

CHAPTER 5

Postsecondary Education and Economic Opportunity

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The New Consensus: Postsecondary Education Is the Legitimate Arbiter of Economic Opportunity

Education has always played both a social and an economic role in the United States. Since the industrial revolution, Americans have looked to education to help reconcile the equality implicit in democratic citizenship with the inequality natural to market economies. After the closing of the frontier in the late nineteenth century, education became an important route to economic success. In the post-World War II era, education gradually evolved into the preferred and the most well-traveled route to good jobs. While not new, the correlation between education or training after high school and career success has strengthened dramatically since the 1980s.¹ Education and economic opportunity are more closely linked than ever. Today, the overwhelming consensus is that access to postsecondary education or training is necessary for access to the middle class—and the data support this consensus. The recession of 2007 accelerated this trend, both through the elimination of many good jobs that required high school or less and through the strengthening of the importance of postsecondary education. Social policy analysts and commentators are now rightfully worried that workers without any postsecondary education will fall behind in the twenty-first-century economy (Cohen and Balz 2011).

This new reality finds wide support in American society because, in theory, using access to postsecondary education to drive economic opportunity

and career choice allows us to expand merit-based opportunity without surrendering individual responsibility. The consensus view that educational achievement is the legitimate arbiter of economic opportunity is even stronger because it complements an American preference for a relatively open economy and limited government. In other words, the education consensus has allowed us to anchor economic opportunity in a merit-based system driven by individual responsibility without the government's being too heavy-handed with either the economy or the labor market.

The growing role of postsecondary education and training as the arbiter of economic opportunity seems fair. Individual performance appears more salient than social markers in determining the college access and success that lead to good jobs. But our emphasis on individual performance in education masks the underlying social structures that sort and rank students long before the college admissions offices get involved. The education consensus is not entirely fair because access to education is not fair.²

The American success formula rests on the notion that merit-based opportunity represents a just means for allocating social benefits. Yet both merit and opportunity are powerfully influenced by coincidences of birth that give some children advantages over others. In a society where people start out unequal, educational achievement measured by test scores and grades can become a dodge—a way of laundering the money that comes with being born into the right bank account or the right race or ethnicity (Rothstein 2004). We know that more advantaged students go to college and graduate at much higher rates than equally qualified students from working families and low-income families. The American postsecondary system is becoming a dual system with the less advantaged half of the nation's students concentrated in the least selective four-year colleges and in community colleges. White students and the relatively more advantaged postsecondary students are more and more concentrated in the most selective colleges (Carnevale and Strohl 2010).

This unavoidable reality is readily apparent long before the selective college admissions process. According to Alden Thresher, a former admissions director at MIT and chair of The College Board:

Though the prim college regulations . . . have been evolving for three centuries . . . most of the real screening has all along been done by the accidents of socioeconomic origins, early environment, and the

various levels of aspirations and subcultures . . .

. . . [T]he sorting forces of many kinds of operation as easily granted, on the principle is water. (Thresher)

The seminal work of Virginia shows that for between innate abilities the time they are of college you come from a poor able to "be all you can measured differences in difference in the development income adolescents. For make more than \$60,000

But fair or not, the more than mere cultural bias logical changes have speed and training.³ Technology continue to drive growth

- the fastest-growing industry, engineering, and professionals—require education levels; and
- over time, all occupations.

About 28 percent of the population is because of new the growth of occupational (author's calculation from surveys).⁴ The vast majority requirements, however, c

various levels of aspiration habitually characterizing particular groups and subcultures . . .

. . . [T]he sorting process involves the interaction of sociological forces of many kinds. Some are so familiar and so subtle in their operation as easily to escape notice; they come to be taken quite for granted, on the principle that the last thing a fish would ever notice is water. (Thresher 1989: 4–5)

The seminal work of Eric Turkheimer and his team at the University of Virginia shows that for most low-income children, there is little relationship between innate abilities measured in childhood and aptitudes developed by the time they are of college age (Turkheimer et al. 2003). In other words, if you come from a poor or working-poor family, chances are you will not be able to “be all you can be.” Conversely, Turkheimer and his team find that measured differences in innate abilities as children account for most of the difference in the developed aptitudes among college-age middle- and upper-income adolescents. For the most part, kids who come from families that make more than \$60,000 a year do get a shot at being all they can be.

But fair or not, the link between education and success is based on more than mere cultural biases or political convenience. Economic and technological changes have spurred increasing demand for postsecondary education and training.³ Technology and increased productivity from education continue to drive growth in the economy as a whole, with the results that

- the fastest-growing occupations—such as STEM (science, technology, engineering, and mathematics), health care, and managerial professionals—require workers with disproportionately higher education levels; and
- over time, all occupations are increasingly requiring more education.

About 28 percent of the increase in demand for postsecondary education is because of new occupations requiring postsecondary education or the growth of occupations that already required high levels of education (author’s calculation from 1980 and 2010 March Current Population Surveys).⁴ The vast majority (72 percent) of the shift toward postsecondary requirements, however, comes from the demand for higher skill levels in

Table 5.1. Education Distribution across Household Income Deciles (1970–2007)

	<i>Lower-Income Class (Lower 3 Deciles)</i>	<i>Middle-Income Class (Middle 4 Deciles)</i>	<i>Upper-Income Class (Upper 3 Deciles)</i>
<i>1970</i>			
High school dropouts	39%	46%	15%
High school graduates	22%	60%	18%
Some college/associate's degree	19%	53%	28%
Bachelor's degree	16%	47%	37%
Graduate degree	13%	46%	41%
<i>2007</i>			
High school dropouts	59%	33%	7%
High school graduates	35%	45%	19%
Some college	29%	45%	26%
Associate's degree	20%	45%	35%
Bachelor's degree	14%	38%	48%
Graduate degree	9%	30%	61%

Source: Carnevale, Smith, and Strohl 2010: 3.

Note: Postsecondary education has become the threshold requirement for a middle-class family income. In the older data (1970), the education code in the questionnaire did not distinguish between associate's degrees and some college (which includes those with a few college credits and those who have completed postsecondary vocational certificates). In later years, the questionnaire specifically separates these two divisions.

the share had fallen to 45 percent. The share of people with some college but no degree in the middle class has fallen from 53 percent to 45 percent between 1970 and 2007.

Over that same period, people with college degrees (associate's, bachelor's, and graduate degrees) have either stayed in the middle class or boarded the escalator upward to the highest three family income deciles. The share of people with bachelor's degrees in the middle class declined from 47 percent to 38 percent, decreasing by nine percentage points. But the share of people with bachelor's degrees in the top three income deciles jumped from 37 percent to 48 percent. Meanwhile, the share of people with graduate degrees in the middle class declined from 46 percent to 30 percent—a decrease of 16 percentage points. But, clearly, the people leaving the middle class with graduate degrees were leaving for higher wages, as the share of people with graduate degrees in the top three income deciles increased from 41 to 61 percent.

