

TALENT DISRUPTED

College Graduates, Underemployment,
and the Way Forward

FEBRUARY 2024

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Author Credits and Acknowledgments

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The Burning Glass Institute advances data-driven research and practice on the future of work and of workers.

Strada Institute for the Future of Work advances actionable research to strengthen talent pipelines for employers and expand pathways to opportunity for individuals, and helps states leverage their education and employment data to improve labor market outcomes for individuals, employers, and regions.

PREFACE

In the United States, higher education serves several important purposes, including strengthening communication and critical thinking skills, preparing individuals for responsible citizenship, expanding intellectual interests, and helping people to navigate an increasingly diverse and global society. A college education¹ is also viewed by many as the most reliable pathway to economic opportunity.

Most people enroll in college in large part because they believe it will provide the knowledge and skills they need to secure a good job and join or remain in the middle class, while employers often rely on colleges as a principal supplier of professional talent. Higher education advocates frequently appeal to that promise of economic opportunity and the country's growing demand for talent as they make the case that greater college enrollment and degree attainment is an important public goal.

However, college is not a guarantee of labor market success. While the typical college graduate continues to fare substantially better in the labor market than workers with no more than a high school education,² a sizable share of graduates do not experience the economic outcome they expected from earning a bachelor's degree. Among workers who have earned a bachelor's degree, only about half secure employment in a college-level job within a year of graduation, and the other half are underemployed—that is, working in jobs that do not require a degree or make meaningful use of college-level skills. Some graduates who are initially underemployed eventually secure a college-level job, but the majority remain underemployed 10 years after graduation.

Recognizing that the labor market has undergone tremendous change over the past six years, Strada Institute for the Future of Work and the Burning Glass Institute have partnered to update our 2018 report, *The Permanent Detour*, to explore how employment outcomes for college graduates have changed as the labor market has tightened. We have also sought to characterize in greater detail the landscape of underemployment for college graduates, including factors related to their college experience, the characteristics of the college they attended, and their characteristics as individuals. Building on this expanded analysis and other research conducted by our organizations, we also offer promising solutions to improve employment outcomes for graduates, including college-level employment rates.

Helping more students realize the economic promise of higher education will require action by several stakeholders, including policymakers, educators, and students. Promising solutions are emerging to strengthen the link between education and opportunity toward a future where the outcomes of education programs are clear, all students have access to quality coaching and work-based learning, and the financial risks imposed upon students and families are minimized.

Strada Education Foundation and the Burning Glass Institute are committed to helping bring these solutions to life.

Stephen Moret, *President and CEO, Strada Education Foundation*

Matt Sigelman, *President, Burning Glass Institute*

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Executive Summary

Most students, families, policymakers, and educators look to higher education in large part as a bridge to economic opportunity and upward mobility. Today, however, some are calling into question whether higher education is delivering on that promise. While a college education is still worth it for the typical graduate, it is not a guarantee: college students face an increasing degree of risk. One of the biggest risks students face is that their degree will not provide access to a college-level job. Today, only about half of bachelor's degree graduates secure employment in a college-level job within a year of graduation.

Using a combination of online career histories of tens of millions of graduates, as well as census microdata for millions of graduates, we developed a comprehensive picture of how college graduates

fare in the job market over their first decade of post-college employment. We measured the prevalence and severity of underemployment and the cost in lost earnings, as well as analyzed how these are associated with a range of factors, including degree field, student characteristics (e.g., race/ethnicity and gender), institutional characteristics (e.g., selectivity, concentration of low-income students, and type), and internship participation.

While many four-year college graduates earn advanced degrees, our analysis focuses primarily on workers with a terminal bachelor's degree (i.e., no advanced degree).

College-level employment and underemployment

In this report, the term **“college-level employment”** (or “college-level job”) refers to employment in occupations that typically require a four-year college degree, and **“underemployment”** refers to the experience of four-year college graduates who are employed in jobs that don't typically require a bachelor's degree. For more detail on how college-level employment and underemployment are defined, refer to the methodology appendix of this report.



KEY FINDINGS



Underemployment is a large and persistent problem. In spite of a historically tight labor market, the underemployment of college graduates remains stubbornly high. Overall, 52 percent of graduates are underemployed a year after graduation. Even a decade after graduation, 45 percent of graduates are underemployed.

The first job after graduation is critical. Graduates who start out in a college-level job rarely slide into underemployment, as the vast majority of them (79 percent) remain in a college-level occupation five years after graduation. Of those employed in college-level occupation five years after graduating, 86 percent were still in a college-level job 10 years out.

Underemployment is sticky. Seventy-three percent of graduates who start out underemployed remain so 10 years after completing college, making them at that point about 3.5 times more likely to be underemployed compared with those who start out in a college-level job.

Underemployment carries a heavy financial cost. A recent graduate employed in a college-level job typically earns about 88 percent more than a high-school diploma holder, while an underemployed graduate typically earns only about 25 percent more than someone with no education beyond high school.³ This leaves underemployed graduates on weaker financial footing as they start their careers, especially those with substantial student loan debt.

Underemployment rates vary greatly by college major. Graduates with degrees that involve a substantial amount of quantitative reasoning, such as computer science, engineering, mathematics, or math-intensive business fields (e.g., finance, accounting), experience the lowest underemployment rates (i.e., less than 37 percent), especially right out of college. Underemployment rates also are low for those who study education or health programs (e.g., nursing). Graduates with degrees in public safety and security, recreation and wellness studies, or general business fields (e.g., marketing) tend to face much higher levels of underemployment (i.e., 57 percent or higher).

KEY FINDINGS



STEM is not a silver bullet. While policymakers typically think of STEM [science, technology, engineering, and mathematics] programs as a sure pathway to college-level employment and high wages, the reality is more nuanced. Graduates with a bachelor's degree in computer science, engineering, or mathematics tend to experience very low underemployment, while those with a degree in a life sciences field (e.g., biology) tend to face higher underemployment rates.⁴

College-level employment rates are higher for those who complete an internship. There is a strong connection between internships and college-level employment after graduation. Controlling for factors such as gender, race/ethnicity, and institutional characteristics, the odds of underemployment for graduates who had at least one internship are 48.5 percent lower than those who had no internships, and the benefits associated with completing an internship are relatively strong across degree fields.

Institution type, race/ethnicity, gender, and geography matter with respect to post-graduation employment outcomes, but typically not as much as college major or internships. Graduates of more selective institutions are less likely to experience underemployment than those who attended more inclusive (and typically less resourced) institutions. Black and Hispanic students are substantially more likely than students of other races and ethnicities to wind up underemployed, and men are more likely to be underemployed than women. Underemployment also varies substantially by state. While all of these differences are meaningful, none of them explains as much of the differences in underemployment rates as college major and internship completion.

Introduction

College Graduates and Underemployment

America's colleges and universities stand in service to a broad range of aspirations. They are relied upon to enrich society and empower individuals, fueling the advancement of knowledge, sparking the genesis of groundbreaking ideas, fostering personal autonomy, instilling democratic values, and nurturing civic engagement. Yet, for the American public, one purpose often stands out: career preparation.

Higher education has become inextricably linked to the American Dream. College often is seen as a singular gateway to economic opportunity and upward mobility. Many students choose college under the assumption that a degree will unlock a lucrative career and secure their place within the middle class. Employers, in turn, rely on colleges to supply qualified talent. Higher education advocates, championing the cause of increased enrollment and degree attainment, paint earning a degree as the cornerstone of prosperity. Their argument—that a college-educated workforce is key to economic growth in the 21st-century knowledge economy and that a college education is a golden ticket to career success—is compelling.

However, the promise of higher education is not always fulfilled. While college graduates typically enjoy a significant advantage in the labor market over those with only a high school diploma, many find themselves grappling with an unexpected reality—a disconnect between their academic achievements and their economic prospects.

For some underemployed graduates, the path to professional fulfillment may materialize over time, as they gradually ascend the career ladder. For many others, however, their potential may remain permanently untapped.

In this report, we examine outcomes both for college haves and have-nots: Those who secure access to college-level jobs and those who find themselves underemployed after graduating—that is, employed in an occupation that doesn't require or make meaningful use of a college degree. Specifically, we examine post-completion employment outcomes of graduates with a terminal bachelor's degree⁵ in terms of their access to college-level jobs.⁶

Strada Institute and Burning Glass first studied this phenomenon together in 2018. But our economy has undergone significant change since then, and our original analysis left a number of questions unanswered. Building upon our original report and analysis,⁷ and using a combination of public census data and novel résumé and professional profile sources, we examine underemployment in greater depth. We measure the prevalence and severity of underemployment and the cost in lost earnings and analyze how these vary by degree field, student characteristics, institutional characteristics, internship participation, and geography. Finally, we analyze how labor market outcomes play out for initially underemployed graduates: Who manages to exit underemployment, and what routes do they follow to escape?

This report is organized by the following topics and research questions:

1

The Landscape of Employment Outcomes for Recent College Graduates

- How likely are college students to graduate and secure employment in college-level jobs versus become underemployed?
- What proportion of underemployed graduates is severely versus moderately underemployed?
- How do earnings premiums vary for underemployed graduates and those employed in college-level jobs?

2

Factors Related to Underemployment

- To what extent are different factors such as degree field, institutional characteristics, internship participation, and geography, as well as gender and race/ethnicity, associated with varying odds of becoming underemployed?

3

Escaping Underemployment

- How does the probability of escaping underemployment vary by degree field, institution type, and initial occupation?
- How likely are underemployed graduates to enroll in graduate degree programs?
- How does earning an advanced degree increase the likelihood of securing a college-level job and the probability of escape for underemployed graduates?

Part 1.

The Landscape of Underemployment

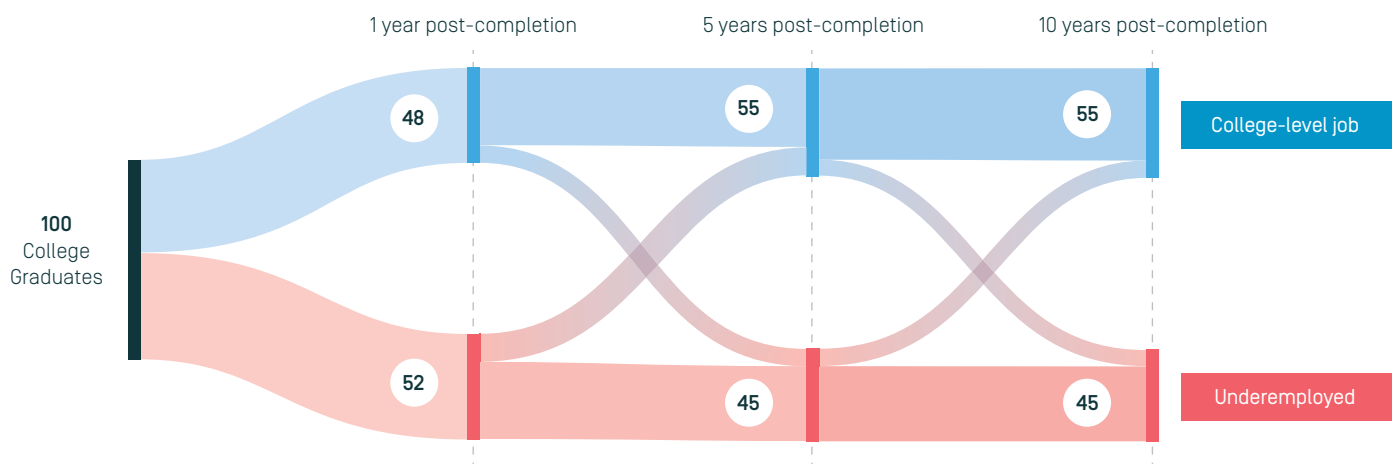
Despite the fact that most individuals attend college largely because of the promise of opportunity and access to a different set of jobs and careers, most students who start college either do not complete their program or do not get hired into a college-level job. Bachelor's degree attainment, including those who went on to earn advanced degrees, has grown substantially for several decades—now at 43 percent for adults between the ages of 30 and 34.⁸ Meanwhile, the share of graduates employed in college-level jobs has not increased across sectors and demographic groups.

The first job following college graduation is critically important for most individuals. Graduates who start out in a college-level job typically remain in a college-level job, while those who start out underemployed are four times as likely to be underemployed as those who start out in a college-level job. What's more, being underemployed has a steep financial cost: Graduates employed in a college-level job typically earn 50 percent more than those who are underemployed.

Underemployment Rates

Fifty-two percent of graduates with a terminal bachelor's degree are underemployed one year after completing; 10 years after completing, 45 percent are underemployed. Among graduates with a terminal bachelor's degree, a slight majority secure employment in a college-level job within the first 10 years following graduation. Of those who do, most do so within the first year of graduation (*Figure 1.1*). For every 100 college graduates with a terminal bachelor's degree, 48 are employed in college-level jobs one year after graduation and 55 five years after graduation; 10 years after completing, that number is still only 55. Approximately 27 percent of underemployed graduates escape underemployment between one and 10 years after graduation, and 21 percent of graduates employed in college-level jobs fall into underemployment. However, the vast majority of graduates who start in college-level jobs stay in them over time, while underemployed graduates largely remain underemployed.

Figure 1.1 Employment outcomes by years after graduation

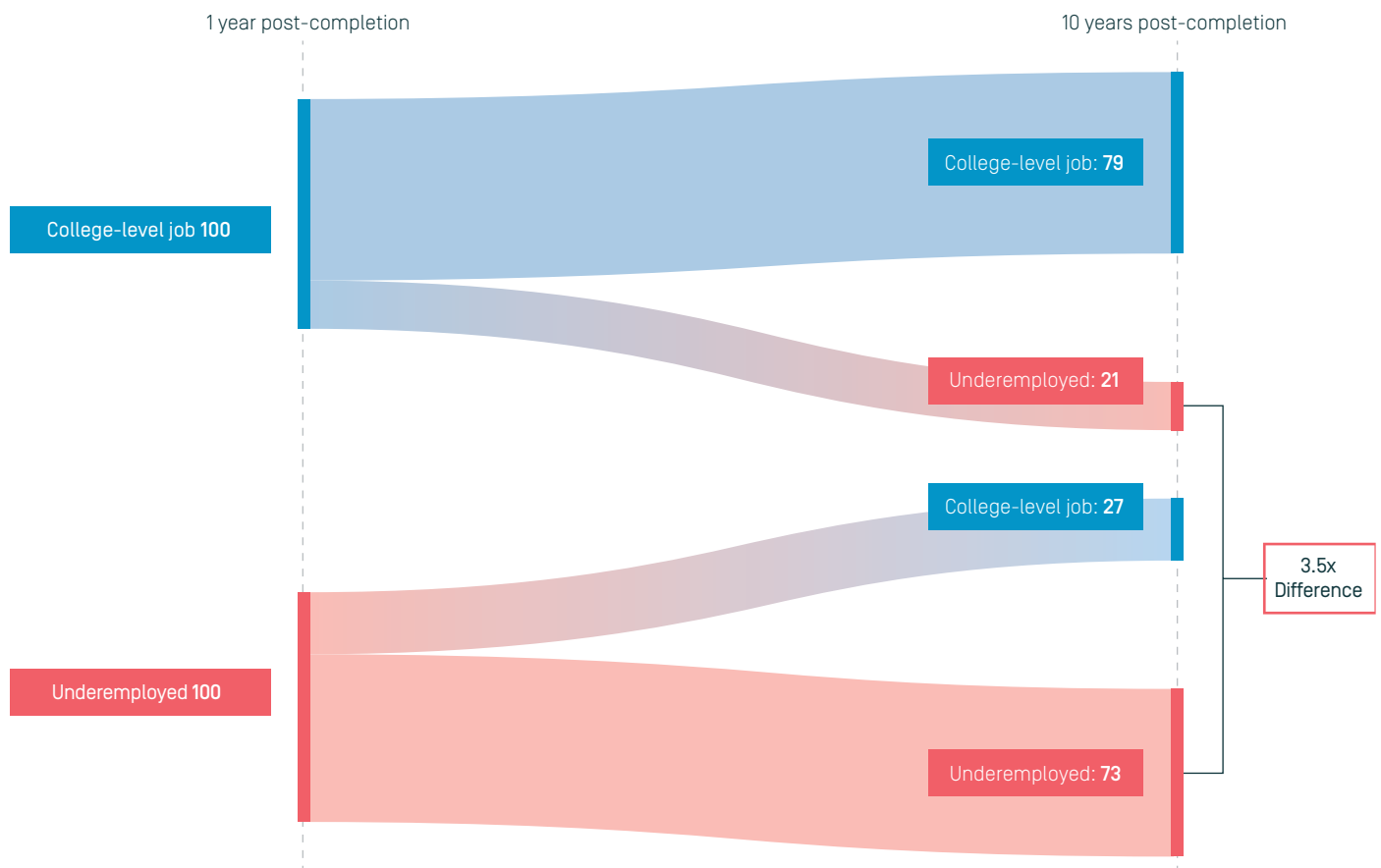


Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree.

Graduates who start out in a college-level job largely remain in employment appropriate to their degree, while underemployed graduates are about 3.5 times as likely to be underemployed a decade later. The odds that a four-year college graduate will wind up underemployed 10 years out vary substantially based on whether they start out in a college-level job (Figure 1.2). Those who are working in a college-

level job one year after graduation are almost three times as likely to be employed in a college-level job 10 years after graduation [compared with initially underemployed graduates], while those who start out underemployed are about 3.5 times as likely to be underemployed 10 years after graduation [compared with graduates who start in a college-level job].

