

State Online College Job Market

★★★ RANKING THE STATES



2015
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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.

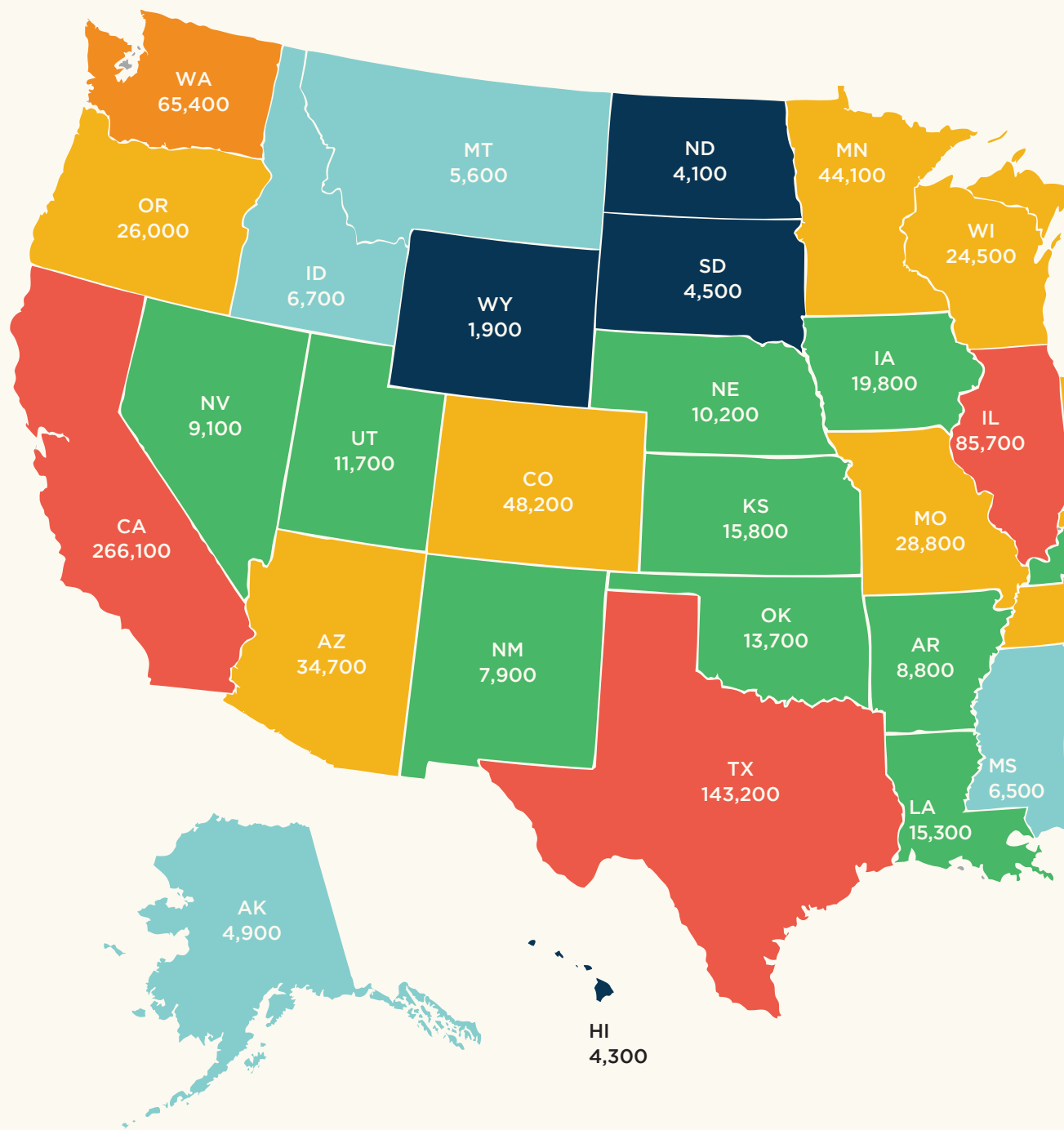
⁵ Careful analyses by the Georgetown University Center on Education and the Workforce have established that online job ads are disproportionately aimed at college-educated workers. For that reason, this report focuses solely on job opportunities for individuals with at least a Bachelor's degree.

