

State Online College Job Market

★★★ RANKING THE STATES



2015
Anthony Carnevale
Tamara Jayasundera
Dmitri Repnikov
Artem Gulish

GEORGETOWN UNIVERSITY



Center
on Education
and the Workforce

McCourt School of Public Policy

State Online College Job Market

★ ★ ★ **RANKING THE STATES**

2015

Acknowledgments

We would like to express our gratitude to the individuals and organizations that have made this report possible. First, we thank the Bill & Melinda Gates Foundation, Lumina Foundation, and the Joyce Foundation for their support of our research over the past few years. In particular, we are grateful for the support of Daniel Greenstein and Elise Miller from Gates; Jamie Merisotis and Holly Zanville from Lumina; and Matthew Muench and Whitney Smith from Joyce. We are honored to be partners in their mission of promoting postsecondary access and completion for all Americans.

We have been working with the underlying data for this report for a long time. The world of online job ads data is a new territory for us and, before producing a report, we wanted to understand the data better. During that time, many individuals have worked with us and have demonstrated great patience.

Special thanks go to Burning Glass Technologies for providing access to its data for this report and for offering timely data updates. Burning Glass Technologies was the only vendor that allowed us to explore the raw job ads data openly. With its help, we were able to understand the accuracy and limitations of the data.

Thanks also go to Andrew R. Hanson for providing superb research and writing assistance throughout; Ryan Clennan and his team at Studiografik, the report's designers, for their outstanding creative work; Tracy Thompson, Nancy Lewis, and Jim McNeil, the report's editors; and Westland Printers, especially Rick Miller, whose staff produced the print versions of the report. Without their support, this report would not have been possible.

Our thanks also go to our colleagues, whose support was vital to our success:

- Nicole Smith and Jeff Strohl provided strong data and research expertise and contributed to strategic and editorial decisions.
- Stephen J. Rose advised our methodological decisions.
- Ban Cheah imputed the missing education data.
- Andrea Porter provided strategic guidance in the design and production of the report.
- Ana Castanon assisted with the design and other logistics of producing the report.

Many have contributed their thoughts and feedback throughout the production of this report. That said, all errors, omissions, and views remain the responsibility of the authors.

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

Table of Contents

Introduction	5
Part 1. Occupations	13
Managerial and professional office occupations	16
STEM occupations	18
Sales and office support occupations	20
Healthcare professional and technical occupations	22
Education occupations	24
Community services and the arts occupations	26
Food and personal service occupations	28
Blue-collar occupations	30
Part 2. Industries	32
Consulting and business services	33
Healthcare services	35
Financial services	37
Education services	39
Manufacturing	41
Wholesale and retail trade services	43
Government services	45
Leisure and hospitality services	47
Appendix	49
Online job ads as 'real-time' proxy for labor demand	49
Adjustments to the data	51
Location quotient	53
References	54

Figures

Figure I. California, Texas, and New York have the most online job ads that require at least a Bachelor's degree.	6
Figure II. Massachusetts, Delaware, and Washington State are the most favorable online college labor markets, while West Virginia, Rhode Island, and South Carolina are the least favorable.	9
Figure 1.1. STEM, managerial and professional office, and healthcare professional and technical occupations with the highest number of job ads per 100 workers provide the best prospects for college graduates,	14
Figure 2.1. Information services, consulting and business services, and financial services provide the best prospects for college graduates, with the highest number of job ads per 100 workers.	32

Tables

Table 1.1. Across all occupations, Massachusetts, Delaware, and Washington State have the most favorable online college labor markets, while West Virginia, Rhode Island, and South Carolina have the least favorable online college labor markets.	15
Table 1.2. Between 2010 and 2013, managerial and professional office college jobs grew the most in South Carolina, Mississippi, and Alabama, and declined the most in Louisiana, Arizona, and Wyoming.	16
Table 1.3. Massachusetts, Delaware, and Washington State have the most favorable managerial and professional office online college labor markets, while West Virginia, Mississippi, and South Carolina have the least favorable.	17
Table 1.4. Between 2010 and 2013, STEM college jobs grew the most in Wyoming, Missouri, and Wisconsin, and declined the most in Tennessee, Colorado, and South Dakota.	18
Table 1.5. Delaware, Massachusetts, and New York have the most favorable STEM online college labor markets, while New Mexico, West Virginia, and Maine have the least favorable STEM online college labor markets.	19
Table 1.6. Between 2010 and 2013, sales and office support college jobs grew the most in North Dakota, Alabama, and Pennsylvania and declined the most in Montana and Idaho.	20
Table 1.7. Montana, Massachusetts, and Idaho have the most favorable sales and office support online college labor markets, while West Virginia, South Carolina, and Vermont have the least favorable sales and office support online college labor markets.	21
Table 1.8. Between 2010 and 2013, healthcare professional and technical college jobs grew the most in Wisconsin, Delaware, and Alabama, and declined the most in Nebraska, Michigan, and Nevada.	22

Table 1.9. Alaska, Montana, and New Mexico have the most favorable labor markets for online healthcare professional and technical job ads, while Wisconsin, New Jersey, and Louisiana have the least favorable.	23
Table 1.10. Between 2010 and 2013, education college jobs grew the most in New Mexico, Ohio, and Arkansas, and declined the most in Arizona, New Jersey, and Indiana.	24
Table 1.11. South Dakota, Vermont, and Maine are the best labor markets for online education job ads, while Rhode Island, Alabama, and Arkansas rank as the worst.	25
Table 1.12. New Jersey, Pennsylvania, and Alaska topped employment growth in community services and the arts, while Kansas, Wyoming, and Nebraska saw the greatest declines.	26
Table 1.13. Delaware, Washington, and Kansas have the best online college labor markets for job seekers in community services and the arts, while South Carolina, Rhode Island, and Hawaii have the least favorable.	27
Table 1.14. Between 2010 and 2013, food and personal services college jobs more than doubled in Rhode Island and Nebraska, and declined the most in New Hampshire, Massachusetts, and Georgia.	28
Table 1.15. Montana, Massachusetts, and Colorado have the best food and personal services online college labor markets, while Tennessee, Rhode Island, and Wisconsin have the least favorable.	29
Table 1.16. Between 2010 and 2013, blue-collar college jobs grew the most in Ohio, Kansas, and Wyoming, and declined the most in Hawaii, Pennsylvania, and Maryland.	30
Table 1.17. North Dakota, Montana, and Massachusetts have the best blue-collar online college labor markets, while Rhode Island, Vermont, and Hawaii have the least favorable.	31
Table 2.1. Between 2010 and 2013, employment grew by 12 percent in the consulting and business services industry. Alabama, Oklahoma, and Utah had the largest job growth, while Ohio, Arizona, and Iowa had the largest job declines.	33
Table 2.2. Delaware, Ohio, and Massachusetts have the most favorable job markets in consulting and business services; Rhode Island, New Mexico, and New Hampshire have the least favorable.	34
Table 2.3. Alabama, Delaware, and West Virginia had the biggest growth in employment among college graduates in the healthcare services industry. Montana, Tennessee, and Oklahoma had the biggest losses.	35
Table 2.4. Montana, Colorado, and Washington State have the most favorable online college labor markets in the healthcare services industry, while West Virginia, Rhode Island, and New York have the least favorable.	36
Table 2.5. Indiana, South Carolina, and Iowa had the biggest growth in financial services employment among college graduates; Nevada, Hawaii, and South Dakota had the biggest losses.	37
Table 2.6. Delaware, Alabama, and Massachusetts have the most favorable online college job markets in financial services, while South Carolina, Mississippi, and Utah have the least favorable job markets.	38
Table 2.7. Hawaii and Pennsylvania had the biggest gains in employment among the college educated in the education services industry. Nevada, New Jersey, and Arizona had the biggest losses.	39

Table 2.8. Alaska, Vermont, and Massachusetts have the most favorable education services online college labor markets, while West Virginia, Hawaii, and Alabama have the least favorable education services online college labor markets.	40
Table 2.9. Tennessee, Oregon, and Wisconsin had the largest employment growth among the college educated in the manufacturing industry; Kentucky, Arizona, and Virginia had the biggest declines.	41
Table 2.10. Virginia, Maryland, and Massachusetts have the most favorable manufacturing online college labor markets, while Rhode Island, South Carolina, and Tennessee have the least favorable manufacturing online college labor markets.	42
Table 2.11. Louisiana, Arkansas, and Delaware had the biggest gains in employment among college graduates in the wholesale and retail trade services; Idaho, Hawaii, and Texas had the largest losses.	43
Table 2.12. Washington, Oregon, and Idaho have the best job markets for college graduates seeking work in wholesale and retail trade services; Wyoming, Arkansas, and South Carolina have the most difficult job markets.	44
Table 2.13. Rhode Island, Minnesota, and Nevada had the largest college job growth in government services, while New Hampshire, West Virginia, and New Jersey had the largest college job declines.	45
Table 2.14. South Dakota, Colorado, and Oklahoma have the most favorable government services online college labor markets, while Rhode Island, Indiana, and Pennsylvania have the least favorable government services online college labor markets.	46
Table 2.15. Rhode Island, Florida, and New Jersey had the largest college job growth in the leisure and hospitality services, while Ohio, Arizona, and Iowa had the largest college job declines.	47
Table 2.16. North Carolina, Colorado, and Georgia have the most favorable leisure and hospitality services online college labor markets, while Vermont, Rhode Island, and Wisconsin have the least favorable leisure and hospitality services online college labor markets.	48
Table A.1. Education distribution percentages of the three age cohorts	52

Introduction

As more Americans connect to the Internet, employers increasingly are using it to fill job openings. We estimate that between 60 and 70 percent of job openings are now advertised online, and the online job market continues to grow each year.¹ Nearly 4 million unique job advertisements are posted online each quarter.

College graduates² are more likely to own personal computers, have access to the Internet at home, and to search for jobs online. For these reasons, online job ads are disproportionately aimed at college graduates. Nearly half of all online job ads cater to college graduates, while only 35 percent of workers have college degrees. Between 80 and 90 percent of job openings that require at least a Bachelor's degree are posted online, compared to just 50 percent of job openings seeking candidates with less education.³ The Internet also substantially expands the geographic scope of college graduates' job searches, giving them another advantage over their less-educated peers. Overall, job candidates who search online find jobs 25 percent faster than those who do not.⁴

As vendors began collecting and storing online job ads data, a new "Big Data" tool emerged of particular interest to employers, researchers, and policymakers. In *The Online College Labor Market*, we analyzed the national labor market demand for college graduates by occupation, industry, and education.⁵ We found that two large occupational clusters – managerial and professional office and science, technology, engineering, and mathematics (STEM) – dominate the online college labor market, accounting for three out of every five online job ads. These occupations offer high wages, upward career mobility, and job stability. The industries that account for the largest shares of online job ads are also those that employ higher shares of college graduates. The consulting and business services,⁶ healthcare services, and financial services sectors generate more than half of all job ads for college-educated job candidates.