Figure 1.2 Probability of college-level employment 10 years after graduation



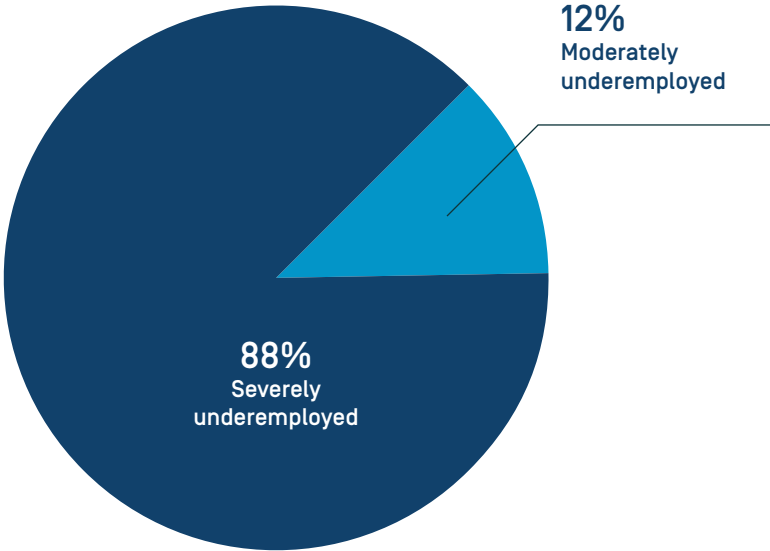
Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2012–2022. Calculated for workers with a terminal bachelor's degree.

Severity of Underemployment

Most underemployed college graduates are severely underemployed. Among underemployed recent graduates, the vast majority (88 percent) are severely underemployed—that is, working in jobs that typically require only a high school education or less [Figure 1.3], such as jobs in office support,

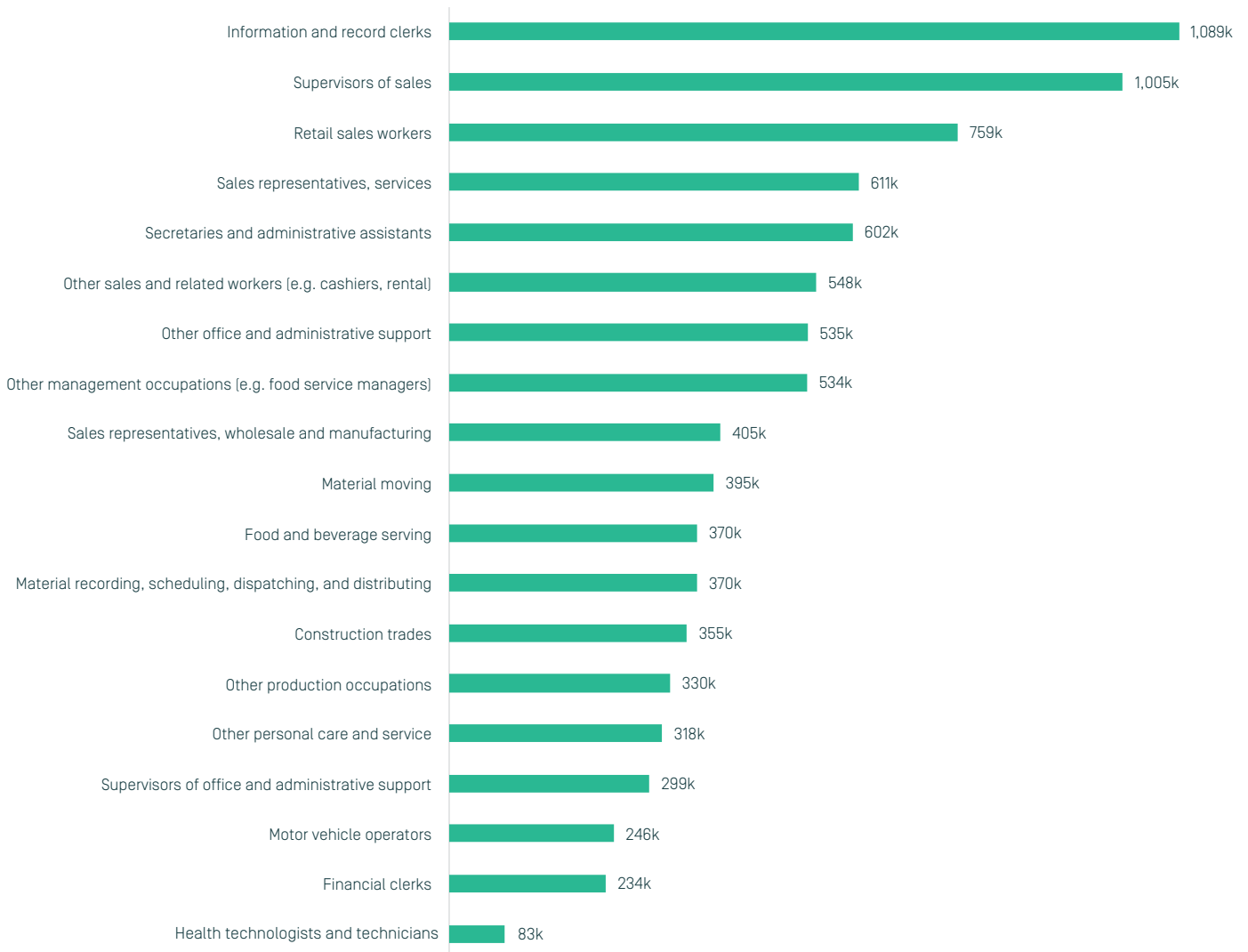
retail sales, food service, and blue-collar roles in construction, transportation, and manufacturing [Figure 1.4]. A relatively small group of these graduates (12 percent) are moderately underemployed, i.e., working in jobs that require some education or training beyond high school but less than a bachelor's degree.

Figure 1.3 Severity of underemployment, five years after completion



Source: Burning Glass Institute analysis of American Community Survey, 2022 and Lightcast Career Histories Database, 2022. Underemployment is calculated for workers with a terminal bachelor's degree five years after graduation.

Figure 1.4 Employment of severely underemployed college graduates by occupation

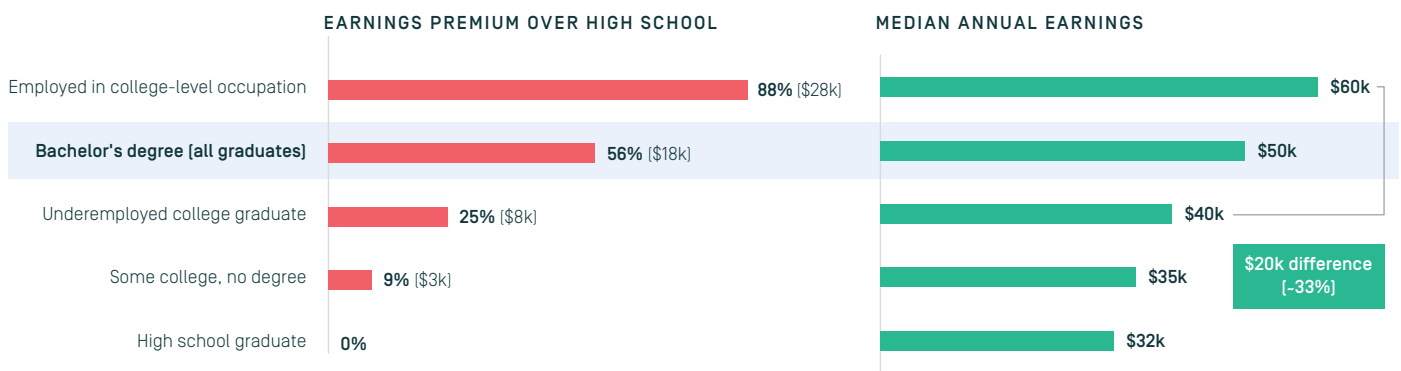


Source: Burning Glass Institute analysis of American Community Survey, 2022.
Employment calculated for workers with a terminal bachelor's degree five years after graduation.

Underemployed graduates earn 33 percent less than those working in college-level jobs. Underemployed college graduates earn substantially less than the typical college graduate and far less than graduates employed in college-level jobs (Figure 1.5). While recent college graduates earn \$50,000 annually, underemployed college graduates earn

only \$40,000. By contrast, recent graduates employed in college-level occupations earn \$60,000, 88 percent more than the typical high school graduate and 50 percent more than their underemployed peers. In fact, earnings of underemployed graduates are substantially closer to those without a degree than they are to peers employed in college-level jobs.

Figure 1.5 Earnings premium over high school graduates and median annual earnings by educational attainment for recent college graduates with a terminal bachelor's degree



Source: Burning Glass Institute analysis of American Community Survey, 2022. Calculated for workers with a terminal bachelor's degree aged 22–27, employed full-time, year-round, and not enrolled in school.

Part 2.

Factors Related to Underemployment

Many factors are associated with the odds of a graduate landing a college-level job, such as:

- **Internship participation during college**
- **Institutional selectivity** (i.e., inclusive, selective, or more selective)
- **Institution type** (public, private nonprofit, for-profit)
- Institutions' **share of low-income students**
- A graduate's **college major** or degree field
- **Demographic characteristics** (e.g., gender, race/ethnicity)
- **Where graduates live** and work

A graduate's choice of degree field is strongly related to their likelihood of obtaining college-level employment. Many have argued that choice of college major is irrelevant to the long-term career prospects of graduates.⁹ However, the available evidence suggests otherwise: Not only do majors matter, but with respect to a graduate's odds of securing a college-level job, they can matter more than the school they attend. A student who earns a degree in health, education, or engineering from an inclusive college or university (i.e., those with relatively few admission requirements), for example, is more likely to get a college-level job than a student who earns a degree in biology, psychology, communications, arts, or non-math-intensive business fields (e.g. management, marketing, or human resources), even at a highly selective institution.

Graduates with degrees in fields with more quantitative rigor have greater odds of securing college-level jobs than their peers. This is true even within STEM (science, technology, engineering, and mathematics) degrees and

business degrees. More quantitative STEM fields (e.g., computer science and engineering) stand apart from less quantitative STEM fields (e.g., biology and life sciences) in the college-level employment rates of their graduates. Similarly, math-intensive business fields such as accounting and finance have substantially higher rates of college-level employment compared with general business, human resources, and marketing fields.

The likelihood of college-level employment also varies by the type of institution attended. Graduates of for-profit colleges experience especially low rates of college-level employment, as do graduates of more inclusive colleges and those with higher concentrations of low-income students.

In the 1990s, women surpassed men in educational attainment, a gap that has continued to grow in the years since,¹⁰ and they now comprise the majority of college-educated workers.¹¹ Women are also more likely to secure college-level jobs than male college graduates. Among racial and ethnic groups, Asian graduates are the most likely to secure college-level jobs, while Black graduates are the least likely.

There is substantial variation in underemployment across states, ranging from 40 percent in Maryland to 57 percent in Hawaii, likely due to a combination of factors such as the industry and occupational composition of a state's labor market, the education and skills of the state's existing workforce, interstate migration of college graduates, and the degree and skill composition of newly minted college graduates in each state.

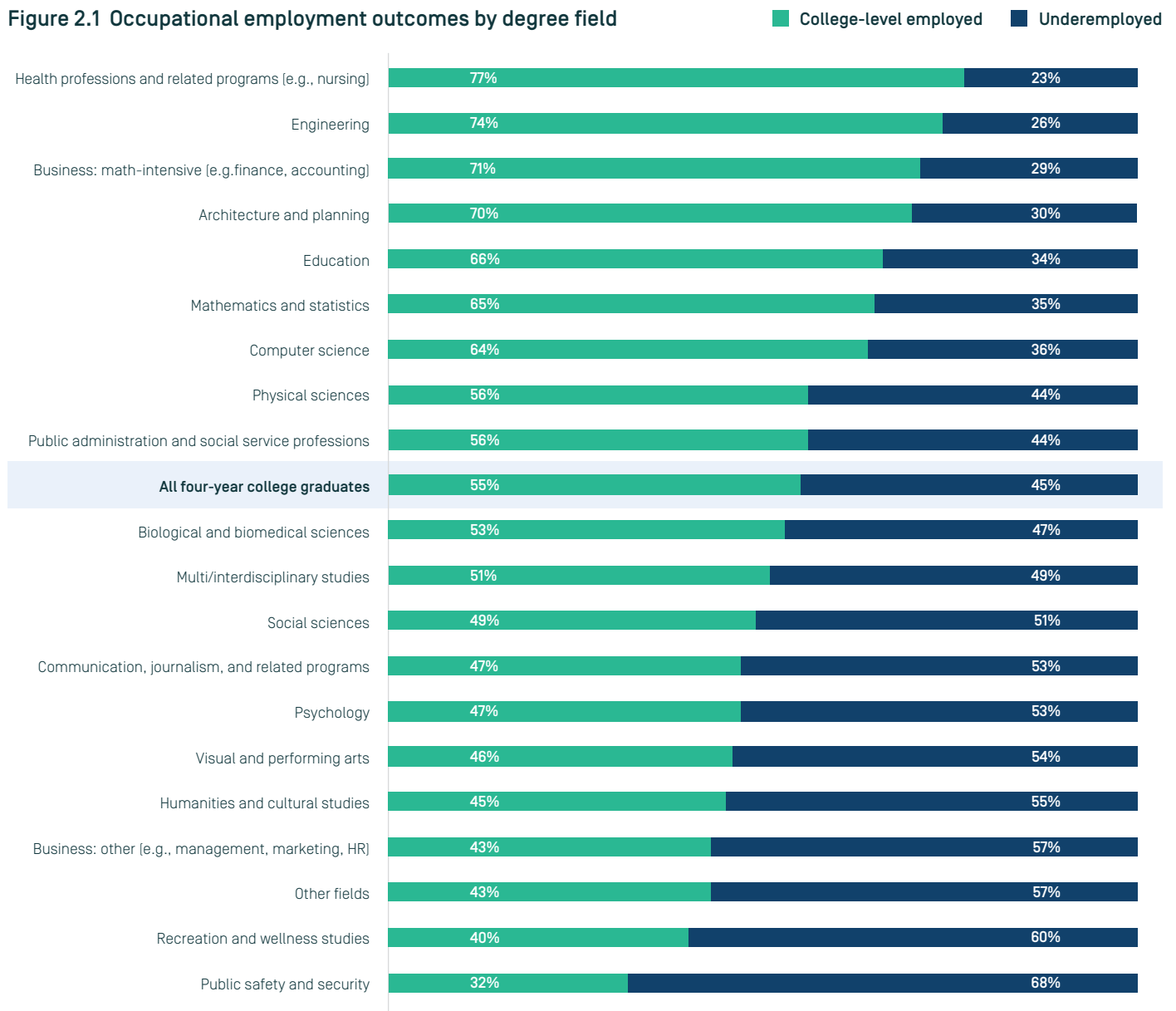
Degree Field

Graduates with a degree in public safety and security, recreation and wellness studies, or a less math-intensive business field are more than twice as likely to be underemployed than graduates with a degree in health, engineering, or a math-intensive business field.

There is a strong association between college major (e.g., degree field) and post-completion

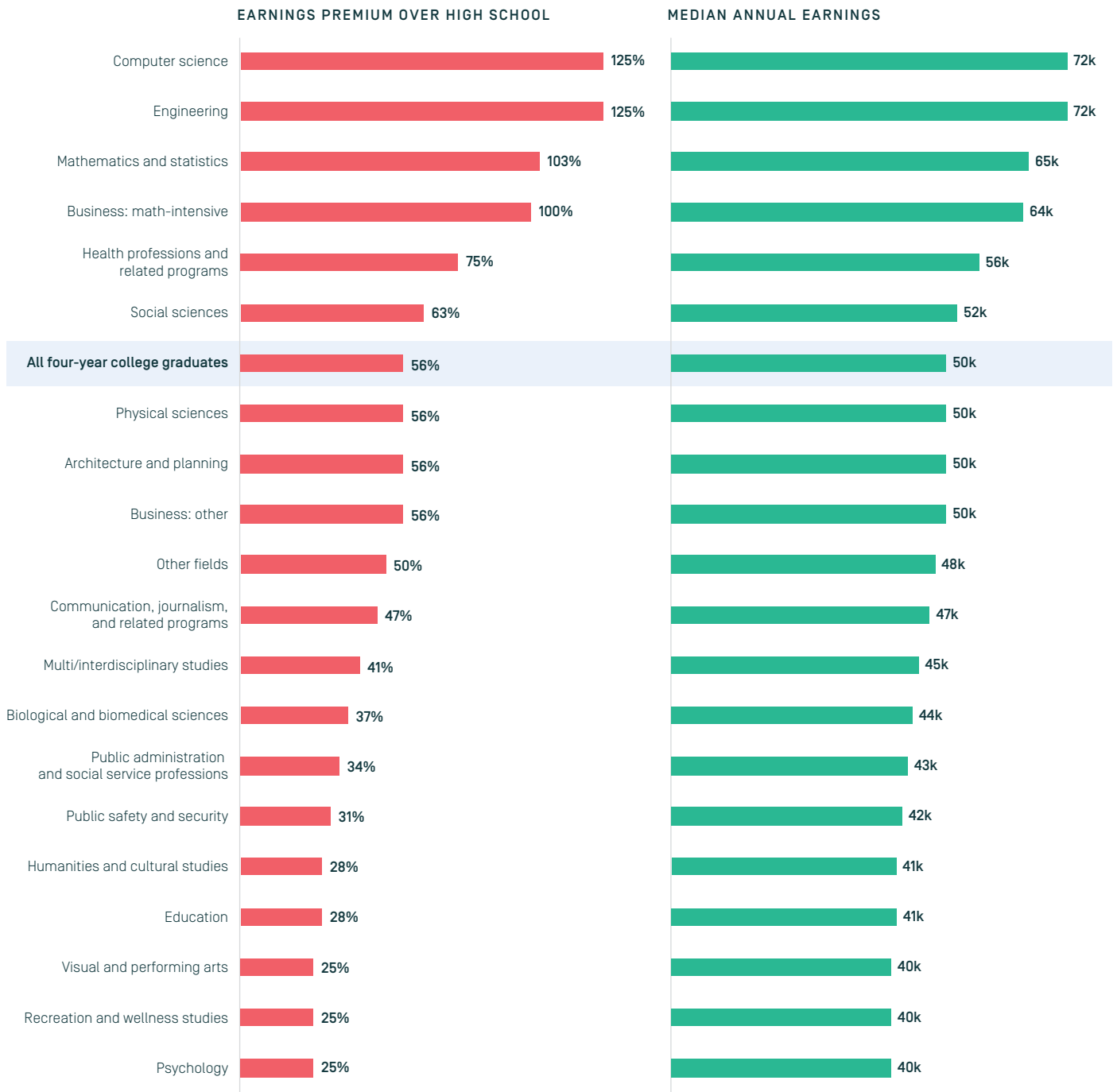
underemployment rates (Figure 2.1). While most employers of college graduates value critical thinking and communication skills, many employers of college graduates also appear to place a premium on the kinds of quantitative reasoning skills that are cultivated in fields such as engineering, computer science, mathematics, and math-intensive business programs.

