Identifying Opportunity Occupations in the Nation's Largest Metropolitan Economies

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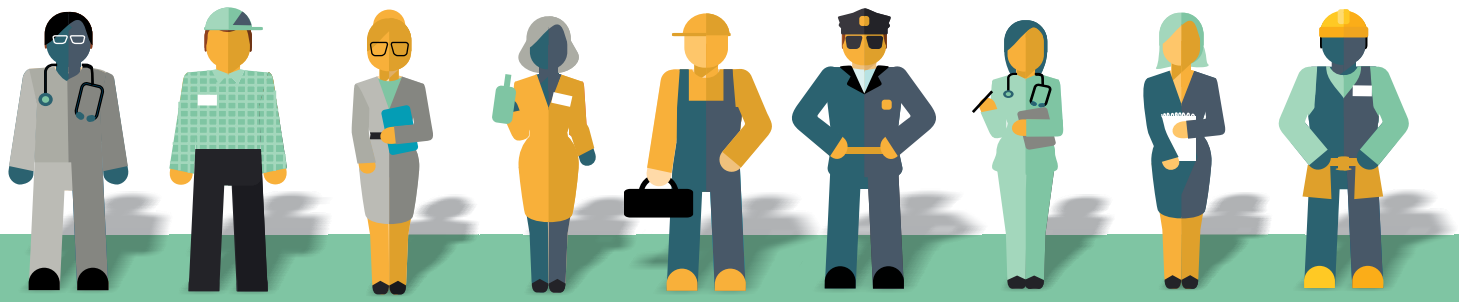

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The authors would like to thank Paul Harrington, Phil Lewis, Hal Martin, Dan Restuccia, Bledi Taska, and Audrey Watson for their feedback on a draft of this report. The views expressed in this report are those of the authors and do not necessarily reflect the views of the Federal Reserve Banks of Philadelphia, Cleveland, Atlanta, or of the Federal Reserve System.

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September 2015

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ABSTRACT

In this paper, we investigate the extent to which the U.S. economy offers decent-paying jobs to workers without a four-year college degree. We define an "opportunity occupation" as one that is generally considered accessible to someone without a bachelor's degree and that pays at least the national annual median wage, adjusted for differences in local consumption prices. Focusing on the 100 largest metropolitan areas and using measures that reflect both the typical education needed to enter an occupation and the requisite education suggested by incumbent workers and occupational experts, we find that 27.4 percent of employment could be found in opportunity occupations in 2014. This estimate falls by more than seven percentage points—to 20.3 percent—when we predicate job accessibility on the educational attainment requested by employers in online job ads.

The availability of opportunity-rich work for those without a bachelor's degree varies dramatically across the metropolitan areas in our study, ranging from 36.6 percent to well under half that level. The educational preferences of employers as expressed in online job ads introduce a potentially significant barrier to economic self-sufficiency for those without a four-year degree, lowering the share of opportunity occupations by more than 10 percentage points in some metro areas. Our analysis suggests that since 2011, the level of education requested in job ads has become less stringent for some occupations and more stringent for others.

INTRODUCTION

Much has been written about the long-run decline in middle-skill and middle-wage jobs.[1] The general consensus in the literature is that the U.S. economy has become "polarized" as a result of a decline in middle-wage jobs and a concurrent increase in jobs situated at the poles of the earnings spectrum. This process of polarization has been said to have produced a "hollowed out" or barbell-shaped economy, again evoking the notion of jobs clustered at the ends of the economy with little opportunity in the middle.

Technological change and the automation of routine tasks at the heart of some middle-wage jobs are often cited as underlying causes of economic polarization (Autor, Levy, and Murnane 2003; Autor, Katz, and Kearney 2006). The globalization of trade and the decline of unions and associated collective bargaining rights are also commonly mentioned in the literature.[2] These forces have not only influenced economic opportunity by favoring or disadvantaging particular industries, but they have also led to occupational shifts within industries that have contributed to the process of polarization (Tüzemen and Willis 2013).

Although much of the research on economic polarization investigates the process over the long term, recent research explores the impact of recessionary periods and recoveries on this phenomenon. While there is some disagreement, work by Jaimovich and Siu (2012) suggests that recessionary periods, including the Great Recession, might accelerate the loss of middle-skill jobs.[3] Whether recessions quicken the pace of polarization over the long term or not, there is ample evidence that job growth during the recent recovery has been concentrated in higher- and lower-wage sectors.[4]

In this paper, we identify occupations that typically pay a better-than-median wage and for which a worker does not need a four-year college degree. We call these **opportunity occupations** because they represent employment opportunities paying good wages for the 70 percent of adults who do not have at least a bachelor's degree.[5] Using the typical education most workers need to enter an occupation, we find that employment in opportunity occupations fell by 1.7 million nationally between 2005 and 2014, even as total employment rose by 4.9 million (Table 1). As a result, the share of jobs in the econo-

[1] This decline has been researched from the perspective of both skills and wages. "Middle-skills" is often used as shorthand to describe work that requires some level of postsecondary education or training but stops short of a four-year college degree. This paper is more consistent with prior "middle-wage" research because we do not focus on employment that requires postsecondary training and use wages, rather than skills, to classify occupations.

[2] For a general overview of economic polarization, see Acemoglu and Autor (2011) and Foote and Ryan (2015), among others. For a review of trends in American labor and unionization, see Lichtenstein (2013).

[3] Foote and Ryan (2015) argue that any recessionary acceleration of middle-skill job loss is because occupations offering middle-skill work, such as construction and manufacturing, are cyclical by nature.

[4] For recent research demonstrating the economy's long-run drift toward the poles, see Abel and Deitz (2012), Tüzemen and Willis (2013), Jaimovich and Siu (2012), and Autor and Dorn (2013). Research focusing on the last decade or two, particularly on job loss during and job growth following the most recent recession, includes Foote and Ryan (2015), Autor (2010), Valletta (2015), and National Employment Law Project (2012).

[5] For those 25 years and over. U.S. Census Bureau, 2013 American Community Survey, Table S1501.

my classified as an opportunity occupation fell from 29.8 percent to 27.4 percent.

As their numbers have declined, research suggests that the middle-wage jobs that remain are becoming increasingly difficult to attain for a worker without a four-year college degree. Some employers have elevated their expectations for an ideal candidate's formal education to include a bachelor's degree in order to fill a position that has not required a four-year degree historically—a process sometimes called "upcredentialing." A number of reasons could explain this apparent trend: an increase in the supply of labor during and after the Great Recession, one which allows employers to be choosier than when the market is tight; the use of a college degree as a proxy for certain skills or for advancement potential; or the evolution of traditional occupations toward non-routine work and more complexity.[6]

Recent findings by Carnevale, Jayasundera, and Repnikov (2014a) illustrate the process of upcredentialing with regard to jobs in sales. Their study shows that 37 percent of online job ads in this field request a bachelor's degree or higher, whereas only 20 percent of those currently working in sales hold a four-year degree. The authors note that the difference "may reflect a shift to a more skilled economy, or it may reflect a job market taking advantage of a temporarily large supply of educated candidates" (23).[7]

The practice of upcredentialing may be cyclical if rooted in a temporary, post-recessionary oversupply of labor. Alternatively, growing complexity in the workplace or the use of a four-year degree as a proxy for success in a job that does not necessarily require one could indicate a "new normal," and research suggests that the practice of upcredentialing may outlive the recovery.[8] Some employers believe that, independent of the skills required to do the work, college graduates bring something to the job that non-degree holders lack and, as a result, have a positive impact on the company's bottom line.[9]

Table 1. National employment growth, 2005–2014 (millions)

	2005	2014	Difference
Total employment	130.2	135.1	4.9
Paying below annual median wage	66.8	69.6	2.8
Paying at or above annual median wage			
Requiring at least a bachelor's degree	24.5	28.5	4.0
Opportunity occupation	38.7	37.0	-1.7
Percent opportunity occupation	29.8%	27.4%	-2.4%

Note: Because of missing wage data, 176,000 jobs included in the estimate of total employment in 2005 are excluded from the subsequent wage-based classifications and the calculation of the opportunity occupation share.

Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2005 and May 2014), BLS Employment Projections (2012–2022), and the Current Population Survey (2004–2005, 2013–2014). Education categories from BLS Employment Projections (2012–2022) were applied to the May 2005 OES file using a 2000 to 2010 SOC crosswalk provided by the Bureau of Labor Statistics.

[6] For research investigating "upcredentialing" or "upskilling," see Burning Glass Technologies (2014) and Burrowes, et al. (2014).

[7] The authors also note that online job ads data are biased toward positions requiring higher levels of education. This is discussed further below.

[8] Modestino, Shoag, and Ballance (2015) find that employers increased their education requirements in online job ads where local unemployment rose between 2007 and 2010 and in communities with a higher share of educated and older workers. The authors attribute only one-third of the increase in education requirements to the slack labor market during the recession. Hershbein and Kahn (2015) find rising education requirements in online job ads between 2010 and 2014 and see little evidence that the requirements loosen after local unemployment falls, concluding that it may be "a more structural change due to growing polarization of the U.S. labor market" (2).

[9] See Burrowes, et al. (2014) for qualitative support; Ferguson, Hitt, and Tambe (2013) for a quantitative analysis of this issue; and CareerBuilder (2014) for the results of a survey of hiring managers.

RESEARCH QUESTIONS

In this paper, we apply our definition of an opportunity occupation to the 100 largest metropolitan economies in the U.S. in order to determine the extent to which they offer workers without a four-year degree an opportunity to earn at least the median wage. To test the presence and level of upcredentialing, we examine the education requested in millions of recent online job ads. In this exploration, our objective is to answer the following research questions:

- Which opportunity occupations employ the most workers in these metro areas?
- Do online job ads support the notion that these jobs are accessible to workers without a four-year degree?
- In which metropolitan areas are opportunity occupations most/least prevalent?
- In which metropolitan areas are employers most/least likely to request a higher level of educational attainment than is suggested necessary by other sources?
- Has the level of educational attainment requested in online job ads increased, decreased, or remained constant in recent years?

