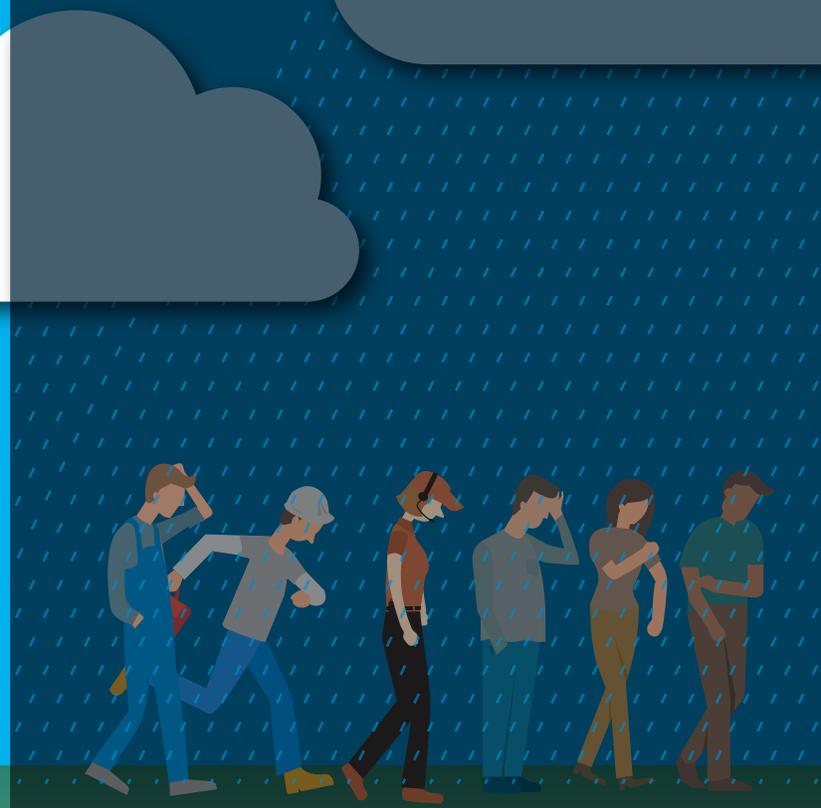
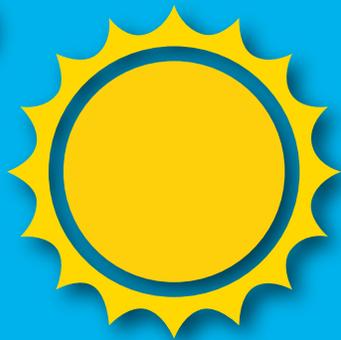


AMERICA'S DIVIDED RECOVERY

College Haves and Have-Nots
2016



Anthony P. Carnevale
Tamara Jayasundera
Artem Gulish

GEORGETOWN UNIVERSITY



Center
on Education
and the Workforce

McCourt School of Public Policy

REPRINT PERMISSION

The Center on Education and the Workforce carries a Creative Commons license, which permits non-commercial re-use of any of our content when proper attribution is provided.



You are free to copy, display, and distribute our work, or include our content in derivative works, under the CEW's following conditions:



Attribution: You must clearly attribute the work to the Center on Education and the Workforce and provide a print or digital copy of the work to cewgeorgetown@georgetown.edu.

Our preference is to cite figures and tables as follows:

Source: Georgetown University Center on Education and the Workforce,
America's Divided Recovery: College Haves and Have-Nots, 2016



Noncommercial: You may not use this work for commercial purposes. Written permission must be obtained from the owners of the copy/literary rights and from Georgetown University for any publication or commercial use of reproductions.



Approval: If you are using one or more of our available data representations (figures, charts, tables, etc), please visit our website at cew.georgetown.edu/publications/reprint-permission for more information.

For the full legal code of this Creative Commons license, please visit creativecommons.org.

Should you need a form to be filled out by us, please email cewgeorgetown@georgetown.edu and we will respond in a timely manner.

AMERICA'S DIVIDED RECOVERY

College Haves and Have-Nots
2016

Anthony P. Carnevale
Tamara Jayasundera
Artem Gulish

GEORGETOWN UNIVERSITY



Center
on Education
and the Workforce

McCourt School of Public Policy

ACKNOWLEDGEMENTS

We are grateful for the individuals and organizations whose generous support has made this report possible: Lumina Foundation (Jamie Merisotis and Holly Zanville), the Bill & Melinda Gates Foundation (Daniel Greenstein and Jennifer Engle) and The Joyce Foundation (Matthew Muench). We are honored to be partners in their shared mission of promoting postsecondary access and completion for all Americans.

Many have contributed their thoughts and feedback throughout the production of this report. We are especially grateful for our talented designers, meticulous editorial advisors, and trusted printers whose tireless efforts were vital to our success. In addition, Georgetown CEW's economists, analysts, and communications and operations staff were instrumental in the production of this report from conception to publication:

- Jeff Strohl for research direction;
- Andrea Porter for strategic guidance;
- Ban Cheah for data programming;
- Martin Van Der Werf and Andrew Hanson for editorial and qualitative feedback;
- Michael Quinn and Cary Lou for data verification;
- Hilary Strahota, Vikki Hartt, Wendy Chang, and Mantong Guo for broad communications efforts, including design development and public relations; and
- Joe Leonard and Coral Castro for assistance with logistics and operations.

The views expressed in this publication are those of the authors and do not necessarily represent those of Lumina Foundation, the Bill & Melinda Gates Foundation, the Joyce Foundation, or their officers or employees.

Table of Contents

INTRODUCTION	1
The United States is in the midst of two different recoveries.	3
The American economic divide did not start with the Great Recession.	4
CHAPTER 1. THE GREAT RECESSION AND ITS AFTERMATH	7
CHAPTER 2. THE LONG-TERM SHIFT TOWARD MORE-EDUCATED WORKERS	11
College graduates outnumber high school educated workers in the workforce for the first time ever.	15
CHAPTER 3. JOB CHANGE BY OCCUPATION	17
High-skill occupations are leading the recovery and most of them are going to college graduates.	17
Management occupations.....	21
Healthcare professional and technical occupations.....	21
Computer and mathematical science occupations	22
Food preparation and serving-related occupations.....	22
Office and administrative support occupations	23
CHAPTER 4. JOB CHANGE BY INDUSTRY	24
Among industries, consulting and business services experienced the largest job growth in the recovery.	24
Consulting and business services.....	27
Financial services	28
Healthcare services.....	28
Manufacturing.....	29
Leisure and hospitality services.....	30
Information services.....	31
Construction.....	31
Natural Resources	32
CONCLUSION	33
REFERENCES	34
APPENDIX: DATA SOURCES AND METHODOLOGY	36

Table of Figures and Tables

Figure I. Workers with a Bachelor's degree have added 8.4 million jobs in the recovery, but workers with a high school diploma or less added only 80,000 jobs after losing 5.6 million jobs in the recession.	2
Figure 1.1. The U.S. labor market has added 4.4 million net new jobs compared to the employment level at the beginning of the Great Recession.	8
Figure 1.2. Workers with a graduate degree have experienced stable employment growth, adding 253,000 jobs in the recession and 3.8 million jobs in the recovery, but workers with a Bachelor's degree have seen stronger growth more recently in the recovery, adding 4.7 million jobs.	10
Figure 2.1. The number of workers with a Bachelor's degree or higher has more than doubled (107%) since 1989.	14
Figure 2.2. Workers with a Bachelor's degree or higher now make up a larger share of the workforce (36%) than workers with a high school diploma or less (34%).	15
Figure 3.1. Workers with a Bachelor's degree or higher are taking almost all the jobs in high- and middle-skill occupations (5.8 million high-skill and 1.9 million middle-skill jobs) in the recovery (2010-2016).	18
Figure 4.1. While most industries have recovered their recession job losses, construction and manufacturing are lagging substantially behind.	25
Table 1.1. Jobs for those with a Bachelor's degree or higher have sharply rebounded, increasing by 8.4 million in the recovery, but jobs for those with only a high school diploma or less have not recovered, adding only 80,000 jobs in the recovery.	9
Table 3.1. Management occupations added the most jobs since December 2007, 1.6 million.	20
Table 4.1. The healthcare industry has had the largest growth since December 2007, adding 2.2 million jobs.	27

Introduction

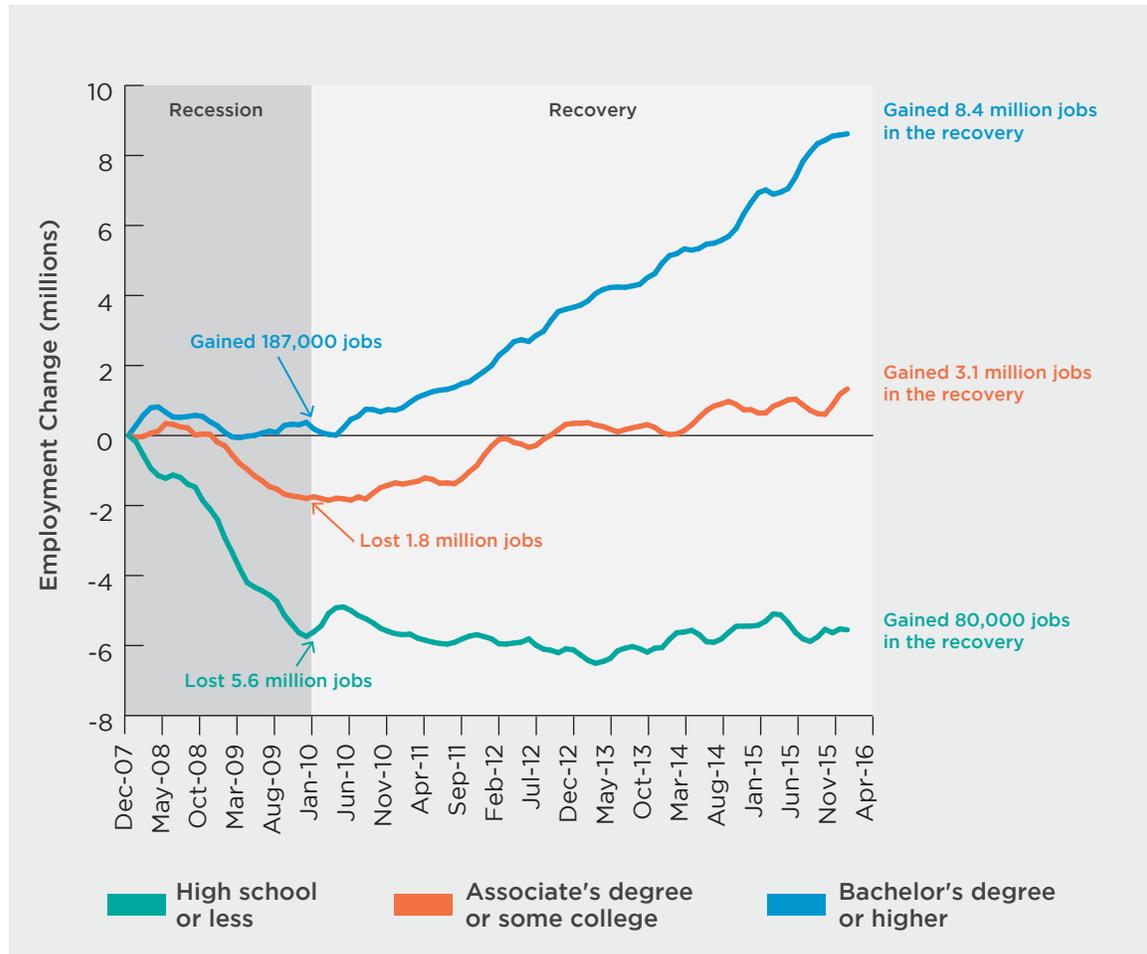
The post-Great Recession economy has divided the country along a fault line demarcated by college education. For those with at least some college education, the job market is robust. The economy has added 11.6 million jobs since the recession bottomed out¹ — 11.5 million, or 99 percent of them, have gone to workers with at least some college education.²

By contrast, workers with a high school diploma or less hear about an economic recovery and wonder what people are talking about. Of the 7.2 million jobs lost in the recession, 5.6 million were jobs for workers with a high school diploma or less.³ These workers have recovered only 1 percent of those job losses over the past six years. This group also saw no growth among well-paying jobs with benefits.⁴

These divergent trends did not begin with the Great Recession, but the recession and subsequent recovery have intensified the long-term trends of differential opportunities between workers with and without a college education, reinforced by skill-biased technological and structural change.