Figure 2.1 Occupational employment outcomes by degree field



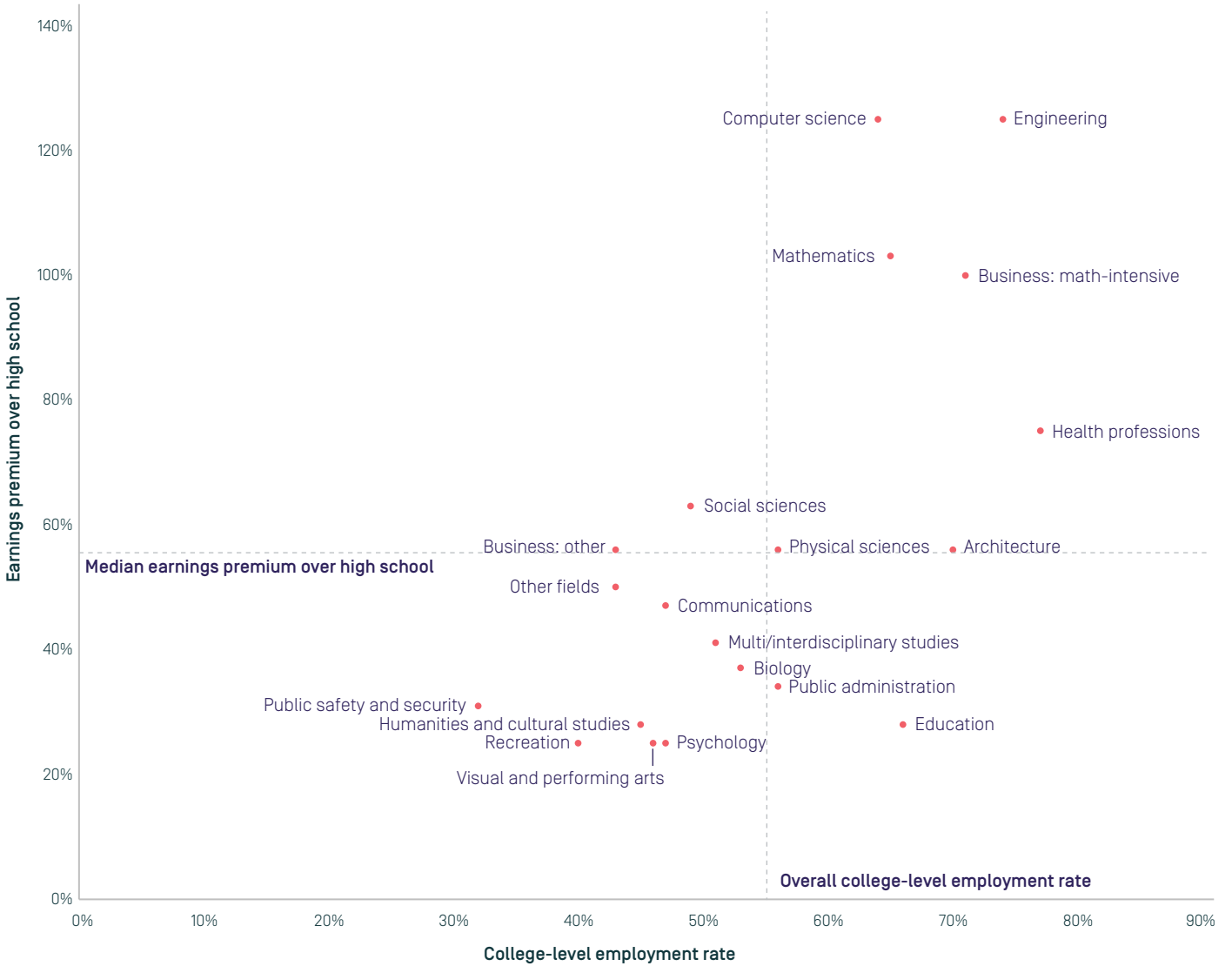
Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Underemployment is calculated for workers with a terminal bachelor's degree five years after graduation.

Figure 2.2 Earnings premium over high school by degree field



Source: Burning Glass Institute analysis of American Community Survey, 2022. Calculated for workers ages 22–27 with a terminal bachelor's degree, employed full-time, year-round and not enrolled in school.

Figure 2.3 College-level employment rate and earnings premium over high school graduates, by degree field



Source: Burning Glass Institute analysis of American Community Survey, 2022 and Lightcast Career Histories Database, 2022. Underemployment is calculated for workers with a terminal bachelor's degree five years after graduation; earnings are calculated for workers ages 22–27 with a terminal bachelor's degree, employed full-time, year-round and not enrolled in school.

Not all STEM majors are created equal: Graduates with a terminal bachelor's degree in computer science, engineering, or math have substantially higher college-level employment rates and earnings than those with a degree in the physical sciences or life sciences. Popular majors like biology do not have the same ready-made career paths at the undergraduate degree level, but many such graduates complete a graduate degree to become a medical doctor or research scientist. As a result, graduates in some STEM fields face many of the same challenges in landing a college-level job as do liberal arts majors. For example, 53 percent of biology graduates are employed in a college-level job five years after graduating, compared with 74 percent of engineering graduates.

Math-intensive business fields such as accounting, business economics, and finance have substantially lower rates of underemployment than general business degrees. Graduates with a math-intensive major, such as engineering, math, or physical sciences, have among the highest rates of college-level employment, while fields with the lowest rates of college-level employment tend to be less quantitatively rigorous.

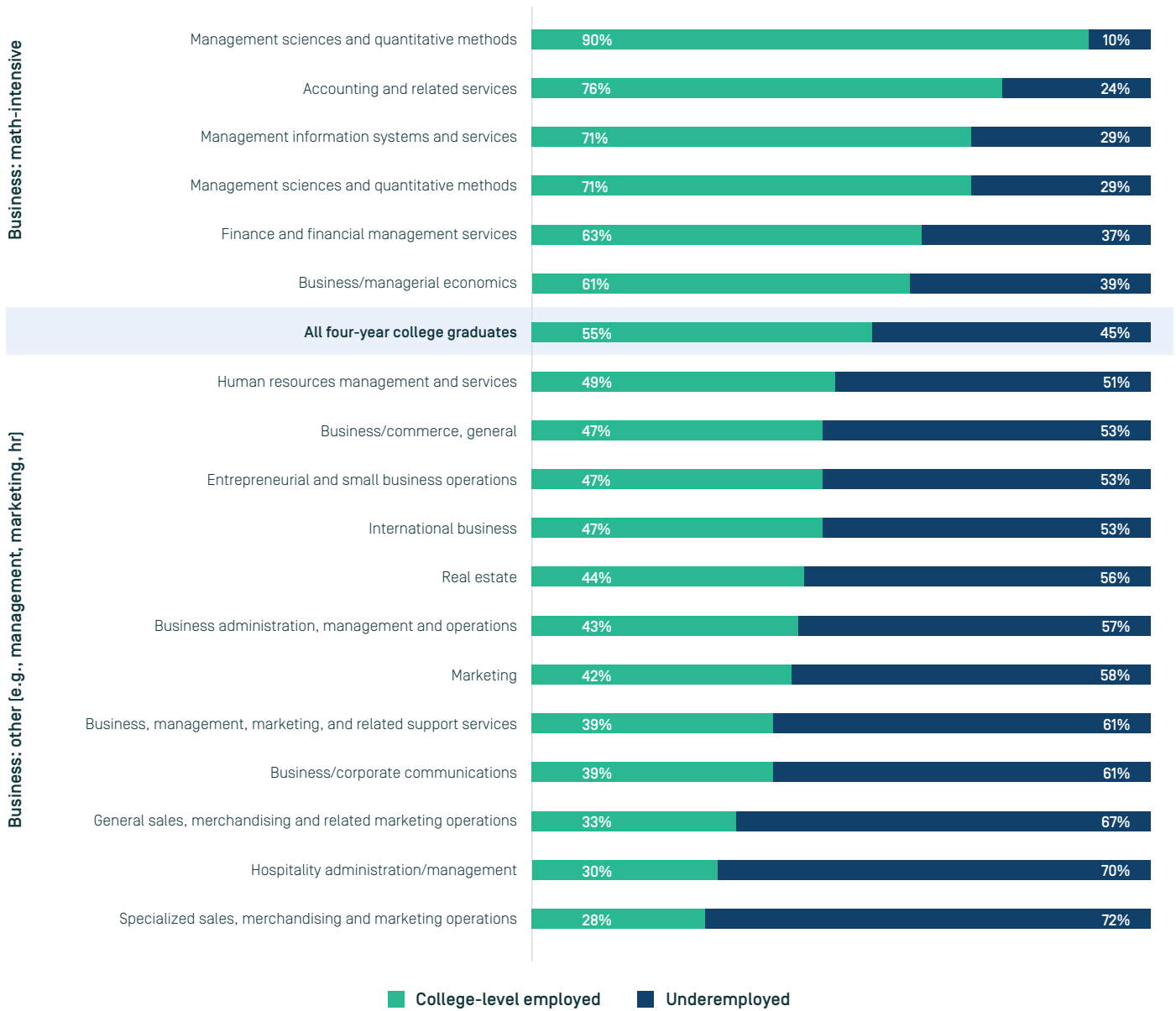
A similar pattern can be observed within broad categories of degree fields. Among business degree fields, for example, quantitatively rigorous fields such as accounting and finance have substantially higher rates of college-level employment compared with general business, human resources, and marketing fields (*Figure 2.4*): 76 percent of accounting graduates secure college-level jobs, compared with 30 percent of graduates in hospitality administration or management.

Implication: To lower their risk of underemployment, students can develop complementary quantitative and qualitative reasoning skills

Graduates with quantitative reasoning skills are highly sought after in today's data-driven market. Students pursuing less quantitatively rigorous fields such as liberal arts and humanities might consider taking courses that involve quantitative rigor, such as statistics, data analysis, or computer science, to complement their qualitative reasoning skills.



Figure 2.4 Occupational employment outcomes for selected business degree fields

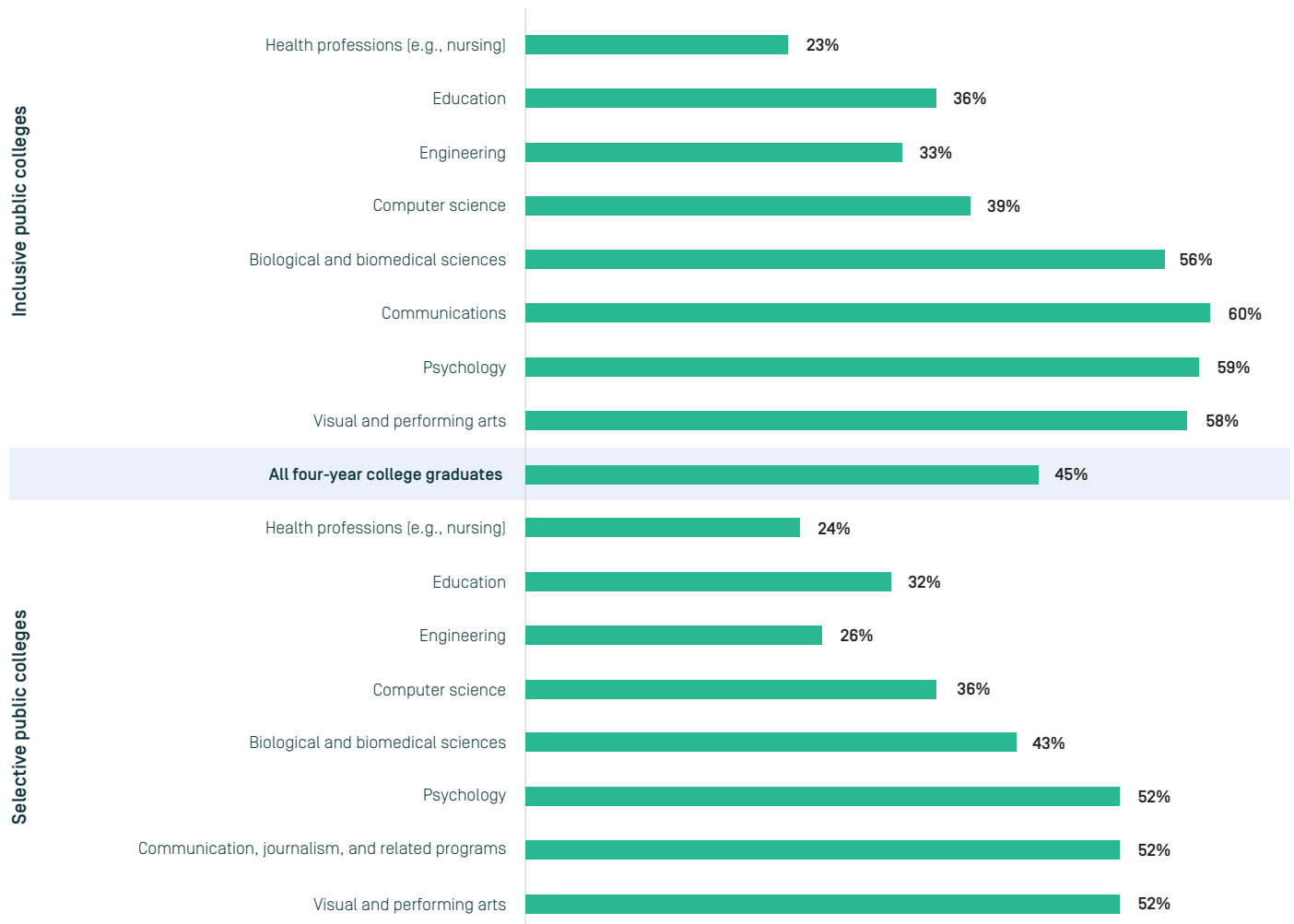


Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree five years after graduation.

Health, education, and engineering majors at inclusive public colleges and universities have lower rates of underemployment than biology, psychology, and communications majors at selective public colleges. As individuals select a college or university to attend, it is noteworthy that post-graduation employment in a college-level job is more closely tied to what they study than where they study. Degree fields account for more of the variation in college graduates'

employment outcomes than institutional characteristics. In fact, graduates of inclusive public colleges with degrees in fields like health, education, and engineering are more likely to get college-level jobs than graduates of selective public colleges with degrees in fields more prone to underemployment, such as biology, psychology, communications, or visual and performing arts (Figure 2.5).

Figure 2.5 Underemployment by degree field and institutional selectivity for public four-year colleges and universities



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree five years after graduation.

Fields of study are associated with not only probability of underemployment but also likelihood of escape.¹² Graduates' likelihood of escaping underemployment and securing college-level jobs varies, even when they start in the same initial occupations.¹³ For example, among graduates employed in personal care and

service occupations, biology graduates are more than three times as likely to escape as education majors. Along with underemployment rates, both the severity of underemployment and likelihood of escaping underemployment are important factors that inform a nuanced understanding of college graduates' employment outcomes.¹⁴

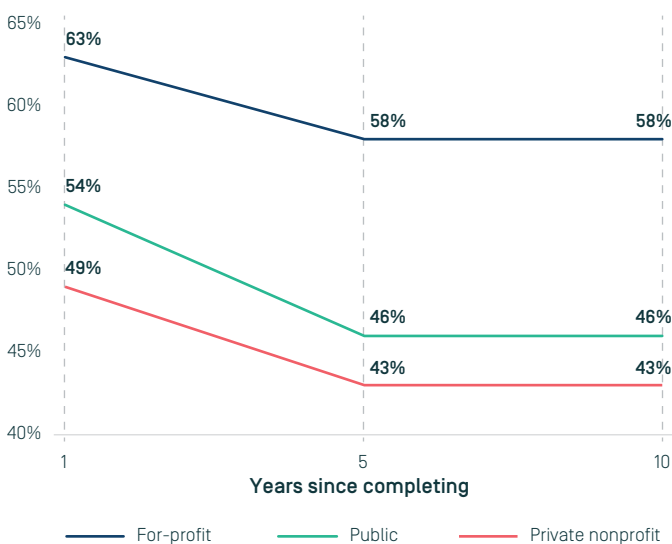
Institution Type

The gap between underemployment rates of for-profit and public college graduates increases slightly in the first five years after graduation. For-profit colleges have come under increasing scrutiny,¹⁵ especially over the past decade. Like community colleges, for-profit colleges serve a student population that faces the greatest barriers to opportunity, but graduates of for-profit colleges are also the least likely to secure college-level jobs compared with graduates of public and nonprofit colleges [Figure 2.6].

What's more, the share of graduates who moved out of underemployment, and into college-level jobs, is lower than that for other institutions.