Lifetime Earnings from College Are High in the Long Term

While the economic return on college may drop off in the short term, as it has in the current recession, lifetime earnings from college are high in the long term. College-educated workers earn more—but what is a degree really worth over a lifetime? A 2002 Census Bureau study estimated that in 1999, the average lifetime earnings of a bachelor's degree holder were \$2.7 million (2009 dollars), 75 percent more than the amount earned by high school graduates in 1999 (Cheeseman Day and Newburger 2002). Today, we find similar numbers—but since 1999 the premium on college education has grown, to 84 percent. Figure 5.1 below illustrates the differences in median lifetime earnings by degree level, showing a steady progression in lifetime earnings from \$973,000 for high school dropouts to \$3,648,000 for professional degrees.⁵

But what if people took the money they spend on college, and instead of spending it on their education, they invested it in blue chip long-term government bonds? The investments would grow over a lifetime. Would the investment be more valuable than the college degree? The financial payoff from college over forty working years is often measured differently, because money in hand is more valuable than money in the future. To adjust for that, we calculate what economists and financiers call the *present value* of degrees (PV) and can therefore do a hypothetical cost-benefit analysis of attending college as opposed to investing the college costs. If we start today and look forward to earning \$1 million in additional pay over forty years that result from our college investment, then the present value tells us how much money is required today at an assumed interest rate to yield that amount in the future. Assuming an interest rate of 2.5 percent (the real interest rate of long-term government bonds), then a conservative estimate of the present value of the lifetime average marginal return from a bachelor's degree over a high school diploma is about \$300,000. To determine if a college degree is worth it, we must simply ensure that the discounted cost of the degree⁶ is less than \$300,000 expressed in today's dollars.⁷

However, the economic costs of attending college should also include the indirect cost of income forgone while students are in school, plus the direct costs of tuition, books, and other necessities.⁸ Two-thirds of students pay less than \$15,000 per year for college, and more than 75 percent of students attend four-year colleges that cost less than \$24,000 in tuition and fees per year. Less than 5 percent of college students go to schools that cost more



Figure 5.1. Estimated median lifetime earnings by degree level. Carnevale, Rose, and Strohl (2009).

than \$39,000 per year. For example, students who attend community colleges receive about \$39,000 per year (Carnevale and Ma 2010).

For argument's sake, let's assume that the majority of students who attend college receive a conclusion: over the long term, the net benefit is \$80,000.⁹ Therefore, the net returns of \$300,000.

Not only is college education a source of economic stability, it provides other economic benefits. Workers with a college degree have higher earnings rates over the past thirty years. College graduates provide a possible shelter from the economic downturn for being hired in the current market. Workers in both good and bad economic times are much more at risk of being laid off than long march back to no work.

A college education is a long-term investment. When it rains it pours.

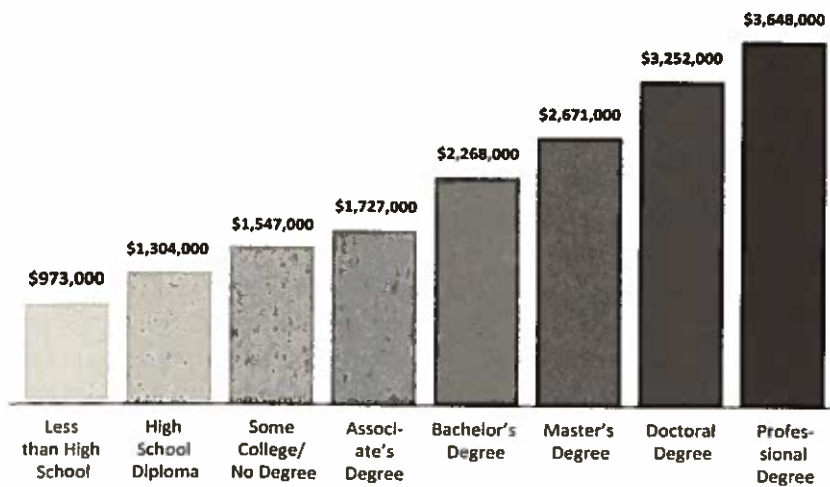


Figure 5.1. Estimated median lifetime earnings by education level. *Source:* Carnevale, Rose, and Cheah 2011: 3.

than \$39,000 per year, according to the College Board (and two-thirds of students who attend these schools don't pay the full sticker price) (Baum and Ma 2010).

For argument's sake, we have taken the larger of those estimates that the majority of students pay into consideration for our calculations. Our conclusion: over the length of a four-year degree, the estimated cost is around \$80,000.⁹ Therefore, costs for college are well below the median expected net returns of \$300,000.

Not only is college worth the cost in sheer economic terms, but it also provides other economic benefits as well, such as career choice and employment stability. Workers with college degrees had the lowest unemployment rates over the past three years (as they have historically), receiving the best possible shelter from the recession of 2007. They also have the best prospects for being hired in the recovery. They are the most trainable and adaptable workers in both good and bad economic times. This means that high school graduates and dropouts (without postsecondary education or training) are much more at risk of being left behind as the economy plods forward in the long march back to normalcy.¹⁰

A college education does not make one immune to economic recession, of course. When it rains long enough and hard enough, everyone gets a little wet.

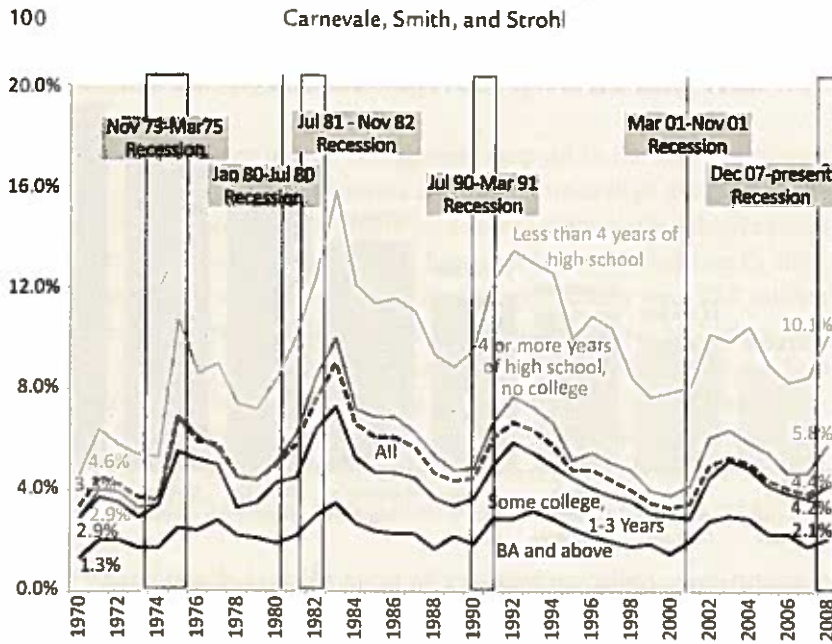


Figure 5.2. Unemployment rate by education level, 1970–2008. Those with the most postsecondary education have the lowest unemployment rates. *Source:* Bureau of Labor Statistics, Employment Situation, various years.

In our current economy, where 59 percent of the population has at least some college education, even the most highly educated have lost jobs, and many college graduates are scrambling for the reduced pool of jobs available to them. Unemployment rates at all education levels have climbed during the recession, and the unemployment rate of those holding bachelor's degrees and above reached a peak of 5.1 percent in November 2010 before declining again.

Still, as Figure 5.2 shows, workers with a postsecondary education have been significantly better off than those with less education in every phase of the economic cycle. The figure, which uses annual unemployment data between 1970 and 2010, shows that those holding bachelor's degrees were three times less likely to be unemployed than workers with no high school diploma. In economic downturns, then, college degrees still make the best umbrellas, and college campuses still provide the best shelters, as well as the launching pads for jobs and careers that will survive the recession.

The tangible benefits of education are more, demand for postsecondary education, and the future promise of a better life.

The Education Gap

The notion that every worker without expert criticism of our mass postsecondary education system is more than 60 percent of the workforce has become a common refrain. Training has become a

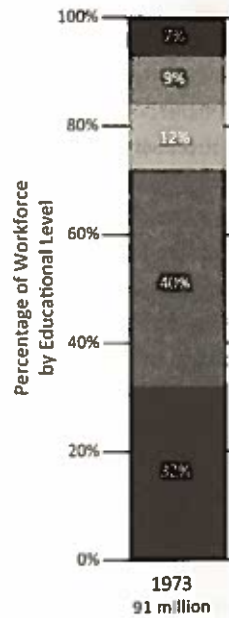


Figure 5.3. Distribution of the workforce by educational level in 1973. *Source:* Carnevale, Smith, and Strohl.

The tangible benefits to postsecondary education, then, are clear. What's more, demand for postsecondary education has been increasing for decades and the future promises more of the same.