-
- 1 Officially, the Great Recession covered the 18-month period from December 2007 to June 2009. However, since the economy did not begin adding jobs until January 2010, this study delineates The Great Recession as the period from December 2007 to January 2010 and the recovery as the period from January 2010 to January 2016.
 - 2 The data on job trends for this paper come from the *Current Population Survey (CPS)*, a monthly survey of households by the U.S. Census Bureau for the Bureau of Labor Statistics.
 - 3 For a more detailed discussion of the impact of the recession by education, industry, and occupation see Carnevale, Jayasundera, and Cheah, *The College Advantage: Weathering the Economic Storm*, 2012.
 - 4 Carnevale, Jayasundera, and Gulish, *Good Jobs Are Back: College Graduates Are First in Line*, 2015.

Figure I. Workers with a Bachelor's degree have added 8.4 million jobs in the recovery, but workers with a high school diploma or less added only 80,000 jobs after losing 5.6 million jobs in the recession.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

THE UNITED STATES IS IN THE MIDST OF TWO DIFFERENT RECOVERIES.

The Great Recession has been followed by a lengthy and inconsistent recovery. After a slow start in the early years of the recovery, the economy has added 11.6 million jobs since January 2010. Behind the positive job growth, however, two starkly different realities have fueled the escalating economic divisions in the country. Almost all the new jobs have gone to workers with at least some postsecondary education, while jobs for high school graduates have barely grown at all.

- **Nearly all the jobs created in the recovery, 11.5 million out of 11.6 million, have gone to workers with at least some postsecondary education.**
 - During the recession, the economy created 253,000 new jobs for graduate degree holders and added 3.8 million more jobs during the recovery, a total of more than 4 million jobs created since 2007.
 - Despite losing some jobs during the recession, Bachelor's degree holders gained the most jobs in the recovery. These workers recovered the 66,000 jobs they lost in the recession by August 2010, and, by January 2016, they had added 4.6 million more new jobs.
 - Combined, the workers with a Bachelor's degree or higher have accounted for 73 percent (8.4 million) of the 11.6 million jobs gained in the recovery.
 - Compared to workers with a Bachelor's degree or higher, job losses during the Great Recession were more severe for workers with an Associate's degree or some college. But these workers recouped the 1.8 million jobs they lost during the recession by September 2012, and they added 1.3 million new jobs as of January 2016 — a turnaround of more than 3 million new jobs.

- **Workers with at least some postsecondary education have also captured the vast majority of the good jobs — jobs that pay more than \$53,000 per year for full-time, full-year workers** and come with benefits, such as employer provided health insurance and a retirement plan.⁵
- **At the other end of the education spectrum, workers with a high school diploma or less essentially have experienced no job recovery.** So far, they have gained 80,000 jobs in the recovery, just a tiny fraction of the 5.6 million jobs that were lost by these workers in the recession.
- **For the first time, workers with a Bachelor's degree or higher make up a larger proportion of the workforce (36 percent) than workers with a high school diploma or less (34 percent).** This marks the continued turning away from the industrial economy of the past that largely employed workers with a high school education.
- **Workers with a high school diploma or less are losing access to high-skill and middle-skill jobs, and increasingly are settling for low-skill, low-wage jobs.** These workers lost 181,000 high-skill jobs and 951,000 middle-skill jobs since 2010. At the same time, they added 1.2 million low-skill jobs.

THE AMERICAN ECONOMIC DIVIDE DID NOT START WITH THE GREAT RECESSION.

Cyclical changes and structural changes have led to a shift from an economy driven by high school-educated labor to one in which almost two in three jobs require some form of postsecondary education or training. These economic changes, increasingly noticeable in recent years, have been marked by long-term economic trends:⁶

- There has been a clear shift in job creation since the second half of 20th century toward industries that employ a high share of workers with postsecondary attainment, such as healthcare services, consulting and business services, financial services, education services, and government services. These industries accounted for 28 percent of the workforce in 1947; they now account for 46 percent of the workforce.⁷

5 Carnevale, Jayasundera, and Gulish, *Good Jobs Are Back: College Graduates Are First in Line*, 2015.

6 For a more careful review of these trends, see Carnevale and Rose, *The Undereducated American*, 2011 and Carnevale and Rose, *The Economy Goes to College: The Hidden Promise of Higher Education in the Post-Industrial Service Economy*, 2015.

7 Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 1947 and *Current Population Survey*, 2016.

- An equally clear shift in job creation has taken place away from production industries, which had a large number of workers with lower average levels of educational attainment, such as manufacturing, construction, and natural resources. These industries employed nearly half of the workforce in 1947; by 2016, they employed just 19 percent of the workforce.
- Even in declining production industries, hiring is shifting in favor of workers with higher levels of educational attainment. For example, employment in manufacturing has declined by 32 percent since the second half of the 1980s. At the same time, however, the employment of workers with a Bachelor's degree or higher in these industries grew by 70 percent.⁸

These are among the many long-term trends that have increasingly divided the country into “college haves” and “college have-nots.” College access and success have been the defining factors in the growing economic divide in America since the early 1980s. That is when the wage premium for college graduates began its meteoric rise.⁹ Since that time, access to college programs with labor market value has accounted for as much as 80 percent of increase in economic inequality.¹⁰

In addition, the value added in virtually every industry has required new production recipes with higher concentrations of postsecondary workers. In food production, for example, high school-educated farming and manufacturing workers have given way to skilled white-collar workers who add quality, variety, customization, convenience, and other product improvements to the value chain.

Recessions and economic recoveries only strengthen and accelerate the economically divisive effects of these long-term structural changes. The acceleration of these structural trends may well be one reason the Great Recession's employment effects are prolonged and the recovery slowed. At their worst, these trends result in “jobless growth,” a situation in which GDP growth in recoveries proceeds without a corresponding growth in jobs or even higher unemployment.¹¹

8 Georgetown University Center on Education and the Workforce analysis of *Current Population Survey*, 1980-2014.

9 The wage premium for postsecondary education and training over a high school diploma has increased dramatically since the 1980s, but there is wide variation in the economic value of postsecondary awards by field of study. In addition, the hierarchy in the traditional levels of postsecondary education only roughly conforms to the hierarchy of economic value. Postsecondary training on the job and industry-based certifications outperform many postsecondary certificates and degrees conferred by educational institutions. Some academic certificates outperform some two-year and four-year degrees. Almost a third of two-year Associate's degrees outperform the average earnings for a Bachelor's degree and more than 40 percent of Bachelor's degrees outperform the average earnings for a graduate degree. For more details, see: Carnevale, Rose, and Cheah, *The College Payoff: Education, Occupations, Lifetime Earnings*, 2011; Carnevale and Rose, *The Undereducated American*, 2011; and Carnevale, Jayasundera, and Hanson, *Career and Technical Education: Five Ways That Pay Along the Way to the B.A.*, 2012

10 Autor, “Skills, Education, and the Rise of Earnings Inequality among the ‘other 99 percent,’” 2014; Goldin and Katz, “Long-Run Changes in the Wage Structure: Narrowing, Widening, Polarizing,” 2007.

11 We have experienced spells of jobless growth in the last three recoveries: following the 1990-91 recession, the 2001-2003 recession, and the Great Recession of 2007-10. For a comparison of jobless growth following the 2007-10 recession with previous recovery periods and a discussion of the relationship between job polarization and jobless recoveries, see Jaimovich and Siu, “The Trend Is the Cycle: Job Polarization and Jobless Recoveries,” 2012. For a review of jobless growth in recoveries following the 1990-91 recession and the 2001-03 recession, see Groshen and Potter, “Has Structural Change Contributed to a Jobless Recovery?,” 2003.

These underlying structural changes ensure that those who benefit from economic progress do not tend to be the same people who are hurt by it. Since the 1980s, those harmed the most have been high school-educated workers in blue-collar jobs, especially those in the manufacturing industry. Those who benefit the most, on the other hand, are college-educated workers in high-skill professions in service industries. In recent recessions, the industries and occupations that lost the most jobs are much less likely to be the industries and occupations that are adding jobs in the recovery.

The Great Recession has followed this classic pattern in terms of how workers with different education levels are affected during recessions. The least educated workers, those with a high school diploma or less, were the first fired in the recession and the last hired in the recovery. Conversely, those with the most years of college were the last fired in the recession and the first hired in the recovery.

The major reason why jobs for high school graduates have not recovered from the Great Recession is the structural shift in blue-collar and white-collar jobs.

- Two of the industries that blue-collar workers with lower education levels historically depended upon for jobs — construction and manufacturing — were especially hard hit in the Great Recession and have not yet fully recovered all the job losses they sustained. Construction employment is still 1.6 million jobs short of its 2007 level. Manufacturing has 1 million fewer jobs than it did before the recession.
- Office and administrative support is the largest major occupational group overall. These are quintessential middle-skill, white-collar jobs for workers without a college degree. However, in the Great Recession, 1.7 million of these jobs were lost. Only 300,000 of those jobs have been recovered. So, compared to pre-recession employment levels, office and administrative support occupations have experienced the second-highest decline in jobs (1.4 million).

CHAPTER 1.

The Great Recession and Its Aftermath

The Great Recession was a tremendous shock to the U.S. economy.¹² The statistics are staggering: the economy lost 7.2 million jobs;¹³ the drop in housing prices caused net wealth to decline by \$9 trillion; and the slowdown in economic growth cost more than \$6 trillion.¹⁴ The total cost of the recession — including the decline in retirement funds, skill erosion from long-term unemployment, and physical, psychological, and social impact — exceeded \$20 trillion.

Even now, six years after the Great Recession ended, its effect is still with us. The economy is still missing 6 million jobs that would have been created had the recession not occurred.¹⁵

¹² The academic definition of the recession set by the Business Cycle Dating Committee of the National Bureau of Economic Research describes the recession as the period between the peak and trough of economic activity, which for the Great Recession covers the 18-month period from December 2007 to June 2009. Since the economy did not begin adding jobs until January 2010, this paper delineates the Great Recession as the period from December 2007 to January 2010 and the recovery as the period from January 2010 to January 2016.