DATA AND METHODS

To be classified as an opportunity occupation, the occupation's annual median wage must exceed a local minimum threshold, which is based on the national annual median wage adjusted for local consumption prices. Additionally, the occupation must be generally considered accessible to someone without a four-year college degree according to one of three data sets used to gauge the educational attainment required for the job. Because these data sets do not always agree on the level of education associated with each occupation, we have developed three sets of opportunity occupations. The following provides a brief overview of the data and methods used in this analysis; a detailed account is provided in Appendix 1.

We rely on data from the Occupational Employment Statistics (OES) program run by the U.S. Department of Labor's Bureau of Labor Statistics for local and national estimates of employment and wages in May 2014. In this analysis, we multiply the occupation's hourly median wage by the median weekly hours worked as calculated from the Current Population Survey (CPS) to determine the occupation's annual median wage.[10] For occupations not typically associated with year-round work (e.g., teachers), the annual median wage reported in the OES data set is used.

The opportunity occupation threshold wage, or the annual wage that an occupation must equal or exceed to be considered an opportunity occupation, is predicated on the national annual median wage from the OES data in May 2014: $35,540. The national wage is adjusted to account for local consumption prices using Regional Price Parities (RPPs) produced by the U.S. Department of Commerce's Bureau of Economic Analysis. RPPs measure price variation across metropolitan statistical areas (MSAs) and states relative to prices nationally and thus allow us to create wage thresholds that reflect local differences in costs.[11]

We use three different data sets for determining the educational attainment associated with a given occupation. The first is developed by the BLS's Employment Projections program, which assigns each occupation to one of eight educational attainment categories to reflect the typical level of education needed to enter the occupation. This data set was developed for the 2012 to 2022 projection series and is national in scope, so regional preferences for education are not captured.

The second is from the Employment & Training Administration's Occupational Information Network (O*NET) program. O*NET data used in this study reflect survey responses from incumbent workers and occupation experts to a question regarding the education that a new hire would need to perform the job.[12] We assume that an occupation is accessible to a worker without a bachelor's degree if at least half of the survey respondents indicate as much. Again,

[10] We assume year-round, 52-week employment in this calculation.

[11] We chose to set an annual threshold wage rather than an hourly threshold wage because we wanted to acknowledge that not all occupations are associated with full-time work. The estimates of median weekly hours worked used in this analysis range from 16 to 60, depending on the occupation. Roughly 78 percent of employment is associated with the standard 40-hour work week, and almost 92 percent falls between 35 and 45 hours.

[12] The O*NET program also provides a "job zone" classification system for grouping occupations with similar levels of required education, work experience, and on-the-job training. Appendix 1 includes a discussion of how the use of job zones would have affected our results.

this data set is national and does not reflect regional variation in employer preferences.

The third classification system that we use is based on our analysis of data from Burning Glass Technologies (BGT). Burning Glass aggregates job ads from more than 40,000 online job sites and extracts an array of data points from each posting, including the occupation and the minimum degree listed in the advertisement. The occupation associated with the ad is extracted in nearly all cases, but a minimum education is specified in only about half of the job postings.[13] Similar to our treatment of the O*NET data set, we assume that an occupation is accessible to a worker without a four-year degree if the minimum education listed for at least half of the job ads for which a minimum education is specified corresponds to a high school diploma or an associate's degree.[14] One advantage of this dataset is that unlike the other two measures of education, it can be used to produce MSA-level estimates. This means that when the sample size is sufficient between the years 2011 and 2014, the classification of an occupation in a given MSA is based on the job ads posted within the metro area. Where there are fewer than 50 such ads, we use the minimum education provided in the ads across the 100 study MSAs to classify the occupation.

Prior research has shown that online job ads are not representative of job openings in the broader economy because employers hiring for different occupations rely to varying degrees on the Internet to identify prospective candidates (EMSI 2015). Of interest for this study, Carnevale, Jayasundera, and Repnikov (2014b) estimate that while roughly 60 percent to 70 percent of all job openings are posted online, the share is much higher for those requiring a bachelor's degree (80 percent to 90 percent) and much lower for those seeking some college or an associate's degree (30 percent to 40 percent) or a worker with only a high school diploma (40 percent to 60 percent). The authors believe that "the main source of bias in the job ads data is due to differences in Internet access among job applicants, which varies by education level" (11). Because we focus on the characteristics rather than the counts of the ads that are posted, the under- or over-representation of ads by occupation is of little importance to this research unless there is a within-occupation education bias. In other words, we would expect the online job ads to be representative of education requirements for a given occupation unless *within* the occupation positions requiring a higher level of formal education are more likely to be posted online than those that do not. Analyses by Burning Glass have not found any evidence of such a systematic bias.

The following table illustrates how these data sets and criteria are used to classify two occupations in four of our 100 study areas. The shading in the last four rows indicates whether the example meets the definition of an opportunity occupation (green) or not (gray) with respect to each criterion.

As Table 2 indicates, registered nurses in both the Huntsville and Knoxville MSAs earn more than enough annually to qualify as an opportunity occupation. Based on the BLS's national education classification system and the national O*NET data set, the profession is considered accessible for a worker without a bachelor's degree. In Huntsville, roughly 84 percent of online job ads included a minimum education below a bachelor's degree, while the same is true for only 47 percent in Knoxville.

[13] We drop cases for which the minimum education was not extracted. Hershbein and Kahn (2015) and Carnevale, Jayasundera, and Repnikov (2014b) impute this information in ways that we do not feel are appropriate for this study.

[14] It should be noted that the minimum education listed in the job ad might not represent the minimum education an employer would accept in a candidate. For example, if the ad simply says, "bachelor's degree preferred," the ad would be assigned a minimum education of "bachelor's degree" even though the employer might consider an applicant without one.

Table 2. Classification of occupations

Occupation	Registered Nurses		Computer User Support Specialists	
MSA	Huntsville, AL	Knoxville, TN	Trenton-Ewing, NJ	Wichita, KS
National annual median wage (OES)	$35,540	$35,540	$35,540	$35,540
Consumption price adjustment (RPP)	92.5	92.1	111.5	91.5
Opportunity occupation threshold wage	$32,875	$32,732	$39,627	$32,519
Hourly median wage (OES)	$26.97	$26.11	$29.69	$14.98
Median hours worked per week (CPS)	40	40	40	40
Annual median wage	$56,098	$54,309	$61,755	$31,158
Entry-level education category (BLS)	Associate's degree	Associate's degree	Some college, no degree	Some college, no degree
Less than a bachelor's degree (O*NET)	77%	77%	67%	67%
Less than a bachelor's degree (Burning Glass)	84%	47%	32%	58%

Note: Sources are shown parenthetically; where no source is provided, the estimate is based on the calculations of the authors.

The third column of Table 2 shows that the annual median wage for computer user support specialists in the Trenton MSA far exceeds the opportunity occupation threshold wage, and the profession is generally accessible to someone without a bachelor's degree according to both the BLS and O*NET data sets. However, more than two-thirds of jobs in this field advertised online between 2011 and 2014 included a minimum education of at least a bachelor's degree. In Wichita, the annual median wage for this profession is below the threshold wage, so even though all three classification systems indicate accessibility for someone without a four-year degree in Wichita, it cannot be considered an opportunity occupation.[15]

[15] In this study, we include an occupation in a given MSA only if we have complete information on employment and wages from OES and education requirements from all three data sets. As discussed in Appendix 1, even after excluding occupations where data are missing, we are able to include between 84 percent and 97 percent of total employment in the 100 study MSAs.

FINDINGS

WHICH ARE THE MOST PREVALENT OPPORTUNITY OCCUPATIONS?

Table 3 lists the most prevalent opportunity occupations identified by each data set, as well as the share of the occupation's total employment classified as such across these MSAs. Many are considered opportunity occupations in all of the 100 study MSAs, indicated by 100 percent in Table 3. A value between 0 percent and 99 percent in the BLS and O*NET sections of the table indicates that in one or more MSAs, the annual median wage did not exceed the opportunity occupation threshold wage. A percentage below 100 using BGT data could indicate the same, or it could reflect local preferences for higher education expressed in online job ads. Occupations unique to the top 15 list for each data set are highlighted in green, and this serves to call attention more to the agreement among the data sets than to the divergence.

Registered nurses tops all three lists and accounts for opportunity occupation employment of roughly 1.6 million according to BGT data and nearly 1.8 million using BLS and O*NET data. The difference between the employment figures is attributable to preferences for higher education expressed in online job ads for registered nurses in a handful of metro areas. Heavy and tractor-trailer truck drivers also appears in the top five for all three data sets. BLS and O*NET data suggest that, broadly, jobs in office and administrative support offer workers with lower levels of formal education an opportunity to earn good wages. A number of detailed occupations in sales and computer and mathematical fields also rank in the top 15. However, preferences for higher education as expressed in online job ads in one or more of the study MSAs reduce the level of opportunity in some of these professional fields; as a result, occupations more typically associated with manual labor and included in one of two major occupation groups—construction and extraction as well as installation, maintenance, and repair—round out the top 15 for the BGT data set.

Across the 100 study MSAs, roughly 27.4 percent of total employment can be found in occupations that typically pay wages above the median and for which a bachelor's degree is not generally required for entry according to the BLS data set. The opportunity occupation share is the same when we use O*NET data, which reflect worker and expert impressions of required education. However, the share of employment found in opportunity occupations falls to 20.3 percent using the minimum education requested in online job ads.

Although our analysis using BLS and O*NET data sets produces similar top-line results, each identifies some opportunity occupations that the other does not. Table 4 includes the 10 largest occupations in the study MSAs for which these data sets produce different results. Estimates that indicate accessibility for a worker without a four-year college degree are shaded green. For five occupations, the BLS data set suggests that a high school diploma is typically needed for a worker entering an occupation, while the majority of incumbent workers and occupation experts surveyed believe that a bachelor's degree is required. For the other five occupations, the reverse is true. The BGT data set suggests that only one of the 10 occupations would be considered an opportunity occupation based on employer preferences for educational attainment.