In this report, we analyze the online college labor market on a state-by-state basis, using data from Burning Glass Technologies, one of the leading developers of online job ads data. We examine the geographic distribution of online job ads for college graduates within industries and occupational clusters, and compare the relative strength of the online college labor markets across states.⁷ Specifically, we analyze the online college

¹ Carnevale, Jayasundera, and Repnikov, *The Online College Labor Market*, 2014.

² In this report, the terms college graduates, college-educated (workers or job seekers), and college labor market refer to individuals with at least a Bachelor's degree.

³ Carnevale, Jayasundera, and Repnikov, *Understanding Online Job Ads Data: A Technical Report*, 2014.

⁴ Kuhn and Mansour, "Is Internet Job Search Still Ineffective?" 2011.

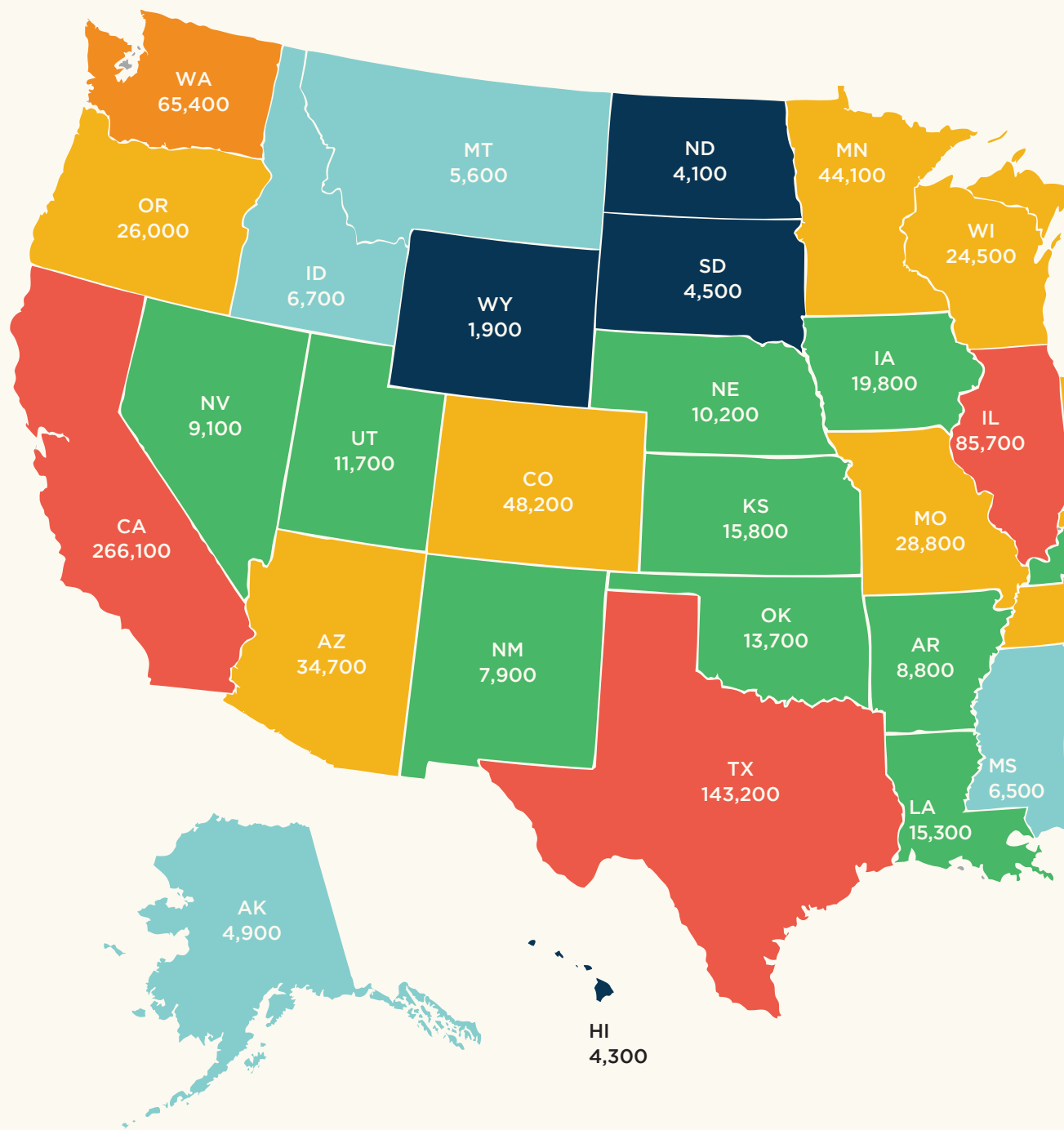
⁵ Careful analyses by the Georgetown University Center on Education and the Workforce have established that online job ads are disproportionately aimed at college-educated workers. For that reason, this report focuses solely on job opportunities for individuals with at least a Bachelor's degree.

⁶ Throughout this report, the term "consulting and business services" refers to the sector known as the "professional and business services" industry.

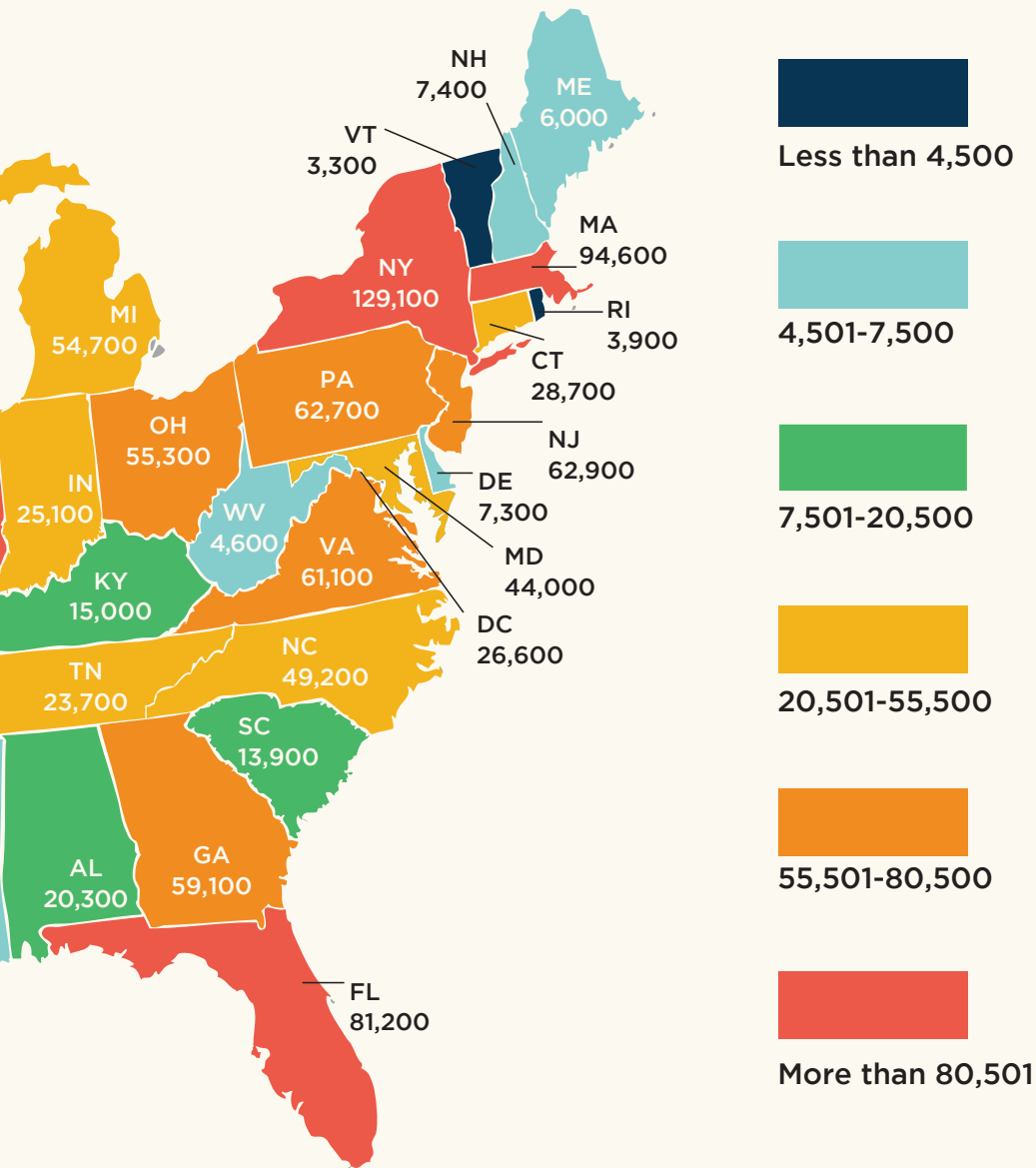
⁷ All the employment figures and analysis presented in this report are limited to college graduates, as online job ads data become less robust at lower levels of educational attainment.

FIGURE I.

California, Texas, and New York have the most online job ads that require at least a Bachelor's degree.



Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data, 2013 Q2.



labor market by 10 major occupational clusters and 13 industries.⁸ We also highlight employment dynamics in each state, such as jobs recovered since the end of the recession, the most in-demand occupations, and employers with the largest recruiting presence as measured by online job ads.

The number of online job ads for college graduates varies greatly across states (Figure 1). California, Texas, and New York have the most online job ads for college graduates, while Wyoming, Vermont, and Rhode Island have the fewest. As expected, the number of job ads strongly correlates with the size of the state: more populous states have more ads. However, since more populous states also have more workers and job seekers, this does not provide a useful indication of the health of the college labor market in a given state. To compare state labor markets better across the United States, we control for the number of college-educated workers in each state. Using the location quotient metric, we report the concentration of online job ads for college graduates in a state relative to the state's employment of college graduates in relation to the national average.⁹

Ranging from a low of half of the national average to a high of 70 percent above it, this indicator demonstrates significant variation by state that cannot be accounted for by population size or population density of the state; larger states do not necessarily have a higher concentration of job ads. Thus, finding a job is not necessarily easier in larger states, despite their larger volume of online job ads, because the competition for each open position also intensifies. Less populated states like Delaware that have a high concentration of college jobs will inevitably rank high using this metric. Also, Alaska which is sparsely populated and has a hard time attracting college-educated workers, ranks high when using the metric.