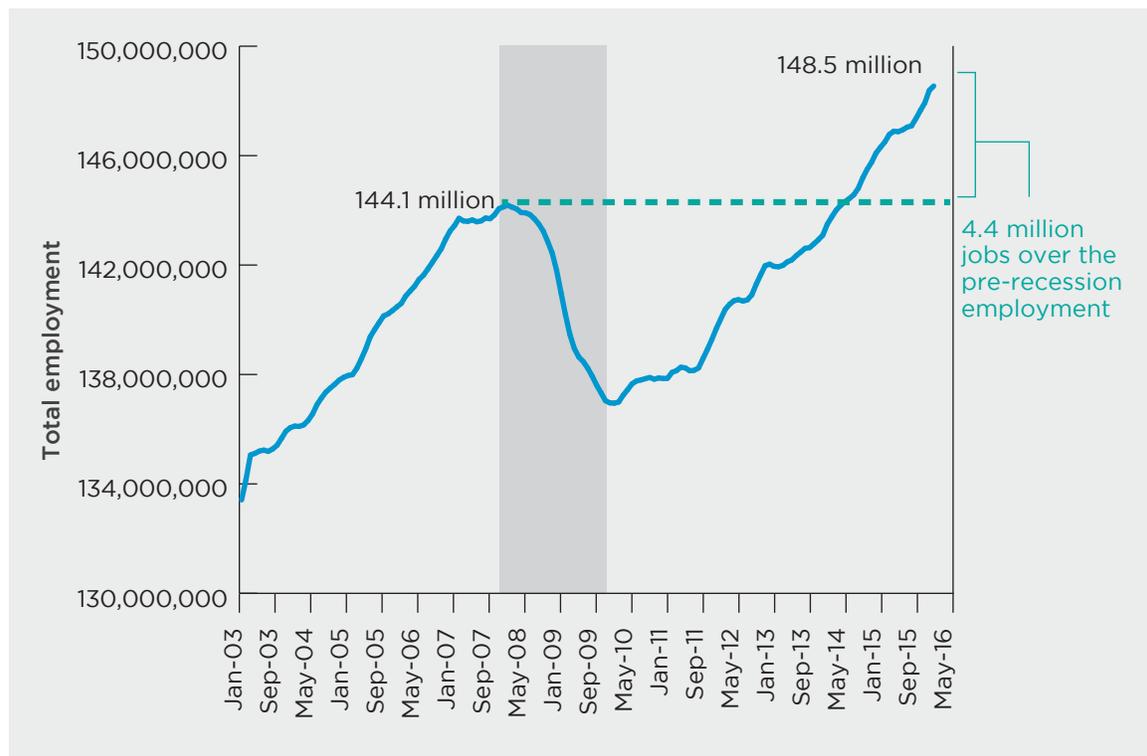
¹³ The data on job losses (7.2 million) for this paper come from the *Current Population Survey* (CPS), a monthly survey of households by the U.S. Census Bureau for the Bureau of Labor Statistics. However, the *CPS household survey* shows smaller job losses than the monthly survey of employer establishments — the *Current Employment Statistics* (CES) data. According to the CES, 8.7 million jobs were lost in the recession (December 2007 – January 2010). The CES data is often used to measure job losses and gains because it is the official source used by the Bureau of Labor Statistics in its monthly jobs report. These differences in estimates of job losses can be attributed to differences in the two surveys — the Labor Department's establishment survey (CES) and the Census Bureau's establishment household survey (CPS). We prefer the Census Bureau's household survey (CPS) because the establishment survey (CES) does not include self-employment and agricultural employment and counts multiple-job holders more than once. Overall, both sources tell a similar story about large job losses in the recession and slow job gains in the recovery.

¹⁴ Government Accountability Office, *Financial Regulatory Reform: Financial Crisis Losses and the Potential Impact of the Dodd-Frank Act*, 2013.

¹⁵ If the pre-recession job growth trends continued, the economy would have added another 6.4 million jobs by 2015. Roughly half of those jobs (3.4 million) would have been for people with a Bachelor's degree or better; 2 million would have been for people with some college or an Associate's degree; and 1 million would have been for people with a high school diploma or less. See Carnevale, Jayasundera, and Gulish, *The Six Million Missing Jobs*, 2015.

The jobs recovery began in January 2010, but during its first year and a half, the economy added jobs at a sluggish pace, resulting in concerns that the economic recovery would be a jobless one. It took more than four years to regain the 7.2 million jobs lost in the recession — the labor market reached that milestone in April 2014.¹⁶ Today, total U.S. employment is at 148.5 million — with 4.4 million more jobs than there were prior to the recession, in December 2007 (Figure 1.1).

Figure 1.1. The U.S. labor market has added 4.4 million net new jobs compared to the employment level at the beginning of the Great Recession.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2003-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

¹⁶ The academic definition of the recession set by the Business Cycle Dating Committee of the National Bureau of Economic Research describes the recession as the 18-month period from December 2007 to June 2009. Since the economy did not begin adding jobs until January 2010, this paper uses the broader definition of the word “recession” as a period of reduced economic activity and, therefore, defines the recession as the period from December 2007 to January 2010.

The recovery between January 2010 and January 2016 has favored workers with a Bachelor's degree or higher the most (Table 1.1). Of the 11.6 million jobs created so far during the recovery, nearly 75 percent (or 8.4 million) have gone to people with a Bachelor's degree or higher.

Table 1.1. Jobs for those with a Bachelor's degree or higher have sharply rebounded, increasing by 8.4 million in the recovery, but jobs for those with only a high school diploma or less have not recovered, adding only 80,000 jobs in the recovery.

EDUCATIONAL ATTAINMENT	CHANGE IN EMPLOYMENT		
	RECESSION (Dec. 2007 to Jan. 2010)	RECOVERY (Jan. 2010 to Jan. 2016)	NET CHANGE (Dec. 2007 to Jan. 2016)
High school or less	-5,611,000	80,000	-5,531,000
Some college/Associate's degree	-1,752,000	3,089,000	1,337,000
Bachelor's degree or higher	187,000	8,424,000	8,611,000
Bachelor's degree	-66,000	4,656,000	4,590,000
Master's degree or higher	253,000	3,768,000	4,021,000
All	-7,176,000	11,593,000	4,417,000

Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007-2016.

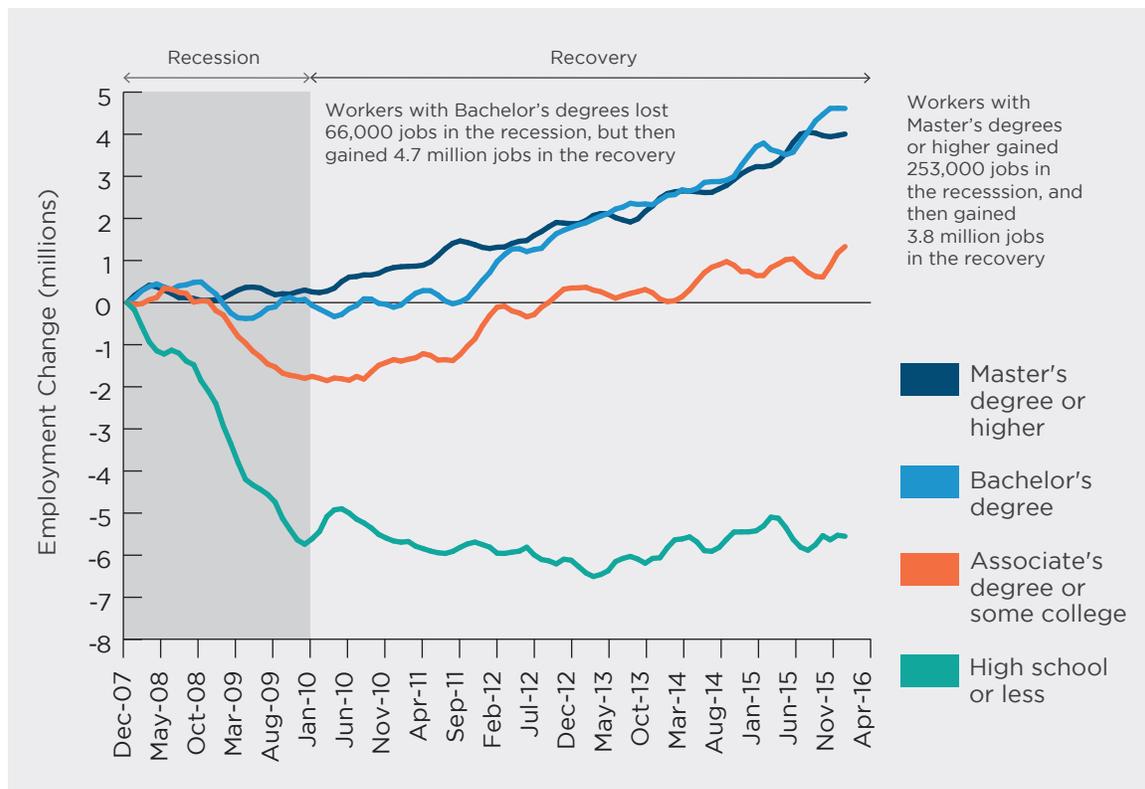
Note: Columns may not sum due to rounding. Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

Workers with a graduate degree (Master's degree or higher) experienced no decline in jobs in the recession and maintained a stable employment growth throughout the recovery. Workers with a Bachelor's degree struggled until the second half of 2011, but have since seen fast job growth, and in fact have exceeded the gains of graduate degree holders (Figure 1.2). Workers with a graduate degree have gained 3.8 million jobs since January 2010. Over the same period, workers with a Bachelor's degree have gained 4.6 million jobs.

Workers with some college or an Associate's degree have experienced a lot of volatility since 2007. They rode the recession to its depths, losing 1.8 million jobs. Those workers have now ridden the recovery back up; the economy recovered all those jobs by mid-2012. Over the next three and a half years, this group of workers experienced decent job growth, with a net gain of 1.3 million jobs since the beginning of the recession. Overall, this group of workers has added 3.1 million jobs since January 2010.

The workers who have suffered the most are those with a high school diploma or less. They lost the most jobs in the recession and have seen almost no growth in the job market during the recovery. They remain 5.5 million jobs short of their pre-recession employment level. Further, the current economic trends fail to provide any sign that those lost jobs will be returning in the near future.

Figure 1.2. Workers with a graduate degree have experienced stable employment growth, adding 253,000 jobs in the recession and 3.8 million jobs in the recovery, but workers with a Bachelor's degree have seen stronger growth more recently in the recovery, adding 4.7 million jobs



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

CHAPTER 2.

The Long-Term Shift toward More-Educated Workers

These diverging trends in job growth are part of a long-term pattern. Our analysis of the Great Recession and the recovery that followed it affirms that structural economic trends in place since the second half of the 20th century are still going strong and in fact have accelerated in the 21st century. These trends have been driven by technological advancements, and they incorporate two concurrent and related economic developments: the growing capabilities of industry and the growing complexity of work.

The advancements in technology, especially exponential growth in computer processing power and digital data storage, have enabled us to produce and supply goods and services more efficiently than ever before; improve business processes across the board; make better decisions, supported by data; and achieve breakthrough discoveries in scientific, medical, financial, and communications fields. At the same time, these technological advancements have bolstered the number and granularity of options available to organizations and underlined the importance of precision in business decisions. The growing array of options, along with the increasing sophistication of available tools, has raised the complexity of many tasks that workers must be able to perform today. Two recent instances can be seen as focal points of these trends.