In general, the type of institution graduates attend is related to their odds of becoming underemployed after graduation, even when controlling for a variety of other factors such as degree programs, and the race or ethnicity, and sex of students.¹⁶ Compared with graduates at public schools, the odds of becoming underemployed are 23 percent lower for graduates of private nonprofit institutions, but 11 percent higher for graduates of for-profits. The likelihood of becoming underemployed also differs for graduates of schools that specialize in serving distinct racial and ethnic groups. Graduates of Historically Black Colleges and Universities (HBCUs), for example, are 15 percent less likely to be underemployed, while graduates from Hispanic Serving Institutions (HSIs) are 3 percent less likely to be underemployed when compared with graduates at all other institution types.

Figure 2.6 Underemployment rate by institutional type and years since graduating



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree one, five and ten years after graduation.

Institutional Selectivity and Concentration of Low-Income Students

Graduates of more selective colleges and colleges that serve fewer low-income students are more likely to be employed in college-level jobs. More selective colleges have many advantages relative to inclusive colleges. They typically have more resources to support students through high-quality career services, for example, as well as alumni networks to help students build social capital through mentorships and less formal “loose connections” that can be beneficial in job searches. Graduates of selective colleges are also often perceived by employers, accurately or not, as being more qualified because employers assume that the college’s selection process is a proxy for intelligence, motivation, industry, and talent. Indeed, when compared with graduates from inclusive institutions, the likelihood of eventually becoming underemployed is 4 percent less among graduates of selective institutions and 32 percent less at more selective institutions.¹⁷

The dynamics of institutional characteristics like selectivity and Pell intensity are complex. In general, underemployment rates tend to be higher among graduates of more inclusive colleges and universities and at institutions with higher concentrations of Pell-eligible students (Figure 2.7A, 2.7B). At the same time, the concentration of high-income students as well as of white and Asian students at more selective colleges is increasing, while low-income as well as Black and Hispanic students are increasingly concentrated at inclusive schools—evidence that other, more intricate correlations between race and wealth and geography may be at play here as well.¹⁸ Institution type, selectivity, and the concentration of low-income students all relate to the likelihood that graduates become underemployed after graduating.¹⁹

Figure 2.7A
Underemployment by institutional selectivity*

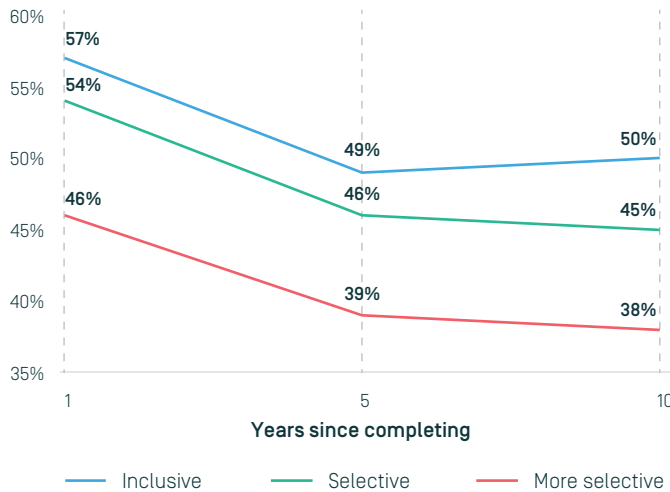
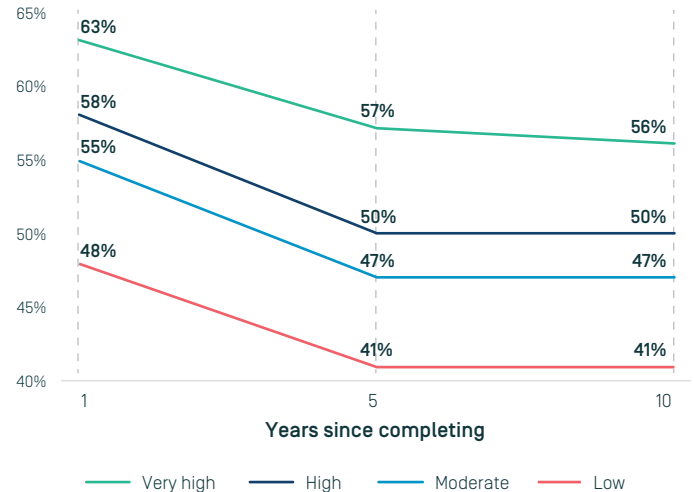


Figure 2.7B
Underemployment by concentration of low-income students*



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System, 2021.. Calculated for workers with a terminal bachelor’s degree one, five, and ten years after graduation.

*Note: For how we define these categories, please refer to the methods section of Appendix A.

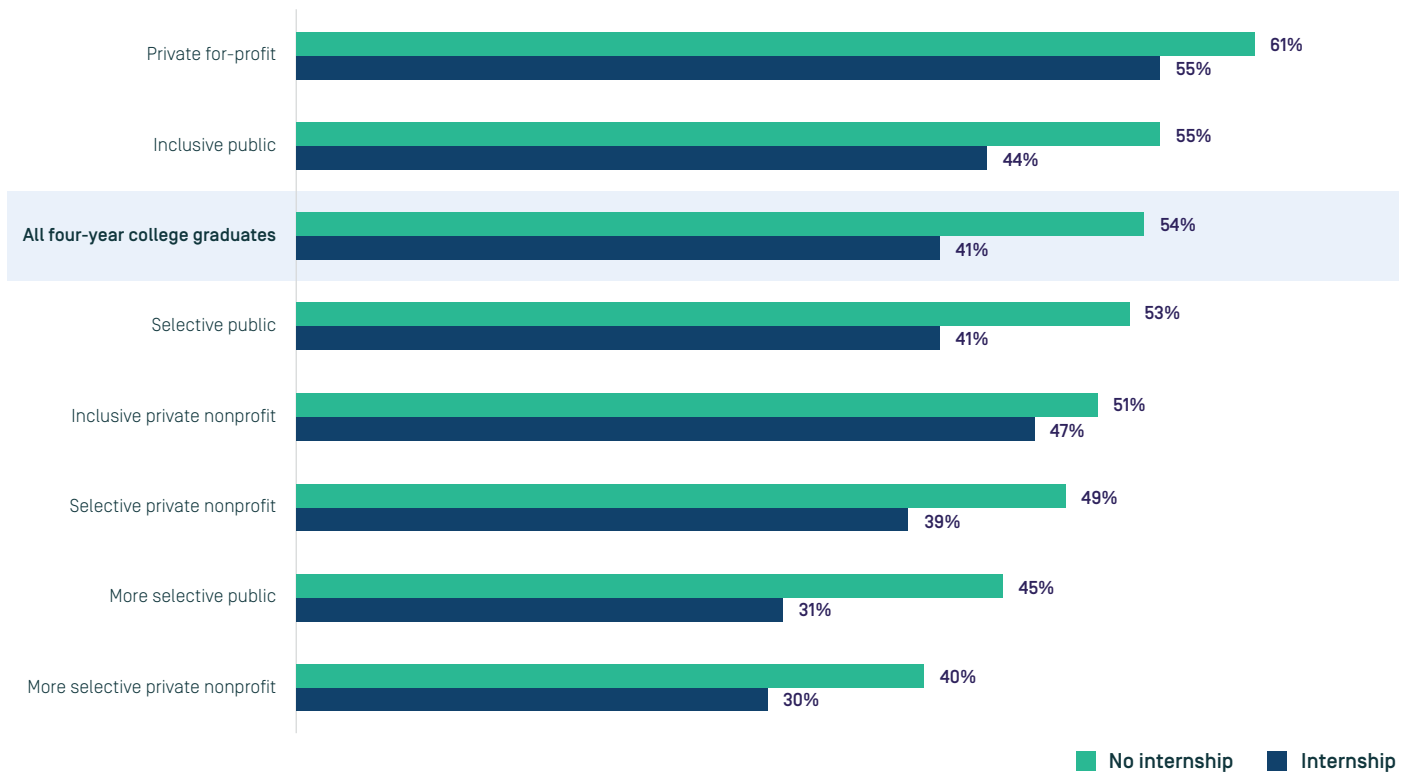
Internships

For college students, internships have emerged as a crucial stepping stone toward securing a successful career. Our analysis suggests that completing even a single internship during college substantially enhances a graduate's access to college-level jobs, reducing their likelihood of underemployment. Internships provide valuable hands-on experience, enabling students to apply their knowledge in real-world contexts, develop industry-specific skills, and gain exposure to the professional environment. This practical experience not only makes students more desirable candidates but also equips them with the confidence and competence to navigate the demands of the workplace effectively. Moreover, internships serve as a bridge connecting the academic world to the professional realm, enabling students to build valuable professional networks, gain insights into potential career paths, and establish themselves within their chosen field.

Overall, the results of this study show that internship participation is strongly associated with lower underemployment after graduation. In fact, the odds of becoming underemployed after completing a bachelor's degree are 49 percent lower for students who reported having participated in an internship as part of their college education.²⁰

Graduates who completed an internship are less likely to become underemployed across nearly every institution type. Students completing internships are at much lower risk of becoming underemployed when compared with those who do not. Fifty-four percent of those who had not completed an internship during college were underemployed five years after graduating, versus 41 percent of those who did complete an internship. The largest differences are for graduates at for-profit institutions, where underemployment for internship participants is 14 percentage points lower than those who had not completed one (*Figure 2.8*). School selectivity and institution type interact with the returns to a college internship in an interesting way. Within public institutions, for example, the gap between underemployment rates of internship and non-internship recipients rises from 11 percentage points at inclusive publics to 12 percentage points at selective and 14 percentage points at more selective institutions. At private nonprofits, graduates at inclusive schools see a small gain from internship participation, while the differences at selective and more selective institutions are both 10 percentage points.

Figure 2.8 Underemployment rate by internship participation and institutional selectivity and type



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System, 2021. Calculated for workers with a terminal bachelor’s degree five years after graduation.

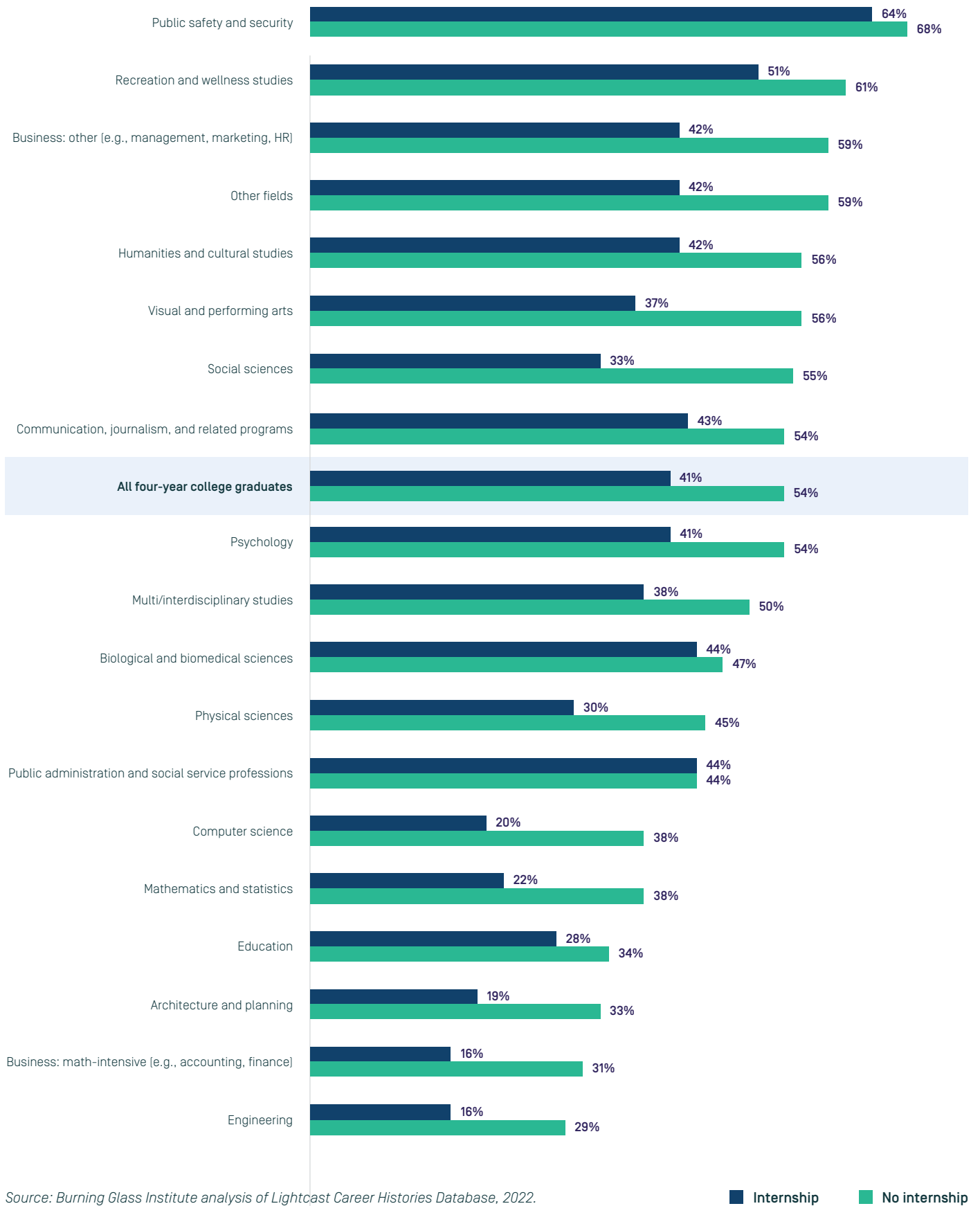
The link between internship participation and underemployment varies by degree field.

The benefits of internship participation on underemployment vary by major (Figures 2.9 and 2.10). For those completing degrees in fields like computer and information sciences, 38 percent of graduates who did not complete an internship were underemployed five years later, compared with only 20 percent for graduates who had at least one internship. Similarly, the difference in underemployment rates for graduates with and without an internship is especially large for engineering graduates (29 percent versus 16 percent) and math-intensive business degree holders (31 percent versus 16 percent). For graduates in other majors, the gap in underemployment rates between those who did and did not pursue an internship during their college tenure is typically much smaller.

While internships are associated with an increased likelihood of securing a college-level job across degree fields, the benefit they appear to confer is not enough to offset key risk factors.

Graduates with degrees in fields with lower rates of underemployment overall also seem to gain the most from internship participation. In contrast, for students with a degree in public safety and security, recreation and wellness, communications, psychology, and general business, underemployment rates even among those who complete internships are higher than among graduates without internships in math-intensive business, engineering, or education degrees (Figure 2.9).

Figure 2.9 Underemployment rate by internship participation and degree field



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree five years after graduation.

Note: graduates with degrees in health professions are excluded.

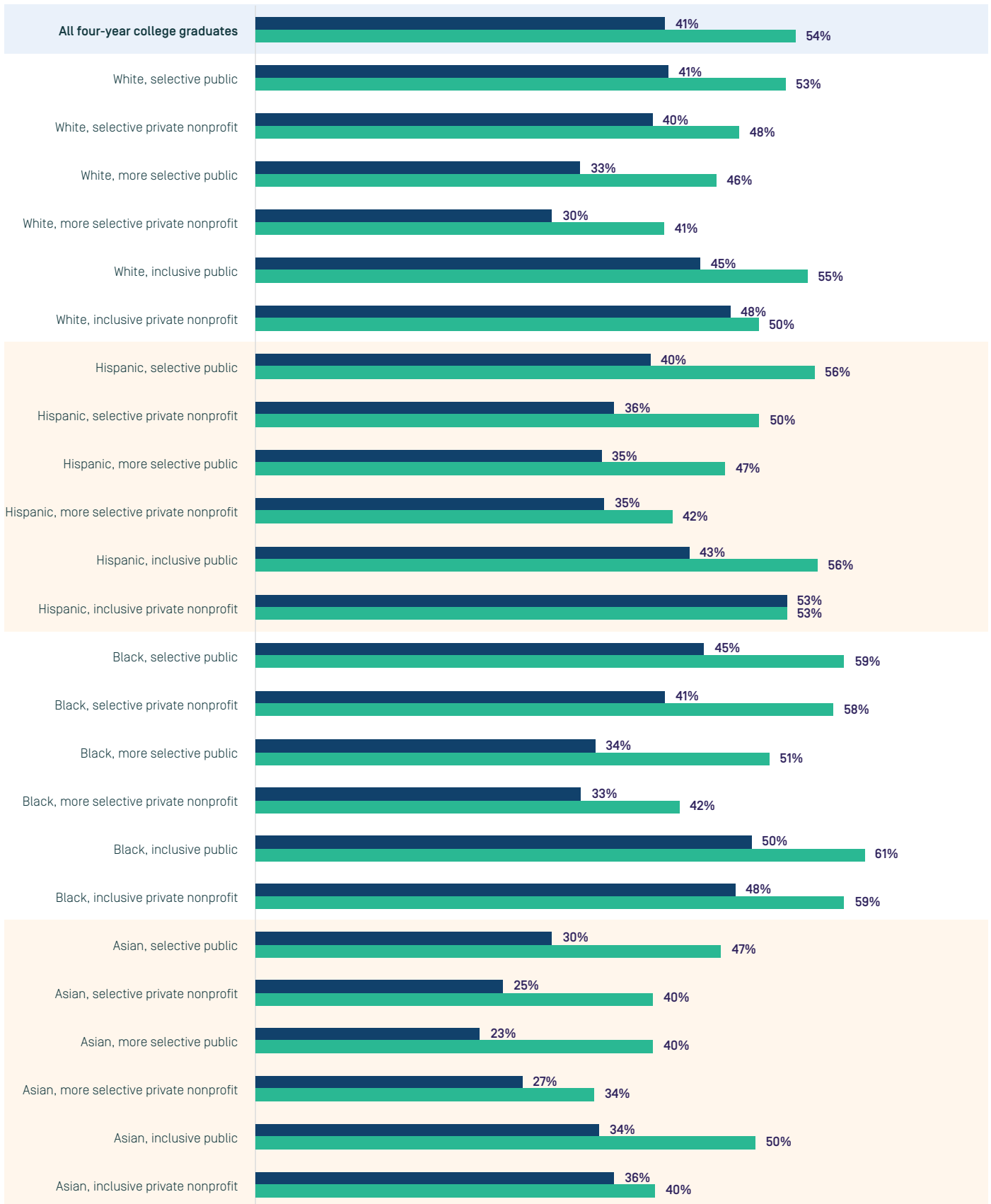
■ Internship ■ No internship

Internships have the strongest relationship with Black graduates' ability to obtain college-level jobs compared to other racial groups.