The Demand for Postsecondary Education Will Continue to Increase

The notion that everyone needs at least some postsecondary education is not without expert critics, but the debate may already be purely academic, as our mass postsecondary education system has already arrived. Nowadays, more than 60 percent of Americans go on to some kind of education or formal training after high school. Access to postsecondary education and training has become the essential goal for education reform in the K-12

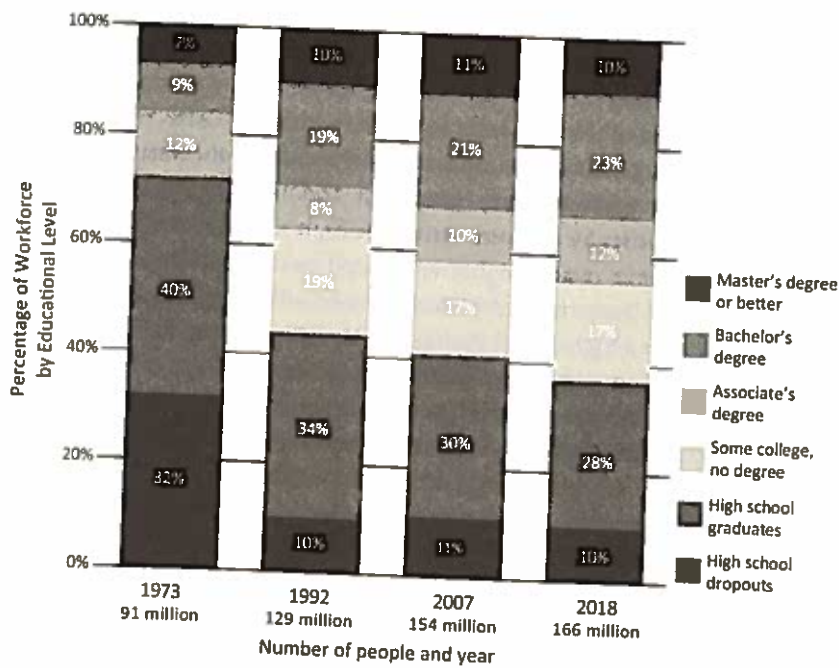


Figure 5.3. Distribution of jobs by education level, 1973–2018. By 2018, about two-thirds of all employment will require some college education or higher. Source: Carnevale, Smith, and Strohl 2010: 14.



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system, and middle-class employability is now emerging as a key standard of educational adequacy in the postsecondary system.

The statistics bear this out. Since the early 1970s, the American economy has transformed from one that featured more jobs for high school dropouts than for college graduates, to one where the share of jobs for dropouts has plunged from roughly one-third to 11 percent. The future promises more of the same, as shown in Figure 5.3: by 2018 almost two-thirds of all jobs will require at least some form of postsecondary education. In 1973, there were 25 million jobs that required¹¹ applicants to have at least some college education (28 percent of all jobs) (Figure 5.3). By 2007, that number had nearly quadrupled to 91 million jobs, or 59 percent of all jobs in the U.S. economy.

The share of workers with an associate's degree, certificate, or some college has more than doubled, from 12 percent to 27 percent of the workforce. The percentage of workers with bachelor's degrees has also more than doubled, from 9 percent in 1973 to 21 percent in 2007. Graduate degree holders have increased at a slightly slower pace, going from 7 percent to 11 percent over the same period.

The proportion of jobs available to workers with no postsecondary education and training has fallen commensurately with the increasing demand for workers with postsecondary education and training. This declining share of opportunities for workers with some high school education, or their high school diploma, is now highly segregated by occupational cluster. For example, by 2018, an estimated 61 million jobs will be available for prime age workers¹² with a high school diploma or less (37 percent of all jobs), compared to 101 million jobs for workers who will need at least some postsecondary education (63 percent of all jobs). Of those 61 million jobs, 87 percent will be found in only three of the sixteen career clusters: food and personal services, sales and office support, and blue collar career clusters. These particular clusters are characterized by either declining job opportunities or low wages. In addition, the rate of wage increase for people with high school or less education has also been stagnant.

The proportion of workers who will need an associate's degree, postsecondary certificate, or some college will increase from 27 percent in 2007 to 29 percent in 2018. The share of workers who must have bachelor's degrees will climb from 21 percent to 23 percent, while the number of jobs requiring graduate degrees may decline slightly, from 11 percent to 10 percent over the same period (Carnevale, Smith, and Strohl 2010: 13–14).

The Role of the On-Ramp

Among other things, this process of increasing the demand for postsecondary education provides access to a variety of skills and knowledge (Carnevale 1993; Eck 1993). In addition to formal education, they also include on-the-job training, which tends to increase as the demand for technical skills increases.

But formal education is not the only solution to the training puzzle. In fact, the entire postsecondary system, including formal and informal education, and a variety of other training opportunities, are needed.

Non-degree education is also needed in the workforce. In fact, many jobs require test-based licenses or certifications, and labor data show that many workers have passed through these requirements while labor market conditions were tight. Moreover, both self-directed learning and occupational licensing are important components of the workforce.

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As noted above, demand for postsecondary education is rising—and it is increasing the demand for postsecondary education. The lock-step progression of the nineteenth and twentieth centuries is being replaced by a more fluid and dynamic system.

The Role of Colleges and Universities Is Vital, Especially as the On-Ramp to a Larger System of Work-Based Learning

Among other things, higher education acts as an important gateway for accessing other parts of the postsecondary learning system. Postsecondary education provides entry to jobs that offer the most employer-provided training, plus access to the most powerful, flexible workplace technology (Krueger 1993; Eck 1993). Education, training, and technology tend to be *sequential and complementary* in producing productivity and earnings. Higher levels of formal education not only increase access to jobs that provide further training, they also increase access to technology that complements, rather than replaces, skills. Use of such technology—desktop computers, for instance—tends to increase both worker autonomy and pay. Less-educated workers tend to use technology that substitutes for skill.

But formal college is only a piece of the postsecondary education and training puzzle. In fact, colleges and universities represent only 35 percent of the entire postsecondary education and training system. The rest consists of formal and informal employer-provided training programs, military training, and a variety of other venues for postsecondary learning (Figure 5.4).

Non-degreed learning systems are also important to access and success in the workforce. Postsecondary training programs that result in certificates, test-based licenses, and certifications are commonly missed by both education and labor data sources. Typically, education data only count people who have passed through educational institutions in pursuit of formal degrees, while labor market data exclude certificates or industry-based certifications. Moreover, both sets of data ignore the role played by formal and informal learning outside the traditional education system, including industry and occupational licensure, apprenticeships, and employer-based training.

Technology Is Driving the Demand for Postsecondary Attainment

As noted above, demand for postsecondary education in the workforce is rising—and it is technology that is driving the shift toward increasing postsecondary requirements. The economic history of the United States is one of lock-step progression between technology and educational attainment. In the nineteenth and twentieth centuries, electricity and the internal combustion