The college-educated job seeker who is willing to move to a state with a high concentration of job ads per worker has a greater likelihood of landing a job than remaining in or moving to states with fewer job ads per worker. The college labor markets of Massachusetts, Delaware, and Washington State are the most robust, offering the highest concentrations of online college job ads per worker. Massachusetts has historically had a strong labor market for college graduates due to the large concentration of colleges in the state.

WASHINGTON, D.C. AND MASSACHUSETTS HAVE THE STRONGEST

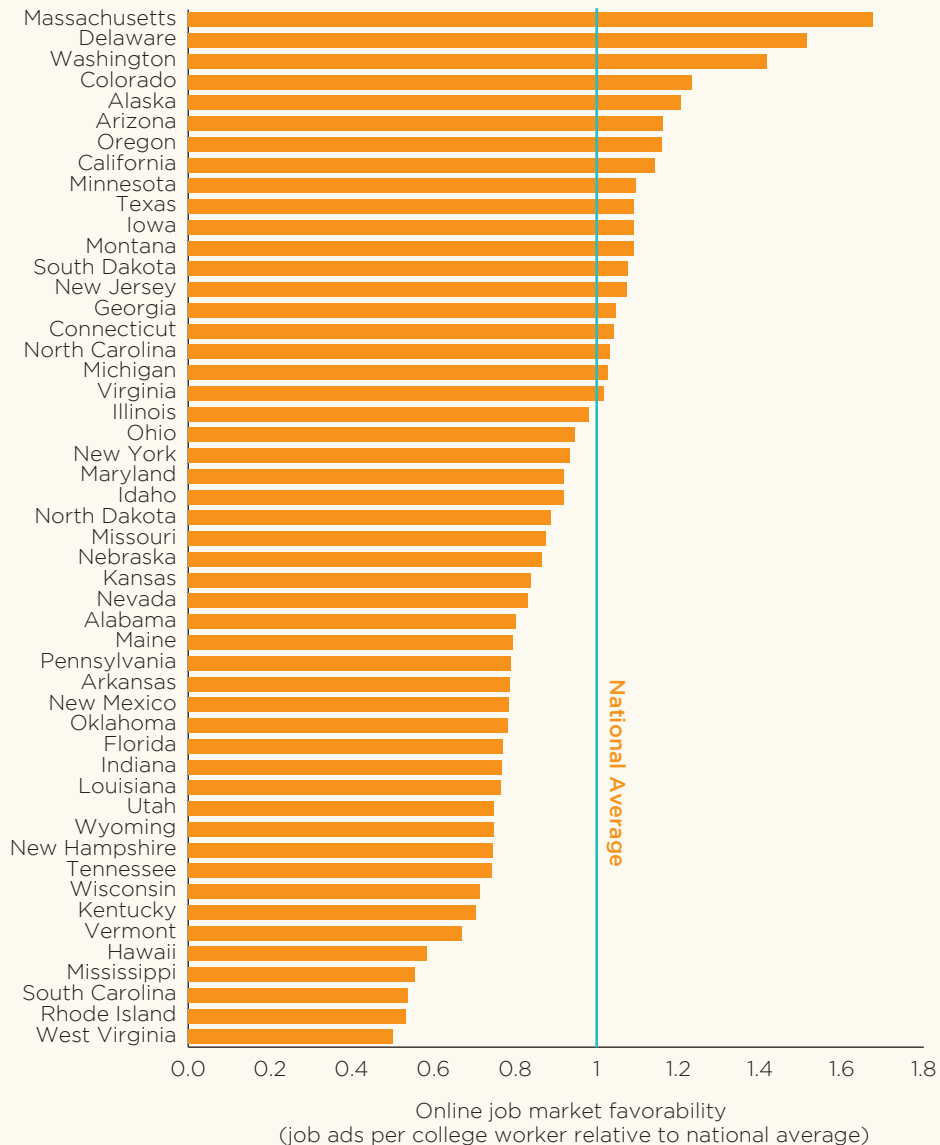
online college labor markets, while West Virginia and Rhode Island have the weakest online college labor markets.

⁸ Because small sample sizes often distort the employment picture between two reference periods, there are states in which we dropped certain industries and occupational groups because of this issue. Geographical analyses of social science and healthcare support occupations are omitted due to low sample sizes for a large number of states in the *Current Population Survey* (CPS). Geographical analyses of information services, personal services, transportation and utilities services, construction, and natural resources are omitted due to low sample sizes for a large number of states in CPS for these industries.

⁹ See the location quotient discussion in the Appendix for a detailed explanation of how the relative strength of each labor market is estimated. Some small states like Delaware that have a high concentration of college jobs will inevitably rank high using this metric.

FIGURE II.

Massachusetts, Delaware, and Washington State are the most favorable online college labor markets, while West Virginia, Rhode Island, and South Carolina are the least favorable.



Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and U.S. Census Bureau *Current Population Survey*, 2013 Q2.

*Note: The states are listed in ranked (descending) order of labor market favorability. Labor market favorability is based on location quotient estimates. See the Appendix for a brief discussion of location quotients.

Despite the state's relatively small college-educated workforce, Delaware ranks among the top due to the high concentration of corporate headquarters creating an increased demand for college talent especially in managerial and professional office and STEM jobs. Washington State ranks high due to the presence of tech giants like Microsoft Corp., the largest online retailer, Amazon.com Inc., and related services. Figure II ranks the 50 states by their relative concentration of job ads.

The online college labor market in Washington, D.C., is especially strong. The ratio of online job ads per college-educated worker is three times the national average, substantially greater than that of any state. Stimulated by the presence of the federal government and many international organizations, the city's unique labor market has been a magnet for highly educated workers. As Richard Florida points out in *The Atlantic*, "the ultimate source of the region's wealth is Washington's unparalleled human capital."¹⁰ With the highest share of college-educated workers in the country, it is a central city that draws workers from surrounding metropolitan areas that include parts of Virginia and Maryland. State labor markets, on the other hand, are more diverse. They have urban centers similar to Washington, D.C., where employers and educated populace tend to concentrate, but they also have rural areas that have relatively few employment opportunities and that demand different skill sets. Thus, comparing Washington, D.C.'s labor market to state labor markets is not an apples-to-apples comparison. For these reasons, we exclude Washington, D.C., from our state-by-state analysis and the ranking tables for occupational clusters and industry sectors.

At the other end of the spectrum, the college labor markets in West Virginia, Rhode Island, and South Carolina are more sluggish, with relatively few online job ads per college-educated worker.

The online demand for college-educated workers also varies substantially across occupations and industries. The top three occupational clusters – managerial and professional office, STEM, and sales and office support – account for three-fourths of the national online labor demand. By contrast, professions within the social sciences and healthcare support are the least in demand, accounting for less than 1 percent of job ads for college graduates.

- In Massachusetts, Delaware, and Washington State, the relative demand for managerial and professional office workers is strong, while in West Virginia, Mississippi, and South Carolina, it is weak.
- In Delaware, Massachusetts, and New York, the relative demand for STEM workers is strong, while in New Mexico, West Virginia, and Maine, it is weak.
- In Montana, Massachusetts, and Idaho, the demand for sales and office support workers is strong, while in West Virginia, South Carolina, and Vermont, it is weak.

¹⁰ Florida, "Boom Towns and Ghost Towns," October 2013.

Among industries, consulting and business services and healthcare services account for the largest shares of online job ads that require at least a Bachelor's degree.

- The relative demand for college-educated workers in the consulting and business services industry is strongest in Delaware, Ohio, and Massachusetts.
- The relative demand for college-educated workers in the healthcare services industry is strongest in Montana, Colorado, and Washington State, and weakest in West Virginia, Rhode Island, and New York.

Thousands of firms, ranging from small local establishments to better-known multinational corporations, use online recruiting to fill job openings. Out of all employers that advertised online in the second quarter of 2013, Accenture, Deloitte Development, Amazon, Verizon Communications, and UnitedHealth Group posted the most online job ads seeking college-educated workers. Accenture and Deloitte Development are both in the consulting and business services industry and, together, posted 11,800 online job ads nationally in the second quarter of 2013. Generally, establishments within healthcare and educational services also have a strong presence in the market for college graduates.

Part 1. Occupations

Nationally, employment grew between 2010 and 2013 in every major occupational cluster except education. However, there was significant variation across states. For example, science, technology, engineering, and mathematics (STEM) occupations grew by 15 percent nationally, the largest growth rate among occupational clusters – but that growth was most noticeable in Wyoming, Missouri, and Wisconsin, while Tennessee, Colorado, and South Dakota experienced declines in STEM employment. Healthcare professional and technical employment grew the most in Wisconsin, Delaware, and Alabama, but declined the most in Nebraska, Michigan, and Nevada. Blue-collar employment experienced the greatest growth in Ohio, Kansas, and Wyoming, and showed the steepest declines in Hawaii, Pennsylvania, and Maryland.

However, strong job growth doesn't necessarily translate into good job prospects, because the number of job seekers in a market affects how competitive that job market is. Ohio and Arkansas, for example, experienced strong education job growth between 2010 and 2013, but both also have large numbers of college-educated workers seeking careers in education relative to the number of available job ads. Conversely, South Dakota, Vermont, and Maine had relatively low education job growth between 2010 and 2013, but the relative lack of competition for those jobs makes those states good education job markets.