Students from different racial and ethnic backgrounds stand to benefit from internship participation differently depending on the type of institution they attend (*Figure 2.10*). Underemployment rates for Black graduates at selective private nonprofit and more selective public institutions are 17 percentage points lower among graduates who did an internship during their college tenure versus those who did not. Asian graduates of selective and more selective public institutions also see a similar 17 percentage point benefit.

The differential for Hispanic graduates is greatest at both selective public (16 percent) and selective private nonprofits (15 percent), while white graduates gain the most at more selective publics (14 percent). However, not all gains from internship participation are equally sizable. For Asian graduates at more selective private nonprofit schools, the difference is only 7 percentage points, and for white graduates at inclusive private nonprofits, internship participation only seems to reduce underemployment by just 3 percentage points.

Figure 2.10 Underemployment by internship participation, race/ethnicity, institution type and selectivity



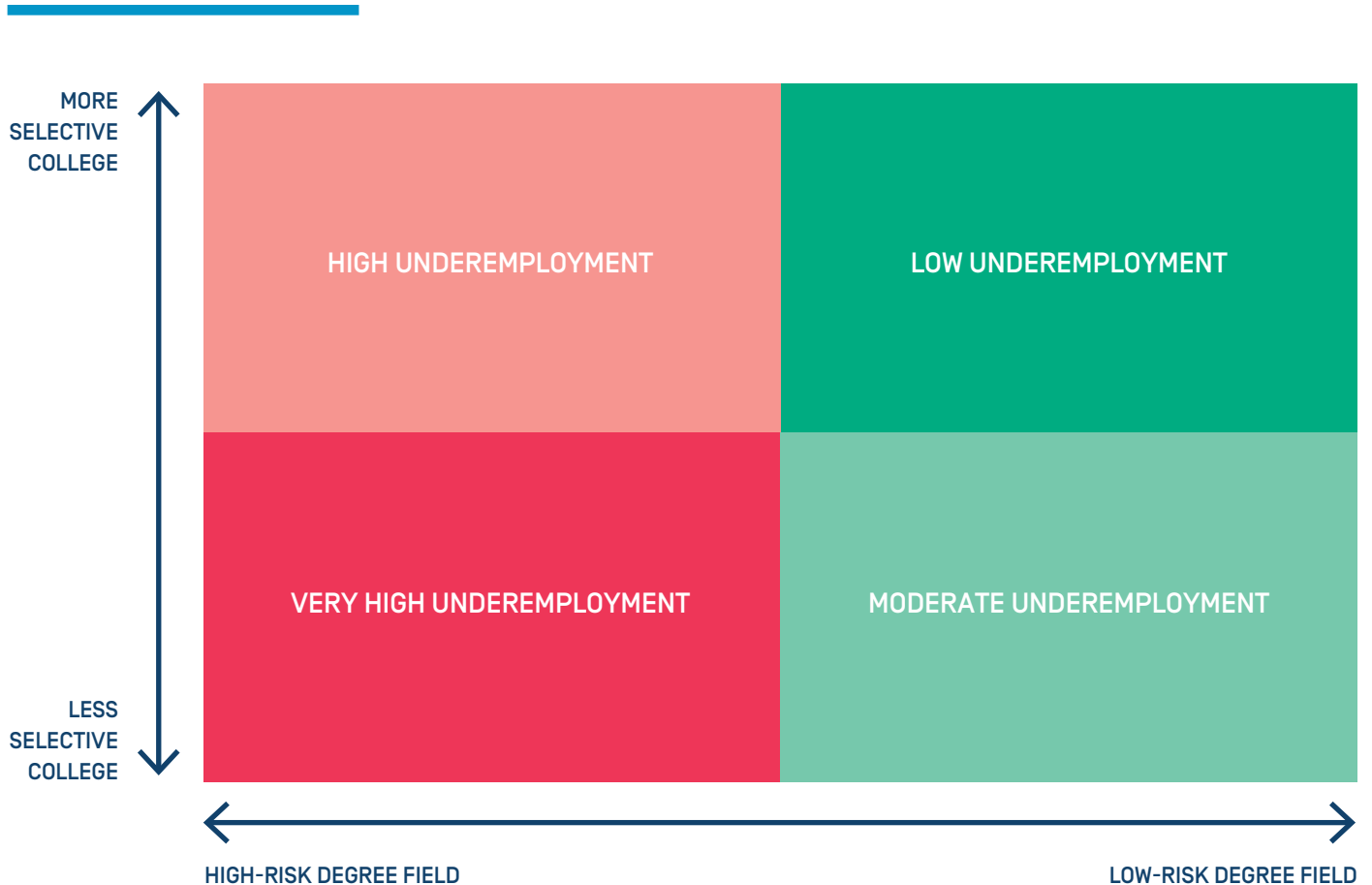
Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree five years after graduation.

■ Internship ■ No internship

Implication: The Interplay of Program of Study and Selectivity, a Decision Matrix

Even before they step foot on campus, prospective students face decisions of significant consequence for their risk of underemployment: where to go and what to study. Students who major in fields with high college-level employment rates overall—such as health professions and math-intensive business fields—face less risk regardless of whether they

attend a selective or inclusive institution. However, those who enroll in programs or schools with lower rates of college-level employment should strongly consider complementing their program with other experiences that increase their likelihood of success, such as paid internships, math-intensive coursework, and proactive networking.

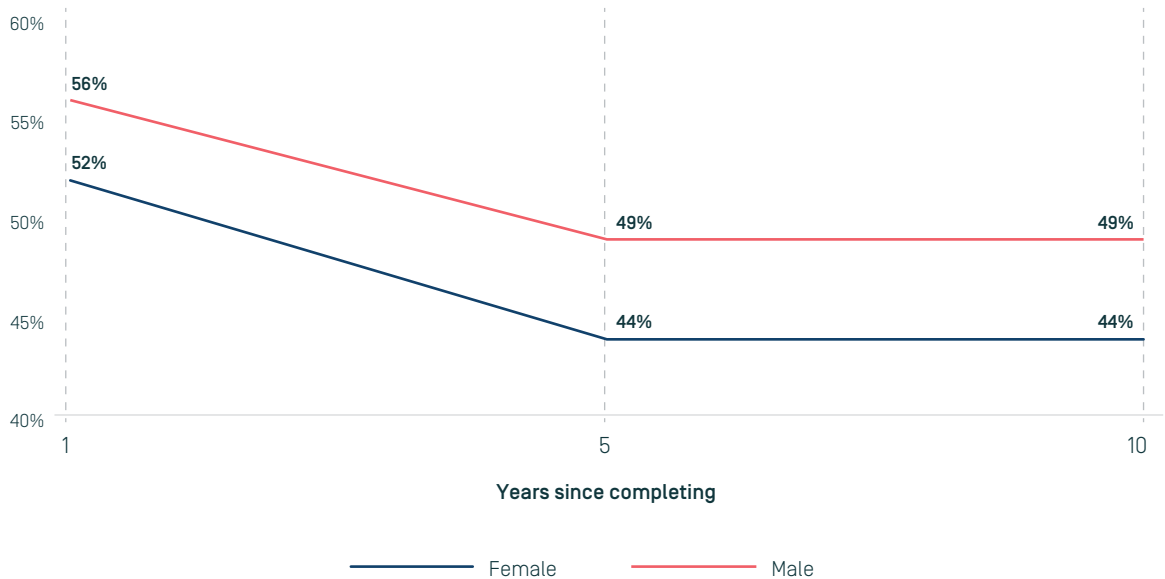


Gender

Female college graduates are less likely than male college graduates to become underemployed.²¹ One year after completing college, 56 percent of male graduates and 52 percent of female graduates are underemployed [Figure 2.11]. Ten years after completing college,

these rates decrease to 49 percent for male graduates and 44 percent for female graduates. These trends accord with and compound related gender-based differences in rates of college enrollment, college completion and attainment, and employment.

Figure 2.11 Underemployment rate by gender and years since graduation



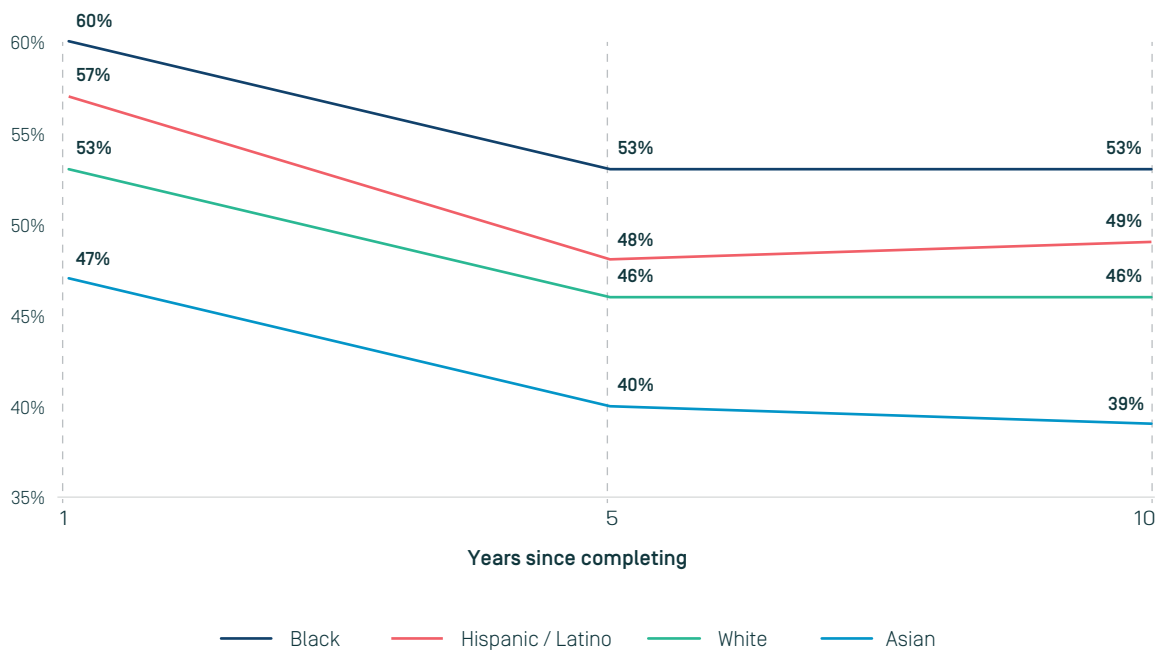
Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree one, five, and ten years after graduation.

Race/Ethnicity

Black graduates are most likely to be underemployed across races and ethnicities, while Asian graduates are least likely. One year after graduating, 47 percent of Asian graduates are underemployed compared with 60 percent of Black graduates, 57 percent of Hispanic and Latino graduates, and 53 percent of white graduates (Figure 2.12). Five years after graduation, the relative positions of the racial and ethnic groups remain consistent, even as all groups experience lower rates of underemployment: from 60 percent to 53 percent for Black graduates, from 57 percent to 48 percent for Hispanic and Latino graduates, from 53 percent to 46 percent for white graduates, and from 47 percent to 40 percent for Asian graduates.

These disparities reflect broader racial disparities in our education systems and in the labor market. Black, Hispanic, and Latino graduates remain concentrated at inclusive colleges that have fewer resources and support services, and less access to networks, while white and Asian students are increasingly concentrated at selective universities. Labor market discrimination is also a factor that influences these outcomes: a wide body of research shows consistently that Black graduates are less likely to be hired than other applicants with the same qualifications.²²

Figure 2.12 Underemployment rate by race/ethnicity



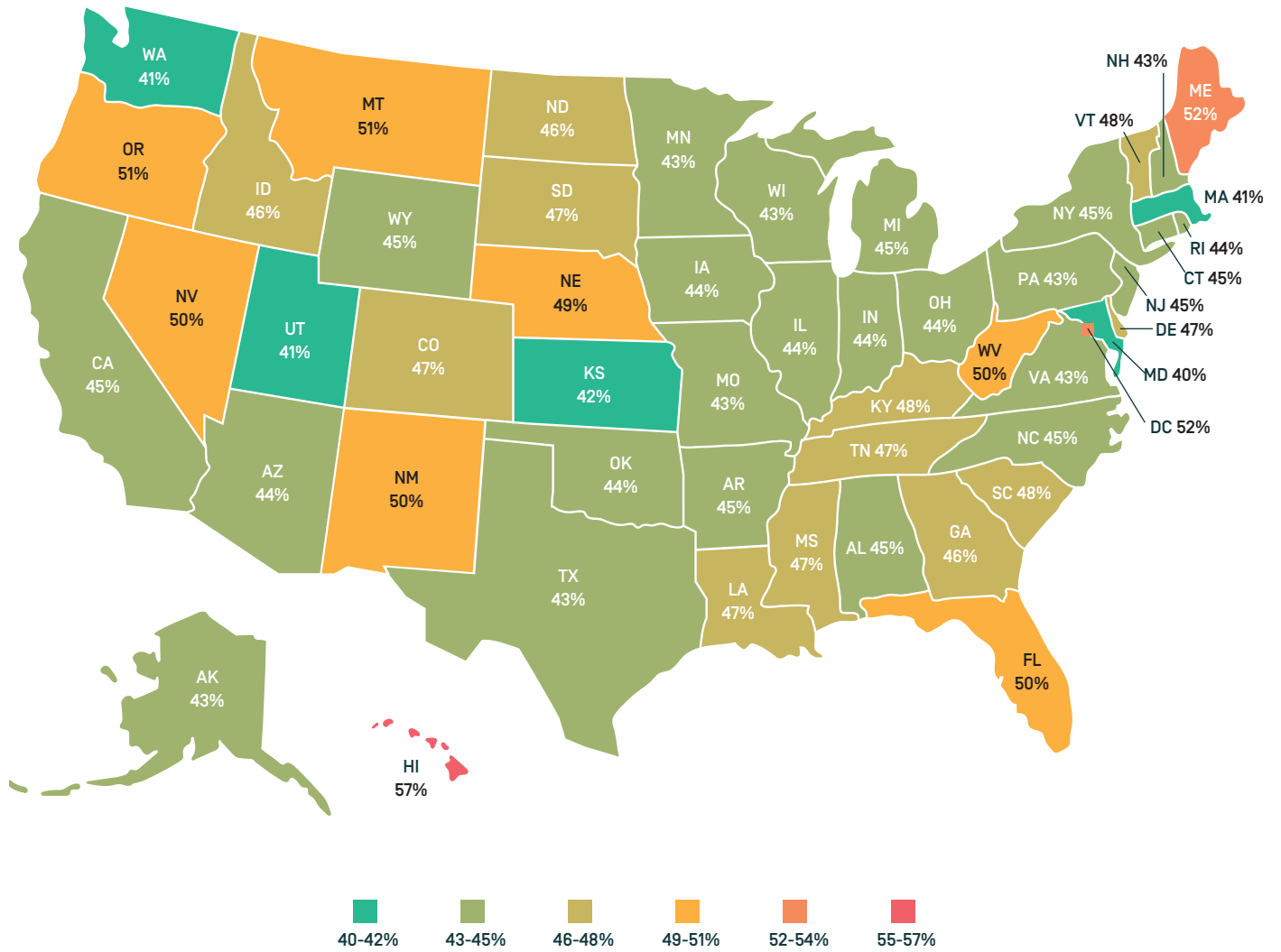
Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022.
Calculated for workers with a terminal bachelor's degree one, five, and ten years after graduation.

Geography

Underemployment rates vary widely by state. In Hawaii, 57 percent of college graduates were underemployed five years after completing, compared with 40 percent of graduates in Maryland (*Figure 2.13*). Dispersion across state-based estimates can be explained by an array of economic, education, and individual factors affecting local labor market supply and demand, including:

- **The occupational structure of a state's labor market.** All else being equal, states with a lower concentration of college-level jobs (e.g., Hawaii, with a largely tourism-driven economy) are more likely to have higher rates of underemployment.
- **The education and skills of the state's existing workforce.** In states with many college graduates per college-level job opening, newly minted college graduates are more likely to be underemployed than in states with fewer college graduates for each college-level job opening.
- **Talent migration.** Flows of college graduates in and out of states may influence the ability of newly minted college graduates to secure college-level jobs.
- **The degree fields and skill composition of newly minted college graduates in the state.** States whose graduates' degree fields and other skills are better-matched to the state's talent needs will have lower rates of underemployment, on the margin.

Figure 2.13 Underemployment rate by state



All four-year college graduates: 45%

Source: Burning Glass Institute analysis of American Community Survey, 2017-2022.
 Calculated for workers with a terminal bachelor's degree ages 26-30.

Part 3.