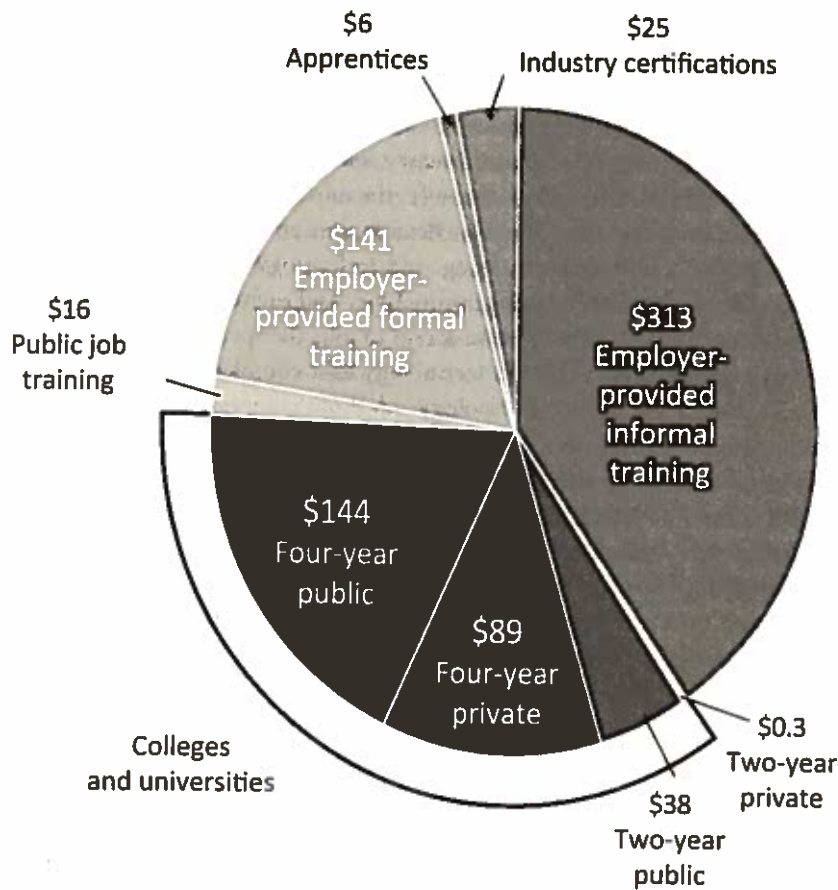


Figure 5.4. Distribution of postsecondary education programs by program type (dollars in billions). Formal postsecondary programs make up 35 percent of the \$772 billion postsecondary education and training system. Source: Carnevale, Smith, and Strohl 2010: 2.

engine drove the rise of manufacturing and America's shift away from an agrarian economy. Today, computers and related inventions are driving the information revolution and transforming the U.S. economic landscape once again. Just as the industrial revolution was critical to building a mass K-12 education system to feed workers into the manufacturing industries, the information revolution is spurring the development of a mass postsecond-

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Integral to this trend is a concept in labor economics known as *skill-biased technological change*. This simply means that technological development and the organizational changes that come with it favor workers with more education because they have the expertise needed to handle more complex tasks and activities. Demand for these workers, in turn, grows across the board as the technology spreads throughout the economy.

Computer-based technology adds new kinds of value that were simply impossible in previous economic eras. In the old industrial economy, the dominant competitive standard was mass production of standardized goods. The dominant outcome metric was material-based productivity: cost-efficiency through reducing inputs required to produce a given level of output. In the postindustrial economy, productivity is still supreme, but it has been joined by a growing set of competitive standards including quality, variety, customization, convenience, customer service, speed, novelty, and social responsibility (Carnevale 1991).

The penetration of information technology has fueled a fundamental change in how employees are organized. The new format emphasizes flexible networks accountable to common performance standards. As a result, production processes are now just as likely to use goods and services produced by other organizations as those produced in-house. These flexible networks, which now dominate the knowledge economy, require communication and information technologies that allow organizations to connect easily with one another and with their customers.

Increases in organizational complexity lead to an ever-increasing bias toward skilled and educated workers because workers need more knowledge and training to handle that complexity. Increases in educational attainment, in turn, result in efficiency and productivity gains when better-trained workers are paired with the technologies that make the networks possible. The result is predictable—demand for employees with better preparation goes up.

On the flip side, information technology can depress demand for workers with only high school diplomas or less. Available evidence shows that information technology tends to substitute for the narrow and repetitive work tasks that require low-skilled workers in many industries—which is why many lower-level jobs tend to disappear forever in recessions. Prior to the 1991 recession, roughly one-third of laid-off workers with high school educations

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or less reclaimed their old (or comparable) positions during recovery periods. In the past two recessions, the numbers have been even smaller. Jobs created in recent recoveries looked nothing like the jobs lost, and the people hired for those new positions looked nothing like the people laid off from the old ones. In the past two recessions, the typical job loser was a high school-educated male in a traditionally male job, such as manufacturing or construction, working in the middle of the country. In the past two recoveries, the typical job gainer was a female with a postsecondary education who lived on either coast and worked in a service occupation—particularly health care, education, or professional and business services.

We Are Still Underproducing Postsecondary Talent

Technology has shifted the economy, bringing about structural change, and we now need more postsecondary talent than ever. The forces of supply and demand have contributed to the resulting underproduction. On the supply side, we have failed to produce postsecondary degrees at a steady rate (Goldin and Katz 2008; Carnevale and Rose 2011). From 1915 to the early 1980s, the supply of college-educated workers in the workforce rose steadily by 3.1 percent a year because more people were going to school and because less-educated workers were gradually being replaced with more-educated workers. Starting in 1985, however, the increase in college-going youth slowed down to a crawl, when compared with their immediate predecessors. But the net replacement of less-educated retirees with more highly educated young people still meant that the relative supply of workers with postsecondary education still grew by 2.5 percent a year from 1980 to 1990.

As the workforce gradually became more educated, however, increasing overall attainment levels beyond what was there became more difficult after 1990. This is because the overall education level of retirees was progressively higher and the difference between the education levels of new entrants and that of retirees shrank. Consequently, the supply of college-educated workers rose by 2 percent per year from 1990 to 2000, and fell to 1 percent per year from 2000 to 2010.

While the rate of increase in the supply of college-educated workers has fallen, the demand for college-educated workers has continued to rise. The movements of demand, however, have been following a different logic. De-

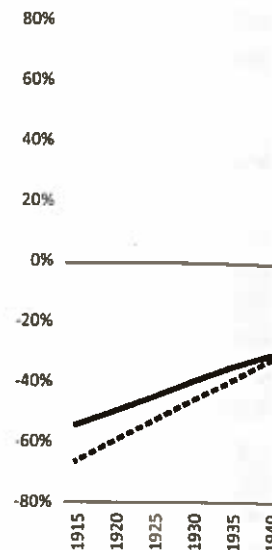


Figure 5.5. Supply and demand for postsecondary talent 1915–2010. Source: Carnevale and Rose 2011.

pression and war in the demand for skilled worker school longer, and increasing labor grew by 1.7 percent in 1950, the long boom computer and Internet revolution increased demand for skilled workers by 1.7 percent.

While the supply of college-educated workers has risen steadily, the demand for postsecondary education has risen more rapidly since the 1980s, bringing growing demand for skilled workers. The supply of college-educated workers has risen steadily, but supply fell to 1 percent per year from 2000 to 2010. The demand for postsecondary education has risen steadily, bringing growing demand for skilled workers. The supply of college-educated workers has risen steadily, but supply fell to 1 percent per year from 2000 to 2010. The demand for postsecondary education has risen steadily, bringing growing demand for skilled workers.

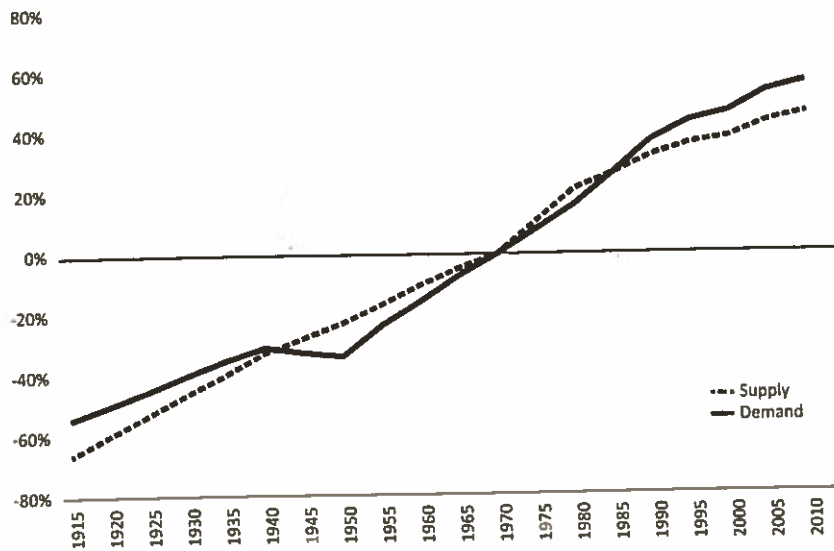


Figure 5.5. Supply and demand for skilled workers relative to 1970 conditions, 1915–2010. *Source:* Carnevale and Rose 2011: 19.

pression and war in the early twentieth century resulted in slow-growing demand for skilled workers in those years, even as more young people stayed in school longer, and increased their human capital. Relative demand for skilled labor grew by 1.7 percent per year from 1915 through 1950 (Figure 5.5). Starting in 1950, the long boom of the 1950s and 1960s was followed by the computer and Internet revolutions starting in the 1980s. The yearly growth of demand for skilled workers between 1950 and 2005 was an impressive 3.6 percent.