The first took place in the early 1980s. Prior to that time, in the golden age of the industrial economy, from the late 1940s through the 1970s, job losses in recessions tended to be temporary. The median duration of unemployment in the 1970s was six weeks, compared to eight weeks in the early 2000s before the Great Recession, and 17 weeks in the past five years of the recovery.¹⁷ Workers who were laid off in recessions tended to be re-hired in recoveries, often with the same employer, or at least in the same industry or occupation.¹⁸ Throughout most of the 20th century, traditional blue-collar factory jobs offered a pathway to the middle class for many Americans, especially men.

¹⁷ Georgetown University Center on Education and the Workforce analysis of Bureau of Labor Statistics, Labor Force Statistics from the *Current Population Survey*, "Median weeks unemployed, seasonally adjusted (Series ID: LNS13008276)," 1970-2016.

¹⁸ Groshen, "Has Structural Change Contributed to a Jobless Recovery?," 2003.

Construction and manufacturing were especially hard hit in the Great Recession and have not yet fully recovered all the job losses they sustained.

Since the 1980s, the shift in employment has favored professional service industries, which have relatively higher concentrations of workers with postsecondary education and training, at the expense of traditional factory jobs.¹⁹ With the advent of the postindustrial service economy, job losses were no longer temporary, especially for high school-educated production workers. These structural changes were turbocharged in the increasingly Darwinian world of recessions and recoveries, especially since the early 1990s. Those who lost jobs were less likely to be re-hired by

the same employer, the same industry, or even in the same occupation. Overall job security declined, especially for high school-educated production workers.²⁰

The second focal point happened in the early 2000s, with the onset of the digital information age. In 2000, three-quarters of the world's information was stored on paper and on analog formats, such as audio and videotapes. By 2002, digital storage surpassed analog storage and, by 2007, 94 percent of the world's information was stored digitally.²¹

This change has had a profound impact on traditional middle-skill white-collar clerical jobs that had been prevalent in the second half of the 20th century, especially for women. Personal computers have reduced the need for typists and personal secretaries. With the reduction in the use of paper, the need for file clerks to organize, store, and retrieve paper records has virtually disappeared. As email has increasingly replaced postal mail, the need for post office clerks, mailroom workers, and correspondence clerks has fallen off.

19 Carnevale and Rose, *The Economy Goes to College: The Hidden Promise of Higher Education in the Post-Industrial Service Economy*, 2015.

20 Boisjoly, Duncan, and Smeeding, "The Shifting Incidence of Involuntary Job losses from 1968 to 1992," 1998; Kletzer, "Job Displacement," 1998.

21 Vastag, "Exabytes: Documenting the 'Digital Age' and Huge Growth in Computing Capacity," 2011.

Financial software has simplified many of the financial record-keeping tasks businesses have to perform, reducing the need for bookkeeping and accounting clerks. Electronic calendars, scheduling tools, and online travel booking tools have cut down on the need for secretaries, administrative assistants, and travel agents. Data-entry office workers — who experienced high demand in the early days of digitization, as organizations sought to convert paper forms and records into digital form — are now not needed by many organizations, as information is entered directly into digital platforms by the end users.

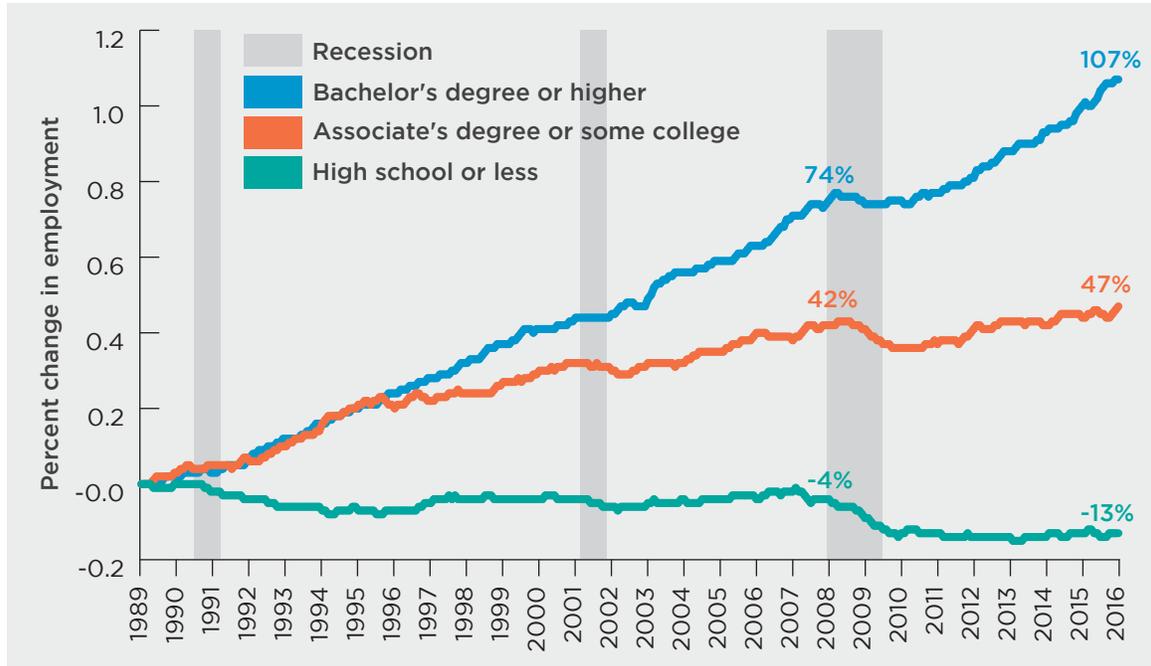
Technology automates repetitive tasks, leaving more complex non-repetitive tasks to more highly educated postsecondary workers.²² Moreover, these changes have been occurring in the context of new networked organizational formats driven by measured outcome standards. These performance-driven networked systems are more flexible, efficient, and innovative, and they also require a more skilled workforce.

The value added in virtually every industry has required new production recipes with higher concentrations of postsecondary workers.

The growing demand for a skilled workforce is evident in the divergent growth of jobs for workers with different levels of educational attainment. Between 1989 and 2016, total employment grew by 31 percent, from 114 million to 149 million jobs — a net increase of 35 million jobs. Yet the number of jobs for workers with a high school diploma or less actually declined by 13 percent over that period, a loss of 7.3 million jobs (Figure 2.1). The net decline in employment for those with a high school diploma or less suggests that many of the job openings for these workers are a result of high turnover in jobs that already existed rather than an expansion of the workforce.

²² Acemoglu and Autor, "Skills, Tasks, and Technologies: Implications for Employment and Earnings," 2010.

Figure 2.1. The number of workers with a Bachelor's degree or higher has more than doubled (107%) since 1989.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 1989-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

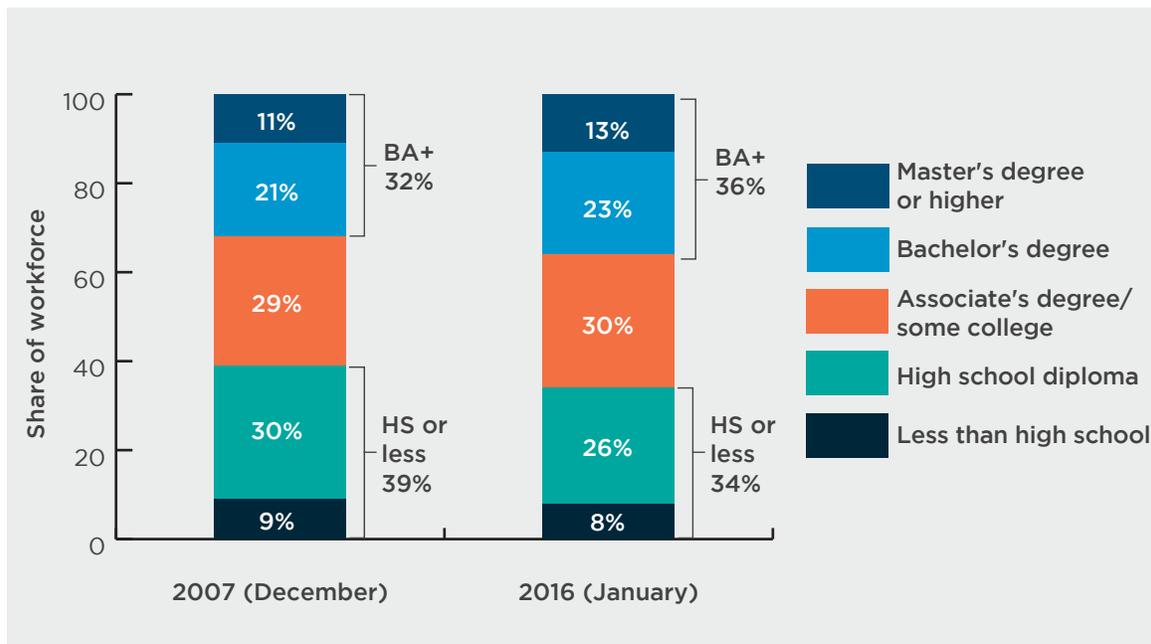
Meanwhile, the number of jobs for workers with at least some college has steadily expanded. The number of jobs held by workers with a Bachelor's degree or higher has more than doubled since 1989, from 26 million to 54.2 million. The number of jobs for workers with an Associate's degree or some college has increased by 47 percent, from 30 million to 43.5 million, over the same period.

From 1989 to 1995, the growth in jobs for workers with an Associate's degree or some college matched the rate of job growth for workers with a Bachelor's degree, but since 1995, the rate of job growth for Associate's degree holders has slowed. However, the employment growth for workers with this level of education is still slowly chugging along, rising by 8 percent during the recovery years (2010-2016).

COLLEGE GRADUATES OUTNUMBER HIGH SCHOOL-EDUCATED WORKERS IN THE WORKFORCE FOR THE FIRST TIME EVER.

The recession and recovery have hastened a long-term change in the composition of the American workforce. In 2016, for the first time ever, workers with a Bachelor's degree or higher comprise a larger proportion of the workforce than those with a high school diploma or less. Workers with a high school diploma or less now make up 34 percent of the workforce, 5 percentage points less than in 2007, when the recession began. Meanwhile, the share of workers with a Bachelor's degree or higher increased from 32 percent to 36 percent (Figure 2.2). These workers also now earn 57 percent of all wages.²³ Including workers with an Associate's degree or some college, workers with postsecondary education now make up 65 percent of total employment.