Quarterly, there are 1.24 online job ads per 100 college-educated workers in the overall economy (Figure 1.1). STEM jobs offer the best prospects for college graduates, with about three job ads per 100 workers. Managerial and professional office occupations and healthcare professional and technical occupations also offer good prospects. Healthcare support and education occupations, on the other hand, are very competitive, with more than 200 workers per each job ad (0.42 and 0.49 job ad per 100 workers, respectively).¹¹



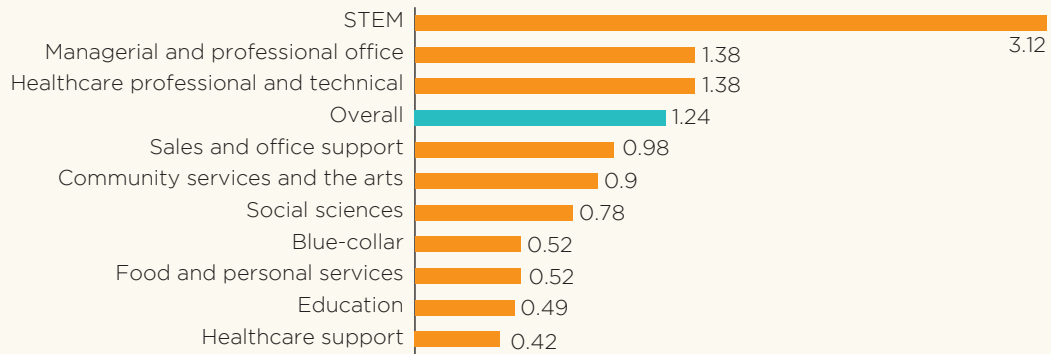
WASHINGTON, D.C.'S ONLINE COLLEGE LABOR MARKET IS MORE ROBUST THAN ANY STATE'S,

with three times the national average of job ads per 100 college-educated workers.

¹¹ As a result, even if the STEM labor market in a given state is less favorable than the national average, it can have more job ads per worker than a labor market that is relatively more favorable than the national average in an occupation cluster with lower demand for college workers in the same state, such as the labor market for education occupations. To illustrate, consider the hypothetical example that the STEM labor market in a particular state X is less favorable than the national average with two college job ads per STEM worker, see Figure 1.1. On the other hand, the labor market for education occupations in state X with just one college job ad per worker is relatively more favorable than the national average.

FIGURE 1.1.

STEM, managerial and professional office, and healthcare professional and technical occupations provide the best prospects for college graduates, with the highest number of job ads per 100 workers.



Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, 2013 Q2.

The favorability of each state's online college labor market for a given occupation is based on job ads per 100 workers in the state relative to the national average of jobs ads per 100 workers for the given occupation. If a state has high college labor market favorability for a given occupation, it means there are more job ads per 100 workers in that state, and therefore college graduates in that state have better odds of finding a job in that occupation compared to the rest of the country.

TABLE 1.1.

Across all occupations, Massachusetts, Delaware, and Washington State have the most favorable online college labor markets, while West Virginia, Rhode Island, and South Carolina have the least favorable online college labor markets.

Top	Middle	Bottom
Massachusetts	North Carolina	New Mexico
Delaware	Michigan	Oklahoma
Washington	Virginia	Florida
Colorado	Illinois	Indiana
Alaska	Ohio	Louisiana
Arizona	New York	Utah
Oregon	Maryland	Wyoming
California	Idaho	New Hampshire
Minnesota	North Dakota	Tennessee
Texas	Missouri	Wisconsin
Iowa	Nebraska	Kentucky
Montana	Kansas	Vermont
South Dakota	Nevada	Hawaii
New Jersey	Alabama	Mississippi
Georgia	Maine	South Carolina
Connecticut	Pennsylvania	Rhode Island
	Arkansas	West Virginia

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, 2013 Q2. The states are listed in ranked (descending) order.

Managerial and professional office occupations

North Carolina, which lost 15 percent of its employment in managerial and professional office occupations between 2010 and 2013 (Table 1.2), has more recently become one of the most favorable labor markets for college graduates interested in going into these occupations (Table 1.3).

TABLE 1.2.

Between 2010 and 2013, managerial and professional office college jobs grew the most in South Carolina, Mississippi, and Alabama, and declined the most in Louisiana, Arizona, and Wyoming.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
South Carolina	74	Connecticut	1
Mississippi	47	New Jersey	-2
Alabama	46	West Virginia	-3
Idaho	36	Kansas	-6
Utah	34	Montana	-6
Nebraska	29	Maine	-15
Minnesota	29	North Carolina	-15
Rhode Island	28	Wyoming	-17
Oklahoma	28	Arizona	-28
Alaska	27	Louisiana	-40

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

TABLE 1.3.

Massachusetts, Delaware, and Washington State have the most favorable managerial and professional office online college labor markets, while West Virginia, Mississippi, and South Carolina have the least favorable.

Top	Middle	Bottom
Massachusetts	Minnesota	North Dakota
Delaware	Illinois	Maine
Washington	Iowa	Tennessee
California	Michigan	Montana
New Jersey	Ohio	Kentucky
New York	Missouri	Indiana
Texas	Arkansas	Utah
Colorado	South Dakota	New Hampshire
Arizona	Louisiana	New Mexico
Connecticut	Nevada	Hawaii
Alaska	Virginia	Oklahoma
North Carolina	Wyoming	Idaho
Oregon	Alabama	Rhode Island
Georgia	Wisconsin	Vermont
	Maryland	South Carolina
	Kansas	Mississippi
	Nebraska	West Virginia
	Pennsylvania	
	Florida	

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

STEM occupations

Oregon showed substantial job growth in STEM occupations between 2010 and 2013 (Table 1.4), and continues to be a good hiring market. Despite job growth during the same period, South Carolina is now a poor hiring market for job seekers in STEM occupations.

TABLE 1.4.

Between 2010 and 2013, STEM college jobs grew the most in Wyoming, Missouri, and Wisconsin, and declined the most in Tennessee, Colorado, and South Dakota.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Wyoming	85	Alabama	-1
Missouri	85	Connecticut	-3
Wisconsin	67	Hawaii	-4
Utah	56	Vermont	-5
North Carolina	55	Oklahoma	-5
Oregon	52	Florida	-10
Kansas	48	New Hampshire	-13
Indiana	46	South Dakota	-14
Arizona	39	Colorado	-19
South Carolina	38	Tennessee	-36

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Arkansas and Mississippi are excluded from this analysis due to small sample sizes.



OREGON SHOWED SUBSTANTIAL JOB GROWTH
in STEM occupations between 2010 and 2013.

TABLE 1.5.

Delaware, Massachusetts, and New York have the most favorable STEM online college labor markets, while New Mexico, West Virginia, and Maine have the least favorable STEM online college labor markets.

Top	Middle	Bottom
Delaware	Tennessee	Montana
Massachusetts	Arizona	Alaska
New York	Alabama	Louisiana
Ohio	Illinois	Wyoming
Oregon	Minnesota	Utah
New Jersey	Indiana	Kansas
Washington	Michigan	Kentucky
California	Maryland	Idaho
Georgia	Florida	Hawaii
Oklahoma	Connecticut	Arkansas
Texas	Nevada	New Hampshire
Virginia	Pennsylvania	Rhode Island
Iowa	North Dakota	South Carolina
Colorado	Nebraska	Vermont
South Dakota	Wisconsin	Maine
North Carolina	Missouri	West Virginia
		New Mexico

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Mississippi is excluded from this analysis due to a small sample size.

Sales and office support occupations

The number of sales and office support jobs grew 32 percent in Alaska between 2010 and 2013 (Table 1.6), and Alaska remains on the list of states with a healthy labor market for these occupations.

TABLE 1.6.

Between 2010 and 2013, sales and office support college jobs grew the most in North Dakota, Alabama, and Pennsylvania and declined the most in Montana and Idaho.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
North Dakota	71	Wisconsin	-1
Alabama	42	Minnesota	-3
Pennsylvania	40	New Jersey	-3
Mississippi	39	Delaware	-4
Indiana	32	Maryland	-5
New Mexico	32	North Carolina	-6
Alaska	32	Hawaii	-7
Louisiana	29	New Hampshire	-8
Nevada	28	Idaho	-35
West Virginia	27	Montana	-37

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010-2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

TABLE 1.7.

Montana, Massachusetts, and Idaho have the most favorable sales and office support online college labor markets, while West Virginia, South Carolina, and Vermont have the least favorable sales and office support online college labor markets.

Top	Middle	Bottom
Montana	Maryland	North Dakota
Massachusetts	Arizona	Missouri
Idaho	Indiana	Louisiana
Washington	Illinois	Kentucky
Delaware	Texas	Pennsylvania
Alaska	Nebraska	New Hampshire
Minnesota	New Jersey	Hawaii
Iowa	Oklahoma	Utah
Colorado	North Carolina	Maine
Connecticut	New York	Tennessee
Michigan	Arkansas	Wisconsin
Georgia	Virginia	Wyoming
Oregon	Kansas	Rhode Island
Ohio	Florida	Mississippi
California	Alabama	Vermont
South Dakota	Nevada	South Carolina
	New Mexico	West Virginia

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Healthcare professional and technical occupations

Wisconsin, which had the highest job growth in healthcare professional and technical occupations between 2010 and 2013 (Table 1.8), is now the state with the poorest labor market for college graduates looking for work in these occupations (Table 1.9).

TABLE 1.8.

Between 2010 and 2013, healthcare professional and technical college jobs grew the most in Wisconsin, Delaware, and Alabama, and declined the most in Nebraska, Michigan, and Nevada.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Wisconsin	100	Oregon	-5
Delaware	83	Vermont	-7
Alabama	74	Tennessee	-9
Missouri	67	Oklahoma	-12
Kansas	47	Montana	-14
Minnesota	44	New Mexico	-14
Indiana	42	Alaska	-15
Washington	40	Nevada	-18
Arizona	36	Michigan	-19
Virginia	33	Nebraska	-22

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

TABLE 1.9.

Alaska, Montana, and New Mexico have the most favorable online labor markets for healthcare professional and technical jobs, while Wisconsin, New Jersey, and Louisiana have the least favorable.

Top	Middle	Bottom
Alaska	Tennessee	Mississippi
Montana	Arkansas	Pennsylvania
New Mexico	Vermont	Illinois
Washington	Georgia	Michigan
Colorado	North Dakota	Maryland
Iowa	Connecticut	Alabama
Wyoming	Ohio	West Virginia
Massachusetts	Florida	Utah
Delaware	Virginia	Nebraska
Idaho	California	Kentucky
Arizona	Kansas	Hawaii
Oregon	Maine	Rhode Island
South Dakota	New Hampshire	New York
Texas	Missouri	Indiana
Nevada	North Carolina	Louisiana
Oklahoma	South Carolina	New Jersey
	Minnesota	Wisconsin

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Education occupations

New Mexico had the highest job growth in education occupations between 2010 and 2013 and also has one of the more favorable online labor markets for college graduates.

TABLE 1.10.

Between 2010 and 2013, education college jobs grew the most in New Mexico, Ohio, and Arkansas, and declined the most in Arizona, New Jersey, and Indiana.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
New Mexico	42	Louisiana	-20
Ohio	30	Kansas	-20
Arkansas	29	South Dakota	-24
Washington	25	Maine	-25
Alabama	23	Missouri	-26
Michigan	20	Montana	-28
Alaska	17	Nevada	-30
Hawaii	17	Indiana	-31
Pennsylvania	15	New Jersey	-33
South Carolina	15	Arizona	-34

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

TABLE 1.11.