Table 3. Most prevalent opportunity occupations

Rank	Occupation	Major Occupation Group	Percent of Employment Qualifying as Opportunity Occupation	Opportunity Occupation Employment
BLS				
1	Registered Nurses	Healthcare Practitioners and Technical	100%	1,763,300
2	First-Line Supervisors of Office and Administrative Support Workers	Office and Administrative Support	100%	1,025,020
3	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Sales and Related	100%	1,011,270
4	Bookkeeping, Accounting, and Auditing Clerks	Office and Administrative Support	80%	848,100
5	Heavy and Tractor-Trailer Truck Drivers	Transportation and Material Moving	89%	824,960
6	Business Operations Specialists, All Other	Business and Financial Operations	100%	727,980
7	First-Line Supervisors of Retail Sales Workers	Sales and Related	93%	719,270
8	Sales Representatives, Services, All Other	Sales and Related	99%	645,350
9	Executive Secretaries and Executive Administrative Assistants	Office and Administrative Support	100%	550,500
10	Maintenance and Repair Workers, General	Installation, Maintenance, and Repair	66%	538,510
11	Computer User Support Specialists	Computer and Mathematical	99%	440,650
12	Police and Sheriff's Patrol Officers	Protective Service	100%	430,880
13	Licensed Practical and Licensed Vocational Nurses	Healthcare Practitioners and Technical	100%	415,170
14	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	Office and Administrative Support	27%	406,620
15	Electricians	Construction and Extraction	100%	385,080
	ALL OCCUPATIONS, 100 LARGEST MSAs		27.4%	24,234,400
O*NET				
1	Registered Nurses	Healthcare Practitioners and Technical	100%	1,763,300
2	General and Operations Managers	Management	100%	1,475,160
3	First-Line Supervisors of Office and Administrative Support Workers	Office and Administrative Support	100%	1,025,020
4	Bookkeeping, Accounting, and Auditing Clerks	Office and Administrative Support	80%	848,100
5	Heavy and Tractor-Trailer Truck Drivers	Transportation and Material Moving	89%	824,960
6	First-Line Supervisors of Retail Sales Workers	Sales and Related	93%	719,270
7	Executive Secretaries and Executive Administrative Assistants	Office and Administrative Support	100%	550,500
8	Maintenance and Repair Workers, General	Installation, Maintenance, and Repair	66%	538,510
9	Computer Systems Analysts	Computer and Mathematical	100%	450,790
10	Computer User Support Specialists	Computer and Mathematical	99%	440,650
11	Police and Sheriff's Patrol Officers	Protective Service	100%	430,880
12	Licensed Practical and Licensed Vocational Nurses	Healthcare Practitioners and Technical	100%	415,170
13	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	Office and Administrative Support	27%	406,620
14	Electricians	Construction and Extraction	100%	385,080
15	Carpenters	Construction and Extraction	87%	356,080
	ALL OCCUPATIONS, 100 LARGEST MSAs		27.4%	24,237,310
BGT				
1	Registered Nurses	Healthcare Practitioners and Technical	88%	1,555,800
2	Heavy and Tractor-Trailer Truck Drivers	Transportation and Material Moving	89%	824,960
3	Bookkeeping, Accounting, and Auditing Clerks	Office and Administrative Support	76%	809,780
4	First-Line Supervisors of Retail Sales Workers	Sales and Related	88%	683,210
5	Maintenance and Repair Workers, General	Installation, Maintenance, and Repair	66%	538,510
6	Police and Sheriff's Patrol Officers	Protective Service	100%	430,880
7	Licensed Practical and Licensed Vocational Nurses	Healthcare Practitioners and Technical	100%	415,170
8	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	Office and Administrative Support	27%	406,620
9	Electricians	Construction and Extraction	100%	385,080
10	Carpenters	Construction and Extraction	87%	356,080
11	Automotive Service Technicians and Mechanics	Installation, Maintenance, and Repair	78%	319,080
12	First-Line Supervisors of Construction Trades and Extraction Workers	Construction and Extraction	99%	316,760
13	Plumbers, Pipefitters, and Steamfitters	Construction and Extraction	99%	251,460
14	First-Line Supervisors of Mechanics, Installers, and Repairers	Installation, Maintenance, and Repair	87%	241,960
15	Construction Laborers	Construction and Extraction	43%	238,870
	ALL OCCUPATIONS, 100 LARGEST MSAs		20.3%	17,922,920

Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2014), BLS Employment Projections (2012–2022), Employment & Training Administration's Occupational Information Network (O*NET) (July 2014), Burning Glass Technologies (2011–2014), BEA Regional Price Parities (2011), and the Current Population Survey (2013–2014).

Table 4. Differences in classification arising from BLS and O*NET data sets

Occupation	Employment	BLS Education Category	O*NET Percent below Bachelor's Degree	BGT Percent below Bachelor's Degree (100 MSAs)
General and Operations Managers	1,475,160	Bachelor's degree	62%	23%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,011,270	High school diploma or equivalent	23%	43%
Business Operations Specialists, All Other	727,980	High school diploma or equivalent	45%	14%
Sales Representatives, Services, All Other	645,350	High school diploma or equivalent	26%	40%
Computer Systems Analysts	450,790	Bachelor's degree	57%	8%
Human Resources Specialists	350,670	Bachelor's degree	51%	28%
Managers, All Other	278,600	High school diploma or equivalent	8%	8%
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	268,260	Bachelor's degree	59%	17%
Securities, Commodities, and Financial Services Sales Agents	266,710	Bachelor's degree	74%	53%
Purchasing Agents, Except Wholesale, Retail, and Farm Products	214,190	High school diploma or equivalent	15%	21%

Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2014), BLS Employment Projections (2012–2022), Employment & Training Administration's Occupational Information Network (O*NET) (July 2014), and Burning Glass Technologies (2011–2014).

FOR THESE OCCUPATIONS, WHAT LEVEL OF EDUCATION DO EMPLOYERS SEEK?

Our analysis of online job ads suggests that many of the opportunity occupations identified using the BLS and O*NET data are, in practice, not readily accessible to someone without a bachelor's degree because online job ads tend to require higher levels of education.

Table 5 reports the share of online job ads with a minimum education below a bachelor's degree for the 100 MSAs overall, as well as the highest and lowest local share calculated across these metro areas. The table includes the 23 detailed occupations that together represent the top 15 lists for the three data sets shown in Table 3. For eight of the 23, the overall percentage is below 50 (highlighted in gray), indicating that in this set of MSAs, employers are typically looking for college-educated candidates.

Even within these eight occupations, it is interesting to note the local-level variability. Take, for example, computer user support specialists. Overall, between 2011 and 2014, only 45 percent of job ads indicated that employers were looking for candidates with less than a four-year degree. However, across the study MSAs, the share ranged from 23 percent to 88 percent. These findings indicate that opportunity is highly localized, greater in one MSA and lesser in another even for workers with the same

Table 5. Percent of job ads seeking less than a bachelor's degree for the most prevalent opportunity occupations

Occupation	Overall	Lowest MSA Percentage	Highest MSA Percentage
Automotive Service Technicians and Mechanics	100%	98%	100%
Bookkeeping, Accounting, and Auditing Clerks	66%	38%	90%
Business Operations Specialists, All Other	14%	7%	46%
Carpenters	100%	95%	100%
Computer Systems Analysts	8%	4%	57%
Computer User Support Specialists	45%	23%	88%
Construction Laborers	95%	82%	100%
Electricians	100%	97%	100%
Executive Secretaries and Executive Administrative Assistants	43%	24%	78%
First-Line Supervisors of Construction Trades and Extraction Workers	65%	42%	89%
First-Line Supervisors of Mechanics, Installers, and Repairers	59%	40%	81%
First-Line Supervisors of Office and Administrative Support Workers	43%	28%	74%
First-Line Supervisors of Retail Sales Workers	62%	31%	76%
General and Operations Managers	23%	11%	51%
Heavy and Tractor-Trailer Truck Drivers	85%	70%	96%
Licensed Practical and Licensed Vocational Nurses	94%	77%	100%
Maintenance and Repair Workers, General	92%	79%	97%
Plumbers, Pipefitters, and Steamfitters	100%	98%	100%
Police and Sheriff's Patrol Officers	90%	68%	99%
Registered Nurses	63%	43%	86%
Sales Representatives, Services, All Other	40%	25%	70%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	43%	30%	67%
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	72%	44%	91%

Sources: Authors' calculations using data from Burning Glass Technologies (2011–2014).

education and, by all appearances, performing the same work. Despite the level of variability exhibited in Table 5, employers hiring for some occupations consistently seek candidates without a bachelor's degree (e.g., heavy and tractor-trailer truck drivers), while the reverse is true for business operations specialists.

Preliminary research not presented in this paper suggests that employer preferences for education are consistently high or low within a given metropolitan area. In other words, if online job ads in a metro area request education that is higher or lower than is typical for one occupation, the same will likely be true for other occupations within that metro area, with a few exceptions. Educational attainment preferences for registered nurses appear to be unrelated

to preferences for other occupations, likely reflecting the fact that one must have a minimum credential that transcends geography. Understanding the local determinants of employer preferences for education is fertile ground and should be the subject of future research.

WHICH ARE THE MOST AND LEAST OPPORTUNITY-RICH METROPOLITAN AREAS?

Looking across our sample of the 100 largest MSAs, the level of economic opportunity available to those without a four-year degree varies dramatically. However, if a particular MSA has a high share of opportunity-rich employment according to one of our measures, it is likely to have a similarly high share using another measure. More simply, all three of our measures are highly correlated (Table 6). As expected given the national scope of the education data and the same overall opportunity occupation share of 27.4 percent, the strongest correlation is between BLS and O*NET measures. Because such similar overall findings can be drawn from these two data sets and because the difference in the opportunity occupation share using the two data sets does not exceed 2.6 percentage points for any of the study MSAs individually, we will focus in this section on the O*NET share, the Burning Glass share, and the differences between them.

Table 6. Correlation coefficients for the three opportunity occupation shares calculated for the study MSAs

	BLS	O*NET	BGT
BLS	1.000		
O*NET	0.983	1.000	
BGT	0.801	0.797	1.000

Source: Authors' calculations.