Escaping Underemployment

Those who graduate into underemployment often pay a heavy price—one that too often plays out across their careers. However, underemployment need not be a life sentence. A meaningful share of underemployed graduates are eventually able to escape into college-level employment. Mapping pathways for escaping underemployment helps

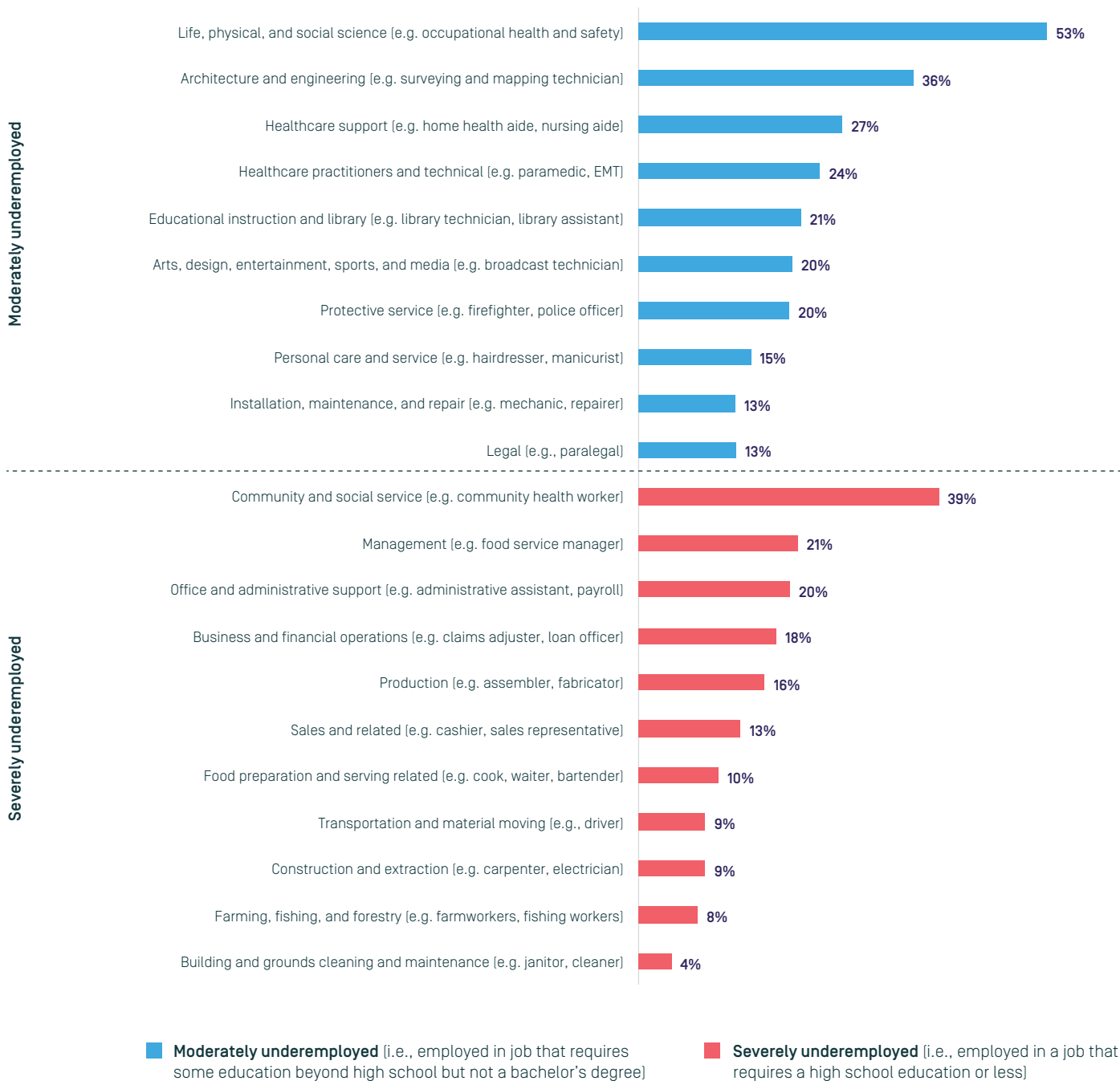
create a playbook for better supporting those at risk, and yields understanding as to what kinds of levers and policy solutions may help others in similar circumstances. For example, charting differences—across majors, first jobs, and onward career steps—is key both to avoiding pitfalls and improving chances of recovery.

Initial Occupation

For those who wind up underemployed, some jobs offer better prospects of advancing to college-level employment. The ability to escape underemployment in the first five years after leaving school depends in part on starting occupation (*Figure 3.1*). Graduates who are severely underemployed (i.e., working in jobs that require no more than a high school degree) are substantially less likely to escape than those who are moderately underemployed (i.e., working in jobs that require at least some education beyond high school but not a bachelor's degree). Only 16 percent of college graduates who initially are severely underemployed escape to college-level employment within five years of completing, whereas 26 percent of those who start out moderately underemployed do so.

Even for underemployed graduates of a given major, the type of job they take on soon after graduation has a strong relationship with their likelihood of later moving into a college-level job. When it comes to underemployment, majors matter. Even within degree fields, however, there are big differences in the likelihood of escaping underemployment based on the job that graduates initially take (*Figure 3.2*). For example, among graduates with degrees in visual and performing arts, the probability of escape is double for those who start off in community and social service jobs [45 percent] versus office and administrative support [21 percent].

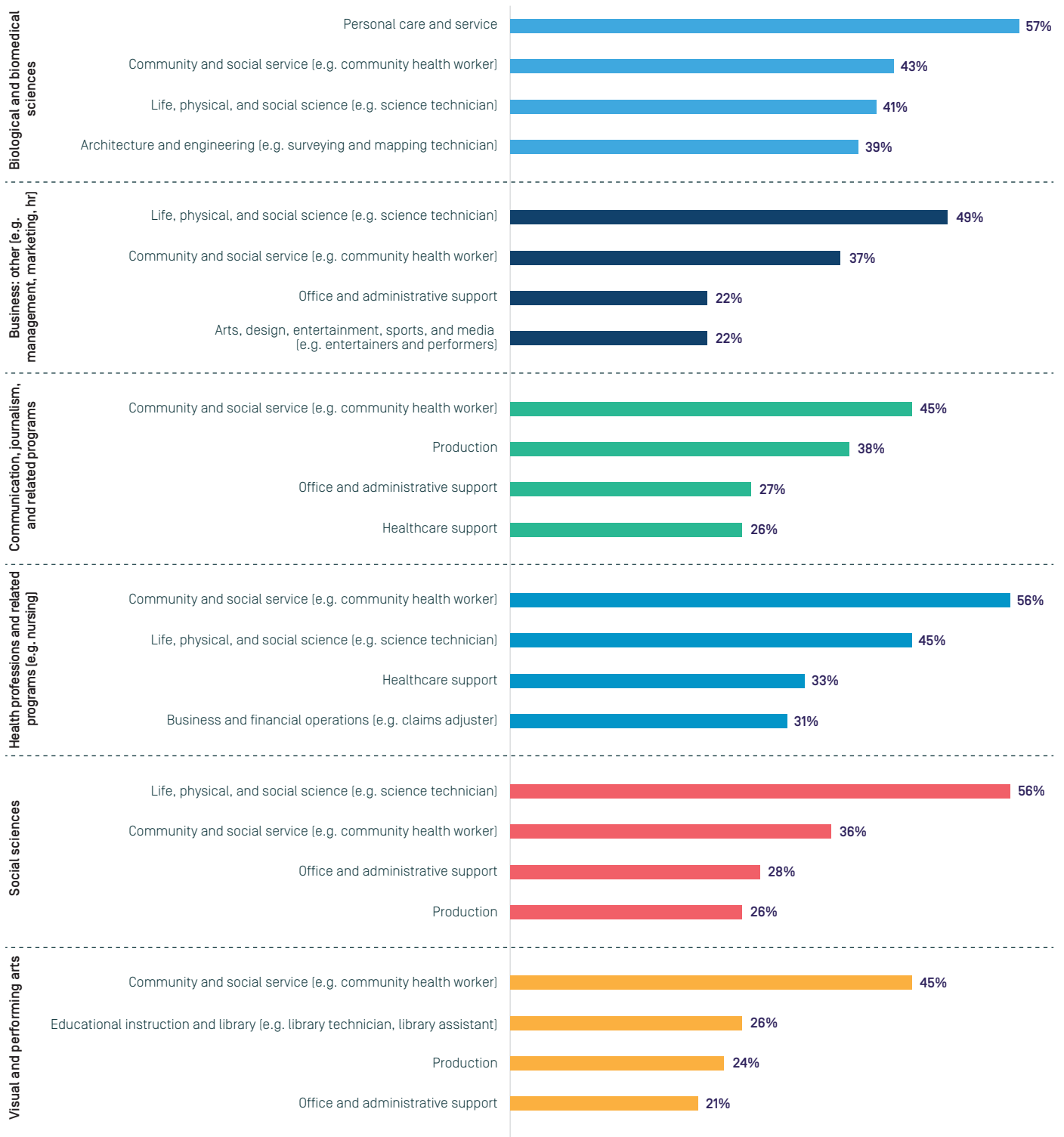
Figure 3.1 Share of initially underemployed college graduates who escape underemployment by occupation group and underemployment severity*



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022; Bureau of Labor Statistics' Employment and Typical Entry-Level Educational Requirements by Occupation, 2021. Calculated for workers with a terminal bachelor's degree who are underemployed one year after graduation.

*Note: Each occupation group includes only workers who are moderately or severely underemployed, respectively, within each group. For example, the healthcare support bar reflects only healthcare support workers who are moderately underemployed, while the production bar represents only production workers who are severely underemployed.

Figure 3.2 Share employed in college-level jobs five years after graduating, among those underemployed a year after graduation, by degree field and initial occupation*



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for workers with a terminal bachelor's degree underemployed one year after graduation.

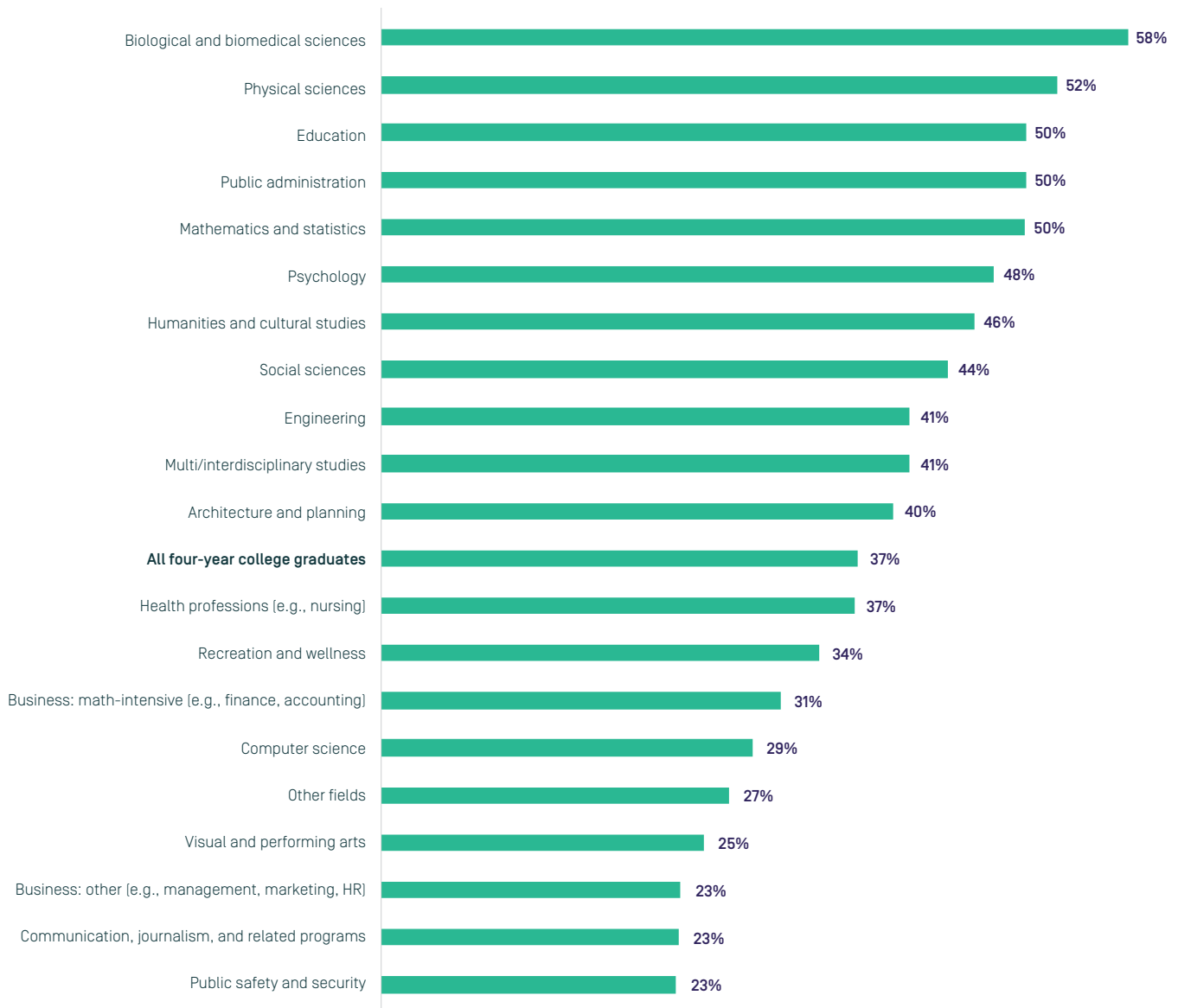
*Note: Each occupation group includes only workers who are moderately or severely underemployed, respectively, within each group. For example, the healthcare support bar reflects only healthcare support workers who are moderately underemployed, while the production bar represents only production workers who are severely underemployed.

Advanced Degrees

While advanced degree holders are not the principal focus of this report, many underemployed graduates go on to earn an advanced degree, whether as a continuation of their planned education path or as a means of escaping underemployment. Overall, those who earn advanced degrees represent a sizable minority of graduates—and their ranks could go part of the way toward explaining the high stickiness of underemployment for those whose

bachelor's is a terminal degree. Thirty-eight percent of four-year college graduates go on to earn an advanced degree, such as a master's, professional, or doctoral degree (Figure 3.3). The rate at which college graduates earn advanced degrees varies substantially by their undergraduate degree field: from 23 percent for public safety and security and communications to 58 percent for biology and life sciences.

Figure 3.3 Advanced degree attainment by undergraduate degree field



Source: Burning Glass Institute analysis of American Community Survey, 2022. Calculated for bachelor's degree holders, ages 22–65.

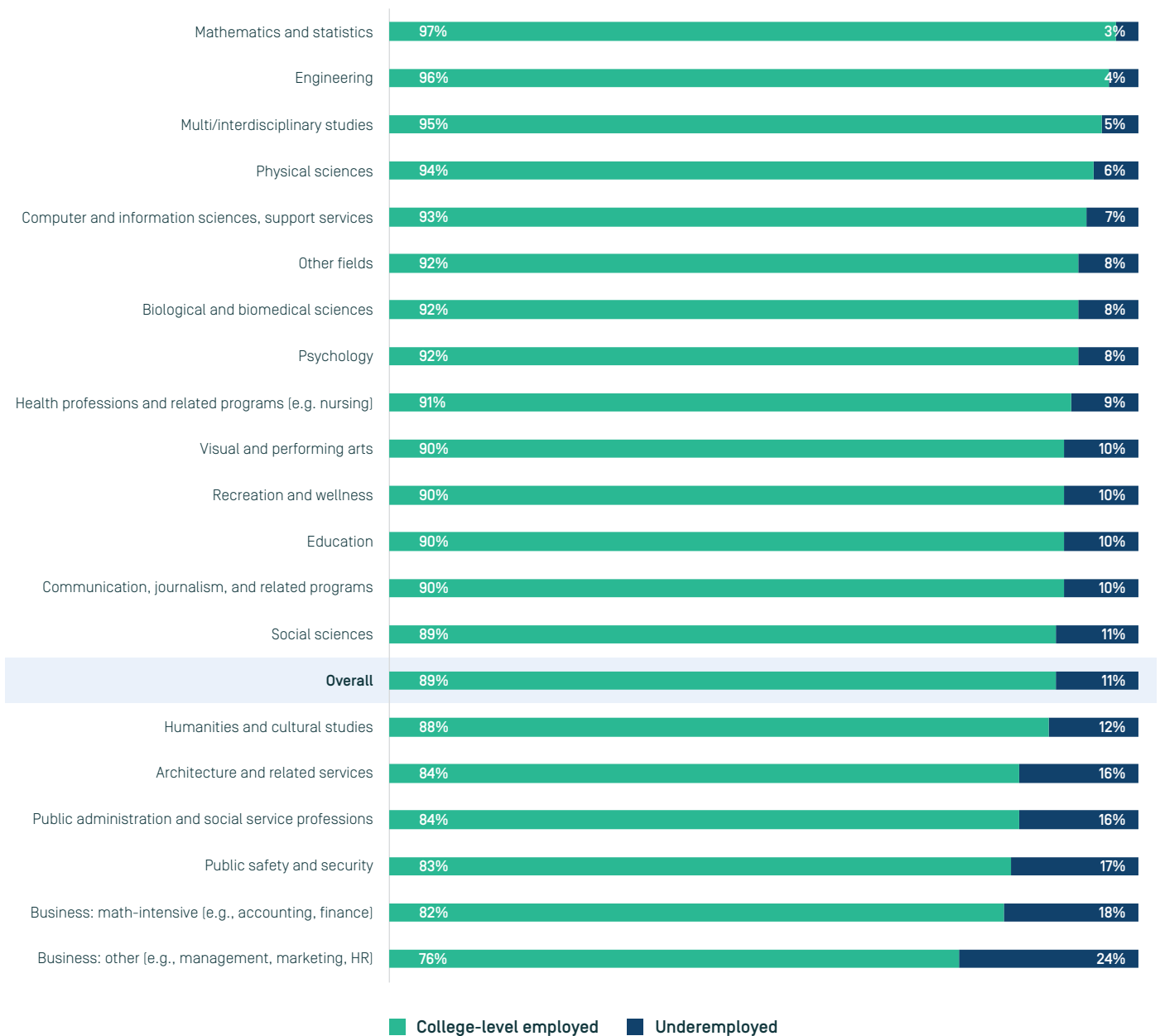
The share of underemployed graduates who enrolled in graduate degree programs grew significantly through the 2000s but has since been declining. For workers with bachelor's degrees who find themselves underemployed, pursuing an advanced degree can offer a pathway to escape underemployment and access to higher-wage professions. In fact, in the 2000s, the share of underemployed graduates who enrolled in graduate degree programs grew every year. Since then, however, the rate at which underemployed graduates pursue advanced degrees has been declining as the labor market has returned to full employment. In spite of this decline, almost 1 in 5 underemployed graduates enrolls in a graduate degree program within five years of completing their bachelor's degree.