South Dakota, Vermont, and Maine are the best online labor markets for education jobs, while Rhode Island, Alabama, and Arkansas rank as the worst.

Top	Middle	Bottom
South Dakota	New Jersey	Delaware
Vermont	North Carolina	Kentucky
Maine	Montana	Tennessee
Alaska	Indiana	Georgia
Massachusetts	Oregon	Florida
Idaho	Virginia	Maryland
Minnesota	Iowa	Wyoming
Arizona	Connecticut	Ohio
Colorado	Texas	Louisiana
Kansas	California	Hawaii
New Hampshire	South Carolina	New York
Nebraska	North Dakota	Wisconsin
Nevada	Oklahoma	Mississippi
Illinois	Michigan	Pennsylvania
Utah	Washington	Arkansas
New Mexico	West Virginia	Alabama
	Missouri	Rhode Island

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Community services and the arts occupations

Kansas, which lost nearly half of its employment in community services and the arts occupations between 2010 and 2013 (Table 1.12), is now one of the best labor markets for college graduates looking for jobs in these occupations.

TABLE 1.12.

New Jersey, Pennsylvania, and Alaska topped employment growth in community services and the arts, while Kansas, Wyoming, and Nebraska saw the greatest declines.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
New Jersey	65	Michigan	-16
Pennsylvania	49	Kentucky	-17
Alaska	45	Florida	-22
South Dakota	45	Washington	-23
South Carolina	30	Oklahoma	-23
Oregon	29	Delaware	-26
New York	27	Missouri	-30
Texas	24	Nebraska	-32
Georgia	24	Wyoming	-37
Iowa	23	Kansas	-49

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Arkansas, Idaho, Louisiana, Mississippi, New Mexico, Utah and West Virginia are excluded from this analysis due to small samples sizes.

TABLE 1.13.

Delaware, Washington, and Kansas have the best online college labor markets for job seekers in community services and the arts, while South Carolina, Rhode Island, and Hawaii have the least favorable.

Top	Middle	Bottom
Delaware	Colorado	North Carolina
Washington	Wyoming	New York
Kansas	California	New Hampshire
Nebraska	Connecticut	Ohio
Massachusetts	South Dakota	Florida
Idaho	Virginia	Indiana
North Dakota	Kentucky	Alabama
Missouri	Arkansas	Oklahoma
Alaska	Maryland	Wisconsin
Utah	Arizona	Pennsylvania
Michigan	Texas	Tennessee
Minnesota	New Mexico	Vermont
Iowa	Louisiana	New Jersey
Oregon	Georgia	Hawaii
Maine	Montana	Rhode Island
Illinois	Nevada	South Carolina

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Mississippi and West Virginia are excluded from this analysis due to small samples sizes.

Food and personal service occupations

The number of food and personal service jobs grew substantially across the United States between 2010 and 2013, but 93 percent of those jobs were for workers without college degrees. The number of these jobs also varied greatly by state.

Rhode Island and Nebraska both more than doubled the number of jobs in food and personal service between 2010 and 2013 (Table 1.14), yet both are now among the states with the least favorable job market for college-educated job seekers in these occupations.

TABLE 1.14.

Between 2010 and 2013, food and personal service college jobs more than doubled in Rhode Island and Nebraska, and declined the most in New Hampshire, Massachusetts, and Georgia.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Rhode Island	152	Montana	-7
Nebraska	119	Hawaii	-7
Delaware	77	Wisconsin	-7
Connecticut	73	Washington	-8
Missouri	65	Vermont	-13
Michigan	60	Oregon	-25
Nevada	54	South Dakota	-28
Florida	34	Georgia	-30
Maryland	24	Massachusetts	-34
Maine	19	New Hampshire	-39

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Arizona, Arkansas, Idaho, Indiana, Kentucky, Louisiana, Mississippi, New Mexico, Oklahoma, South Carolina, Utah, West Virginia, and Wyoming are excluded from this analysis due to their small employment sample sizes.

TABLE 1.15.

Montana, Massachusetts, and Colorado have the best food and personal service online college labor markets, while Tennessee, Rhode Island, and Wisconsin have the least favorable.

Top	Middle	Bottom
Montana	Minnesota	Wyoming
Massachusetts	Delaware	Vermont
Colorado	North Dakota	Ohio
Washington	Kentucky	Nebraska
New Hampshire	Virginia	Missouri
South Dakota	Kansas	Oklahoma
Georgia	Oregon	Nevada
Connecticut	New Jersey	Hawaii
Alaska	Texas	Florida
Iowa	Michigan	South Carolina
North Carolina	Pennsylvania	West Virginia
Arizona	California	New York
Utah	Maine	Wisconsin
	Illinois	Rhode Island
	Maryland	Tennessee

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Alabama, Arkansas, Indiana, Idaho, Louisiana, Mississippi, New Mexico, and West Virginia are excluded from this analysis due to their small employment sample sizes.



Rhode Island and Nebraska both more than

DOUBLED THE NUMBER OF JOBS

in food and personal service between 2010 and 2013.

Blue-collar occupations

Between 2010 and 2013, the number of blue-collar college jobs grew by 12 percent nationally, but that growth was highly uneven. In Ohio, the number nearly doubled, while in Hawaii, Pennsylvania, and Maryland it declined substantially.

Tennessee and Wyoming, which both saw healthy job growth in blue-collar occupations between 2010 and 2013 (Table 1.16), are now poor labor markets for college-educated job seekers in these occupations.

TABLE 1.16.

Between 2010 and 2013, blue-collar college jobs grew the most in Ohio, Kansas, and Wyoming, and declined the most in Hawaii, Pennsylvania, and Maryland.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Ohio	97	Delaware	-4
Kansas	81	Texas	-6
Wyoming	73	New Jersey	-10
Tennessee	67	Colorado	-10
Connecticut	58	Massachusetts	-19
South Carolina	48	South Dakota	-23
Illinois	40	Nevada	-24
Indiana	33	Maryland	-25
Georgia	32	Pennsylvania	-26
Alaska	27	Hawaii	-26

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Arizona, Idaho, Louisiana, Mississippi, Missouri, Montana, New Mexico, North Dakota, Oklahoma, and West Virginia are excluded from this analysis due to their small employment sample sizes.

TABLE 1.17.

North Dakota, Montana, and Massachusetts have the best blue-collar online college labor markets, while Rhode Island, Vermont, and Hawaii have the least favorable.

Top	Middle	Bottom
North Dakota	Washington	Florida
Montana	North Carolina	Virginia
Massachusetts	Pennsylvania	Wisconsin
Michigan	Colorado	New Jersey
Delaware	Oregon	New York
Iowa	Texas	Kansas
Arkansas	Nevada	Wyoming
South Dakota	California	Utah
Maryland	Illinois	Maine
Nebraska	Missouri	Tennessee
Alaska	Georgia	New Hampshire
Alabama	Connecticut	South Carolina
Minnesota	Indiana	Hawaii
	Kentucky	Vermont
	Ohio	Rhode Island

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Arizona, Idaho, Louisiana, Mississippi, New Mexico, Oklahoma, and West Virginia are excluded from this analysis due to their small employment sample sizes.

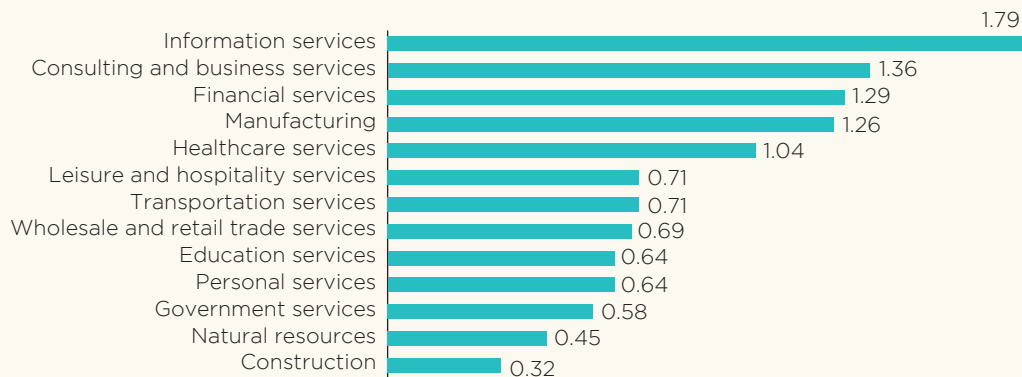
Part 2: Industries

Job growth within industries between 2010 and 2013 also varied among states, as does the favorability of current labor markets within industries. But as noted earlier, strong job growth doesn't necessarily translate into good job prospects: job growth also tends to bring increased competition. In addition, employment statistics cover a three-year period, while the labor market numbers reflect only recent hiring. Finally, an industry that lost many jobs in a state might be in the process of making a comeback – as, for instance, the consulting and business services industry in Ohio, which lost a lot of jobs between 2010 and 2013 but which, based on the number of online job ads, appears to be making a healthy recovery.

Nationally there are 1.24 job ads per 100 workers. By industry, information services, consulting and business services, and financial services offer the best prospects for college graduates, with 1.29 to 1.79 job ads per 100 workers (Figure 2.1). Conversely, the labor markets in construction and natural resources are quite challenging for college-educated job seekers, with fewer than 0.5 job ads per 100 workers.

FIGURE 2.1.

Information services, consulting and business services, and financial services provide the best prospects for college graduates, with the highest number of job ads per 100 workers.



Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013.

Consulting and business services

Between 2010 and 2013, employment in consulting and business services grew by 12 percent overall, but in no particular geographical pattern. It was down in Georgia and Tennessee, for instance, but up in neighboring Alabama, down in Iowa but up in next-door Missouri.

TABLE 2.1.

Between 2010 and 2013, employment grew by 12 percent in the consulting and business services industry. Alabama, Oklahoma, and Utah had the largest job growth, while Ohio, Arizona, and Iowa had the largest job declines.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Alabama	127	Massachusetts	-2
Oklahoma	71	Georgia	-4
Utah	67	Washington	-7
Alaska	56	Tennessee	-8
Nevada	53	Maine	-14
Missouri	46	Louisiana	-14
Kentucky	46	Colorado	-15
West Virginia	45	Iowa	-16
Montana	40	Arizona	-20
Michigan	36	Ohio	-24

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Arkansas and Mississippi are excluded from this analysis due to their small employment sample sizes.