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

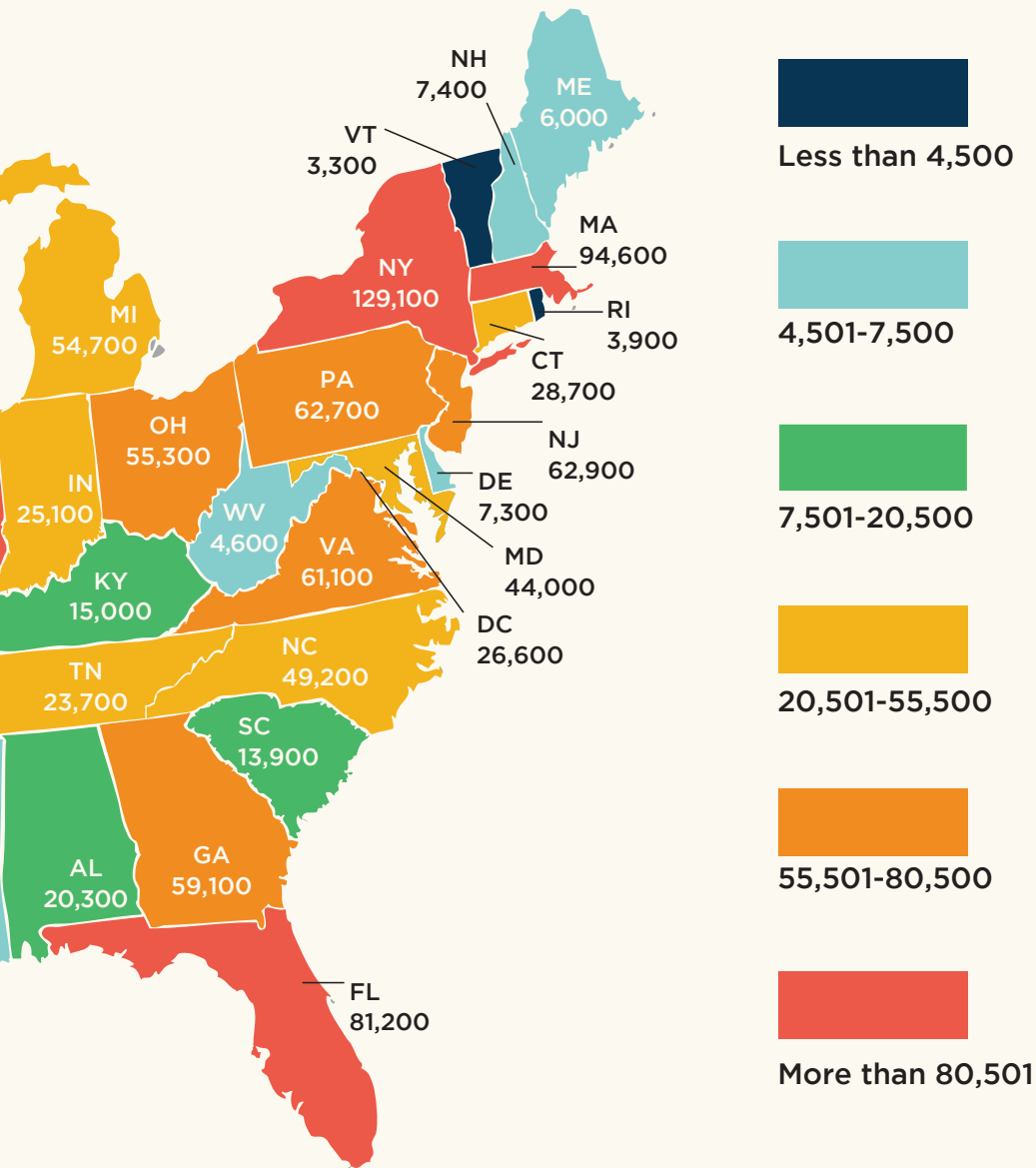
⁷ All the employment figures and analysis presented in this report are limited to college graduates, as online job ads data become less robust at lower levels of educational attainment.