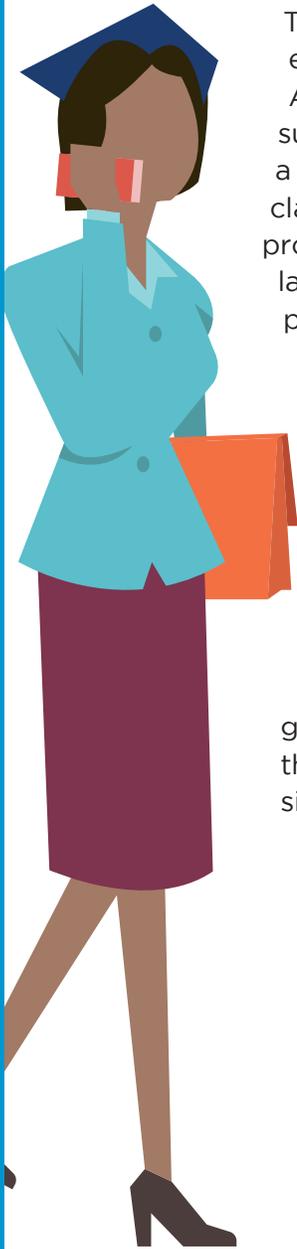
Figure 2.2. Workers with a Bachelor's degree or higher now make up a larger share of the workforce (36%) than workers with a high school diploma or less (34%).



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007, 2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

²³ Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS), *March Supplement* data, 2015.



The human cost of these trends for workers without postsecondary education, their families, and their communities has been immense. As factories and mines have closed and office and administrative support functions have been automated, men and women without a college education — who were previously able to build a middle-class life and raise a family — found themselves out of a job, often for prolonged periods of time and, in some cases, even detached from the labor force.²⁴ The labor force participation rate has declined from 66.5 percent in 1989 to 63 percent in 2016.²⁵ Those who were lucky enough to find another job after being laid off or displaced often did so at a price — lower wages, which often take decades to rebuild to their pre-displacement levels.²⁶ This economic state of affairs has had a traumatic impact, even on sectors of the population that have historically fared reasonably well in American society. Specifically, these economic trends are likely the major culprits behind growing rates of suicides and substance abuse that have led to increases in death rates and the prevalence of illness among middle-aged whites since the end of the last century.²⁷ The negative effects of joblessness have even been shown to transcend generations, with children whose fathers have been displaced from their jobs earning 9 percent lower annual wages as adults compared to similar children whose fathers did not face this challenge.²⁸

24 For more on the plight of men who lost blue-collar jobs and declining industrial communities where they leave, see Luhby, “The Men America Has Left Behind,” 2016.

25 Center on Education and the Workforce analysis of U.S. Bureau of Labor Statistics, “Labor Force Participation Rate (seasonally adjusted)” series, *Current Population Survey*, 1989-2013.

26 Leubsdorf, “The Recession’s Economic Trauma Has Left Enduring Scars,” 2016.

27 Case and Deaton, “Rising Morbidity and Mortality in Midlife among White Non-Hispanic Americans in the 21st Century,” 2015.

28 Oreopoulos, Page, and Stevens, “The Intergenerational Effects of Worker Displacement,” 2008.

CHAPTER 3.

Job Change by Occupation

HIGH-SKILL OCCUPATIONS ARE LEADING THE RECOVERY AND MOST OF THEM ARE GOING TO COLLEGE GRADUATES.

The growing demand for workers with post-secondary qualifications is ever more tightly tied to occupations and the skills they require and, consequently, more loosely tied to industries. This concept is critical to understanding the forces that drive educational demand and to understanding what shapes the U.S. job market.

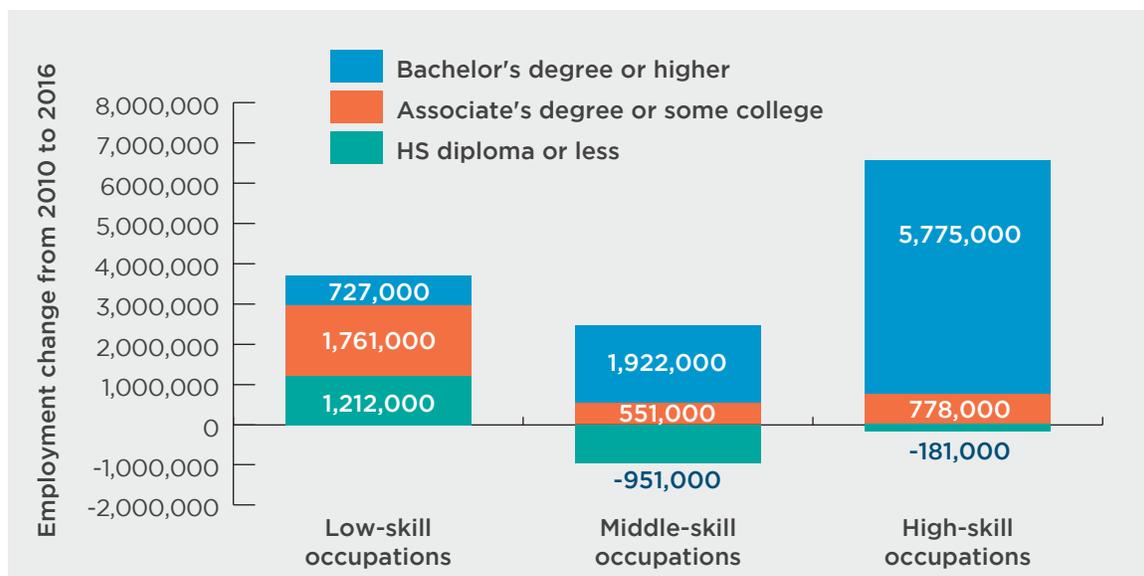
Regardless of the industry, occupations have similar job requirements and wages. Accountants perform comparable tasks whether they are working for a mining company or a hospital — the training required to do the work is virtually the same and the pay tends to be similar. If the tasks of a particular job require a high degree of skill, the demand for workers with postsecondary education or training will be high, regardless of industry.

The job growth by occupation during the Great Recession and subsequent recovery demonstrates how changes in occupational composition have contributed to a growing demand for more educated workers. Based on the education level of incumbents, this report designates the 23 major occupation groups into three categories (see Table 3.1). *High-skill occupations* are those for which 50 percent or more of workers have a Bachelor's degree or higher. *Middle-skill occupations* are those for which 50 percent to 75 percent of workers have at least some postsecondary education. *Low-skill occupations* are those for which at least 50 percent have no education beyond high school.

Workers with a Bachelor's degree or higher have taken nearly all of the jobs in high-skill occupations added in the recovery, almost 5.8 million out of 6.4 million jobs. They have also experienced sizable gains in middle-skill occupations during the recovery, adding 1.9 million such jobs (Figure 3.1). Their largest job gains are in occupations such as computer and mathematical science; management; healthcare professional and technical; and business and finance (Table 3.1).

Workers with a graduate degree have had the most job gains (83%) in high-skill occupations during the recovery. For workers with a Bachelor's degree, 57 percent of job gains have come in high-skill occupations. The largest job growth for the workers with a graduate degree was among healthcare professional and technical occupations, such as doctors; pharmacists; nurses; and lab technicians.

Figure 3.1. Workers with a Bachelor's degree or higher are taking almost all the jobs in high- and middle-skill occupations (5.8 million high-skill and 1.9 million middle-skill jobs) in the recovery (2010-2016).



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2010-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average. *High-skill occupations* are those for which 50 percent or more of workers have a Bachelor's degree or higher. *Middle-skill occupations* are those for which 50 percent to 75 percent of workers have at least some postsecondary education. *Low-skill occupations* are those for which at least 50 percent have no education beyond high school.

Workers with an Associate's degree or some college have gotten some (1.3 million) high- and middle-skill jobs, in such occupations as business and financial operations; computer and mathematical science; sales; personal care and services; and healthcare support. However, the majority (1.8 million or 58 percent) of the jobs gained by these workers are in low-skill areas, such as transportation; production; and installation, maintenance and repair occupations.

Workers with an Associate's degree or some college are seeing substantially fewer job opportunities in office and administrative support, which was one of the prime middle-skill occupation areas for these workers prior to the recession.

For those with a high school diploma or less, low-skill jobs have been just about the only jobs available. These workers have continued to lose jobs in high- and middle-skill occupations (181,000 and 951,000 jobs lost, respectively). They have managed to gain 1.5 million low-skill jobs, particularly in blue-collar occupations, such as production; installation, maintenance, and repair; and transportation.

These occupation and education trends have not been isolated to the Great Recession and recovery. Since the 1980s, workers with a high school diploma or less have been struggling to maintain their footing in a labor market increasingly defined by the higher-skilled occupations. Of all the jobs added since 1989, 73 percent have been in high-skill occupations, especially management; health professional and technical; and education and training. Of these high-skill jobs, 83 percent have gone to workers with a Bachelor's degree or higher.

College access and success are the defining factors in the growing economic divide in America since the early 1980s.

Table 3.1. Management occupations have added the most jobs since December 2007, 1.6 million.

MAJOR OCCUPATION GROUP	RECESSION Job change from Dec. 2007- Jan. 2010 (in thousands)				RECOVERY Job change from Jan. 2010- Jan. 2016 (in thousands)				NET CHANGE Job change from Dec.2007- Jan. 2016 (in thousands)			
	High school or less	Some college /AA	BA or higher	Total	High school or less	Some college /AA	BA or higher	Total	High school or less	Some college /AA	BA or higher	Total
	HIGH-SKILL											
Management	-43	-29	-277	-349	23	291	1,611	1,925	-20	262	1,334	1,576
Healthcare professional and technical	131	205	31	367	-28	182	1,007	1,162	103	387	1,038	1,528
Computer and mathematical science	-9	26	-50	-33	0	79	920	1,000	-8	104	870	966
Business and financial operations	52	-150	8	-91	-94	148	886	940	-42	-2	894	850
Education, training, and library	-38	69	299	330	-65	-29	264	170	-103	40	562	499
Community and social services	10	74	-1	83	-22	26	296	300	-12	100	295	383
Arts, design, entertainment, sports, and media	13	-15	25	23	-7	47	297	337	6	32	322	360
Life and physical science	12	-14	27	25	-1	21	146	166	11	8	172	191
Architecture and engineering	-27	-138	-65	-229	21	34	281	337	-6	-104	217	108
Legal	-28	24	43	39	-11	-26	74	38	-39	-1	117	77
Social science	9	-10	19	19	2	3	-7	-1	12	-6	12	17
MIDDLE-SKILL												
Personal care and service	48	179	71	297	8	151	253	412	56	329	324	709
Healthcare support	24	214	46	284	-89	180	61	152	-65	394	107	435
Protective service	63	53	93	210	-167	-106	249	-24	-104	-53	342	186
Sales and related	-396	-392	-188	-976	-226	298	643	715	-622	-95	455	-261
Office and administrative support	-1,154	-627	66	-1,715	-477	28	716	267	-1,631	-599	781	-1,449
LOW-SKILL												
Food preparation and serving-related	-172	140	94	62	354	207	92	653	182	348	186	715
Building and grounds cleaning and maintenance	-127	33	28	-66	164	153	71	389	37	187	99	323
Installation, maintenance, and repair	-404	-239	77	-566	291	460	31	782	-114	222	108	216
Transportation and material moving	-575	-215	5	-786	157	572	262	991	-418	357	267	205
Farming, fishing, and forestry	-47	-6	16	-36	74	79	38	191	28	73	54	155
Production	-1,393	-403	-123	-1,919	161	371	167	700	-1,232	-32	44	-1,219
Construction and extraction	-1,560	-532	-56	-2,148	11	-82	66	-5	-1,549	-614	10	-2,153
Total	-5,611	-1,752	187	-7,176	80	3,089	8,424	11,593	-5,531	1,337	8,611	4,417

Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using four-month moving average.