Table 7 displays the metro areas with the highest and lowest shares of opportunity occupations using O*NET and BGT data. When using the education required in the O*NET data set, the Kansas City MSA tops the list with the highest share of employment classified as an opportunity occupation (36.6 percent), and the McAllen MSA has the lowest share (15.5 percent). Looking at opportunity occupations identified using BGT data, the New York MSA has the lowest share (11.9 percent) of employment while the Louisville MSA claims the largest share (32.1 percent) among the 100 largest metros.

The majority of the metros with the highest shares of opportunity occupations based on the O*NET education data are also in the top 10 based on the education listed in online job ads. The exceptions are the Hartford and Portland MSAs, which together are replaced by Toledo and Milwaukee when using the online job ads.

When examining the metros with the smallest shares of opportunity occupations, just five of the 10 metros appear in both lists. Using online job ads data rather than O*NET data, the five metros joining the list include Washington DC, San Jose, and Bridgeport, metros which are the three most highly educated areas included in the study. The other two metros joining this group are the San Diego and New York MSAs, both of which also rank in the top quartile based on the share of the adult population with at least a bachelor's degree.

Given the dissimilarity of the 10 metro areas with the lowest BGT opportunity occupation shares, Figure 1 explores the distribution of employment by wages and education for each. The McAllen and El Paso MSAs, as well as Fayetteville and Miami to a lesser degree, are dominated by low-wage employment. Here, it is important to remember that the opportunity occupation threshold wage is not set at the local median wage but at the national median wage, adjusted for differences in local consumption prices.

Table 7. Share of total employment classified as an opportunity occupation

O*NET		BGT	
Highest Shares			
Kansas City, MO-KS	36.6%	Louisville-Jefferson County, KY-IN	32.1%
Des Moines-West Des Moines, IA	36.5%	Birmingham-Hoover, AL	31.3%
Cleveland-Elyria-Mentor, OH	36.2%	Toledo, OH	30.8%
St. Louis, MO-IL	35.9%	Springfield, MA-CT	30.2%
Baton Rouge, LA	35.7%	St. Louis, MO-IL	30.1%
Louisville-Jefferson County, KY-IN	35.6%	Kansas City, MO-KS	30.1%
Hartford-West Hartford-East Hartford, CT	35.2%	Cleveland-Elyria-Mentor, OH	29.9%
Springfield, MA-CT	34.8%	Milwaukee-Waukesha-West Allis, WI	29.7%
Portland-Vancouver-Hillsboro, OR-WA	34.5%	Baton Rouge, LA	29.4%
Birmingham-Hoover, AL	34.1%	Des Moines-West Des Moines, IA	29.3%
Lowest Shares			
Poughkeepsie-Newburgh-Middletown, NY	22.0%	El Paso, TX	16.6%
North Port-Bradenton-Sarasota, FL	21.8%	San Diego-Carlsbad-San Marcos, CA	16.6%
Los Angeles-Long Beach-Santa Ana, CA	21.8%	San Jose-Sunnyvale-Santa Clara, CA	16.2%
Fayetteville-Springdale-Rogers, AR-MO	21.4%	McAllen-Edinburg-Mission, TX	15.4%
Tampa-St. Petersburg-Clearwater, FL	21.4%	Fayetteville-Springdale-Rogers, AR-MO	14.5%
Honolulu, HI	20.8%	Miami-Fort Lauderdale-Pompano Beach, FL	14.3%
Miami-Fort Lauderdale-Pompano Beach, FL	20.1%	Los Angeles-Long Beach-Santa Ana, CA	13.1%
Orlando-Kissimmee-Sanford, FL	19.7%	Washington-Arlington-Alexandria, DC-VA-MD-WV	12.9%
El Paso, TX	17.6%	Bridgeport-Stamford-Norwalk, CT	12.8%
McAllen-Edinburg-Mission, TX	15.5%	New York-Northern New Jersey-Long Island, NY-NJ-PA	11.9%

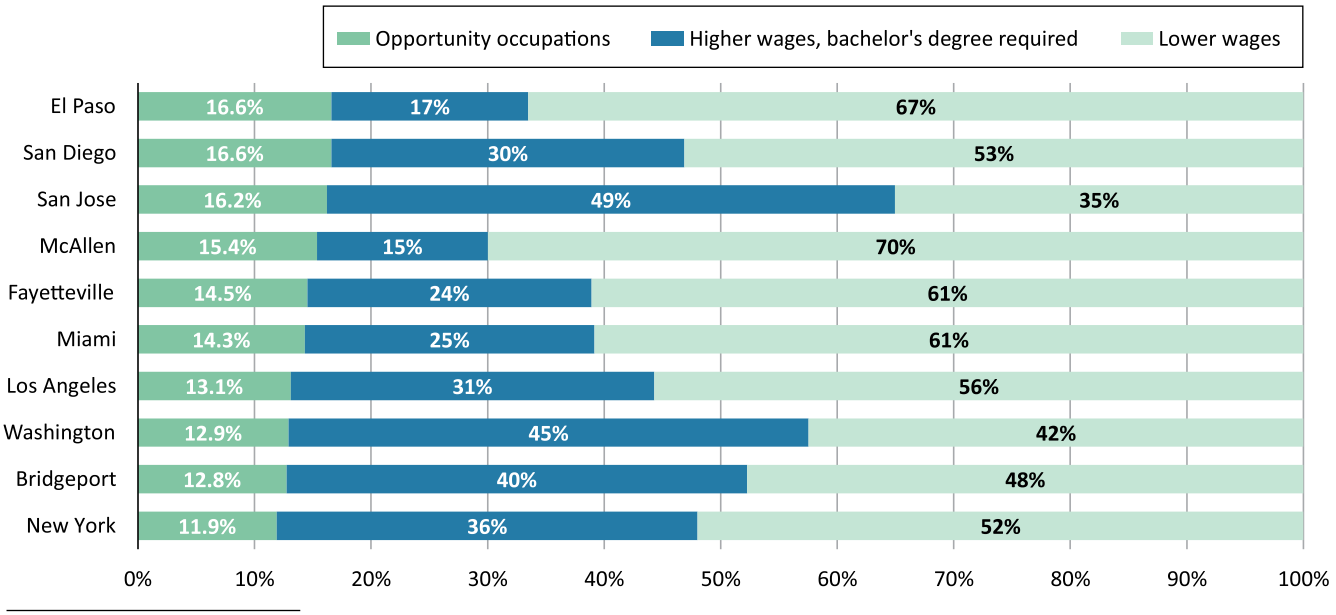
Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2014), Employment & Training Administration's Occupational Information Network (O*NET) (July 2014), Burning Glass Technologies (2011–2014), BEA Regional Price Parities (2011), and the Current Population Survey (2013–2014).

In these MSAs, the median wages for 61 percent to 70 percent of employment fall below this threshold wage. At the other end of the spectrum are metro areas such as San Jose and Washington DC where higher-wage employment is much more prevalent generally but decent-paying jobs for workers without a four-year college degree remain scarce nonetheless.

Reflected in Table 8, metros registering high opportunity occupation shares have generally experienced lower population, employment, and house-price growth than those with low opportunity occupation shares. Considering manufacturing's decline over the past half century, it is quite interesting to note that those metros with higher shares of opportunity occupations also have higher concentrations of employment in manufacturing. They also tend to be more affordable metros with lower regional consumption prices and higher rates of homeownership. Moreover, high opportunity occupation metros tend to have higher levels of education along with lower levels of poverty and wage inequality.

Some of the characteristics associated with high opportunity occupation metros are more indicative of economic stagnation than dynamism.

Figure 1. Distribution of employment by wages and BGT education



Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2014), Burning Glass Technologies (2011–2014), BEA Regional Price Parities (2011), and the Current Population Survey (2013–2014).

Table 8. Average MSA characteristics by O*NET opportunity occupation share

	Top Quartile MSAs	Bottom Quartile MSAs
Share of opportunity occupations (O*NET)*	33.6 (0.3)	22.8 (0.5)
Log population, 2014	3.14 (0.1)	3.28 (0.1)
Population growth, 1970–2014 (log difference)*	0.15 (0.03)	0.49 (0.04)
Percent of adult population with a bachelor's degree, 2013*	32.9 (1.1)	29.2 (1.4)
Regional Price Parities, 2011*	96.1 (1.3)	102.3 (2.0)
Per capita income (thousands $), 2013*	47.2 (1.2)	42.3 (1.8)
Productivity (GDP/employment), 2013	117.3 (4.3)	110.8 (4.3)
Payroll employment growth, 2000–2014*	4.4 (1.4)	17.1 (2.7)
Share of employment in manufacturing, 2014*	9.4 (0.5)	6.0 (0.7)
Median home value (thousands $), 2013	200.7 (19.7)	232.5 (26.8)
Nominal home price growth, 2000–2014 *	44.8 (5.0)	70.4 (6.1)
Poverty rate, 2013*	14.0 (0.6)	17.0 (1.1)
Homeownership rate, 2014*	65.4 (1.1)	59.7 (1.4)
Wage inequality ratio (90th/10th percentile), 2014*	3.38 (0.05)	3.62 (0.04)

* Significantly different means at the 95% confidence level

Note: Standard errors shown parenthetically.

Sources: Authors' calculations using data from the Census Bureau, the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Federal Housing Finance Agency.

The differences identified in Table 8 provide a good starting point for future research into the factors that affect the local economic opportunity structure.

In Table 9, we display the metros that exhibit the largest and smallest differences in their O*NET and BGT opportunity occupation shares. For all of the metros, online job ads indicate lower levels of opportunity than do O*NET data. This finding suggests that employers are seeking workers with higher levels of education than are required according to the O*NET survey. The difference is greatest in the Bridgeport MSA, where roughly 26 percent of employment is classified as an opportunity occupation using the O*NET survey compared with only 13 percent based on our analysis of online job ads. The smallest differences range from 0.1 to 2.2 percentage points. In these metro areas, employer preferences for educational attainment are generally reflective of the incumbent worker and occupational expert survey on which the O*NET data set is based.