Trends in the share of underemployed who pursue graduate study vary widely by their bachelor's degree field. The largest shares of those underemployed who finished a bachelor's degree in 2010 and enrolled in graduate school any time over the next five years were workers with degrees in public administration (41 percent), biological and biomedical sciences (37 percent), psychology (36 percent), and physical sciences (36 percent).

Underemployed bachelor's degree holders who do go back and complete a graduate degree typically achieve greater protection against continued underemployment. For graduates of many programs of undergraduate study, returning to school to pursue advanced training can be an effective route to college-level employment (*Figure 3.4*). Among underemployed undergraduates who leave the workforce and go back to graduate school, only 3 percent of those who earn advanced degrees in mathematics and statistics remain underemployed after completing graduate school. Those earning a graduate degree in engineering (4 percent), computer science (7 percent), health professions and related programs (9 percent), or education (10 percent) have similarly low rates of underemployment.

However, not every graduate degree helps mitigate underemployment to the same extent. For previously underemployed individuals who earn a graduate degree in general business programs, such as management, marketing, and human resources-related programs, 24 percent of graduates remain underemployed.

Figure 3.4 Occupational employment outcomes for graduate degree holders who were initially underemployed one year after finishing their bachelor's program, by graduate degree field



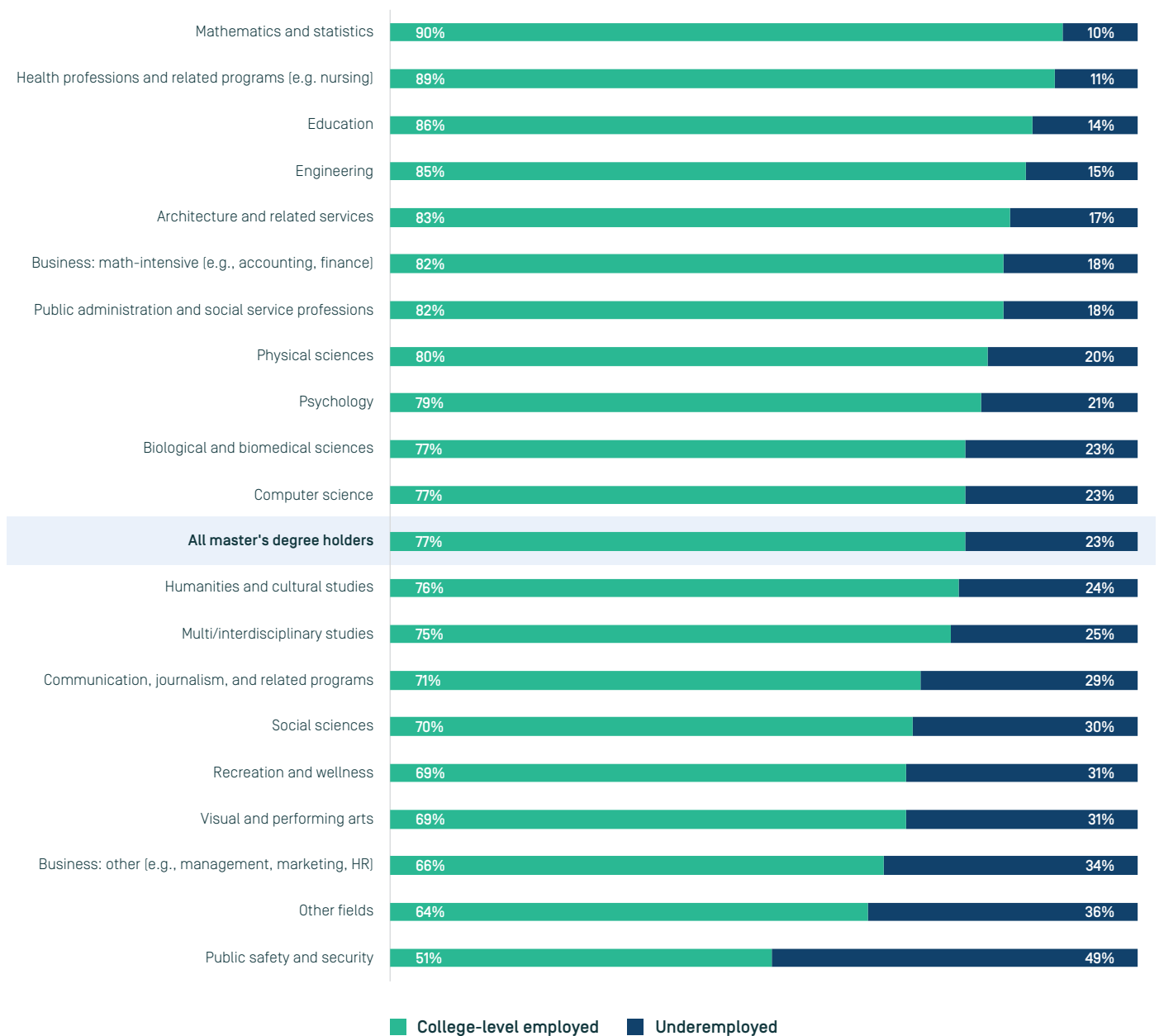
Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated for graduate degree holders, including master's and doctoral degrees, one year after completing the graduate program, who were initially underemployed after completing a bachelor's degree.

Earning a graduate degree is not a sure bet.

While earning an advanced degree is an effective route to college-level work for many, the efficacy of this strategy varies substantially by advanced degree program (Figure 3.5). The most common advanced degree is the master’s degree, held by 75 percent of those with an advanced degree.²³

Among those with a master’s degree, just 10 percent of those earning degrees in mathematics and statistics are underemployed five years after graduating, compared with 34 percent of those with master’s degrees in non-math intensive business fields, such as HR, management, and marketing.

Figure 3.5 Underemployment rate by master’s degree field for all workers with a master’s degree



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2022. Calculated five years after completion of master’s degree.

Implication: Escaping Underemployment

While underemployment can quickly become a permanent detour, there are steps the underemployed can take to achieve college-level employment, including:

- **Complete an advanced degree program.** Depending on their long-term career goals, individuals may consider pursuing an advanced degree. The same evaluation of cost, likely post-degree employment, and earning power undertaken for an undergraduate degree is important.
- **Secure a starting job with better odds of escape.** For those unable to initially secure a college-level job, salary shouldn't be the only consideration for choosing among available options. Some initial jobs have considerably higher probabilities of escape, even among those with similar pay. In general, occupations in which more college graduates are employed offer better prospects for escape [e.g., science technicians, allied health professions, and teaching assistants], even when those occupations do not themselves require a college degree for entry. Similarly, teaching and human resources are among the most traveled escape routes for underemployed college graduates.
- **Consider opportunities in vibrant regions with abundant college-level jobs.** Graduates facing difficulty finding college-level jobs in their local labor market may have better success by expanding their horizons beyond their community. In some cases, graduates have difficulty finding college-level jobs in particular areas, but their skills are in high demand in other labor markets across the country. If a relocation is possible, graduates may find more opportunities in regions where there are more abundant job opportunities for graduates with their particular skill profile.
- **Attain more quantitative skills** in-demand in occupations with the highest rates of college-level employment through short-term certificates, bootcamps, or training programs.



Recommendations for Policymakers, Colleges and Universities, and Students



Policymakers and institution leaders can substantially reduce the risk of underemployment by dramatically increasing access to paid work-based learning opportunities and education-to-career coaching; making the occupational outcomes of college programs transparent; and adjusting funding models for public institutions so that all students interested in pursuing degree programs associated with high-wage, college-level jobs can do so.

Recommendation 1.

Enable every college student to access at least one paid internship.



Today, only 29 percent of college graduates have completed a paid internship.²⁴ However, paid internships offer a proven route to college-level employment.

- **Policymakers** should offer incentives to employers to expand paid internships and invest in partnerships between colleges and universities and employers to promote access to paid internships.
- **Colleges and universities** should collaborate with employers to cultivate more paid internship opportunities, especially in industries with abundant college-level job opportunities, and connect students with available resources to enable them to pursue internships.
- **Students** should actively seek out and secure at least one paid internship to complement their academic learning and increase their odds of securing a college-level job after graduating.

Recommendation 2.

Ensure that everyone has access to clear employment outcomes by college and degree program, with earnings and occupation data included.

2

Over the past decade, the federal government (via the College Scorecard) and many states have greatly expanded the amount of information available to individuals about earnings outcomes for most colleges and degree programs. However, relatively little data is published by institution or degree program about the proportion of graduates who secure a college-level job. This concerning lack of transparency could be addressed by adding occupation to the unemployment insurance wage records already filed by employers every quarter. This change would also enable myriad other benefits for employers and job seekers alike.²⁵

- **Policymakers** should develop the ability to measure and report the occupational employment outcomes of college degree programs to inform decision-making by educators, students, families, and other stakeholders. This includes enhancing unemployment insurance wage records to include job titles²⁶ and adding college-level employment for four-year college graduates as a specific indicator in public-facing data dashboards. States with comprehensive reporting of occupational information through enhanced wage records could add this indicator to their interactive sites for education-to-employment reporting, and the Department of Education should consider adding occupational outcomes information on its College Scorecard (*Figure R1*).²⁷

Recommendation 3.

Provide quality education-to-employment coaching to every college student.

3

Today, few students receive personalized education-to-employment coaching and guidance. For example, the ratio of students to career services staff at colleges and universities is 1:2,263.²⁸ What's more, there is some emerging evidence that learners who receive high-quality coaching and guidance are more likely to experience a positive economic outcome following the completion of their program.²⁹

- **Policymakers** should provide targeted funding to enable public colleges and universities to deliver quality education-to-career coaching to all students, giving institutions flexibility for how they deliver it. Colleges and universities often lack the resources to hire coaches, advisors, and mentors to help students reflect on their talents and interests, choose a career goal, map pathways through education, and navigate challenges faced along the way.
- **Colleges and universities** should ensure students have timely, clear, and personalized guidance about education-to-career pathways. Students deserve to understand what steps they can take to reduce underemployment risk, including choice of major (and minor[s]), participation in work-based learning (e.g., internships), campus leadership experiences, and college GPA. Educators should provide quality, personalized education-to-career coaching for all students, beginning early in each student's educational journey.

Recommendation 4.

Ensure that every student has access to degree programs that lead to well-compensated, college-level employment.

4

Many bachelor's degree programs with the best employment outcomes (i.e., relatively high wages and college-level employment), such as computer science, data science, engineering, or nursing, also cost substantially more for institutions to deliver than programs with less attractive employment outcomes. Reasons for their higher program delivery costs include higher market salaries for faculty, as well as higher costs for laboratory-intensive courses. There is a strong correlation between programs with high delivery costs and those with strong restrictions to access, suggesting that a major reason for these restrictions is that state funding formulas, which largely do not reflect program delivery costs, effectively disincentivize institutions from expanding enrollment in high-cost programs – even when both employer and student demand is high. Importantly, the solution is not to reduce funding for liberal arts programs, as those lower-cost programs often subsidize higher-cost programs.

- **Policymakers should eliminate disincentives for public colleges and universities to meet student demand for degree programs that typically lead to well-compensated, college-level employment.** By focusing targeted new investments in programs that prepare students for well-compensated, college-level jobs, policymakers can also make progress toward their workforce and economic development goals, strengthening their regional and state economies by closing supply-demand gaps for talent. In order to avoid disrupting existing degree programs, these targeted investments, which could be structured in a performance-based manner (such as Virginia's Tech Talent Investment Program) and should be made on top of base funding for public institutions.

Figure R1.
Adding Occupational Outcomes to the College Scorecard

College Scorecard

[Home](#) [About the Data](#) [Search](#) [Compare:](#)

Jane Doe University

29,699 undergraduate students
[vt.edu](#)

Year

Public

City

Large

Special Designations:

Asian American and Native American Pacific Islander-Serving Institution

EXPAND ALL CLOSE ALL

Fields of Study

Top Fields of Study at University

Out of 74 undergraduate fields of study at University, the 5 largest are shown below. (68 had relevant data on number of graduates.) [See All Fields of Study](#)

Sort By:
Largest Size
Highest Earnings
Lowest Debt
College-Level Employment

Field of Study	College-Level Employment Rate
Management Sciences and Quantitative Methods - Bachelor's Degree	92%
Mechanical Engineering - Bachelor's Degree	85%
Liberal Arts & Humanities - Bachelor's Degree	69%

Median Earnings

\$40,000

Median Total Debt After Graduation

\$13,500

Monthly Earnings

\$3,333

Monthly Loan Payment

\$217

Number of Graduates

311

Occupation	Typical Education Required	Median annual earnings	Share of employment
Teacher	Bachelor's degree	\$43,000	15%
Human Resources	Bachelor's degree	\$50,000	4%
Customer service rep.	High school diploma	\$32,000	3%
Marketing manager	Bachelor's degree	\$52,000	3%
Receptionist / Information clerk	High school diploma	\$30,000	2%
Social worker	Bachelor's degree	\$26,000	2%

Include debt borrowed at any prior institutions Compare

Computer and Information Sciences, General - Bachelor's Degree	92%
Finance and Financial Management Services - Bachelor's Degree	81%

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Appendix A. Data Sources and Methods

Data Sources

The data used in this analysis came primarily from Lightcast's career history and job postings datasets. These include information on the educational attainment, employment, and career trajectories of more than 60 million workers, along with hundreds of millions of online job postings. This information was then combined with information from multiple federal education and labor datasets to capture extensive information about, for example, college-educated workers' alma maters, degree field, earnings, and geographic location.

Job Postings Data

Lightcast postings data captures labor market demand across occupations, industries, and educational attainment levels. This comprehensive database includes hundreds of millions of deduplicated online job postings that are updated daily and sourced from a wide array of online jobs boards, newspapers, and employer websites. This rich dataset includes a diverse array of information, including company name, location, requisite experience, internship opportunities, as well as desired education levels, certifications, desired skills, salary where advertised, and various job description data. Job postings data were used to identify, in conjunction with data from the Bureau of Labor Statistics, the share of employers that required a bachelor's degree for each occupation.

Profiles Data

The Lightcast Career Histories Database, or Lightcast profiles data, captures the career histories of workers and tracks, over time, the different occupations they are employed in. This dataset currently includes information on more than 60 million U.S. workers. It includes a wide array of listed career experiences, including

position, start and end dates, company, industry, job title, and location. The dataset also includes information on the education experiences of workers, including which educational institution they attended, education levels, and majors. The Lightcast profiles data were used to identify the occupations of workers in the decade following their graduation.

We captured each profile's educational attainment and graduation years, as well as a variety of other measures, such as their institution of graduation, their college major, and their predicted gender, race, or ethnicity. We then took snapshots of each profile's occupation in the years following their graduation. We matched these multiple occupations for each profile with their respective occupation-level underemployment measure (the exact methodology of its construction is described below) to determine whether a profile was underemployed at various time frames after their graduation. We examined profiles with graduation dates between 2012 and 2021, determined who was employed in 2022, limited the analysis to one occupation per profile per year, and only examined those occupations with a tenure of at least six months.

The resulting dataset included about 18.6 million unique observations, 10.8 million of which had a terminal bachelor's degree, 6.3 million had a master's degree, and 1.6 million had a doctorate or equivalent. In 2023, college graduates made up about 29 percent of the entire profiles dataset.

ACS data were then used to ensure the Lightcast profiles data better reflected the employed population in the U.S. Not all employed individuals create a LinkedIn profile, and those who do are not an accurate representation of all employed

individuals. For instance, we found that the share of those employed as General and Operations Managers with a terminal bachelor's degree are represented about four times more frequently in the profiles data as they are in the weighted census data, whereas Retail Salespersons with a terminal bachelor's degree were underrepresented by about 50 percent. In general, and on average, non-college-level occupations appear to be more frequently underrepresented in the profiles data.

To improve occupational representation, we divided the share of employed in each occupation out of the total employed between 2018 and 2021 using the Lightcast profiles data, by the share of employed in the ACS data over this same time frame. We then matched this measure to each individual's occupation at various years after their graduation in the profiles data, and used it to down weight where an individual's occupation was overrepresented, and upweight where the occupation was underrepresented.

To create more balanced estimates of underemployment for graduates by degree program, we expanded the weights to reflect both the distribution of workers across occupations for each category of educational attainment and graduates' bachelor's degree program of study for the same time period. We divided the occupational share of profiles data for each degree program and educational attainment by their ACS-equivalent shares and then applied the weights in analyses examining underemployment outcomes by degree program.

Bureau of Labor Statistics

The Bureau of Labor Statistics (BLS) dataset is a comprehensive collection of economic and labor-related data in the United States that includes key indicators such as employment, unemployment, inflation, wages, and productivity. The BLS gathers and disseminates this information through various surveys, including the monthly Employment Situation report, the Consumer

Price Index, and the Occupational Employment Statistics survey, among others. BLS data on educational attainment and employers' entry-level educational requirements by occupation were used to identify whether occupations were college-level, or whether bachelor's graduates were underemployed. Using this approach and a separate approach (described in more detail below), we found that our classifications were in agreement for every occupation. We additionally used BLS entry-level educational requirement data to determine which occupations were severely or moderately underemployed, as described below.