TABLE 2.2.

Delaware, Ohio, and Massachusetts have the most favorable job markets in consulting and business services; Rhode Island, New Mexico, and New Hampshire have the least favorable.

Top	Middle	Bottom
Delaware	Pennsylvania	South Dakota
Ohio	New York	Mississippi
Massachusetts	Arizona	Utah
Iowa	Michigan	Maine
Nebraska	Missouri	Wyoming
Washington	Colorado	Oklahoma
North Carolina	Connecticut	West Virginia
North Dakota	Maryland	South Carolina
Minnesota	Tennessee	Vermont
Virginia	Wisconsin	Louisiana
New Jersey	Alaska	Arkansas
California	Idaho	Nevada
Illinois	Kansas	Kentucky
Oregon	Indiana	Montana
Texas	Florida	New Hampshire
Georgia	Alabama	New Mexico
	Hawaii	Rhode Island

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Healthcare services

The healthcare services industry appears to be booming in Washington State and Iowa, where employment grew between 2010 and 2013 and which still appear to be good labor markets. New Mexico, Oklahoma, and Montana saw employment declines between 2010 and 2013, but the labor market in those states now seems to be on the upswing.

TABLE 2.3.

Alabama, Delaware, and West Virginia had the biggest growth in employment among college graduates in the healthcare services industry. Montana, Tennessee, and Oklahoma had the biggest losses.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Alabama	60	Oregon	1
Delaware	56	Nebraska	0
West Virginia	54	Louisiana	0
Washington	53	Michigan	-5
Missouri	50	Maine	-8
Idaho	44	Vermont	-9
Iowa	36	New Mexico	-12
Indiana	35	Oklahoma	-13
Illinois	35	Tennessee	-22
Arkansas	34	Montana	-22

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.



THE HEALTHCARE SERVICES INDUSTRY APPEARS TO BE BOOMING

in Washington State and Iowa.

TABLE 2.4.

Montana, Colorado, and Washington State have the most favorable online college labor markets in the healthcare services industry, while West Virginia, Rhode Island, and New York have the least favorable.

Top	Middle	Bottom
Montana	Minnesota	Maryland
Colorado	Ohio	New Hampshire
Washington	South Dakota	Nevada
Alaska	North Dakota	Illinois
Massachusetts	Kentucky	Wisconsin
Utah	Maine	Pennsylvania
Arizona	Connecticut	Nebraska
New Mexico	Virginia	South Carolina
Tennessee	Idaho	Indiana
Oklahoma	California	Alabama
Iowa	North Carolina	Louisiana
Delaware	Florida	Mississippi
Oregon	Vermont	New Jersey
Wyoming	Michigan	Hawaii
Texas	Missouri	New York
Georgia	Kansas	Rhode Island
	Arkansas	West Virginia

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Financial services

Between 2010 and 2013, employment for college graduates in the financial services industry increased nationally by 7 percent – and once again, this growth appears to have been geographically divergent. Employment declined in North Carolina, for instance, but grew in South Carolina and Virginia; Wisconsin lost jobs while neighboring Michigan gained. Even though Arizona, Nebraska, North Carolina, and South Dakota lost jobs in the financial services industry between 2010 and 2013, those states now appear to be favorable labor markets for college graduates seeking employment in the industry.

TABLE 2.5.

Indiana, South Carolina, and Iowa had the biggest growth in financial services employment among college graduates; Nevada, Hawaii, and South Dakota had the biggest losses.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Indiana	77	Kansas	-13
South Carolina	74	Maine	-17
Iowa	64	Wisconsin	-17
Tennessee	61	Nebraska	-18
Virginia	47	New Jersey	-18
Oklahoma	45	Arizona	-22
North Dakota	37	North Carolina	-23
Michigan	36	South Dakota	-29
Florida	28	Hawaii	-33
Colorado	23	Nevada	-42

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Alaska, Arkansas, Idaho, Mississippi, Montana, New Mexico, West Virginia, and Wyoming are excluded from this analysis due to their small sample sizes.

TABLE 2.6.

Delaware, Alabama, and Massachusetts have the most favorable online college job markets in financial services, while South Carolina, Mississippi, and Utah have the least favorable job markets.

Top	Middle	Bottom
Delaware	Ohio	Indiana
Alabama	Nevada	Hawaii
Massachusetts	Rhode Island	Louisiana
Oregon	Iowa	Florida
Idaho	New Jersey	Kentucky
South Dakota	Connecticut	Colorado
Washington	Georgia	North Dakota
Arizona	New York	Pennsylvania
Nebraska	Missouri	Maine
Minnesota	Illinois	Oklahoma
North Carolina	California	New Hampshire
	Texas	Vermont
	Virginia	Tennessee
	Michigan	Utah
	Maryland	Mississippi
	Kansas	South Carolina
	Wisconsin	

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Alaska, Arkansas, Montana, New Mexico, West Virginia, and Wyoming are excluded from this analysis due to their small sample sizes.

Education services

Nationally, employment in the education services industry declined 2 percent between 2010 and 2013, with the declines concentrated in the South (Louisiana, Mississippi, and Tennessee) and West (Nevada, Arizona, Idaho, and Montana). But based on more recent online job ads, the industry seems to be making a comeback in Arizona, Idaho, and Nevada.

TABLE 2.7.

Hawaii and Pennsylvania had the biggest gains in employment among the college educated in the education services industry. Nevada, New Jersey, and Arizona had the biggest losses.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Hawaii	35	Montana	-12
Pennsylvania	30	Mississippi	-17
New Mexico	27	Idaho	-18
Utah	24	Indiana	-19
South Carolina	22	Tennessee	-21
Ohio	17	Louisiana	-23
Washington	16	Kansas	-25
Arkansas	14	Arizona	-31
Iowa	10	New Jersey	-38
Alaska	10	Nevada	-41

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

TABLE 2.8.

Alaska, Vermont, and Massachusetts have the most favorable education services online college labor markets, while West Virginia, Hawaii, and Alabama have the least favorable education services online college labor markets.

Top	Middle	Bottom
Alaska	New Jersey	Oregon
Vermont	Kansas	New Mexico
Massachusetts	Illinois	Wisconsin
Idaho	California	Florida
South Dakota	Iowa	Montana
Arizona	Arkansas	South Carolina
Minnesota	Kentucky	Wyoming
Maine	Oklahoma	Missouri
Colorado	Maryland	Georgia
Utah	Michigan	Mississippi
Nevada	Indiana	Pennsylvania
Virginia	Tennessee	Ohio
North Carolina	Connecticut	Louisiana
North Dakota	Nebraska	Rhode Island
New Hampshire	Delaware	Alabama
Washington	Texas	Hawaii
	New York	West Virginia

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Manufacturing

Between 2010 and 2013, college jobs grew by 19 percent nationally in the manufacturing industry and in Tennessee the number of such jobs more than doubled (Table 2.9). However, Tennessee now ranks near the bottom in terms of online job ads per worker in the manufacturing industry (Table 2.10). But Virginia, which lost 26 percent of its college jobs in the manufacturing industry between 2010 and 2013, now ranks at the top in the number of online job ads for college graduates.

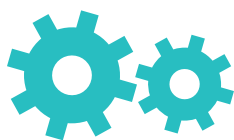
TABLE 2.9.

Tennessee, Oregon, and Wisconsin had the largest employment growth among the college educated workers in the manufacturing industry; Kentucky, Arizona, and Virginia had the biggest declines.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Tennessee	107	Florida	-2
Oregon	85	New Hampshire	-3
Wisconsin	68	South Dakota	-3
South Carolina	60	Utah	-3
Missouri	56	Maryland	-4
Indiana	54	Vermont	-4
Ohio	48	Delaware	-11
Nebraska	47	Virginia	-26
Massachusetts	40	Arizona	-27
Washington	39	Kentucky	-30

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Alaska, Arkansas, Hawaii, Louisiana, Mississippi, Montana, Nevada, New Mexico, North Dakota, Oklahoma, West Virginia, and Wyoming are excluded from this analysis due to their small sample sizes.



Between 2010 and 2013, college jobs grew by
19 PERCENT IN THE MANUFACTURING INDUSTRY.

TABLE 2.10.

Virginia, Maryland, and Massachusetts have the most favorable manufacturing online college labor markets, while Rhode Island, South Carolina, and Tennessee have the least favorable manufacturing online college labor markets.

Top	Middle	Bottom
Virginia	Georgia	Nevada
Maryland	Kentucky	Wisconsin
Massachusetts	California	Minnesota
Alabama	North Carolina	Kansas
New Jersey	Arkansas	Oklahoma
Texas	Florida	Pennsylvania
New York	Connecticut	Utah
Iowa	Colorado	Missouri
Nebraska	Illinois	Oregon
Delaware	Ohio	Indiana
	South Dakota	West Virginia
	Arizona	Maine
	Michigan	New Hampshire
	Idaho	Vermont
	Washington	Tennessee
		South Carolina
		Rhode Island

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Alaska, Hawaii, Louisiana, Mississippi, Montana, New Mexico, North Dakota, and Wyoming are excluded from this analysis due to their small sample sizes.

Wholesale and retail trade services

Between 2010 and 2013, employment grew by 3 percent in the wholesale and retail trade services industry. Louisiana and Arkansas experienced the largest growth in jobs within the wholesale and retail trade sector (Table 2.11), yet their job markets tend to be more saturated based on the number of jobs ads to employment base (Table 2.12). Meanwhile, college graduates pursuing careers in this sector face the best prospects in Washington state, Oregon, and Idaho (Table 2.12).

TABLE 2.11.

Louisiana, Arkansas, and Delaware had the biggest gains in employment among college graduates in the wholesale and retail trade services; Idaho, Hawaii, and Texas had the largest losses.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Louisiana	41	Michigan	-8
Arkansas	38	Missouri	-9
Delaware	37	Tennessee	-9
South Carolina	34	Iowa	-9
West Virginia	33	Vermont	-13
Kansas	32	Colorado	-15
Massachusetts	31	Florida	-20
Washington	31	Texas	-23
Mississippi	28	Hawaii	-37
Pennsylvania	27	Idaho	-43

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alaska, Montana, New Mexico, and Wyoming are excluded from this analysis due to their small sample sizes.

TABLE 2.12.

Washington state, Oregon, and Idaho have the best job markets for college graduates seeking work in wholesale and retail trade services; Wyoming, Arkansas, and South Carolina have the most difficult job markets in the industry.