The difference in a metro area's O*NET and BGT opportunity occupation shares can be easily explained by identifying the occupations for which the two data sets disagree on the level of education

Table 9. Difference in opportunity occupation share between O*NET and BGT data sets

Largest Difference	O*NET Share	BGT Share	Difference
Bridgeport-Stamford-Norwalk, CT	26.1%	12.8%	13.4%
San Jose-Sunnyvale-Santa Clara, CA	29.4%	16.2%	13.2%
San Francisco-Oakland-Fremont, CA	31.5%	18.9%	12.6%
New York-Northern New Jersey-Long Island, NY-NJ-PA	23.9%	11.9%	12.0%
Boston-Cambridge-Quincy, MA-NH	28.6%	17.0%	11.7%
New Haven, CT	28.7%	17.9%	10.8%
Hartford-West Hartford-East Hartford, CT	35.2%	25.5%	9.7%
Washington-Arlington-Alexandria, DC-VA-MD-WV	22.5%	12.9%	9.6%
Winston-Salem, NC	29.9%	20.7%	9.2%
Atlanta-Sandy Springs-Marietta, GA	28.3%	19.3%	9.0%
Smallest Difference			
Orlando-Kissimmee-Sanford, FL	19.7%	17.5%	2.2%
Scranton--Wilkes-Barre, PA	28.5%	26.4%	2.1%
Youngstown-Warren-Boardman, OH-PA	31.1%	29.1%	2.0%
Bakersfield-Delano, CA	28.7%	27.2%	1.5%
Cape Coral-Fort Myers, FL	22.5%	21.1%	1.4%
El Paso, TX	17.6%	16.6%	1.0%
North Port-Bradenton-Sarasota, FL	21.8%	21.1%	0.7%
Riverside-San Bernardino-Ontario, CA	24.1%	23.4%	0.6%
Las Vegas-Paradise, NV	24.9%	24.4%	0.6%
McAllen-Edinburg-Mission, TX	15.5%	15.4%	0.1%

Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2014), Employment & Training Administration's Occupational Information Network (O*NET) (July 2014), Burning Glass Technologies (2011–2014), BEA Regional Price Parities (2011), and the Current Population Survey (2013–2014).

required. In the 10 MSAs where the difference is greatest, the largest occupation classified as accessible to a worker without a bachelor's degree by O*NET but not in the BGT data set is general and operations managers. Five of the 10 largest occupations similarly classified in these MSAs, such as computer systems analysts and human resources specialists, are also listed in Table 4 because the O*NET data also suggest greater accessibility than even the BLS data set. For these occupations, it is likely that the O*NET data set underestimates the requisite education, and this underestimation, in turn, exaggerates the gap between the O*NET and BGT opportunity occupation shares.

However, there are some occupations employing a substantial number of workers that are considered accessible to a worker without a bachelor's degree in both the BLS and O*NET data sets as well as in the BGT data set for other metro areas, but for which employers in some of these MSAs seek a higher level of formal education. In three of these 10 MSAs, the majority of online job ads request at least a bachelor's degree for registered nurses. Computer user support specialists and executive secretaries and executive administrative assistants are also large contributors to the difference in O*NET and BGT opportunity occupation shares in these 10 metro areas. In these cases and in these places, employer preferences for education appear to limit job accessibility for workers without a four-year college degree.

According to Table 10, the MSAs where the difference between the O*NET and BGT opportunity occupation shares is the greatest—that is, where employers are much more likely to request a higher

Table 10. Average MSA characteristics by the difference in opportunity occupation shares (O*NET minus BGT)

	Top Quartile MSAs	Bottom Quartile MSAs
Difference in opportunity occupation share (O*NET–BGT)*	9.1 (0.4)	2.2 (0.2)
Log population, 2014*	3.42 (0.1)	3.01 (0.1)
Population growth, 1970–2014 (log difference)	0.28 (0.04)	0.38 (0.05)
Percent of adult population with a bachelor's degree, 2013*	37.2 (1.2)	25.1 (1.0)
Regional Price Parities, 2011*	105.7 (1.9)	96.9 (1.6)
Per capita income (thousands $), 2013*	52.5 (2.1)	38.7 (1.1)
Productivity (GDP/employment), 2013*	140.0 (5.4)	98.5 (2.8)
Payroll employment growth, 2000–2014	9.7 (2.1)	14.1 (3.1)
Share of employment in manufacturing, 2014	7.7 (0.7)	8.1 (1.1)
Median home value (thousands $), 2013*	283.4 (27.9)	169.1 (19.1)
Nominal home price growth, 2000–2014	65.2 (5.8)	54.5 (5.8)
Poverty rate, 2013*	13.6 (0.6)	17.9 (1.1)
Homeownership rate, 2014	60.9 (1.2)	62.8 (1.9)
Wage inequality ratio (90th/10th percentile), 2014*	3.67 (0.04)	3.50 (0.05)

* Significantly different means at the 95% confidence level

Note: Standard errors shown parenthetically.

Sources: Authors' calculations using data from the Census Bureau, the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Federal Housing Finance Agency.

level of education than is suggested by O*NET data—tend be larger metro areas with a better-educated workforce, higher regional consumption prices, higher income and total factor productivity levels, higher home prices, lower poverty rates, and higher wage inequality. In other words, employers in metropolitan areas with many of these characteristics and generally competitive labor markets (e.g., San Jose) are in a position to request a higher level of education from prospective employees, higher than in less-competitive labor markets (e.g., McAllen) and higher than may be necessary to perform the job satisfactorily.

Appendix 2 includes summary information on each of the 100 MSAs covered in this report.

HAVE EMPLOYER PREFERENCES FOR EDUCATIONAL ATTAINMENT CHANGED IN RECENT YEARS?

Employers may be relaxing educational preferences for many of the opportunity occupations identified in this report. Between 2011 and 2014, a total of 16 opportunity occupations analyzed in Table 11 saw statistically significant increases in the share of online job ads requesting less than a bachelor's degree, while only three saw statistically significant decreases.

For most, the change over this relatively short period of time was statistically significant but insubstantial. The change was plus or minus 3 percentage points for 19 of the 23 occupations, and for no occupation did the share of online job ads move to the other side of 50 percent, a move which would have changed its classification as an opportunity occupation with regard to the BGT data. It is worth calling attention to registered nurses, however, because the share of online job ads for those without a bachelor's degree fell dramatically and consistently. If the trend continues, this occupation may soon present limited opportunity for a worker with an associate's degree.[16]

It is worth noting that the changes observed in Table 11 could reflect the geographic distribution of the job opportunities or the types of employers advertising for a given occupation rather than a real change in educational attainment preferences among employers. For example, if job openings were more numerous in MSAs where education preferences are generally higher or by employers that typically seek more highly-educated workers in 2011 than in 2014, the changes presented in Table 11 might reflect the composition of the job openings rather than a real lowering or raising of educational standards.

To investigate this further, we control for the first concern—that the location of the job openings is affecting the observed difference over time—by examining changes at the metropolitan level. In Table 12, we highlight changes for registered nurses because it is the largest opportunity occupation identified in this report, it has the second-most online job ads over the study period, and it became significantly less accessible to workers who lack a four-year degree between 2011 and 2014. As a counterpoint, we also explore sales representatives, wholesale and manufacturing, except technical and scientific products because employers' preferences for education appear to have relaxed significantly over the same period.

For registered nurses, the share of online job ads requesting less than a bachelor's degree declined by more than 20 percentage points in the 10 MSAs shown in Table 12; in many cases, the share was over 50 percent in 2011 but well under this threshold in

[16] BGT suggested that for registered nurses, ads with missing education data should be considered positions that require an associate's degree. We chose not to impute education data for these cases in order to maintain consistent treatment with job ads for other occupations for which we could not make assumptions about missing data. Had we imputed, the percentage of ads accessible to a worker without a bachelor's degree would have declined by a statistically significant 6 percentage points between 2011 and 2014, from roughly 72 percent to 66 percent.

Table 11. Share of online job ads requesting less than a bachelor's degree

Occupation	2011	2012	2013	2014	Difference
First-Line Supervisors of Mechanics, Installers, and Repairers	56%	59%	59%	61%	4.8%*
First-Line Supervisors of Office and Administrative Support Workers	40%	40%	45%	44%	3.9%*
Licensed Practical and Licensed Vocational Nurses	92%	95%	95%	94%	2.9%*
Computer Systems Analysts	7%	7%	8%	10%	2.9%*
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	42%	42%	42%	44%	2.1%*
Maintenance and Repair Workers, General	91%	91%	92%	92%	1.9%*
First-Line Supervisors of Construction Trades and Extraction Workers	63%	62%	68%	65%	1.8%
Carpenters	98%	100%	100%	100%	1.7%*
Police and Sheriff's Patrol Officers	88%	87%	91%	90%	1.6%*
Bookkeeping, Accounting, and Auditing Clerks	65%	64%	67%	66%	1.2%*
Computer User Support Specialists	44%	46%	47%	45%	1.2%*
Electricians	99%	100%	100%	100%	1.2%*
Plumbers, Pipefitters, and Steamfitters	99%	100%	100%	100%	1.2%*
Automotive Service Technicians and Mechanics	99%	100%	100%	100%	1.0%*
General and Operations Managers	22%	21%	24%	23%	1.0%*
Heavy and Tractor-Trailer Truck Drivers	83%	85%	87%	84%	0.9%*
First-Line Supervisors of Retail Sales Workers	63%	63%	60%	64%	0.7%*
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	72%	72%	72%	72%	-0.4%
Business Operations Specialists, All Other	15%	13%	14%	15%	-0.5%
Construction Laborers	95%	94%	95%	94%	-0.9%
Executive Secretaries and Executive Administrative Assistants	45%	43%	43%	42%	-2.8%*
Sales Representatives, Services, All Other	42%	41%	39%	39%	-3.7%*
Registered Nurses	69%	63%	62%	59%	-9.7%*

*Pearson's chi-square test indicates significant difference at the 95% confidence level

Sources: Authors' calculations using data from Burning Glass Technologies (2011–2014).

2014. Over the same period, ads for registered nurses suggested a significant loosening of educational preferences in only five metros, and the magnitude of change was much less substantial.

Turning to ads for sales representatives, wholesale and manufacturing, except technical and scientific products, we see the same pattern, but in reverse: Large and significant local-level increases in the share of job ads requesting less than a bachelor's degree, as well as smaller, not always significant decreases. The McAllen MSA experienced the largest increase in job ads requesting less than a four-year degree, rising from 43 percent in 2011 to 73 percent in 2014. Conversely, the Bakersfield MSA experienced the largest decrease in accessibility for this occupation, dropping by 16 percentage points over the same period.