Management occupations

Management occupations include employees with general responsibility for strategic decision-making and day-to-day decision-making at a policy level. This high-skill occupation group added the most jobs of any major occupation group since the beginning of the recession in December 2007 (1.6 million jobs). Much of the long-term growth in these occupations comes as a result of the increasing complexity of the business landscape, as employers try to function in ever more complicated networks and regulatory environments, while coping with fast-paced economic and technological changes.

The management occupations group has also added more jobs for workers with a Bachelor's degree or higher than any other occupation group since December 2007. These occupations added 1.3 million jobs for workers with a Bachelor's degree or higher over the past eight years, accounting for 16 percent of all jobs added for this highly educated group of workers.



Healthcare professional and technical occupations

Healthcare professional and technical occupations added the second-largest number of jobs of all major occupation groups since December 2007 (1.5 million jobs). These high-skill occupations — which include registered nurses; physicians; surgeons; therapists and lab technicians; among others — are at the center of the fast-growing healthcare services industry (see the discussion of healthcare services in the following section on industries). As the population ages and as advances in pharmaceuticals, medical technology, and healthcare practices make it possible to treat more illnesses, demand for these services continues to grow.

These positions tend to be geared toward workers with postsecondary education. Jobs for workers with a Bachelor's degree or higher accounted for two out of every three jobs added in this occupation group between December 2007 and January 2016. Because these occupations involve high levels of risk to the safety and well-being of patients, they tend to have some of the highest education requirements in the economy. Among workers in these occupations, 31 percent have a Master's degree or higher. Not surprisingly, 45 percent of all healthcare professional and technical jobs added between December 2007 and January 2016 were for workers with a graduate degree.



Computer and mathematical science occupations

Workers in computer and mathematical science occupations help institutions and individuals keep up with the rapid pace of technological change and development in network applications. Computers have been playing an integral role in the technological change the U.S. economy has been undergoing in recent years. As a result, computer and mathematical science occupations are experiencing growing demand across all industries. This occupation group has added the third-most jobs among high-skill occupations since December 2007 (966,000 jobs).

Computer and mathematical science occupations increasingly favor workers with postsecondary education. These occupations added 870,000 jobs for workers with a Bachelor's degree or higher, and 104,000 jobs for workers with some college or an Associate's degree since December 2007. At the same time, computer and mathematical science jobs for workers with a high school diploma or less declined by 8,000.



Food preparation and serving-related occupations

Food preparation and serving-related occupations are low-skill, low-wage occupations covering workers involved in preparing and serving food in restaurants and fast-food establishments. These occupations had the highest growth among low-skill occupations, adding 715,000 jobs between December 2007 and January 2016. However, to some extent, the job gains in these

occupations are overstated in the data because many of these jobs are part-time. Some of the jobs in this occupation group are first jobs that people take while they are in school, or temporary stepping-stones toward better-paying jobs in occupations that require a higher level of skills. However, for some workers with a high school diploma or less, these occupations have been one of the few areas of the economy with growing job opportunities over the past eight years.

The post-Great Recession economy has divided the country along a fault line demarcated by college education.

After experiencing job losses in the recession, food preparation and serving-related occupations added 354,000 jobs for workers with a high school diploma or less during the recovery, more than any other occupation group.



Office and administrative support occupations

This occupation group has had the second-largest decline in employment between December 2007 and January 2016, shedding 1.4 million jobs. While much of the focus has been on jobs lost in the construction and production occupations (see the discussion of construction and manufacturing industries in the following section on industries), the job losses in office and administrative occupations may have had even more impact, primarily because they are broadly disbursed throughout the economy.

These occupations have been some of the most common middle-skill, white-collar jobs in recent decades, especially for women. As a result, the employment decline in office and administrative support occupations has substantially contributed to the reshaping of the labor market.

Office and administrative support occupations have been declining since 2000, as digital information storage has replaced paper,²⁹ reducing the need for filing clerks; post office clerks; and correspondence clerks. In addition, increasing automation with new computer technologies has reduced the demand for bookkeeping and accounting clerks; information clerks; tellers, secretaries; and administrative assistants.

The job losses in this occupation group have been disproportionately concentrated among jobs for workers with a high school diploma or less. Jobs for these workers have declined by 1.6 million since December 2007, the largest decline for this group of workers among all major occupation groups. Office and administrative support jobs for workers with a Bachelor's degree or higher, on the other hand, added 781,000 jobs over the same period.

Office and administrative support occupations have experienced the second-highest decline in jobs.

²⁹ Vastag, "Exabytes: Documenting the 'Digital Age' and Huge Growth in Computing Capacity," 2011.

CHAPTER 4.

Job Change by Industry

AMONG INDUSTRIES, CONSULTING AND BUSINESS SERVICES EXPERIENCED THE LARGEST JOB GROWTH IN THE RECOVERY.

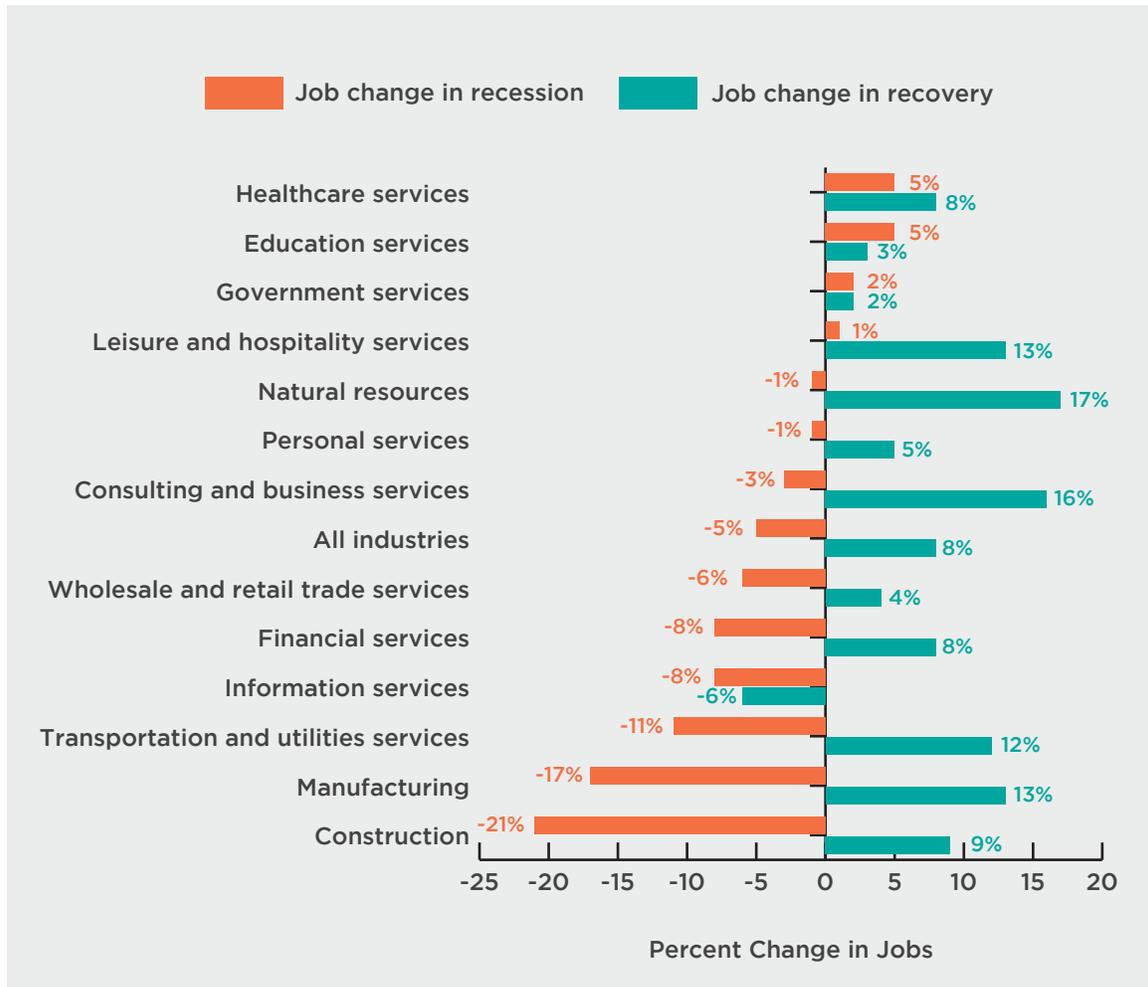
Consulting and business services added the largest number of jobs in the recovery — 2.5 million. At the other end of the workforce picture, the information services sector is the only industry that continued to lose jobs in the recovery. Manufacturing added the second-largest number of jobs in the recovery, 1.7 million, beginning to reverse its large losses during the Great Recession. Yet, the industry is still 1 million jobs short of its employment level in December 2007, when the recession began.

Those with the most years of college were the last fired in the recession and the first hired in the recovery.

Overall, healthcare has experienced the largest employment growth since December 2007, adding 2.3 million jobs. Construction is the industry that has recovered the least from its large recession job losses; it remains 1.6 million jobs short of its 2007 employment level.

In four industries — healthcare services; education services; leisure and hospitality services; and government services — employment has grown during both the recession and the recovery (Figure 4.1). The healthcare services sector grew by 5 percent in the recession and 8 percent in the recovery.

Figure 4.1. While most industries have recovered their recession job losses, construction and manufacturing are lagging substantially behind.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007-2016.
 Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using four-month moving average.

Nearly all industry sectors are shifting toward a more-educated workforce (Table 4.1). Both the industries that traditionally employed mostly workers with a college degree and those that traditionally employed workers with a high school diploma or less are showing signs of upskilling. The two industries that traditionally hired large numbers of workers without a college degree — construction and manufacturing — are shifting toward workers with more education than a high school diploma. Of the 834,000 jobs added in construction during the recovery, about 450,000 (or 54 percent) have gone to workers with a high school education or less. Most telling is the manufacturing sector: of the 1.7 million jobs that have been gained since the onset of the recovery, only 214,000 (or 12 percent) have gone to workers with a high school diploma or less.

In a number of industries that traditionally employ workers with a college degree — such as information services; financial services; education services; and government services — the long-term shift toward more highly-educated workers has intensified during the recession and recovery. Workers with a Bachelor's degree or higher have gained jobs during the recovery, while those with less education have continued to lose jobs in those industries. The divergent employment trends for workers with different education levels are primarily tied to structural changes in these industry sectors, rather than anything specific to this recovery.

Similarly, in financial services and government services, increasing reliance on computers and information technology has moved these sectors toward greater demand for skilled workers. The government services industry has experienced this shift toward more educated workers for at least the last three decades. The share of workers with a Bachelor's degree or higher in government services has increased from 31 percent in 1989 to 48 percent in 2016.

Leisure and hospitality has been the main source of jobs for workers with less education. Of the 1.5 million jobs this industry added in the recovery, 71 percent were for workers with an Associate's degree or less.

Table 4.1. The healthcare industry has had the largest growth since December 2007, adding 2.2 million jobs.