While the supply and demand story for postsecondary education is complex in its details, the long-term trend is clear. Demand has increased steadily, but supply fell off after 1984. As a result, the wage premium for postsecondary education and training has risen precipitously since the 1980s, bringing growing earnings inequality along with it. The future promises more of the same. Our own research at the Georgetown Center on Education and the Workforce suggests that at the current trend rate, the wage premium for bachelor's degree holders will grow from the current

84 percent to a whopping 93 percent by 2025, even with a trend increase of almost eight million new college degrees (Carnevale and Rose 2011).

Relative Wages Are a Conclusive Indicator of Demand for Postsecondary Workers

Economic theory demonstrates that wages are a marker of productivity and tells us that employers will pay more for workers who strengthen the bottom line. This reasoning has been countered by the argument that the increasing demand for postsecondary education is not related to what employers *need* but what they can get, and those employers are just hiring empty degrees, devoid of additional value. This perspective, however, ignores the basic economic principles of supply and demand at work in the labor market. Even more importantly, this argument flies in the face of good market reasoning. Employers might err and hire empty degrees once or twice, but they will not continue to do so over a long period. In general, employers have no incentive to pay a higher wage unless they are obtaining higher productivity, or they want to either guarantee a worker's tenure or provide a premium for special skills or training in tight labor markets.

Wages by education level traditionally behave as human capital theory predicts: higher education levels correlate with higher wages (a proxy for higher productivity). This trend has remained unchanged, with few exceptions, for the last several decades. What's more, the best available data on the hiring and pay practices of American employers has indicated that, for the past thirty years, employers have been paying increasingly more for more highly educated workers relative to their high school-educated counterparts. Economists call the pay of bachelor's degree holders relative to their high school educated counterparts the "wage premium." This wage premium paid to holders of bachelor's degrees and above acts as an indicator of the relative demand for workers with bachelor's degrees and above versus non-degree holders.¹³ In a free market, wages, or annual earnings, are a measure of worker productivity. It is hard to imagine that rational employers would continue to hire degrees if they were not obtaining commensurate productivity gains.

In the 1970s, the wage premium for college-educated workers declined as the supply of these workers grew dramatically with a surge in college attainment. A declining wage premium indicated that relative supply exceeded relative demand for college-educated workers. This quickly changed

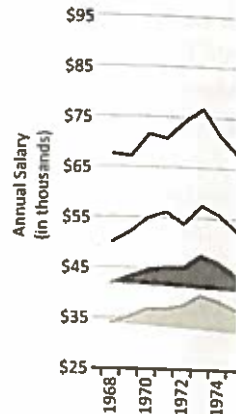


Figure 5.6. Annual salary Current Population Sur

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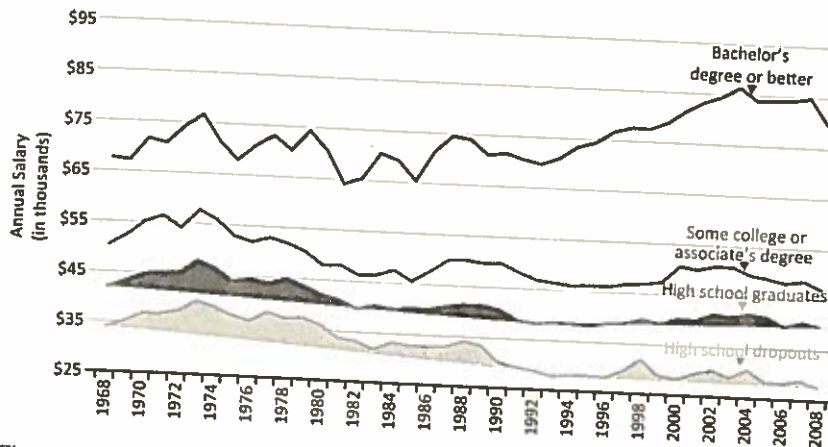


Figure 5.6. Annual salaries by education level. Source: Author's analysis of March Current Population Survey data, various years.

in the wake of the recession in the early 1980s as information technology began to transform the economy from an industrial base to one focused primarily on services. This trend peaked in the 1990s as the wage premium for college-educated workers spiked dramatically. Rising wages over time indicate excess demand or a short-term inability of supply to meet demand for a particular skill. In other words, the supply of educated workers is not keeping up with demand, and as a result, employers must invest more of their profits in order to acquire the skills and talent their work requires.

Figure 5.6 clearly illustrates the point that postsecondary education has led to a consistent earnings advantage for over a generation. For the great majority of Americans, it is necessary to obtain at least some college—a postsecondary certificate or an associate's degree—to earn wages above the national median. By obtaining a bachelor's degree, a worker contributes the greatest percentage jump to his or her earning power—84 percent over a high school graduate.

From an Economic Perspective, All Jobs and All Degrees Are Not Equal

Most data, including our own, understate the importance of postsecondary education and training because they treat all jobs as if they had similar

characteristics.¹⁴ However, not all jobs are created equal. Low-wage service jobs account for about 20 percent of the workforce but only 14 percent of the hours worked in the economy (Autor and Dorn 2009). Moreover, these jobs are commonly in industries with large shares of part-time work, or characterized by very high turnover.

Some jobs available to workers who lack postsecondary experience provide opportunities for these workers to settle into a career and earn a sustainable wage,¹⁵ particularly jobs in manufacturing, professional and business services, and some technology positions. The best opportunities, though, for those out of high school are in male-dominated fields. Over 80 percent of workers in manufacturing, architecture and construction, and transportation, distribution, and logistics are male.

Many of the low-wage service jobs, however, are highly transitional; young people commonly take jobs in food services or other low-skill occupations as they work themselves through school or toward better, more skilled jobs they can turn into a career. Roughly half the workers in low-skill, low-wage occupations move into higher wage categories within five years.

As an illustration, there are many more doctors who used to be cashiers than there are cashiers who used to be doctors, but the statistics treat the two jobs equally. For every new job for cashiers that will open up between 2008 and 2018, there will another thirteen job openings to replace cashiers who leave the occupation. By way of contrast, for every new job for physicians, there will only be 0.8 job openings to fill the jobs of physicians who leave the occupation (Carnevale, Smith, and Strohl 2010).

Yet jobs data treat openings for low-skilled positions the same as openings for long-term career jobs. This data issue exaggerates the significance of low-skilled jobs and, in turn, underestimates the demand for postsecondary education and training. Ultimately, about 11 percent of Americans are stuck in low-wage low-skill jobs in the bottom quartile of wage distribution (Carnevale and Rose 2001). In other words, as robust as the demand for higher education and training may seem in our forecasts, in reality it may actually be greater.