Table 12. Share of online job ads requesting less than a bachelor's degree

Registered Nurses					
MSAs Showing the Largest Increase	2011	2012	2013	2014	Difference
Lexington-Fayette, KY	58%	54%	60%	71%	13%*
Madison, WI	65%	65%	74%	73%	8%*
Oxnard-Thousand Oaks-Ventura, CA	56%	59%	58%	63%	7%*
Charlotte-Gastonia-Rock Hill, NC-SC	76%	76%	73%	80%	3%*
Sacramento-Arden-Arcade-Roseville, CA	69%	61%	62%	72%	2%
Boston-Cambridge-Quincy, MA-NH	60%	54%	53%	62%	2%*
North Port-Bradenton-Sarasota, FL	80%	85%	83%	82%	2%
Cape Coral-Fort Myers, FL	78%	83%	76%	78%	1%
St. Louis, MO-IL	74%	73%	72%	74%	0%
MSAs Showing the Largest Decrease					
Bakersfield-Delano, CA	79%	68%	69%	57%	-22%*
Durham-Chapel Hill, NC	81%	86%	80%	58%	-23%*
Greensboro-High Point, NC	70%	53%	37%	47%	-23%*
Knoxville, TN	67%	56%	36%	43%	-24%*
Lancaster, PA	82%	67%	55%	55%	-27%*
Des Moines-West Des Moines, IA	71%	62%	56%	44%	-28%*
Salt Lake City, UT	75%	72%	70%	46%	-30%*
Colorado Springs, CO	67%	52%	45%	35%	-32%*
New Orleans-Metairie-Kenner, LA	75%	74%	64%	41%	-34%*
Raleigh-Cary, NC	81%	61%	51%	44%	-37%*

Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products					
MSAs Showing the Largest Increase	2011	2012	2013	2014	Difference
McAllen-Edinburg-Mission, TX	43%	72%	70%	73%	30%*
Toledo, OH	43%	39%	59%	58%	15%*
Huntsville, AL	43%	48%	55%	57%	14%*
North Port-Bradenton-Sarasota, FL	54%	59%	63%	66%	12%*
Virginia Beach-Norfolk-Newport News, VA-NC	52%	58%	53%	64%	12%*
El Paso, TX	52%	60%	56%	63%	11%*
Lexington-Fayette, KY	44%	48%	47%	54%	10%*
Cleveland-Elyria-Mentor, OH	38%	43%	42%	48%	10%*
Dayton, OH	40%	45%	46%	50%	9%*
Richmond, VA	40%	43%	40%	49%	9%*
MSAs Showing the Largest Decrease					
Los Angeles-Long Beach-Santa Ana, CA	42%	42%	38%	38%	-4%*
Austin-Round Rock-San Marcos, TX	44%	40%	37%	40%	-4%*
Bridgeport-Stamford-Norwalk, CT	36%	36%	32%	32%	-4%
San Jose-Sunnyvale-Santa Clara, CA	34%	30%	27%	29%	-5%*
Harrisburg-Carlisle, PA	53%	43%	47%	48%	-5%
Des Moines-West Des Moines, IA	49%	41%	42%	43%	-7%*
San Francisco-Oakland-Fremont, CA	38%	38%	30%	31%	-7%*
Baton Rouge, LA	53%	50%	49%	46%	-7%*
Youngstown-Warren-Boardman, OH-PA	70%	62%	53%	62%	-8%
Bakersfield-Delano, CA	69%	65%	56%	53%	-16%*

*Pearson's chi-square test indicates significant difference at the 95% confidence level

Note: For registered nurses, the share of online job ads requesting less than a bachelor's degree increased between 2011 and 2014 in only nine of the study MSAs.

Source: Authors' calculations using data from Burning Glass Technologies (2011–2014).

CONCLUSIONS

Access to jobs that provide good wages for those without a four-year college degree varies considerably across America's metropolitan landscape. For the 100 metro areas covered in this study and based on incumbent worker and occupational expert assessments of required education, opportunity occupations represent as many as 1 in 3 local jobs at the high end and as few as 1 in 6 local jobs at the low end. Employers' educational preferences as revealed in online job ads tend to further limit opportunity for workers without a bachelor's degree, particularly in large metro areas with higher living costs and a better-educated workforce. However, employer preferences for higher education appear to have become less restrictive since 2011 for a number of the opportunity occupations identified in this study.

This analysis shows some of the difficulty in determining where there are significant opportunities for workers who hold less than a four-year college degree. We find that the share of jobs that meet our definition of an opportunity occupation is not only contingent on the local economy under investigation but also on the type of data used to assess education requirements. Geographic specificity is important in determining where opportunity lies in a local area. A central challenge is accessibility to geographically specific information on the labor market. Online job ad data provide a very promising avenue for better understanding the local labor market, but they do not paint a complete picture (Carnevale, Jayasundera, and Repnikov 2014b).

Our finding that many of the largest opportunity occupations might have become easier to access for workers with less education over the last several years does not reveal whether the geographic location, the composition of employers seeking candidates, or the growing comprehensiveness of online jobs data is behind some or all of this decline. If the decline is real, these findings could be indicative of several potential trends. One possibility is that the national labor market is recovering from the Great Recession, and this research provides early evidence that employers are relaxing standards and seeking workers with lower levels of formal education as demand for labor increases. One could also point to an increasingly agile workforce development and job training industry in preparing workers for these positions, a situation which might make a college degree less relevant than targeted workforce training in the eyes of employers. The significant growth in sectoral training partnerships (and many are in healthcare and nurse training) might have some effect on employer demands, but the data cannot speak to this directly. Further analysis is necessary to determine whether these potential explanations or others are behind what appears to be a slight loosening of employers' educational attainment expectations for some occupations in recent years.

The varying level of opportunity occupations across metro areas poses a host of important policy questions. This study presents preliminary evidence that for workers who lack a bachelor's degree but seek employment at a decent wage, not all economies are created equal. An economy that provides opportunity for these workers could be seen as a real asset to attract active labor force participants from other areas or to retain—and potentially retrain—current residents. A greater understanding of the factors that influence the local opportunity structure could help communities make strides in expanding

employment for workers lacking a four-year college degree and represents fertile ground for future research.

Further research into the drivers of employer educational preferences is also needed to fully understand the implications for policy. This research shows that in relation to other measures of educational requirements, employer preferences restrict opportunity for workers with lower levels of formal education. Are these higher expectations related to labor market slack, an abundance of which allows employers to be choosier? Do they reflect the growing complexity of work in a way that government classifications and surveys as yet do not? Is a bachelor's degree being used as a proxy for intangible skills employers seek? Does the educational attainment of the labor force or the industry composition of the economy affect employer preferences? Answers to these questions could help lower barriers to employment for workers without a bachelor's degree and potentially inform the efforts of workforce development professionals going forward.

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APPENDIX 1
Detailed Data and Methods

Local estimates of employment and wages: The data sets on metropolitan area economies that form the foundation of this report are produced by the U.S. Department of Labor's Bureau of Labor Statistics (BLS). The BLS's Occupational Employment Statistics (OES) program collects occupation-level employment and wage data from employers via a mail survey of roughly 200,000 establishments in May and November of each year. The data sets are published annually and reflect information collected over the prior six panels. For example, the May 2014 data used in this research are based on survey responses dating back to November 2011. Employers are asked to include both full-time and part-time employees, but self-employed individuals, private household employers, and farm establishments are excluded.

National estimates provided in this report are predicated on the May 2005 and May 2014 national files. Metropolitan area estimates derive from the May 2014 metropolitan area file and reflect metropolitan statistical area (MSA) definitions developed by the Office of Management and Budget and published in OMB Bulletin No. 10-02.[17] In the six New England states, New England City and Town Areas (NECTAs) replace the county-based MSA definitions used for all others. For simplicity's sake, all metropolitan areas discussed in this report are referred to as MSAs. In this report, we provide estimates for the 100 MSAs in the 50 states and the District of Columbia with the highest estimated total employment in May 2014.

Using OES data on hourly and annual wages, we determine whether an occupation in a given MSA meets the minimum annual wage threshold to be classified as an opportunity occupation. The opportunity occupation threshold wage is calculated for each MSA as the national annual median wage adjusted for local consumption prices (see below).[18] For occupations that are paid an annual salary but that are not typically associated with year-round work (e.g., teachers), we use the annual median wage reported in the OES data set. For all other occupations, we multiply the hourly median wage by the median number of hours worked per week for the occupation reported in the Current Population Survey (see below). We calculate an annual median wage for each occupation rather than use the annual estimates provided in the OES data set because we want to acknowledge that not all occupations are associated with full-time work. Incorporating weekly hours worked from the Current Population Survey allows us to discount the income for occupations that are generally part-time in nature, though we still assume year-round (i.e., 52-week) employment in this calculation and thus do not adjust downward the annual wages for seasonal work. OES wage data are suppressed where they exceed $90 per hour or $187,200 per year in 2014 and $70 per hour or $145,600 annually in 2005; we use these topcoded values where they are suppressed.

Although much detailed information on local employment is utilized and presented in this report, data for some occupations are excluded. In some instances, the OES employment or wage estimate is not available. In other situations, the data sets that we merge with the OES files are not perfectly compatible or lack sufficient data and result in the

[17] These definitions were released on December 1, 2009, and are available at https://www.whitehouse.gov/sites/default/files/omb/assets/bulletins/b10-02.pdf. The BLS has not yet incorporated the latest MSA definitions developed in 2013.

[18] The national annual median wage reported in the May 2014 OES data set was $35,540. In May 2005, the national annual median wage was $29,430.

exclusion of the occupation. In May 2014, estimated employment is suppressed in the OES file for almost 4,500 of the 56,600 MSA-occupation combinations in the 100 study MSAs. Excluded records for which we have employment data but are missing other information account for another 3,500 records, or roughly 1.8 million jobs. Of these, we can classify roughly 1.4 million jobs using the BLS education categories and find that 25.6 percent would be classified as opportunity occupations, compared to 27.4 percent for included occupations. Even after these exclusions, our analysis covers between 84 percent and 97 percent of total MSA employment for the 100 MSAs analyzed, with a median coverage level of 94 percent.