MAJOR INDUSTRY SECTOR	RECESSION Job change Dec. 2007-Jan. 2010 (in thousands)				RECOVERY Job change Jan. 2010-Jan. 2016 (in thousands)				NET CHANGE Job change Dec. 2007-Jan. 2016 (in thousands)			
	High school or less	Some college/AA	BA or higher	Total	High school or less	Some college/AA	BA or higher	Total	High school or less	Some college/AA	BA or higher	Total
Healthcare services	189	464	146	799	-473	276	1,672	1,475	-284	741	1,818	2,275
Consulting and business services	-163	-140	-110	-412	214	345	1,947	2,506	50	206	1,837	2,093
Leisure and hospitality services	-215	116	174	75	614	486	439	1,539	399	602	613	1,615
Education services	-69	139	499	569	-292	35	695	438	-361	174	1,194	1,007
Natural resources	-83	25	41	-18	173	55	244	472	89	80	285	455
Personal services	-195	99	11	-85	-19	83	275	339	-213	182	286	254
Government services	44	-16	94	122	-269	-92	489	128	-225	-108	583	250
Transportation and utilities services	-451	-319	-85	-855	226	346	307	879	-225	27	222	24
Financial services	-388	-290	-104	-782	-121	111	731	721	-509	-179	627	-60
Wholesale and retail trade services	-781	-315	-39	-1,135	-381	616	497	733	-1,161	301	458	-402
Information services	-147	-102	-12	-261	-255	-75	136	-195	-402	-177	124	-456
Manufacturing	-1,563	-808	-375	-2,745	214	724	785	1,723	-1,349	-83	409	-1,023
Construction	-1,789	-608	-54	-2,451	449	179	206	834	-1,340	-429	153	-1,617
Total	-5,611	-1,752	187	-7,176	80	3,089	8,424	11,592	-5,531	1,337	8,611	4,416

Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey* (CPS) data, 2007-2016.

Note: Employment includes all workers age 18 and older. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using four-month moving average.

Consulting and business services

Consulting and business services had the largest job gains of any industry during the recovery, adding 2.5 million jobs between January 2010 and January 2016. This industry now has 2.1 million more jobs than it had prior to the recession.

The consulting and business services industry employs workers who provide consulting, temporary help, technical support, and network computing and communications support to the complex organizational networks that typify the

postindustrial economy. The consulting and business services industry sector is now the third-largest industry by employment. It employs 12 percent of all workers.

Consulting and business services also added the most jobs for workers with a Bachelor's degree or higher during the recovery: nearly 2 million jobs. Even though workers with a Bachelor's degree or higher make up only half of the consulting and business services workforce, they accounted for 78 percent of the job gains in this industry during the recovery. Workers in this industry with an Associate's degree or some college credit have gained 345,000 jobs during the recovery, after losing 140,000 jobs in the recession. Workers with a high school diploma or less gained 214,000 jobs in consulting and business services during the recovery after losing 163,000 jobs in the recession. So, while workers at each education level have experienced net positive job growth since December 2007, workers with a Bachelor's degree or higher have experienced the largest job gains. Legal services had the largest job gains within the consulting and business services industry sector.³⁰



Financial services

The financial services industry has grown markedly over the decades preceding the Great Recession, as a result of several factors. Among these are the shift from defined-benefit to defined-contribution retirement plans; increasing consumer debt for mortgages, postsecondary education, and consumer durables, such as automobiles; and the globalization of financial services. Workers in this sector were hit hard by the Great Recession, with jobs declining by 782,000 between December 2007 and January 2010. This was largely because the economic crisis was triggered by a financial and housing market collapse, and the resulting layoffs were significant. Because of the industry's role in modern economic institutions, it has made solid progress during the recovery. The financial services industry gained 721,000 jobs between January 2010 and January 2016, but it still remains 60,000 jobs short of its pre-recession employment.



Healthcare services

The healthcare services industry has been growing solidly since the middle of the last century. The share of consumer and public spending on healthcare has grown from 5 percent in 1947 to 20 percent in 2007.³¹ In 1947, this industry accounted for

³⁰ Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 2007-2016.

³¹ Carnevale and Rose, *The Economy Goes to College: The Hidden Promise of Higher Education in the Post-Industrial Service Economy*, 2015.

only 5 percent of employment, and now it is the largest industry, accounting for 14 percent of all workers.³²

An aging population and the rapid advance of health technologies are driving the growth in healthcare services. By 2030, approximately 78 million Baby Boomers will be over 65 — a segment of the population that accounts for 26 percent of physician office visits, 38 percent of emergency medical service responses, 34 percent of prescriptions, and 90 percent of nursing home residents.³³ New technologies and drugs have allowed people to live to advanced ages, when healthcare needs are higher than normal. Technology advances also ensure increased survival rates from major diseases, but trigger increased costs of critical recovery care. Indeed, such cost pressures affect growth — as well as the distribution of growth — shifting treatment from hospitals to less expensive outpatient settings in practitioners' offices, home healthcare, and nursing and residential facilities.

Even in the challenging economy of the past eight years, through the recession and recovery, the healthcare services industry has been a particularly strong generator of jobs. It has added 2.3 million jobs since the beginning of the recession, more than any other industry, including the 799,000 jobs it added during the recession. During the recovery, between January 2010 and January 2016, the healthcare services industry added nearly 1.5 million jobs, led by gains in ambulatory and emergency health services.³⁴

Manufacturing

The manufacturing industry includes those companies that make nondurable goods that are consumed shortly after being purchased and have to be replaced on a regular basis, such as cosmetics or office supplies, and durable goods that last for several years, such as cars and furniture. Manufacturing was once the nation's largest employer, but automation and globalization have contributed to its long-term decline. Between 1967 and 2007, the share of value added to the economy by manufacturing declined from 31 percent to 16 percent.³⁵ Manufacturing still has the highest output among industries,³⁶ but is now the fourth-largest industry by employment, accounting for 10 percent of all workers.

³² Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 1947-2016.

³³ Ricketts, "The Healthcare Workforce: Will It Be Ready as the Boomers Age? A Review of How We Can Know (or Not Know) the Answer," 2011.

³⁴ Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 2007-2016.

³⁵ Carnevale and Rose, *The Economy Goes to College: The Hidden Promise of Higher Education in the Post-Industrial Service Economy*, 2015.

³⁶ Carnevale, Smith, and Strohl, *Recovery: Projections of Jobs and Education Requirements through 2020*, 2013.

The long-term decline in manufacturing has been accelerated by the Great Recession. Manufacturing was the hardest-hit industry in the Great Recession, losing 2.7 million jobs between December 2007 and January 2010. Workers with a high school diploma or less experienced the brunt of the losses, accounting for 1.6 million jobs lost in manufacturing during the recession.

The manufacturing sector has added a healthy number of jobs during the recovery: 1.7 million. Wood products manufacturing; automobile manufacturing; and fabricated metal products manufacturing have experienced the largest gains in the manufacturing sector.³⁷ The recovery in manufacturing has been aided by the revival in American car manufacturing and the reshoring of manufacturing jobs from overseas. U.S. jobs created from reshoring and foreign direct investment in manufacturing have grown from around 10,000 in 2010 to 60,000 in 2014, with over half of reshoring jobs returning from China.³⁸

These gains, however, must be put into the context of the 2.7 million jobs lost in manufacturing during the recession. Thus, manufacturing remains 1 million jobs short of the job level before the recession began.



Leisure and hospitality services

Leisure and hospitality services has been one of the main sources of job opportunities for workers with less than a Bachelor's degree. The share of spending devoted to recreation and leisure has grown substantially since the middle of the 20th century, from 8 percent of consumer and public spending in 1947 to 14 percent in 2007.³⁹ This industry added 1.5 million jobs during the recovery; 71 percent of them went to workers with an Associate's degree or less. While leisure and hospitality services is the industry responsible for the largest job gains for workers with a high school diploma or less since December 2007, and one of only three industries for which this group of workers has experienced job gains (the other two being consulting and business services and natural resources), workers with a postsecondary education still experienced larger job gains in the industry over this period. While workers with a high school diploma or less gained 399,000 jobs in this industry since the beginning of the Great Recession, workers with an Associate's degree or some college gained 602,000, and workers with a Bachelor's degree or higher gained 613,000. Within the leisure and hospitality services sector, the largest job growth has been in restaurants and other eateries.⁴⁰

37 Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 2007-2016.

38 Reshoring Initiative, *Reshoring Initiative Data Report: Reshoring and FDI Boost Manufacturing in 2014*, 2014.

39 Carnevale and Rose, *The Economy Goes to College: The Hidden Promise of Higher Education in the Post-Industrial Service Economy*, 2015.

40 Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 2007-2015.



Information services

The information services industry is the only industry sector that continued to lose jobs during the recovery, shedding 195,000 jobs between January 2010 and January 2016. The industry has shed 456,000 jobs since December 2007. The job losses in the information services industry are part of a continuing shift from print media to online media, with most of the job losses occurring in

traditional print media and most of the job gains coming from electronic (online and software) publishing and data processing and hosting services.⁴¹ The new information media are more productive than the old ones, so, in part, employment in this industry is declining because of productivity gains. This shift to high-tech media has also increased the skill requirements for jobs in this industry. The industry has added 124,000 jobs for workers with a Bachelor's degree or higher since December 2007, even as the number of jobs for workers with less education had declined. This trend indicates that even as this sector is moving away from traditional print media, there are still job opportunities in new electronic and computing communications technologies.

Workers with a high school diploma or less have essentially experienced no job recovery.



Construction

The construction industry's woes are tied mostly to housing. The industry saw 2.5 million jobs eliminated amidst the bursting of the housing bubble and the increased number of home foreclosures. Home ownership is at its lowest rate in 20 years.⁴² The construction industry is showing some signs of recovery, with a gain of 834,000 jobs amid a slight rebound in new single-family home sales and increased spending on commercial construction.⁴³ Still, this industry has experienced the largest overall job losses of any sector compared to its employment levels in December 2007. The largest job gains in construction during the recovery were among specialty contractors, in particular building-equipment contractors and plumbing and HVAC contractors.⁴⁴

⁴¹ Ibid.

⁴² Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau of *Housing Vacancies and Homeownership* data, 1990-2015.

⁴³ Ibid.

⁴⁴ Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 2007-2016.



Natural Resources

Jobs in the natural resources industry have grown by 17 percent during the recovery, mostly because of the boom in domestic production of oil and natural gas. The largest employment gains came in oil and gas operations and support for oil and gas operations industries.⁴⁵ However, it remains a comparatively small industry, so the growth translated to just 472,000 jobs. Also, the nature of the industry makes employment volatile. The drop in international oil prices and shifting policies in the Middle East have led to declining employment in the industry since September 2014 and have put a serious question mark over the sustainability of growth in this industry.

Further, like almost all industries, the natural resources industry sector has increasingly shifted toward a more educated workforce. This industry has long employed mostly less-educated workers — 78 percent of the natural resources workforce has an Associate's degree or less. However, since the beginning of the recovery, workers with a Bachelor's degree or higher have accounted for more than half of the job gains in this industry. This shift, in part, has been driven by a need for more advanced technology in the exploration for shale oil and gas, which in turn has increased the demand for more skilled workers to operate the necessary technology.



⁴⁵ Georgetown University Center on Education and the Workforce analysis of *Current Employment Statistics* data, 2007-2015.