American Community Survey

The American Community Survey (ACS) is an ongoing survey conducted by the U.S. Census Bureau that provides detailed demographic, social, and economic data about the nation's population. It is the largest ongoing survey in the United States, collecting data from about 3.5 million households each year. The ACS collects data on a wide range of topics, including demographics such as age, sex, and race/ethnicity, as well as social and economic characteristics such as educational attainment, employment, income, and occupation. ACS data were used to adjust occupational representation of the profiles data (as described above), to determine earnings, to examine the full-time employment status of individuals by educational attainment and underemployment status, to analyze advanced degree attainment by bachelor's degree program, to determine underemployment by state, and to determine the number of severely underemployed by occupation.

U.S. Department of Education IPEDS

The U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) dataset is a rich and comprehensive resource that gathers and organizes a wide array of data pertaining to higher education institutions

across the United States. IPEDS includes data on enrollment, graduation rates, faculty demographics, financial aid, institutional finances, and more. IPEDS data was employed to determine the type of institution workers graduated from, to determine whether such an institution was a Historically Black College or University (HBCU) or a Hispanic-Serving Institution (HSI), and to assess institutional selectivity and the share of students who received Pell grants.

People Data Labs (PDL) and L2 Data

Data from PDL were used to determine individuals' gender within the Lightcast profiles data. These data were also used to predict the probability of individuals' race or ethnicity from a combination of PDL, L2 and Lightcast data. The probabilities were constructed using census data, racial and ethnic distribution by education for select geographies from the American Community Survey, and the racial or ethnic distribution of college graduates by institution from IPEDS.

How Underemployment Is Calculated

Underemployment is a concept that refers to individuals who are employed in jobs that do not fully utilize their skills, education, or availability.³⁰ This study focuses on the scenario in which workers are employed in positions that do not require the level of education, training, or expertise they possess. A common way that underemployment is characterized involves classifying jobs as college-level based on Occupational Information Network (O*NET) surveys of current workers, or by utilizing the BLS education assignments by detailed occupation.³¹ Another common approach involves classifying jobs as college-level based on whether a majority of workers in the jobs hold at least a bachelor's degree.

Determining which occupations require college-level education is challenging for several reasons. Among jobs with high demand from workers, employers may ask for more advanced degrees, not because they are necessarily required for the tasks to be done, but instead as ways to flag higher quality candidates. Estimates that rely largely on O*NET survey data risk missing evolving skills and credential requirements for many jobs, particularly those in technical fields, which can evolve more quickly than O*NET updates. This can

lead to a phenomenon known as incumbent worker bias, where workers who have been employed for longer time periods, or who gain regular on-the-job training can skew the survey results.

In this study, workers with a bachelor's degree are classified as underemployed based on whether the majority of workers in an occupation have or are required to have a bachelor's degree. To do this, for any given occupation we combined: [1] BLS data showing the education levels that other workers in the same occupation held, and [2] BLS researchers' determination of the typical entry-level education required for that occupation. To these we added a third component, job postings data showing what kind of education requirements employers were seeking for that occupation. We then created an averaged measure using these three components. In the end, our approach yielded the same occupational classification as the method used for the Bureau of Labor Statistics for their typical education assignments by detailed occupation.³²

To determine if a worker was employed in college-level work, we then compared workers' career trajectories using 2012 through 2022 Lightcast profiles data (adjusted to reflect the distribution

of workers across the U.S.) to our occupation-level underemployment measure. If a bachelor's degree graduate was employed in an occupation where less than half of workers either had, or were required to have, a bachelor's degree, they were classified as underemployed. For example,

a worker would be considered underemployed if they had earned a bachelor's degree and who after graduating was working in a sales job where less than half of workers either had a bachelor's degree or were required to have a bachelor's degree.

How Other Key Measures Are Calculated

Definition of “severely underemployed.” We classify graduates as “severely underemployed” if they have a bachelor's degree or higher but are employed in an occupation where the typical educational requirement for an entry-level position is either “a high school degree or equivalent” or requires “no formal educational credential.” We classify graduates employed in non-college-level jobs where the typical requirement is an associate degree or a “postsecondary nondegree award” as being “moderately underemployed.”

We used a combination of ACS and BLS occupation data to estimate the number of severely underemployed for 3-digit Standard Occupational Classification (SOC) equivalent occupational groups. As a first step, we matched ACS occupational categories to associated 6-digit SOC BLS occupations and then used 2021 BLS employment data to calculate the weighted share of those employed in occupations where the educational requirement for entry included either a high school diploma or less for each ACS occupation category. These averages were then multiplied by the weighted observation counts for 2022 ACS respondents who had bachelor's degrees and were employed in non-college-level occupations.

Description of state-based underemployment estimates. We identified graduates' state of employment using ACS data for workers with

terminal bachelor's degrees between ages 26 and 30, to attempt to capture the state of graduates' career about five years after their graduation.

Identification of degree fields for bachelor's and advanced degrees. We classified degree fields of graduates by using Lightcast profiles education data, and then grouped these majors together. For example, graduates in English and foreign language, history, philosophy, theology, and liberal arts and science programs were combined in a “humanities and cultural studies” category. We also separated business majors by their math intensity. For example, accounting and finance programs were combined, while majors like management, marketing, and HR were grouped together into a non-quantitative business major category. Finally, graduates in diverse fields such as natural resources, legal studies, and library studies were grouped together under an “other fields” header.

Classification of more selective, selective, and inclusive institutions. To identify the selectivity of educational institutions, we used 2021 IPEDS administrative data on four-year colleges and universities. Selectivity tiers are based on the American Council of Education's Carnegie Classifications.³³

Concentration of low-income students and how we classified institutions. We used 2021 IPEDS data to determine the share of students who received Pell grants for each four-year college

or university, then grouped these institutions across four relatively evenly distributed and easily understandable categories for further analysis: less than 25 percent of students who received Pell grants; between 25 and 40 percent; between 40 and 60 percent; and 60 percent or higher Pell grant recipient share.

How we analyzed internships. We used Lightcast’s profiles data to determine whether bachelor’s degree graduates were employed in a co-op or an internship by flagging graduates who had intern or co-op job titles during the duration of their college tenure, and excluding non-internship jobs during that tenure, such as camp counselors, retail salespersons, or employment at a college. To limit the potential bias of graduates who removed internships from their profile as their career progressed beyond their graduation date, we restricted analysis on internships and underemployment to workers in 2017 or later graduation years.

How graduate earnings were calculated. We used 2022 data from the ACS to determine median earnings for workers who were employed full-time, year-round (i.e., working at least 35 hours per week and 50 weeks per year) and not enrolled in school.

Regression analysis estimates. To determine the relationship between variables, including whether workers pursued an internship in college, and the probability of workers being underemployed a year after graduation, we employed logistic regression on a sample of about 3.5 million Lightcast profiles of bachelor’s degree graduates who completed degrees in 2017 or later. We controlled for several variables, including degree program, predicted gender, race, or ethnicity, selectivity of a graduate’s educational institution attended, and the share of Pell grant recipients at a graduate’s institution.

Limitations

A great deal of our analysis is based on real-time labor market information (LMI) such as job postings and professional profiles. While the quality of these data continues to improve, they are an imperfect data source. Unlike traditional sources of labor market information, such as the Bureau of Labor Statistics, real-time LMI is not necessarily representative of the entire labor market, though its coverage improves each year and we leverage weighting techniques to correct for gaps in representativeness. Along the same lines, real-time LMI does not include important demographic information, such as age, gender,

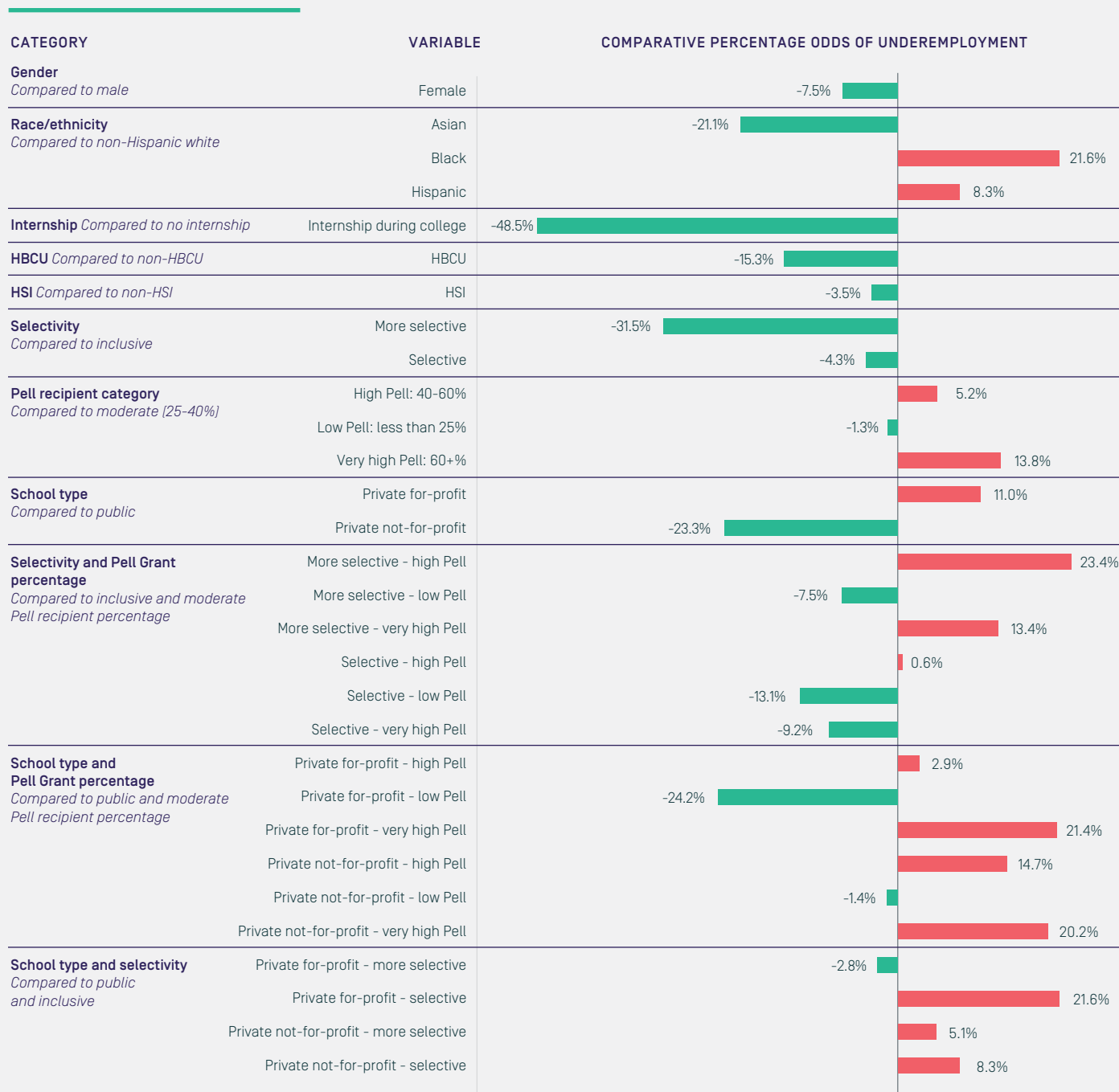
race, and ethnicity. We are able to impute some but not all of these characteristics with a high degree of confidence using modern statistical techniques. Importantly, we do not factor age or work experience into our analysis, both of which may influence employment outcomes.

Another important limitation is that it is highly likely that many factors that substantially influence our results are not included in our study, such as individual differences in family background, ambition, motivation, skills, and social capital that students possess prior to matriculating at college.³⁴

Appendix B. Predictors of Underemployment Regression Analysis

How to Interpret This Chart: The bars represent how the probability of being underemployed one year after graduation differs for the explanatory variables built into the logistic regression model when compared to baseline or reference values. In the case of gender, for example, the baseline

is male graduates, and the -7.5 percent in the top row can be interpreted as the following statement: “Controlling for other factors in the model, the odds of being underemployed one year after graduation are 7.5 percent lower for female graduates compared to male graduates.”



Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2017-2022. Calculated for workers with a terminal bachelor's degree one year after graduation.

Appendix C. Graduate School Enrollment for Initially Underemployed Workers with Bachelor's Degrees by Bachelor's Degree Field and Year

Bachelor's Degree Field	YEAR OF GRADUATION							
	2010	2011	2012	2013	2014	2015	2016	2017
Architecture and Planning	25%	27%	25%	30%	24%	24%	26%	27%
Biological and Biomedical Sciences	37%	35%	33%	32%	31%	30%	28%	28%
Business: Math-Intensive (e.g., Accounting, Finance)	24%	23%	23%	21%	20%	19%	18%	18%
Business: Other (e.g., Management, Marketing, HR)	16%	15%	14%	14%	13%	13%	12%	12%
Communication, Journalism, And Related Programs	14%	14%	12%	12%	12%	12%	12%	12%
Computer Science	16%	18%	15%	15%	17%	14%	12%	13%
Education	25%	27%	24%	23%	23%	23%	21%	19%
Engineering	27%	26%	25%	25%	23%	22%	20%	18%
Health Professions and Related Programs (e.g. Nursing)	26%	27%	26%	27%	27%	28%	26%	25%
Public Safety and Security	24%	23%	24%	21%	20%	21%	21%	17%
Humanities and Cultural Studies	29%	27%	26%	24%	24%	24%	23%	22%
Mathematics And Statistics	26%	27%	26%	23%	24%	22%	20%	23%
Multi/Interdisciplinary Studies	29%	28%	24%	24%	24%	24%	25%	22%
Other Fields	18%	18%	19%	18%	19%	18%	16%	16%
Recreation and Wellness	26%	25%	26%	24%	23%	25%	24%	24%
Physical Sciences	36%	34%	30%	28%	29%	25%	23%	22%
Psychology	36%	36%	34%	34%	33%	32%	32%	32%
Public Administration And Social Service Professions	41%	39%	37%	39%	38%	35%	36%	37%
Social Sciences	29%	29%	27%	26%	25%	25%	24%	22%
Visual And Performing Arts	13%	11%	11%	10%	10%	10%	8%	8%

Source: Burning Glass Institute analysis of Lightcast Career Histories Database, 2010-2022. Calculated for workers with a terminal bachelor's degree within five years after graduation.

Endnotes

- 1 This report is exclusively focused on the students and graduates of four-year colleges and universities.
- 2 Selingo and Sigelman, [“Yes, a College Degree Is Still Worth It,”](#) 2023.
- 3 Earnings are calculated for recent workers ages 22–27 who are employed full-time, year-round and not enrolled in school.
- 4 Notably, many graduates with a degree in biology go on to complete an advanced degree (e.g., master’s and doctoral degrees), whereas this analysis focuses on individuals with only a bachelor’s degree.
- 5 Graduates with advanced degrees are analyzed separately.
- 6 College-level jobs refers to jobs in occupations that typically require a bachelor’s degree.
- 7 Burning Glass and Strada Institute for the Future of Work, [The Permanent Detour](#), 2018.
- 8 U.S. Census Bureau, [“Educational Attainment in the United States: 2021,”](#) 2022.
- 9 McNair, [“Are liberal arts degrees worthless? ‘Employers don’t care what you major in,’ says career expert,”](#) 2023.
- 10 U.S. Census Bureau, [“CPS Historical Time Series Tables,”](#) 2023.
- 11 Pew Research Center, [“Women now outnumber men in the U.S. college-educated labor force,”](#) 2022.
- 12 The extent to which graduates escape underemployment and secure college-level jobs is analyzed in more detail in Part 3.
- 13 See Appendix C.
- 14 We explore this in more detail in Part 3.
- 15 Sheffey, [“Inside the scandal-ridden for-profit education industry, which churns out quick degrees and loads student-loan borrowers up with debt,”](#) 2022.
- 16 See Appendix B.
- 17 See Appendix B.
- 18 Carnevale and Strohl, [Separate & Unequal](#), 2013.
- 19 See Appendix B.
- 20 See Appendix B.
- 21 Notably, these results differ from our 2018 report, *The Permanent Detour*, which found higher rates of underemployment for women than men. This change most likely resulted from improvements to our methods to weight the profiles data so that it was more representative of the occupational distribution of employment. See Appendix A for a detailed discussion of our data sources and methods.
- 22 Kline et al., [“Systemic Discrimination Among Large U.S. Employers,”](#) 2022
- 23 U.S. Census Bureau, [“Educational Attainment in the United States: 2021,”](#) 2022.
- 24 Torpey-Saboe et al., [The Power of Work-Based Learning](#), 2022.
- 25 Workforce Information Advisory Council, [Enhanced Unemployment Insurance Wage Records Subcommittee Expedited Recommendations](#), 2020.
- 26 Administrative Wage Record Enhancement Study Group, [Enhancing Unemployment Insurance Wage Records](#), 2015.
- 27 This is a long-term aspirational goal that would require the inclusion of occupational information in administrative data systems such as state unemployment insurance wage records.
- 28 National Association of Colleges and Employers, [Career Services Benchmarks Survey Report](#), 2022.
- 29 MDRC, [From Degrees to Dollars: Six-Year Findings from the ASAP Ohio Demonstration](#), 2023.
- 30 Underemployment can, for example, be alternatively defined as the percent of people in the labor force working part time that would prefer to be working full time, or by looking at the percent of people working full time on wages that do not meet basic living expenses.
- 31 Bureau of Labor Statistics, [“Measures of education and training,”](#) 2023
- 32 Bureau of Labor Statistics, [“Education assignments by detailed occupation,”](#) 2024.
- 33 American Council of Education, [Undergraduate Profile Classification](#), 2024.
- 34 Dale and Krueger, [“Estimating the Return to College Selectivity over the Career Using Administrative Earnings Data,”](#) 2011.