All jobs are not created equal and neither are all college courses, certificates, and degrees. The traditional degree hierarchy from high school to Ph.D. doesn't hold up when measured from an earnings perspective. On average, higher degree levels bring higher earnings, but there is a lot of overlap in earnings by degree level. Figure 5.7 demonstrates that, depending on

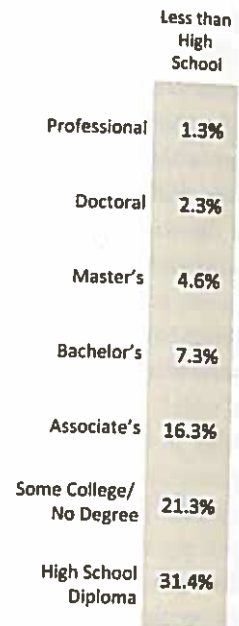


Figure 5.7. Earnings of people who earn more than the average. Carnevale, Rose, and Chea

industry and occupation, higher wages can be earned with an associate's degree, a bachelor's degree, or a college degree but no degree, and a bachelor's degree, and the same amount or more.

There is also much overlap between degree levels. The earnings advantage of the top 10 percent of school counselors and teachers (Melton 2011). For the

	Less than High School	High School Diploma	Some College/No Degree	Associate's Degree	Bachelor's Degree	Master's Degree	Doctoral Degree
Professional	1.3%	2.4%	4.8%	4.5%	17.2%	24.2%	36.9%
Doctoral	2.3%	4.6%	8.5%	9.5%	26.7%	35.5%	
Master's	4.6%	9.2%	15.9%	14.2%	59.8%		
Bachelor's	7.3%	14.3%	23.1%	28.2%			
Associate's	16.3%	29.8%	41.9%				
Some College/No Degree	21.3%	36.6%					
High School Diploma	31.4%						

Figure 5.7. Earnings overlap among people with different education levels. Some people earn more than their more highly educated counterparts. Source: Carnevale, Rose, and Cheah 2011: 6.

industry and occupational choice, the link between better education and higher wages can sometimes be unclear. For instance, 28 percent of workers with an associate's degree make the same amount or more than their colleagues with a bachelor's degree. About 23 percent of workers with some college but no degree earn the same amount or more than employees with a bachelor's degree, and 40 percent of those with bachelor's degrees earn the same amount or more than their counterparts with a master's degree (Carnevale, Rose, and Cheah 2011).

There is also much greater variation in earnings within degree level than between degree levels. For example, while bachelor's degrees bring an 84 percent earnings advantage over high school degrees, the difference between the earnings of the top and bottom bachelor's degree majors (for example, high school counselor and petroleum engineer) is four times the difference between high school degrees and bachelor's degrees (Carnevale, Strohl, and Melton 2011). For the most part, college degrees are worth the cost and the

debt burdens. After all, college costs only accumulate over two to four years and earnings returns accumulate over several decades. Nonetheless, some awards and degrees are not worth the cost and debt burden, as the ongoing tensions between the federal government and for-profit schools have demonstrated (and as William G. Tierney discusses in his chapter in this volume).

In addition, there is always mismatch between people's skills and available jobs. Many people end up with the wrong degree in the wrong place at the wrong time. Others choose occupations that do not maximize earnings returns from their certificate or degree.

The complex and dynamic relationships between postsecondary programs and the labor market suggests the need for information to better align postsecondary programs and jobs.

Occupation Matters

The knowledge-based economy has not only shifted demand for postsecondary education, it has fundamentally reshaped the way that we think about careers. As we have moved from the industrial-based manufacturing economy, where a job was defined by the workplace, plant, and industry, work has become defined more by the tasks a worker performs. Today, the predominant unit of analysis for understanding the economy is occupation.

Although education matters enormously in determining earnings, an individual's earnings are not dependent solely on educational attainment. Occupation—the job someone works in—matters, too. Of course, occupation and educational attainment are closely linked, with some occupations requiring more education than others. Demand for workers with postsecondary qualifications is tied tightly to occupations and the skills they require, and more loosely to the industries in which the occupations reside.

Understanding the relationship between education and occupation is critical to understanding the forces driving demand for postsecondary education. Occupation is a simple, shorthand way of expressing all the tasks performed in a particular job and therefore the skills and level of formal education needed. While there is variation, occupations generally have similar requirements regardless of industry. Accountants, for example, perform comparable tasks whether they are working for a mining company or a hospital—and the training required to do the work is virtually the same. As a result, the education requirements for occupations are relatively homogenous.

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To speak about the educational requirement of an industry is not really meaningful, because industries are conglomerates of many different occupations and levels of educational demand. The day when people left high school, went to work in the local industry, and then worked their way up through a wide variety of occupations is disappearing. Starting out straight from high school on the loading dock or in the mail room and climbing to the CEO's corner office is no longer an option. Individuals who work in multiple occupations within a single industry over their lifetime are becoming rarer and rarer.

This is partially because of the increasing complexity of work today, which requires more specific education and training focused on a particular occupation (labor market specialization). More often now, education, training, and work are focused on the occupation, and careers reflect workers' ascension of an occupational hierarchy. Some occupations are tied tightly to particular industries (such as nurses in health care), but more and more occupations are dispersed broadly *across* industries.

In Figure 5.8, we show average wages for broad education levels in each of our ten occupational groupings. The best-paying jobs at the top of the education distribution overall are still doctors and nurses in the health-care professional and technical occupations, while managers and CEOs in managerial and professional office jobs rank second for the size of their wage premiums. STEM jobs also pay well at every level of the educational distribution, a trend that remains consistent across time. Someone with an associate's degree in a STEM occupation makes more than a master's degree holder working in education.

While better education correlates to better pay across the board, this dynamic is especially significant in low-earning jobs. Workers with some college, for instance, receive a 13 percent bump in salary over high school graduates in food and personal services occupations and a 10 percent increase in health-care support occupations. Occupations that require the least amount of education for its workers still pay low wages, however—even at the top of that education distribution. For example, college graduates earn only about \$33,000 in health-care support and \$35,000 in food and personal services occupations. Although there are benefits to more training in these occupational groupings, there are still wage ceilings that make it impossible to climb comfortably into the middle class. The average wages of workers in food and personal services with various levels of educational attainment has actually declined in real terms since the 1980s (Carnevale, Smith, and Strohl 2010: 105).

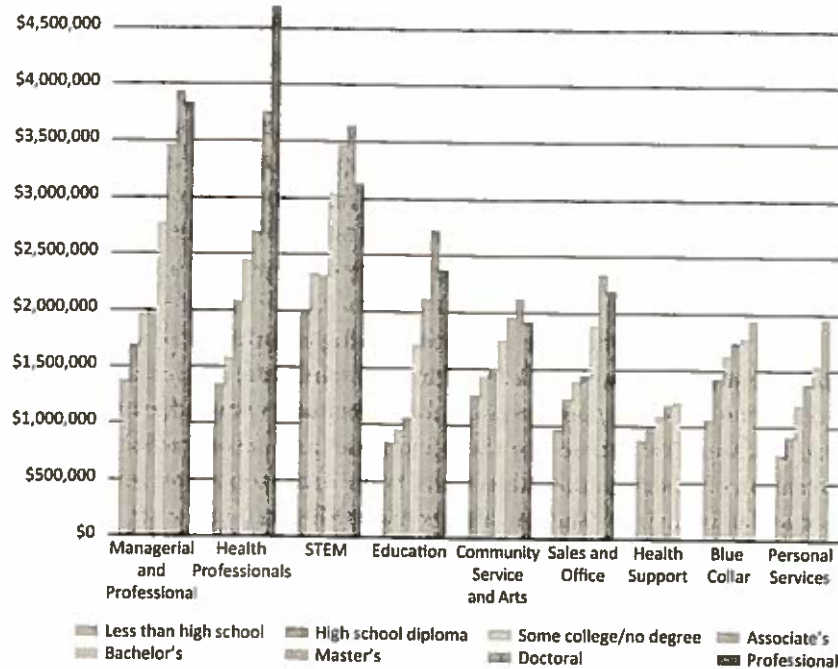


Figure 5.8. Lifetime earnings by education level (2008 real dollars). There is a direct relationship between income and occupation by education level. Within each occupation, lifetime earnings are also determined by one's level of education. More educated workers are paid more, even within the same occupation. *Source:* Carnevale, Rose, and Cheah 2011: 7.