Top	Middle	Bottom
Washington	New Jersey	Pennsylvania
Oregon	Colorado	Nevada
Idaho	Hawaii	Kansas
Montana	New Hampshire	New Mexico
Rhode Island	Iowa	New York
Massachusetts	Indiana	Maine
Alaska	Georgia	Alabama
Minnesota	Oklahoma	Florida
Michigan	Ohio	West Virginia
Wisconsin	Illinois	Kentucky
Delaware	Arizona	Utah
North Dakota	Maryland	Vermont
Missouri	Virginia	Mississippi
Connecticut	Tennessee	Louisiana
Texas	South Dakota	South Carolina
California	Nebraska	Arkansas
	North Carolina	Wyoming

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Government services

Between 2010 and 2013, employment grew by 12 percent in the government services industry, with examples of growth in every region of the country. More recently, the labor market for government services appears to be moving westward: most of the states with poor labor markets are east of the Mississippi River, while most of the states where hiring is booming are in the West or Midwest.

TABLE 2.13.

Rhode Island, Minnesota, and Nevada had the largest college job growth in government services, while New Hampshire, West Virginia, and New Jersey had the largest college job declines.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Rhode Island	82	Wisconsin	-12
Minnesota	71	Washington	-20
Nevada	66	Delaware	-25
Vermont	55	South Dakota	-29
Massachusetts	52	Oregon	-30
Connecticut	44	Michigan	-31
Montana	40	Wyoming	-35
Kentucky	32	New Jersey	-39
Alaska	31	West Virginia	-40
Illinois	28	New Hampshire	-40

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Arizona, Arkansas, Idaho, Louisiana, Mississippi, and Oklahoma are excluded from this analysis due to their small employment sample sizes.

TABLE 2.14.

South Dakota, Colorado, and Oklahoma have the most favorable government services online college labor markets, while Rhode Island, Indiana, and Pennsylvania have the least favorable government services online college labor markets.

Top	Middle	Bottom
South Dakota	Minnesota	Arkansas
Colorado	Connecticut	Ohio
Oklahoma	Idaho	New Jersey
Montana	Hawaii	Virginia
Wyoming	Texas	Iowa
Delaware	California	Maine
Alabama	Missouri	Wisconsin
Nebraska	West Virginia	Alaska
North Dakota	Maryland	Florida
Tennessee	Nevada	South Carolina
Kansas	Michigan	Kentucky
Massachusetts	New Mexico	New York
Washington	Georgia	Illinois
Oregon	North Carolina	Vermont
Arizona	New Hampshire	Pennsylvania
	Utah	Indiana
		Rhode Island

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Louisiana and Mississippi are excluded from this analysis due to their small employment sample sizes.

Leisure and hospitality services

Between 2010 and 2013, college jobs grew by 21 percent overall in the leisure and hospitality services industry. North Carolina, Georgia, and Virginia, which all suffered significant job loss in this industry between 2010 and 2013 (Table 2.15), now rank among the states with the most favorable online college labor markets in leisure and hospitality services. But Rhode Island, which ranked first in job growth during this period, now appears to be a poor labor market choice.

TABLE 2.15.

Rhode Island, Florida, and New Jersey had the largest college job growth in the leisure and hospitality services, while North Carolina, Georgia, and Virginia had the largest college job declines.

Top States	Change Q1-2010 to Q2-2013 (%)	Bottom States	Change Q1-2010 to Q2-2013 (%)
Rhode Island	87	New Hampshire	5
Florida	74	Iowa	1
New Jersey	70	Nevada	-3
New York	54	Minnesota	-4
Ohio	51	Montana	-7
Connecticut	38	Massachusetts	-18
Wisconsin	34	Pennsylvania	-23
Tennessee	32	Virginia	-24
California	30	Georgia	-27
Oregon	29	North Carolina	-29

Source: Georgetown University Center on Education and the Workforce analysis of the U.S. Census Bureau *Current Population Survey* data (2010–2013). Employment includes all workers with a Bachelor's degree or better, aged 18 and older. Here 2010 Q1 is considered to represent the beginning of employment recovery after the 2007 recession.

Note: Alabama, Alaska, Arizona, Arkansas, Delaware, Idaho, Indiana, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Nebraska, New Mexico, North Dakota, Oklahoma, South Carolina, South Dakota, Utah, West Virginia, and Wyoming are excluded from this analysis due to their small employment sample sizes.

TABLE 2.16.

North Carolina, Colorado, and Georgia have the most favorable leisure and hospitality services online college labor markets, while Vermont, Rhode Island, and Wisconsin have the least favorable leisure and hospitality services online college labor markets.

Top	Middle	Bottom
North Carolina	Texas	Indiana
Colorado	Minnesota	Florida
Georgia	Connecticut	New Jersey
Virginia	Michigan	New Hampshire
Nevada	Alaska	Oregon
Massachusetts	Illinois	New York
Maryland	Nebraska	Tennessee
Iowa	North Dakota	Hawaii
Washington	Montana	Maine
	Delaware	Wisconsin
	Pennsylvania	Rhode Island
	California	Vermont
	Ohio	

Source: Georgetown University Center on Education and the Workforce analysis of Burning Glass online job ads data and the U.S. Census Bureau *Current Population Survey* employment data, second quarter of 2013. Both, employment and online job ads data, are restricted to those with a Bachelor's degree or better. The states are listed in ranked (descending) order.

Note: Alabama, Arizona, Arkansas, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Missouri, New Mexico, Oklahoma, South Dakota, South Carolina, Utah, West Virginia, and Wyoming are excluded from this analysis due to their small employment sample sizes.

Appendix

I. Online job ads as real-time proxy for labor demand

This research project makes use of online job ads data obtained from one real-time labor market data provider, Burning Glass Technologies (BGT). BGT browses more than 15,000 websites and compiles job ads into one comprehensive database. From one job ad, BGT is able to parse the employer name, job title, salary, education requirements, certifications, and skills, among nearly 70 data elements. The data are further refined using an algorithm that eliminates duplicate job ads. This presents a fundamental change in the way labor market information is captured and has made analyses more current and feasible. The following sheds additional light on several crucial elements of the data collection process: spidering, parsing, and de-duplication.

The “spidering” process: Vendors employ spiders to collect a wealth of job ads information, based on a fixed schedule and a predetermined basket of websites. While there is not necessarily an optimal frequency, routine spidering can make the data more susceptible to artificial spikes. For example, if spiders only collect data bi-weekly, a spike that is seemingly unrelated to the actual labor demand will appear every two weeks. To avoid such fluctuations and sometimes the loss of postings, large job boards are given more preference over individual employer sites, which by design are updated less frequently. The basket of sites is typically carefully monitored and updated to ensure the most current and complete stream of online job listings.

Extraction and parsing: Once the data are located, they are extracted, parsed, and coded into specific data elements. Some vendors use systems that require words to be in a somewhat rigid and predetermined sequence, pattern, or format, such as lexical systems. Others, such as BGT, rely on a more flexible approach that uses an algorithm to sort through and process each ad. Among other things, it focuses on the context and sentence structure to determine the form, subject, and meaning of each job listing. This contextual approach is also largely dependent on a large taxonomy of keywords and variables, which is essentially the bridge that translates job ads into the coded data elements. When the posting context is unclear or missing, the coding process is enhanced via semantic analyses or text mining inference, both of which contribute to the final interpretation.

De-duplication: To correct for the practice of scraping – that is, copying identical job ads from one job board to another – across the web, vendors attempt to minimize the number of duplicate ads. BGT, for example, uses robust algorithms to identify a series of identically parsed variables in job ads, such as location, employer, and job title. Time frames are important, too: based on industry research, BGT employs a 60-day window for job ads, meaning that after 60 days, the same job posting would be considered new. Again, by focusing on the content of the ad rather than just its basic fields, BGT claims to achieve a near 90 percent accuracy rate.¹²

¹² <http://burning-glass.com/technology/coding-interpretation/>

Data limitations: A job ad does not always translate into a job opening.

Despite this innovative approach, several lingering issues remain – namely, a trade-off between accuracy and speed. While government statistics are notorious for lagging behind real-time events, their validity is rarely questioned. On the other hand, online ads arrive via a daily feed, but they are also crafted for recruitment purposes and not necessarily for analysis. Moreover, they often omit critical information of interest to researchers. Unlike traditional labor market data, job ads can also be influenced by factors other than true labor demand.

As a beginning, job ads distribution does not exactly reflect the actual labor market. Our estimates indicate that about 60 to 70 percent of total job openings are captured in online job ads data.¹³ The main reason for this is that employers target job seekers who are more likely to do their job search online – so online ads within math and computer science occupations, for example, are more plentiful than are those for construction workers. The overall distribution is skewed toward professional sectors such as healthcare, finance, and management, rather than agriculture and mining.

Another source of bias in the ads data is due to education differences among applicants, and this bias corresponds to differences in Internet access. In addition, reliable data on education requirements are also hard to get because recruiters often omit that information. When available – in slightly over half of all ads¹⁴ – the parser correctly identifies education level nearly nine out of 10 times. But more than 20 percent of ads with no education information actually seek out highly skilled professionals. These job ads often come with an implicit assumption of an advanced degree or licensure, such as JDs for lawyers or MDs for physicians. The remaining job ads with missing education requirements are dispersed across a wide range of industries and occupations.

While a considerable education bias persists, for the purposes of this report, job ads for college graduates are assumed to be more representative of actual labor market conditions. Using a back-of-the-envelope approach, we estimate that 30 to 40 percent of job openings for applicants with some college or an Associate's degree, and 40 to 60 percent of job openings for workers with a high school diploma, get posted online. In contrast, 80 to 90 percent of the openings seeking candidates with BAs and better are estimated to be posted online.

Lastly, previous analyses suggest that a large fraction of misclassifications of job ads stem from meta-data encryption, an issue that arises when spiders capture both header and footer data along with the job ads text. Fortunately, this problem is limited to select job boards and to some extent has been alleviated with new and improved spiders that exclude the meta-data when scraping the web. Context errors also generate a number of false positives. That is, even when algorithms are precise, parsing the context of each ad remains a very delicate process because many keywords are interrelated and acutely context-sensitive.

¹³ As we discuss later, this number varies by education, industry, and occupation groups. Also, see Carnevale, Jayasundera, and Repnikov, *The Online College Labor Market*, 2014, for a more detailed discussion.

¹⁴ The next section of the appendix discusses our correction methodology for missing data.