For more information on Occupational Employment Statistics data, please visit http://www.bls.gov/oes/home.htm.

Occupation-specific measures of education:

Bureau of Labor Statistics, Employment Projections: BLS's Employment Projections program provides occupation-level predictions of employment for the coming decade, and the last published series covers the period 2012 to 2022. The data set also provides information on the typical level of education needed to enter an occupation, the typical work experience in a related occupation considered necessary for entry, and on-the-job training required to attain competency. Education is defined using eight categories, and all except the final three listed here meet the education criterion for an opportunity occupation as we define it in this paper: less than high school; high school diploma or equivalent; some college, no degree; postsecondary non-degree award; associate's degree; bachelor's degree; master's degree; and doctoral or professional degree.

For additional information on the BLS Employment Projections program, visit http://www.bls.gov/emp/.

Burning Glass Technologies (BGT): BGT is an aggregator and vendor of online job ads. It scans more than 40,000 online job boards and websites to gather and convert the detailed information found in job postings into usable data elements. BGT uses an algorithm to eliminate duplicate job ads across the various online sources.[19] There are over 70 data elements available in the BGT data set including MSA codes, occupation and industry codes, and education and experience requirements for the job. In our analysis, we use data for the years 2011 through 2014, data which include approximately 62 million online job ads. While the occupation and MSA codes are nearly always populated in the database, the education is specified by employers in about half of the jobs ads. The education variable used in this analysis is the minimum listed in the job ad and could reflect the "preferred" education rather than the minimum accepted by the employer. If at least 50 percent of the job ads that include a minimum education suggest that the position is open to a worker without a bachelor's degree, the occupation satisfies our opportunity occupation education criterion.

The Burning Glass data set is a rich source of information regarding online job postings but has some important shortcomings. Carnevale, Jayasundera, and Repnikov (2014b) report online job ads are not representative of the universe of job openings. In their analysis, they

[19] For a detailed description of the process used to extract job information from online sites and the de-duplication procedures, see Carnevale, Jayasundera, and Repnikov (2014b).

find that between 60 percent and 70 percent of job openings are posted online, and the percentage varies by education, industry, and occupation. Job postings requiring a bachelor's degree or more are overrepresented in online job ads, and those requiring an associate's degree or less are underrepresented. Between 80 percent and 90 percent of the job openings for those with at least a bachelor's degree are posted online. In comparison, just 40 percent to 60 percent of jobs requiring a high school diploma and only 30 percent to 40 percent of those requiring some college or an associate's degree are posted online (Carnevale, Jayasundera, and Repnikov 2014b). Similarly, certain occupations are less likely to be found in online job ads than are others. In particular, skilled-trade occupations have been found to be underrepresented in the online jobs postings in part because job seekers in these fields are less likely than others to look online for jobs (EMSI 2015).

Importantly, Carnevale and his co-authors (2014b) tested the accuracy of the information extracted from the online job ads by BGT. To do this, they examined a sample of the full-text job ads with the parsed information from these ads. For the geographic information, the accuracy rate exceeded 80 percent; the education requirement was correct 85 percent of the time; and for the six-digit occupation code, the accuracy rate was 73 percent.

Employment & Training Administration, Occupational Information Network (O*NET) data: O*NET is a database built on a survey sponsored by the U.S. Department of Labor's Employment and Training Administration. The survey is administered to collect job-oriented data on occupational requirements, workforce characteristics (such as labor market information and occupational outlooks), and occupation-specific information (such as the tasks and technology that occupations use). The O*NET survey also collects worker-oriented data on worker characteristics (such as abilities and interests), worker requirements (such as educational attainment, skills, and knowledge), and experience requirements (such as the number of years of on-the-job training needed and licensing information). The survey question of interest to this research asks the respondent—either an incumbent worker or an occupational expert—to indicate the level of education required of a new hire to perform the work.

The survey currently identifies 974 detailed occupations, far more than the number classified by the Standard Occupational Classification (SOC) system on which many of the other data sets used in this study are predicated. While education data are collected and provided for many of these 974 detailed occupations, the data are also provided at the SOC-level for 695 occupations. For an additional 71 occupations, we calculated a weighted average based on the education data of the detailed O*NET occupations and the number of online job ads reported in the BGT data set. O*NET education data are not available for roughly 50 SOC occupations, and these are excluded from our analysis. Where data are available and consistent with our treatment of the BGT data set, if at least 50 percent of survey responses suggest that the position is open to a worker without a bachelor's degree, the occupation satisfies our opportunity occupation education criterion.

As mentioned in the body of the report, the O*NET program also provides a "job zone" clas-

sification system for grouping occupations with similar levels of required education, work experience, and on-the-job training. Because we use information on education only and ignore work experience and on-the-job training data in the BLS and BGT data sets, we feel that O*NET survey data are more consistent with the other education measures than are job zones. However, we developed alternative estimates using job zones and found that they would result in either higher or lower O*NET education requirements for 22 occupations included in the study. The overall O*NET opportunity occupation share would fall from the 27.4 percent reported in the body of this paper to 25.5 percent; as such, the gap between the O*NET and BGT opportunity occupation shares would shrink by roughly 2 percentage points overall.

O*NET data are national in scope and are updated periodically. For this research, we used version 19.0, released in July 2014.

For additional information, visit https://www.onetcenter.org/.

Regional variation in consumption prices: Because consumption prices can vary dramatically from one metropolitan area to another, the opportunity occupation threshold wage must be adjusted to reflect this reality. In this analysis, we begin with the national annual median wage as reported in the OES data set. This represents the minimum threshold for our national estimates of opportunity occupations. In the development of MSA-level estimates, we adjust this threshold using Regional Price Parities (RPPs) produced by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). RPPs measure price variation across MSAs and states relative to prices nationally and thus allow us to create minimum annual wage thresholds that reflect local differences in costs. RPPs are based on Consumer Price Index and American Community Survey data.

Although more recent estimates are available, we use RPPs from 2011 because they were the last series to use MSA definitions consistent with the OES data set that forms the foundation of this report. Because the OES data set uses New England City and Town Areas (NECTAs) to define metropolitan areas in New England, the RPP for the county-based MSA that most closely aligns with the NECTA is applied in this analysis. The RPPs for the 100 MSAs included in this report range from 86.7 in McAllen-Edinburg-Mission, TX, to 122.3 in Bridgeport-Stamford-Norwalk, CT.

For more information on Regional Price Parities, please see the U.S. Bureau of Economic Analysis's "Real Personal Income for States and Metropolitan Areas, 2007-2011 (Prototype Estimates)," news release, June 12, 2013, and supplementary Table 4 available at http://bea.gov/newsreleases/regional/rpp/2013/rpp0613.htm (accessed May 18, 2015).

Median weekly hours worked: The data used to estimate the median weekly hours in this analysis are from the Current Population Survey (CPS), which is jointly sponsored by the U.S. Census Bureau and the BLS. We used a crosswalk to apply data from the broader occupational codes from the CPS to the narrower SOC occupation codes used in the OES data. Occupation-specific hours data were retrieved using the Minnesota Population Center's *Integrated Public Use Microdata Series* website (https://cps.ipums.org/). Data from 2004 and 2005 as well as data from 2013 and 2014 were pooled to improve coverage across all occupations in the sample such that we have two estimates of median hours, 2004–2005 and 2013–2014. The former was used only in the calculation of 2005 national estimates provided in Table 1. Despite efforts to improve coverage, in 2013–2014, 131 of

the 820 occupations (16 percent) either do not have weekly hours data available or have a pooled sample size below 20; for these occupations, we assume 40 hours of work per week. According to our estimates, 575 (70 percent) occupations in the study have a median of 40 hours per week, a fact which makes assigning 40 hours to those without CPS data less worrisome. The remaining 114 occupations have medians above or below 40 hours. Representing the extremes of our estimates, the 2013–2014 pooled data suggest that crossing guards typically work 16 hours per week, while three occupations associated with the oil and gas industry are assigned 60-hour work weeks.

For more information on the Current Population Survey, visit http://www.census.gov/cps/.

For the crosswalk used to apply data from the Current Population Survey to the SOC occupation codes, see the first link under "Occupation" here: http://www.census.gov/people/io/methodology/.

APPENDIX 2

Summary Estimates for the 100 Study MSAs

MSA	MSA Employment	Share of MSA Employment Analyzed in Study	Opportunity Occupation Share			Number of 10 Largest Occupations Classified as an Opportunity Occupation		
			BLS	O*NET	BGT	BLS	O*NET	BGT
Akron, OH	320,520	94%	33.6%	33.4%	28.1%	2	2	2
Albany-Schenectady-Troy, NY	430,020	94%	31.6%	32.2%	25.3%	2	3	2
Albuquerque, NM	370,270	94%	23.8%	23.7%	20.0%	1	2	1
Allentown-Bethlehem-Easton, PA-NJ	341,530	95%	26.4%	26.3%	21.6%	1	1	1
Atlanta-Sandy Springs-Marietta, GA	2,387,970	97%	28.2%	28.3%	19.3%	2	2	1
Austin-Round Rock-San Marcos, TX	886,620	95%	23.4%	25.6%	17.6%	1	2	1
Bakersfield-Delano, CA	295,860	94%	29.4%	28.7%	27.2%	3	3	3
Baltimore-Towson, MD	1,294,280	96%	26.3%	26.4%	18.7%	1	2	1
Baton Rouge, LA	382,280	90%	36.2%	35.7%	29.4%	2	3	2
Birmingham-Hoover, AL	494,960	95%	34.5%	34.1%	31.3%	4	3	3
Boise City-Nampa, ID	279,870	93%	25.9%	26.7%	23.5%	2	3	2
Boston-Cambridge-Quincy, MA-NH	2,587,770	94%	27.0%	28.6%	17.0%	1	2	1
Bridgeport-Stamford-Norwalk, CT	422,570	94%	24.5%	26.1%	12.8%	2	3	1
Buffalo-Niagara Falls, NY	539,250	96%	28.7%	29.3%	25.5%	1	1	1
Cape Coral-Fort Myers, FL	224,140	93%	23.2%	22.5%	21.1%	1	1	1
Charleston-North Charleston-Summerville, SC	308,520	93%	26.5%	27.6%	24.4%	2	2	2
Charlotte-Gastonia-Rock Hill, NC-SC	910,290	97%	30.5%	30.8%	22.4%	2	2	1
Chattanooga, TN-GA	230,180	90%	28.1%	28.9%	24.4%	2	2	2
Chicago-Joliet-Naperville, IL-IN-WI	4,411,860	95%	26.9%	26.8%	18.4%	1	2	1
Cincinnati-Middletown, OH-KY-IN	1,012,100	94%	31.4%	31.9%	26.1%	1	1	1
Cleveland-Elyria-Mentor, OH	1,014,440	96%	36.1%	36.2%	29.9%	1	1	1
Colorado Springs, CO	253,430	91%	25.2%	24.5%	19.6%	2	2	0
Columbia, SC	356,160	92%	26.5%	26.3%	22.3%	2	2	2
Columbus, OH	968,190	94%	29.5%	31.0%	23.7%	1	1	1
Dallas-Fort Worth-Arlington, TX	3,168,590	97%	25.6%	25.7%	18.4%	1	2	1
Dayton, OH	369,680	95%	30.1%	30.0%	26.6%	1	1	1