Occupational choice also matters at the highest education levels. A graduate degree in health-care professional, managerial, and STEM occupations gives workers a wage premium vastly superior to that of a comparable degree for workers in food and personal services occupations. Ultimately, occupation-specific human capital ties people to their occupations and can result in substantial wage premiums for specialized tasks. Occupational choice is highly correlated to earnings, regardless of educational attainment levels. High school dropouts in managerial and professional office and STEM jobs, for instance, still earned twice as much as high school dropouts in health-care support or food and personal services jobs.

Further, workers with bachelor's degrees in managerial and professional office or STEM occupations earned more than employees with graduate de-

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greens in blue collar, community services and arts, education, health-care support, and food and personal services occupations, on average. In general this pattern holds true for all levels of education.

Majors Matter

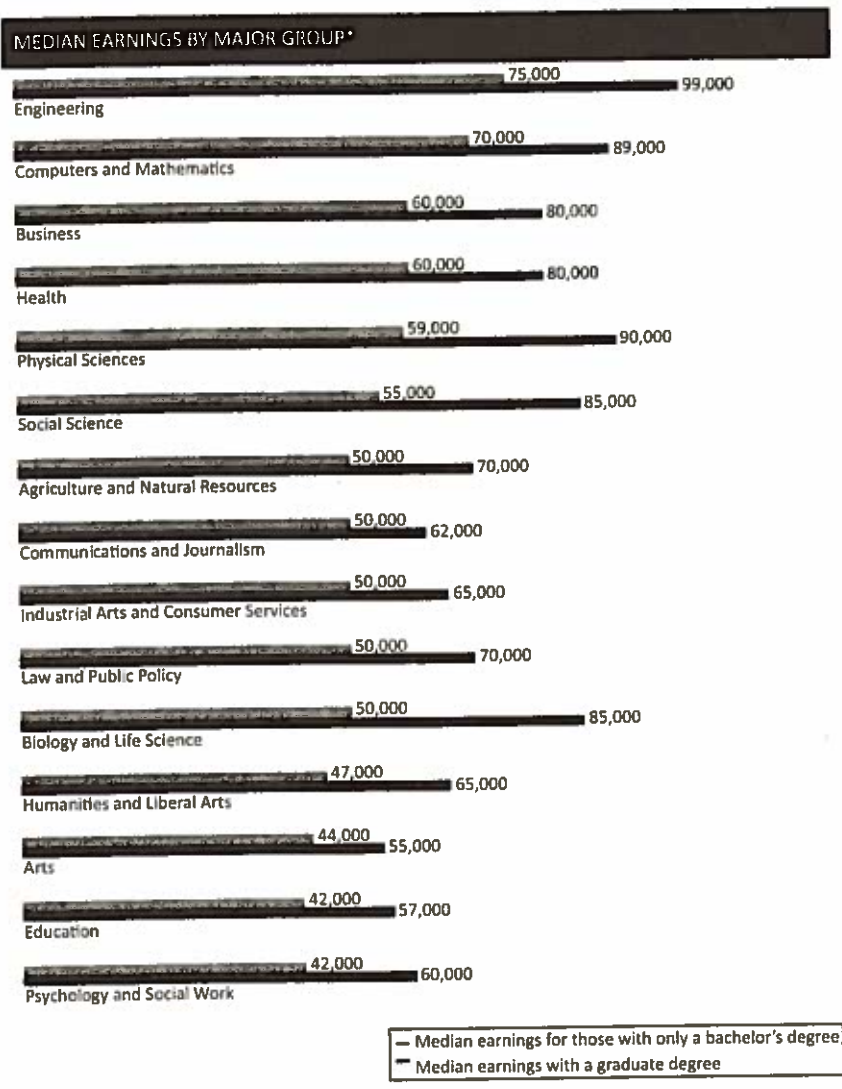
Finally, examining the earnings of individuals by undergraduate major also demonstrates that educational attainment is not the only factor driving earnings. Different majors have different economic value. While going to college is undoubtedly a wise decision, what you take while you're there also matters a lot. Economic returns on different majors run a wide gamut—primarily because different majors lead to different occupations. At the extreme, the highest-earning major (petroleum engineering) earns 314 percent more at the median than the lowest-earning major (counseling psychology). As shown in Figure 5.9, the highest median earnings at the aggregate level are in engineering majors (\$75,000) and computers and mathematics majors (\$70,000), while the lowest-earning majors are psychology and social work (\$42,000) and education (\$42,000) (Carnevale, Strohl, and Melton 2011).

Commodification or Intrinsic Value? Higher Education Does Not Need to Choose

It is no secret that the U.S. economy has changed since the late 1970s. Manufacturing's decline is just a symptom of the larger change recently wrought by technology. As a result, postsecondary education is now required in the majority of jobs—an estimated 63 percent of all jobs by 2018 (Carnevale, Smith, and Strohl 2010). Moreover, postsecondary education and training is the key to accessing the middle class, higher-paying jobs, and advanced training.

But what does the increasing demand for postsecondary-educated workers mean for our educational institutions, which are struggling to integrate their potentially contradictory missions of educating students for work and educating them for citizenship?

The increasing economic value of knowledge is both a boon and a burden for educators. As the economic value of higher education grows, the scale and scope needs to increase commensurately. The good news is that the knowledge economy also forces a mass democratization of higher education,



* Full-time, full-year workers with a terminal bachelor's.

Figure 5.9. Median earnings by college major. There is extreme variation in the median earnings of workers with bachelor's degrees by their college major. (Analysis of data from the 2009 American Community survey.) Source: Carnevale, Strohl, and Melton 2011: 5.

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because access to college has become the threshold requirement for middle-class earnings and status in postindustrial America. In very short order, college has become a mass system and is asked to meet the standards of both democratic accountability and economic utility. Demand has grown faster than traditional institutions have been able to keep up, and as a result, enrollment in for-profit higher education has grown exponentially. But the standards of accountability in a mass democratic institution and the vision of a selective college apparatus are fundamentally at odds.

The political landscape highly favors postsecondary education and, by extension, as other authors in this volume argue (O'Connor; Hoffman; Wolf-Powers and Andreason), has largely ignored career and technical education (CTE) at the high school level and above. What then do we do about the 37 percent of our workforce who drop out of high school, or who will only attain a high school diploma and have little chance of entering a postsecondary program? As Ronald Ferguson also argues in this volume, career pathways out of high school that explain to Americans entering college how to maneuver the postsecondary education system, or how to climb the ladders and lattices required to get to the "next steps" in the workforce, are not well-developed.

The major political obstacle to this connection of career and technical training is fear of "tracking"—a toxic policy that hinders the nation's quest to make the American Dream accessible to all its citizens, in particular for minorities, inner-city youth, or those from low-income communities. CTE programs do serve a great purpose for our nation's youth, as they help to make connections between young adults and postsecondary opportunities. Without discussing these options in a directed way, as with CTE, many minority and low-income youth will lack the resources needed to make good decisions about postsecondary education and workforce choices.

As Tierney argues in this volume, for-profit institutions are here to stay. They have been extremely successful in reaching the non-traditional student;¹⁶ and in providing access to low-income communities, minority populations, adults over twenty-six, and adults with children. The foresight of for-profit institutions in making key market connections between the classroom and the workforce surpasses that of CTE programs, which face similar curriculum challenges. Many for-profit institutions collaborate closely with business to design curricula to meet workforce needs.¹⁷

Some believe that the increasing value of education may force a reckoning of narrow economic needs and broader educational goals, resulting in a

"commodification" of education, where the social value is stripped away and education is reduced to a mere product that can be bought, sold, or hired. Hence the outcry of critics who lament that college students these days do not study enough Plato. They are not entirely off the mark. Education has intrinsic as well as extrinsic value. The temptation to provide narrow vocational training rather than more general learning is strong in a market economy, especially in our current budgetary environment. In theory, the increasing power of economic markets in higher education can promote underinvestment in the value of knowledge for its own sake, underinvestment in the value of self-knowledge, and reduced concern for the broader cultural and political value of knowledge in a democratic political system.