Conclusion

The steady job growth and falling unemployment rate offer some reassurance that the economy is on the right track. Yet, the long-term structural changes accelerated by the cyclical impact of the Great Recession have resulted in a very unequal recovery. During the recession, the worst economic downturn since the Great Depression, workers without postsecondary education suffered tremendous job losses. The recovery has been virtually nonexistent for less-educated workers. Men without a college degree were traditionally able to make their way into the middle class through manufacturing and construction jobs, and women without a college degree could get middle class jobs in office and administrative support occupations. These pathways are increasingly closing down, leaving few opportunities to access the middle class without postsecondary education. By contrast, for most workers with a Bachelor's degree or higher, the recovery has resulted in a strong job market. These recent economic trends have made it clearer than ever that a college degree continues to be the most important economic asset for those who want to succeed in the labor market.

The economy is seeing a continuing scouring out of low-skill jobs in favor of high-skill jobs. This makes the acquisition of postsecondary education an essential prerequisite to participate in the 21st century labor market. Workers with a high school diploma or less must attain postsecondary credentials if they want to compete effectively in growing high-skill career fields. The nation must face up to a need to train more of its workers for the growing high-skill jobs that play an increasingly central role in the post-Great Recession economy.

Bachelor's degree-holders
gained the most jobs
in the recovery.

References

- Acemoglu, Daron, and David Autor. "Skills, Tasks, and Technologies: Implications for Employment and Earnings." Boston, MA: Massachusetts Institute of Technology, 2010. <http://economics.mit.edu/files/5571>.
- Autor, David. "Skills, Education, and the Rise of Earnings Inequality Among the 'Other 99 Percent,'" *Science* 344 no. 6188 (2014): 843-851 doi: 10.1126/science.1251868.
- Boisjoly, Johanne, Greg Duncan, and Timothy Smeeding. "The Shifting Incidence of Involuntary Job Losses from 1968 to 1992," *Industrial Relations* 37 no. 2 (1998). ftp://monitoringthefuture.org/pub/src/psid/other/Job_loss.pdf.
- Carnevale, Anthony, Nicole Smith, and Jeff Strohl. *Recovery: Projections of Jobs and Education Requirements through 2020*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2013. <https://cew.georgetown.edu/report/recovery-job-growth-and-education-requirements-through-2020/>.
- Carnevale, Anthony, Tamara Jayasundera, and Ban Cheah. *The College Advantage: Weathering the Economic Storm*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2012. <https://cew.georgetown.edu/report/the-college-advantage/>.
- Carnevale, Anthony, Tamara Jayasundera, and Artem Gulish. *Good Jobs are Back: College Graduates are First in Line*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2015. <https://cew.georgetown.edu/cew-reports/goodjobsareback/>.
- Carnevale, Anthony, Tamara Jayasundera, and Artem Gulish. *Six Million Missing Jobs: The Lingering Pain of The Great Recession*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2015. <https://cew.georgetown.edu/cew-reports/missingjobs/>.
- Carnevale, Anthony, Tamara Jayasundera, and Andrew R. Hanson. *Career and Technical Education: Five Ways that Pay Along the Way to the B.A.* Washington, D.C.: Georgetown University Center on Education and the Workforce, 2015. <https://cew.georgetown.edu/report/career-and-technical-education/>.
- Carnevale, Anthony, and Stephen J. Rose. *The Undereducated American*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2011. <https://cew.georgetown.edu/report/the-undereducated-american/>.
- Carnevale, Anthony, Stephen J. Rose, and Ban Cheah. *The College Payoff: Education*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2011. <https://cew.georgetown.edu/report/the-college-payoff/>.
- Carnevale, Anthony, and Stephen J. Rose. *The Economy Goes to College: The Hidden Promise of Higher Education in the Post-Industrial Service Economy*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2015. <https://cew.georgetown.edu/report/economygoestocollege/>.
- Case, Anne, and Angus Deaton. "Rising Morbidity and Mortality in Midlife among White non-Hispanic Americans in the 21st Century," *Proceedings of the National Academy of Sciences of the United States of America* 112 no. 49 (2015), doi: 10.1073/pnas.1518393112.
- Engemann, Kristie M., and Howard J. Wall. "The Effects of Recession across Demographic Groups," *Federal Reserve Bank of St. Louis Review*, January/February, 2010. <https://research.stlouisfed.org/publications/review/10/01/Engemann.pdf>.
- Gellman, Lindsay. "The Workers Who Say 'Thanks, but No Thanks' to Jobs," *Wall Street Journal*, July 14, 2015. <http://www.wsj.com/articles/the-workers-who-say-thanks-but-no-thanks-to-jobs-1436868001>.
- Goldin, Claudia, and Lawrence Katz. "Long-Run Changes in the Wage Structure: Narrowing, Widening, Polarizing," *Brookings Papers on Economic Activity*, 2. http://www.brookings.edu/~media/Projects/BPEA/Fall-2007/2007b_bpea_goldin.PDF.

Groshen, Erica L., and Simon Potter. "Has Structural Change Contributed to a Jobless Recovery?," *Federal Reserve Bank of New York, Current Issues in Economic and Finance* (2003). https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci9-8.pdf.

Hecker, Daniel E. "Occupational employment projections to 2014," *Monthly Labor Review*. Washington, D.C.: Bureau of Labor Statistics, November 2005. <http://www.bls.gov/opub/mlr/2005/11/art5full.pdf>.

Jaimovich, Nir, and Henry Siu. "The Trend is the Cycle: Job Polarization and Jobless Recoveries," *NBER Working Paper* 18334 (2012). <http://www.nber.org/papers/w18334>.

Kletzer, Lori. "Job Displacement," *The Journal of Economic Perspectives* 12 no. 1 (1998). <http://www.jstor.org/stable/2646942>.

Leubsdorf, Ben. "The Recession's Economic Trauma Has Left Enduring Scars," *The Wall Street Journal*, May 2016. <http://www.wsj.com/articles/the-recessions-economic-trauma-has-left-enduring-scars-1462809318>.

Luhby, Tami. "The Men America Has Left Behind," *CNN Money* (May 2016). <http://money.cnn.com/2016/05/04/news/economy/america-left-behind-white-men/index.html>.

Oreopoulos, Phillip, Marianne Page, and Ann Huff Stevens. "The Intergenerational Effects of Worker Displacement," *Journal of Labor Economics* 26 no. 3 (2008): 455-483. doi: 10.1086/588493.

Reshoring Initiative. *Reshoring Initiative Data Report: Reshoring and FDI Boost Manufacturing in 2014*. Kildeer, IL: Reshoring Initiative, www.reshorennow.org.

Ricketts, T.C. "The Healthcare Workforce: Will It Be Ready as the Boomers Age? A Review of How We Can Know (or Not Know) the Answer." *Annual Review of Public Health* 32 (2011): 417-430. <http://www.annualreviews.org/doi/abs/10.1146/annurev-publhealth-031210-101227>. doi: 10.1146/annurev-publhealth-031210-101227.

U.S. Bureau of Labor Statistics. *Employment Situation Summary*. Washington, D.C.: Bureau of Labor Statistics, February 2016. <http://www.bls.gov/news.release/empst.nr0.htm>.

U.S. Bureau of Labor Statistics. *Current*

Employment Statistics. Washington, D.C.: Bureau of Labor Statistics, 1947, 2007-2015. <http://www.bls.gov/ces/>.

U.S. Census Bureau. *Housing Vacancies and Homeownership*, 1990-2015. Current Population Survey/Housing Vacancy Survey, Series H-111, Bureau of the Census using "Business and Industry" Time Series/Trend Charts tool. <https://www.census.gov/econ/currentdata/dbsearch?program=HV&startYear=1956&endYear=2015&categories=RATE&dataType=RVR&geoLevel=US&adjusted=0-Adjusted=1&errorData=>.

U.S. Census Bureau and Bureau of Labor Statistics. *Current Population Survey (Basic Monthly)*. Washington, D.C.: U.S. Census Bureau and Bureau of Labor Statistics, 1989-2015. http://thedataweb.rm.census.gov/ftp/cps_ftp.html#cpsbasic.

U.S. Census Bureau and Bureau of Labor Statistics, *Current Population Survey March Supplement (Annual Economic and Social Supplement)*. Washington, D.C.: U.S. Census Bureau and Bureau of Labor Statistics, 2015. <http://www.nber.org/data/current-population-survey-data.html>.

U.S. Government Accountability Office. *Contingent Workforce*, GAO-15.168R. Washington, D.C.: Government Accountability Office, April 2015.

U.S. Government Accountability Office. *Financial Regulatory Reform: Financial Crisis Losses and Potential Impact of the Dodd-Frank Act*, GAO-13-180. Washington, D.C.: U.S. General Accountability Office, 2014. <http://www.gao.gov/assets/660/651322.pdf>.

Vastag, Brian. "Exabytes: Documenting the 'Digital Age' and Huge Growth in Computing Capacity." *The Washington Post*, February 10, 2011.

Williams John C. "The Recovery's Final Frontier?" *Federal Reserve Bank of San Francisco Economic Letter* (July 2015). http://www.frbsf.org/economic-research/publications/economic-letter/2015/july/the-recovery-s-final-frontier-economic-outlook-speech/?utm_source=mailchimp&utm_medium=email&utm_campaign=economic-letter-2015-07-13a/.

APPENDIX:

Data Sources and Methodology

This report uses data from *Current Population Survey* (CPS), a monthly survey administered by the U.S. Census Bureau on behalf of the U.S. Bureau of Labor Statistics (BLS), and in some places is supplemented by other data sources, as indicated in specific sections of the report. The CPS surveys from January 1989 to January 2016 are used to estimate the employment (18 and over) by educational attainment, industry, and occupation. The monthly employment numbers are seasonally adjusted using the U.S. Census Bureau X-12 procedure and smoothed using a four-month moving average.

The Great Recession period is considered to be from December 2007 to January 2010. The recovery period is considered to be from January 2010 to January 2016. The “net change” refers to the combination of the two periods, from December 2007 to January 2016. The Great Recession employment change data has been adjusted for consistency with *The College Advantage* (Carnevale, Jayasundera, and Cheah, 2012), the Center’s previous report on employment change in the Great Recession and recovery by workers’ education, industry, and occupation.

The workers’ educational attainment level is presented using four levels: high school diploma or less, some college/Associate’s degree, Bachelor’s degree, and Master’s degree or higher. In some sections of the report the educational attainment level of workers has been further aggregated to three levels: high school diploma or less, some college/Associate’s degree, and Bachelor’s degree or higher.

The job change by occupation analysis uses 23 major occupation groups, which are further aggregated into three tiers based on educational attainment of workers within each occupation group: *high-skill occupations*, *middle-skill occupations*, and *low-skill occupations*. *High-skill occupations* are those for which 50 percent or more of workers have a Bachelor’s degree or higher. *Middle-skill occupations* are those for which 50 percent to 75 percent of workers have at least some postsecondary education. *Low-skill occupations* are those for which at least 50 percent have no education beyond high school.

The industry analysis uses 13 major industry sectors. In addition, where relevant, this is supplemented by trends among more detailed industries based on data from the BLS *Current Employment Statistics* survey.



The Divided Recovery: College Haves and Have-Nots
can be accessed online at cew.georgetown.edu/dividedrecovery

GEORGETOWN UNIVERSITY



Center
on Education
and the Workforce

McCourt School of Public Policy

3300 Whitehaven St. NW
Suite 3200
Washington, D.C. 20007
cew.georgetown.edu



facebook.com/GeorgetownCEW



twitter.com/GeorgetownCEW



linkedin.com/company/georgetowncew