MSA	MSA Employment	Share of MSA Employment Analyzed in Study	Opportunity Occupation Share			Number of 10 Largest Occupations Classified as an Opportunity Occupation		
			BLS	O*NET	BGT	BLS	O*NET	BGT
Des Moines-West Des Moines, IA	344,060	94%	35.8%	36.5%	29.3%	3	4	3
Detroit-Warren-Livonia, MI	1,861,300	96%	27.1%	26.9%	21.0%	1	2	1
Durham-Chapel Hill, NC	284,480	92%	31.9%	31.6%	23.9%	4	3	3
El Paso, TX	284,440	94%	17.9%	17.6%	16.6%	1	1	1
Fayetteville-Springdale-Rogers, AR-MO	214,650	84%	20.8%	21.4%	14.5%	1	1	0
Fresno, CA	332,160	92%	24.8%	25.2%	22.1%	2	3	2
Grand Rapids-Wyoming, MI	406,910	91%	27.0%	28.3%	25.8%	2	2	2
Greensboro-High Point, NC	350,450	95%	29.2%	29.2%	24.6%	2	2	2
Greenville-Mauldin-Easley, SC	309,340	95%	24.4%	25.7%	22.8%	0	0	0
Harrisburg-Carlisle, PA	309,740	94%	27.8%	27.0%	22.6%	2	2	2
Hartford-West Hartford-East Hartford, CT	564,480	96%	35.2%	35.2%	25.5%	4	5	3
Honolulu, HI	448,520	93%	21.4%	20.8%	18.2%	1	2	1
Houston-Sugar Land-Baytown, TX	2,843,360	96%	29.9%	30.1%	21.8%	1	2	1
Huntsville, AL	208,480	95%	28.3%	27.8%	22.3%	2	3	2
Indianapolis-Carmel, IN	937,000	95%	31.6%	31.2%	25.9%	2	2	2
Jackson, MS	251,020	94%	28.0%	29.0%	26.4%	3	4	3
Jacksonville, FL	601,250	96%	27.8%	26.8%	21.0%	2	2	2
Kansas City, MO-KS	1,006,620	97%	37.0%	36.6%	30.1%	3	4	3
Knoxville, TN	330,330	95%	27.1%	28.1%	21.6%	1	2	0
Lancaster, PA	225,140	95%	31.3%	31.0%	28.2%	1	1	1
Las Vegas-Paradise, NV	870,740	95%	25.4%	24.9%	24.4%	0	0	0
Lexington-Fayette, KY	259,700	88%	30.4%	30.1%	26.7%	3	3	3
Little Rock-North Little Rock-Conway, AR	335,390	95%	26.4%	26.4%	22.4%	2	2	2
Los Angeles-Long Beach-Santa Ana, CA	5,541,000	96%	21.5%	21.8%	13.1%	1	2	1
Louisville-Jefferson County, KY-IN	622,180	94%	35.9%	35.6%	32.1%	2	2	2
Madison, WI	347,750	92%	33.0%	32.7%	28.5%	2	3	2
McAllen-Edinburg-Mission, TX	239,300	94%	15.3%	15.5%	15.4%	1	1	1
Memphis, TN-MS-AR	595,060	93%	28.2%	28.7%	24.5%	2	2	2
Miami-Fort Lauderdale-Pompano Beach, FL	2,350,300	94%	21.7%	20.1%	14.3%	1	1	1

MSA	MSA Employment	Share of MSA Employment Analyzed in Study	Opportunity Occupation Share			Number of 10 Largest Occupations Classified as an Opportunity Occupation		
			BLS	O*NET	BGT	BLS	O*NET	BGT
Minneapolis-St. Paul-Bloomington, MN-WI	1,824,720	96%	33.6%	32.9%	26.5%	2	3	2
Nashville-Davidson--Murfreesboro--Franklin, TN	819,880	95%	26.4%	27.3%	21.3%	1	1	1
New Haven, CT	275,450	91%	28.4%	28.7%	17.9%	2	2	0
New Orleans-Metairie-Kenner, LA	539,910	94%	29.5%	29.7%	24.7%	1	2	1
New York-Northern New Jersey-Long Island, NY-NJ-PA	8,615,710	96%	23.5%	23.9%	11.9%	1	2	0
North Port-Bradenton-Sarasota, FL	258,340	93%	22.5%	21.8%	21.1%	1	1	1
Ogden-Clearfield, UT	208,450	92%	27.6%	28.2%	24.9%	0	1	0
Oklahoma City, OK	602,150	97%	28.5%	29.2%	25.7%	2	3	2
Omaha-Council Bluffs, NE-IA	467,130	95%	30.4%	30.2%	25.3%	2	2	2
Orlando-Kissimmee-Sanford, FL	1,079,670	96%	20.7%	19.7%	17.5%	1	1	1
Oxnard-Thousand Oaks-Ventura, CA	295,990	91%	23.1%	24.9%	20.3%	1	2	1
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	2,706,840	96%	27.3%	26.8%	19.3%	1	1	1
Phoenix-Mesa-Glendale, AZ	1,825,850	95%	25.2%	26.0%	21.2%	2	2	2
Pittsburgh, PA	1,129,980	97%	31.9%	31.8%	25.8%	1	1	1
Portland-Vancouver-Hillsboro, OR-WA	1,056,200	93%	34.7%	34.5%	27.4%	2	3	1
Poughkeepsie-Newburgh-Middletown, NY	246,910	90%	21.3%	22.0%	19.0%	1	1	1
Providence-Fall River-Warwick, RI-MA	551,850	97%	30.5%	30.9%	25.3%	2	2	2
Raleigh-Cary, NC	546,130	96%	27.0%	26.4%	18.9%	1	2	1
Richmond, VA	616,800	95%	30.7%	30.3%	24.6%	1	1	1
Riverside-San Bernardino-Ontario, CA	1,249,880	96%	24.2%	24.1%	23.4%	2	3	2
Rochester, NY	495,180	95%	27.9%	28.3%	21.7%	1	1	1
Sacramento--Arden-Arcade--Roseville, CA	858,060	95%	32.9%	32.4%	25.0%	3	3	1
Salt Lake City, UT	662,920	94%	28.7%	28.8%	21.3%	2	3	2
San Antonio-New Braunfels, TX	914,030	94%	26.3%	26.1%	23.1%	1	2	1
San Diego-Carlsbad-San Marcos, CA	1,320,390	96%	23.4%	23.1%	16.6%	1	2	1

MSA	MSA Employment	Share of MSA Employment Analyzed in Study	Opportunity Occupation Share			Number of 10 Largest Occupations Classified as an Opportunity Occupation		
			BLS	O*NET	BGT	BLS	O*NET	BGT
San Jose-Sunnyvale-Santa Clara, CA	973,480	95%	28.1%	29.4%	16.2%	1	2	1
Scranton--Wilkes-Barre, PA	254,340	94%	28.8%	28.5%	26.4%	2	2	2
Seattle-Tacoma-Bellevue, WA	1,761,920	91%	32.5%	31.1%	23.4%	2	1	1
Springfield, MA-CT	291,200	94%	34.1%	34.8%	30.2%	1	2	1
St. Louis, MO-IL	1,305,470	97%	35.9%	35.9%	30.1%	3	4	3
Syracuse, NY	300,320	94%	30.7%	30.3%	24.3%	2	2	2
Tampa-St. Petersburg-Clearwater, FL	1,182,200	96%	22.7%	21.4%	18.4%	1	1	1
Toledo, OH	303,730	93%	33.1%	33.0%	30.8%	1	1	1
Trenton-Ewing, NJ	224,020	87%	31.1%	28.5%	20.1%	4	3	3
Tucson, AZ	353,790	89%	24.2%	25.0%	22.2%	2	2	2
Tulsa, OK	427,420	94%	30.7%	32.2%	27.5%	2	3	2
Virginia Beach-Norfolk-Newport News, VA-NC	728,940	96%	26.5%	26.4%	23.2%	1	1	1
Washington-Arlington-Alexandria, DC-VA-MD-WV	2,944,560	97%	23.4%	22.5%	12.9%	1	1	0
Wichita, KS	290,100	94%	30.8%	29.9%	25.9%	2	2	2
Winston-Salem, NC	209,450	93%	30.3%	29.9%	20.7%	2	2	1
Worcester, MA-CT	249,630	94%	32.0%	32.4%	25.6%	1	2	1
Youngstown-Warren-Boardman, OH-PA	218,200	93%	30.9%	31.1%	29.1%	2	2	2

Sources: Authors' calculations using data from BLS Occupational Employment Statistics (May 2014), BLS Employment Projections (2012–2022), Employment & Training Administration's Occupational Information Network (O*NET) (July 2014), Burning Glass Technologies (2011–2014), BEA Regional Price Parities (2011), and the Current Population Survey (2013–2014).