As the economic value of education increases, we will need to remember that education, especially higher education, concerns more than dollars and cents. It should do more than provide new technology and new foot soldiers for the American economy. Higher education is a crucial anchor for the professions in their struggle to maintain their professional values and standards in a world increasingly driven by the narrow valuation of cost efficiency and direct earnings returns—the medical professions are an obvious case in point.

Many jobs now require preparation that sounds a lot more like liberal education and professional education than narrow job training. Postindustrial careers are defined by unique sets of applied knowledge, values, skills, and interests that far exceed what one can find in postsecondary course catalogues, let alone in the narrow training programs characteristic of the industrial era.

Even beyond these considerations, however, educators in both secondary and postsecondary institutions have a cultural and political mission to ensure that there is an educated citizenry that can continue to defend and promote our democratic ideals and freedom of thought. Streams of inquiry that trace back to various sources from Theodor W. Adorno to Seymour Martin Lipset demonstrate convincingly that, once nations achieve a basic level of wealth, tolerant political attitudes and political participation depend more on education and less on traditional metrics for economic class. Moreover, the same streams of research suggest that more general forms of education, as opposed to narrow vocational or technical schooling, tend to promote tolerance and undermine the development of authoritarian personalities.

We need to aspire to a dual bottom line in American higher education. There is a pragmatic balance to strike between postsecondary education's

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growing economic role and its traditional cultural and political independence from economic forces. Ultimately, however, the inescapable reality is that ours is a society based on work. Those who are not equipped with the knowledge and skills necessary to get, and keep, good jobs are denied full social inclusion and tend to drop out of the mainstream culture, polity, and economy. In the worst cases, they are drawn into alternative cultures, political movements, and economic activities that are a threat to mainstream American life. Hence, if secondary and postsecondary educators cannot fulfill their economic mission to help grow the economy and help youths and adults become successful workers, they also will fail in their cultural and political missions to create good neighbors and good citizens. And increasing the economic relevance of education should, if done properly, extend the ability of educators to empower Americans to work in the world, rather than retreat from it.

Conclusions

The economic role of education, especially postsecondary education, has become central to the American social contract; education provides upward mobility that helps us reconcile the equality implicit in democratic citizenship with the inequality that market economies create. Over the past three decades, computer technology has automated repetitive mental and physical tasks. Well-paid jobs that only required a high school education are declining, replaced by jobs requiring some form of postsecondary education and training. As a result, by 2018, at least 63 percent of all jobs will require education and training beyond high school.

Over the past three decades, postsecondary education and training have become the new arbiters of access to middle-class earnings. The increase in lifetime earnings of those with postsecondary education relative to the earnings of high school graduates, which has been rising ever since the 1980s, now stands at roughly \$1,547,000 for people with some college but no degree; \$1,727,000 for people with associate's degrees; \$2,268,000 for people with bachelor's degrees; \$3,252,000 for people with doctoral degrees; and \$3,648,000 for people with professional degrees. This growing lifetime earnings premium is the best evidence of increasing demand for education.

The growth in demand for postsecondary education and training shows no signs of slowing. At the same time, the difference in earnings by degree

level has been superseded by a much broader variation in earnings based on the relationship between particular curricula and occupations. For example, 28.2 percent of workers with associate's degrees earn more than the average bachelor's degree holder. And while the difference between high school and bachelor's degree earnings is 84 percent, the difference between the median earnings for the lowest and highest paid bachelor's degree majors is 314 percent.

As demand for skilled and educated workers continues to increase in the years ahead, the need to better align postsecondary programs with labor market demands for particular skills will also increase. The relationship between postsecondary education and training and earnings has become both more important and more complex. Aligning student transcript data with employer wage data is now prudent policy. These pressures are changing the postsecondary system from one focused on access and completion in general, to one focused on employability and earnings differentials tied to particular curricula.

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These data attest to the value of these programs in preparing students for high-demand, high-paying careers in a wide variety of industries. A few of these fields and jobs include

- business—accounting technology and business administration;
- creative—computer design technology and radio and television broadcasting;
- education—Exceptional Student Education, secondary math and science, and early childhood education;
- health care—nursing, physician assistants, and specialized medical technicians;
- high tech—networking service technician, Microsoft database administration, and computer-aided drafting and design; and
- public safety—corrections, fire-fighting, and emergency medical services

3. For the most recent data on early colleges and a variety of community college initiatives at Jobs for the Future, see <http://www.JFF.org>. For the Learn and Earn Early Colleges, see the North Carolina New Schools Project and <http://newschoolsproject.org/>.

Chapter 5. Postsecondary Education and Economic Opportunity

1. This chapter will focus on a more general need for educated workers; however, the ideas discussed herein apply to metropolitan areas as much as to the rest of the country.

2. This is even more true in urban areas where the minority-White performance gaps on standardized tests—an outcome that is very highly correlated with socioeconomic status—cascades into missed educational opportunities and contributes to the intergenerational persistence of poverty.

3. In a separate analysis of the demand for certificates we find that postsecondary certificates requiring at least one year of study add market value and comprise an increasing share of the education landscape—close to 8 percent of all education attainment.

4. This is true for industries that require relatively more education as well as industries that require relatively less.

5. We use median and not average because the average can be skewed by outliers or extreme values.

6. The discounted cost of the degree here attempts to calculate the added burden of repayment in the future as part of the cost of the degree. Usually, an interest rate is attached to the principal and valued at today's prices.

7. At the following interest rates for money invested today, the present value (PV) of an additional \$1 million forty years into the future is: \$675,000 (1 percent), \$453,000 (2 percent), \$307,000 (3 percent).

8. Tuition and fees, \$9,000 per year; books, \$1,500 per year; trips and extra costs, \$1,500 per year. Rent and food are excluded from these calculations since these are costs that one incurs regardless of whether one is attending college or working.

9. Salary forgone should also be considered at the high school median earnings potential for four years. We have excluded this from the immediate analysis, given the relatively high unemployment rates for recent young high school graduates—irrespective of the state of the economy. We can, however, assume an average annual wage of \$23,000 as income forgone for a college education.

10. Many critics have pointed out that the unemployment rate for recent college graduates is much higher than the rate for graduates as a whole. This is to be expected—they typically have no labor market experience. However, comparing the unemployment rate of recent college graduates, which was about 9 percent last year, with the overall unemployment rate of 9 percent presents a skewed picture of the benefits of college. It is more appropriate to compare the unemployment rate for recent college graduates with the unemployment rate of recent high school graduates—whose unemployment rate was about 35 percent last year, much higher than 9 percent for recent college graduates.

11. By “required,” we mean paid the applicants a significant premium for having a college degree.

12. Prime age is defined as ages twenty-five to fifty-four.

13. This argument is fully developed in Goldin and Katz 2008.

14. Our projections assume we were producing enough postsecondary graduates in the base year and only measure unmet demand going forward, when in fact other evidence suggests otherwise (see Goldin and Katz 2008, and Carnevale and Rose 2011).

15. We have adopted a standardized definition of a sustainable wage if its level of earnings exceeds the median. This definition will depend on the state in question and its associated cost of living. For the nation, that value is about \$35,000.

16. More and more the phrase “non-traditional student,” defined loosely as anyone over the age of twenty-six who is not in school full-time pursuing a major, is becoming irrelevant, as larger shares of the college-going population are over twenty-six, first- or second-generation Americans, first-generation college-goers, minorities, parents, working learners, or a combination of the above.

17. Granted, problems are highlighted by recent rulemaking that requires for-profits to justify many of their programs’ value in the marketplace, particularly as it pertains to repaying federal debt.