7	-0.05	0.03
Rural	-13.4	-$2,060	0.00	2.8	$942	0.43	-15.8	-0.07	0.00
Labor markets (per $1,000)									
Median income	0.4	$63	0.25	0.9	$306	0.00	-0.5	0.00	0.21
Median income for occupations in field of study	-0.8	-$122	0.00	-0.2	-$53	0.19	-0.6	0.00	0.00

Sources: College Scorecard, Integrated Postsecondary Education Data System, and Occupational Employment Statistics.

Notes: N = 388; R^2 debt = 0.543; R^2 earnings = 0.538; R^2 debt burden = 0.587.

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