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

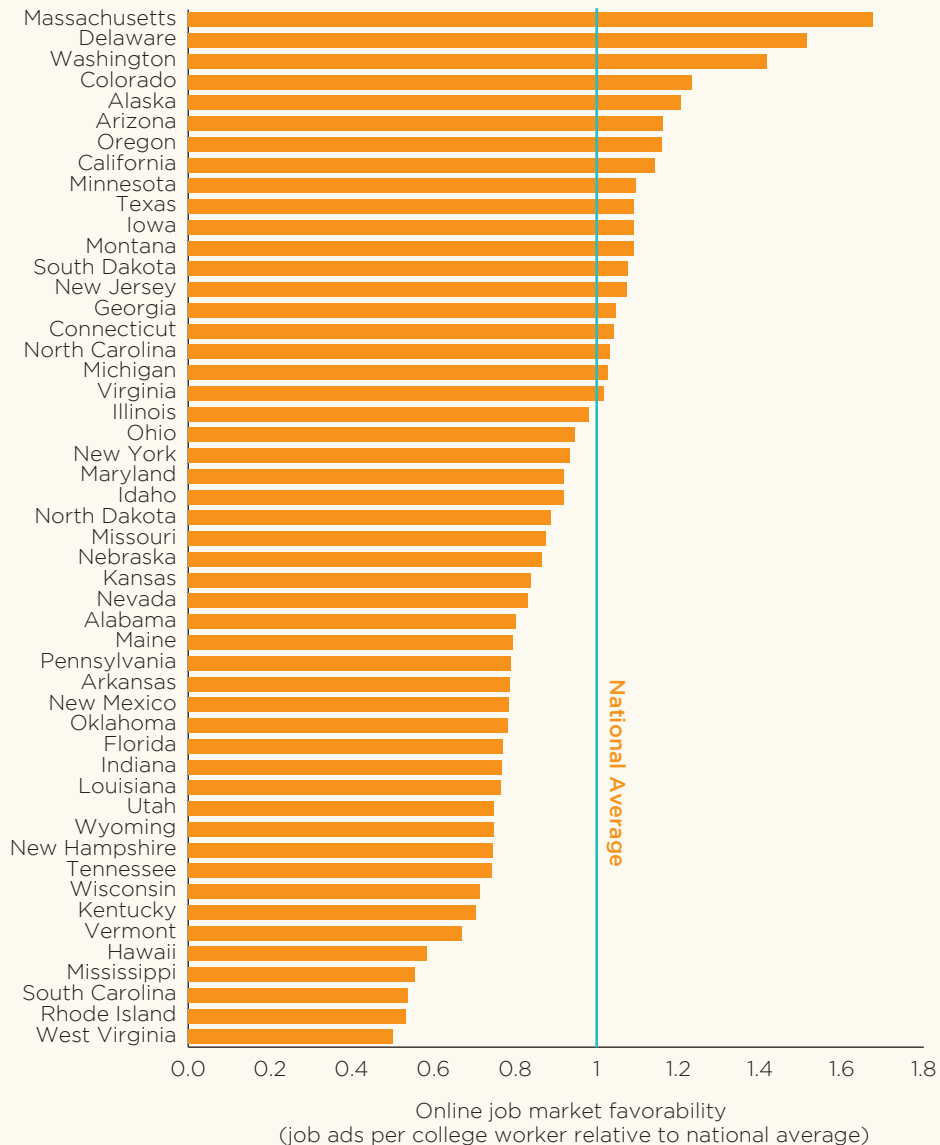
online college labor markets, while West Virginia and Rhode Island have the weakest online college labor markets.

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



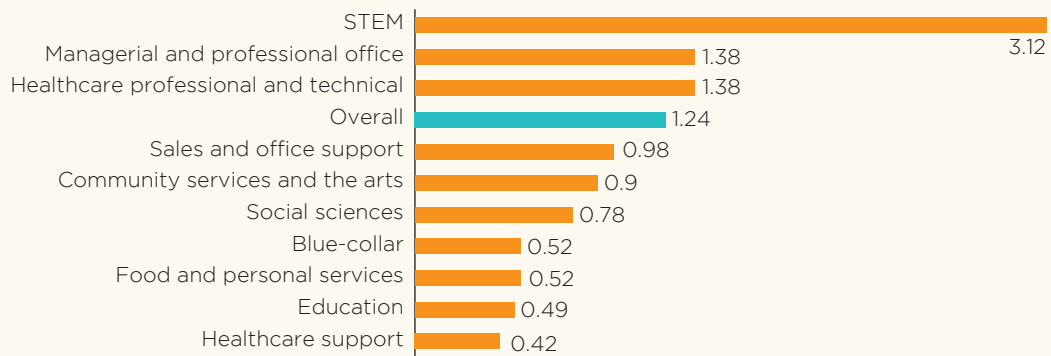
WASHINGTON, D.C.'S ONLINE COLLEGE LABOR MARKET IS MORE ROBUST THAN ANY STATE'S,

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.

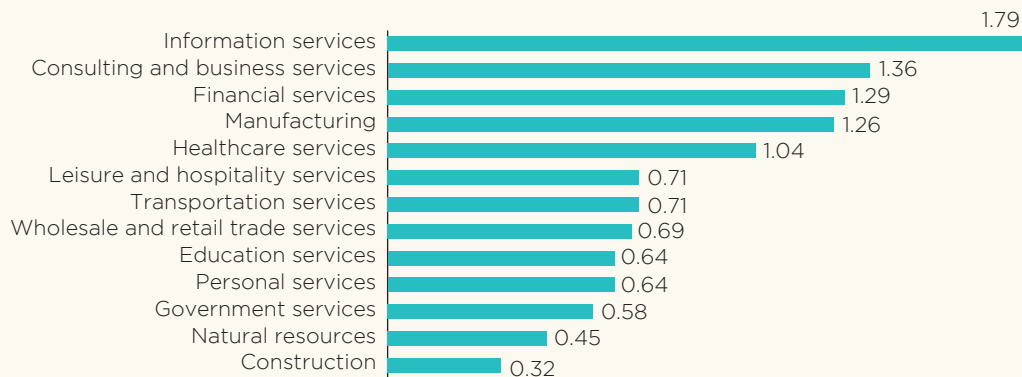
Part 2: Industries

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.

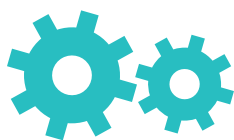
TABLE 2.9.

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.

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

All can be accessed at
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