Full reliance on algorithms to sort through the complexity of online job ads does not come without continued challenges.

Despite the issues detailed above, job postings still serve as a useful gauge of college labor demand. Many of the pitfalls associated with job postings data have been mitigated, but some will remain a function of the underlying posting content and the effectiveness of artificial intelligence at accurately deconstructing the information into robust variables. Nevertheless, there are advantages to this approach over the traditional survey-based method, mainly in that it hones in on variables that were previously either inaccessible or prohibitively expensive to get. Although job ads data should be carefully used in conjunction with traditional labor market data, their emergence has already complemented segments of labor research where such disruptions are few and far between.

II. Adjustments to the data

Imputing education requirement for ads data

Missing information in the dataset limits the scope for analysis, and if the degree of omission is systematically different, the result can be biased estimates. However, the imputation of missing values can enable analysis using standard techniques for complete data. The imputation approach used in this report combines the hot-deck and cold-deck imputation methods. The hot-deck approach uses information from present observations in the dataset to impute the missing. The cold-deck approach uses information data from another dataset.

Education requirements are available for only 52 percent of job ads data, an omission that is usually due to the ad's failure to specify a preferred education level, as opposed to a parser error in capturing the information. Education requirements can be omitted for several reasons. Employers may be flexible and willing to substitute experience for education. At other times, job ads may not state the education requirement because the education level is implicit: a lawyer, for example, is expected to have a law degree. Nevertheless, the number of missing values in the data is too high simply to base the imputations on the characteristics of the observations with information available in the data. We therefore use the *American Community Survey (ACS)* to derive education demand for job ads with missing education data. We consider variation in education to be across occupations and fairly similar within occupations. For example, regardless of the industry in which he or she is employed, an engineer will most likely have at least a Bachelor's degree.

As seen in table A.1 below, we looked at the education distribution of three age cohorts - the 25-to-34 age cohort, the 35-to-44 age cohort, and the 45-to-54 age cohort - in ACS data. With 31.4 percent of the cohort with a Bachelor's degree or better, the middle age cohort (35 to 44) was slightly more educated than the other two age cohorts. The shares among the younger (25 to 34) and older (45 to 54) cohorts were 30.9 percent and 29.9 percent, respectively. Overall, the younger cohorts are more educated than the 45-to-54 cohort.

Existing research supports the idea that the “revealed preference” of employers, as defined by the education attainment of current incumbents, is a good proxy for education demand in the market. Thus, we assume that the education requirements of ads with education information are indicative of true education demand. Comparisons of education attainment of current employment to online ads data suggest that labor demand is skewed toward the more educated, which reflects the combined effect of both the inherent bias in ads data and the possible recent trend of upskilling across the job market. In the post-recession era, employers have the upper hand and are able to hire candidates with higher levels of education.

TABLE A.1.**Education distribution percentages of the three age cohorts**

Educ. Category	Age 25-34	Age 35-44	Age 45-54	Total
Less than HS	12.1	11.4	10.2	11.2
HS diploma	25.9	27.4	29.2	27.5
Some college	22.7	20.9	21.6	21.7
AA	8.5	9.1	9.2	8.9
BA	22.2	20.2	18.5	20.3
MA	6.4	7.8	7.9	7.4
Professional	1.6	2.2	2.3	2
PhD	0.7	1.2	1.3	1
Total	100	100	100	100
Observations (weighted)	36,510,182	38,541,084	38,049,351	113,100,617
BA+	30.9	31.3	29.9	30.7

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau *American Community Survey* Data (ACS), 2006-2010.

Note: BA+: Bachelor’s degree or better.

The correction procedure

To obtain the best of both worlds, we look for a middle ground – a cross-fertilization of the education distribution of current employment and online ads. If, for example, the education requirement was missing from 60 percent of the ads for a given occupation in a given state, we would keep the 40 percent of the ads with education information as they are. However, to avoid the 40 percent dictating the imputation process, half of the missing values are imputed with the education distribution of the current employment in that state and the other half is further split between the ACS and the ads distribution according to the percentage of missing values in the postings for a particular occupation in the state. Then, the other half is divided 60-40. It follows that the 60 percent of the second half is imputed again through the ACS and the remainder is assigned through the

job ads distribution. Thus, in this example, 80 percent of the weight is determined using the ACS distribution and the remaining 20 percent is made up from the job ads data.

The imputations use the education distribution of the 25-to-44 age group currently employed in the ACS survey. This group was chosen because its members are slightly more educated than the older cohort and more representative of the current demand for college graduates. We make use of as much occupation detail as possible from the ACS data, mainly at the five-digit occupational code level. If the number of observations at the five-digit occupation code level in a given state was too small to estimate a proper education distribution, education distribution at the regional level and then the national level was applied for that five-digit occupation. For occupations at the four-digit or three-digit levels, the imputations were done at corresponding levels of detail. Whenever job ads data did not have a five-digit occupation code, the imputation was based on the conforming education distribution of the three-digit level.

III. Location quotient

Location quotients (LQ) are used in this report to assess the health of state labor markets by occupation and industry relative to the entire nation. The LQ generally compares the concentration of a resource or activity in a particular area to that of a larger area. It is often employed by analysts and economic developers as a way to identify and support unique industries in a given region. Here we use it to provide a measure of how easy it is to find a job within a particular industry or occupation in a given state relative to the rest of the country. The formula used to determine the LQ is given below. It follows that the higher the LQ, the greater is the concentration of postings in a state relative to its employment. Thus, a higher LQ implies that the residents of the state have better prospects of finding a job compared to workers in other parts of the country. Lower LQ values mean the opposite

The Location quotient for state i and industry (or occupation) j :

$$\text{Location Quotient}_{ij} = \frac{\left(\frac{\text{State job ads}_{ij}}{\text{State employment}_{ij}} \right)}{\left(\frac{\text{National job ads}_j}{\text{National employment}_j} \right)}$$

LQ > 1 - The state has more job ads per worker in the specific industry (or occupation) than the rest of the country.

LQ = 1 - Job ads per worker in the state equal the national average in the specific industry (or occupation).

LQ < 1 - The state has fewer job ads per worker in the specific industry (or occupation) than the rest of the country.

References

- Carnevale, Anthony P., Tamara Jayasundera, and Dmitri Repnikov. *The Online College Labor Market: Where the Jobs Are*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2014.
- *Understanding Online Job Ads Data: A Technical Report*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2014.
- Carnevale, Anthony P., Tamara Jayasundera, and Ban Cheah. *The College Advantage: Weathering the Economic Storm*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2012.
- Carnevale, Anthony P., Nicole Smith, Artem Gulish, and Bennet H. Beach. *Healthcare*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2012.
- Carnevale, Anthony P. and Stephen J. Rose. *The Undereducated American*. Washington, D.C.: Georgetown University Center on Education and the Workforce, 2011.
- Florida, Richard. "The Boom Towns and Ghost Towns of the New Economy" and "The Truth about D.C.'s Growing Knowledge-Based Economy." *The Atlantic*. October, 2013.
- Henderson, William D., and Rachel M. Zahorsky. "Law Job Stagnation May Have Started Before the Recession – And It May Be a Sign of Lasting Change." *ABA Journal Magazine*, July 1, 2011, http://www.abajournal.com/magazine/article/paradigm_shift/.
- Irwin, Neil and Ylan W. Mui. "The Economy Is Holding up Surprisingly Well in a Year of Austerity." May 28, 2012, *The Washington Post*, <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/05/28/the-economy-is-holding-up-surprisingly-well-in-a-year-of-austerity/>.
- Jaimovich, Nir and Henry Siu. "The Trend in the Cycle: Job Polarization and Jobless Recoveries." NBER Working Paper no.18334. 2012.
- Kuhn, Peter J. and Hani Mansour. "Is Internet Job Search Still Ineffective?" The Institute for the Study of Labor, Discussion paper series, No. 5955. 2011
- Luo, Tian, Amar Mann, and Richard Holden. "The expanding role of temporary help services from 1990 to 2008." *Monthly Labor Review*, 133 no. 8 (2010): 3-16.
- National Association for Law Placement. "Class of 2011 Law School Grads Face Worst Job Market Yet – Less than Half Find Jobs in Private Practice." Employment for the Class of 2011 - Selected Findings. 2012, <http://www.nalp.org/uploads/Classof2011SelectedFindings.pdf>.

- Pethokoukis, James. *Technological unemployment and the loss of 2 million clerical jobs since 2007*. Washington, D.C.: American Enterprise Institute, 2013, <http://www.aei-ideas.org/2013/04/technological-unemployment-and-the-loss-of-2-million-clerical-jobs-since-2007/>.
- Plumer, Brad. "Back to 'Made in America?'" *The Washington Post*, May 1, 2013, <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/05/01/is-u-s-manufacturing-set-for-a-comeback-or-is-it-all-hype/>.
- Rampell, Catherine. "Law School Admission Testing Plunges." *The New York Times*, Nov. 21, 2012, <http://economix.blogs.nytimes.com/2012/11/21/law-school-admission-testing-plunges>.
- Smith, Mitch. "Prestigious Law School Reduces Admissions, Marks New Trend." *USA Today*, May 1, 2012, <http://usatoday30.usatoday.com/news/education/story/2012-05-01/hastings-law-school-admissions/54662710/1>.
- U.S. Bureau of Labor Statistics. *Job Openings and Labor Turnover Survey (JOLTS)*, July 2013.
- U.S. Bureau of Labor Statistics. *Professional, Scientific, and Technical Services: North American Industry Classification System (NAICS) 54*, Nov. 14, 2013, <http://www.bls.gov/iag/tgs/iag54.htm>.
- U.S. Census Bureau and Bureau of Labor Statistics. *Current Population Survey (Basic Monthly)*. 2010-2013, available at http://thedataweb.rm.census.gov/ftp/cps_ftp.html#cpsbasic.
- U.S. Census Bureau. *North American Industry Classification System (NAICS)*. 2012, <http://www.census.gov/eos/www/naics/>.
- U.S. Census Bureau. *American Community Survey (ACS)*, (pooled micro data). 2006-2010, available at <http://www2.census.gov/>



Online College Labor Market: Ranking the States comprises a full report and an executive summary.

All can be accessed at
cew.georgetown.edu/oclmstates

GEORGETOWN UNIVERSITY



Center
on Education
and the Workforce

McCourt School of Public Policy

3300 Whitehaven Street NW,
Suite 3200
Washington, DC 20007
cew.georgetown.edu