

EDUCATIONAL ATTAINMENT BY STATE AND METROPOLITAN AREA

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SUMMARY

The educational attainment of the workforce has taken on added importance over time, as the economy has shifted from a manufacturing basis to one increasingly information driven and dependent on innovation. In terms of regional economic development, the quality and availability of the workforce is now the most important factor cited by export businesses in determining where to locate.

Significant differences in the share of the workforce that has earned at least a bachelor's degree are present across states and metropolitan areas. In metro areas, the share is strongly correlated to size, with the largest areas on average having the highest shares. In smaller metro areas, university enrollment as a percentage of employment has a strong relationship with the share of the workforce that has earned at least a bachelor's degree. A weaker geographic relationship exists, with the northeastern part of the country on average having higher educational attainment.

In 2013, the share of employed individuals between 25 and 64 years of age who had earned at least a bachelor's degree was 32.1 percent in Arizona, less than the national figure of 35.7 percent. Arizona ranked 33rd nationally. The share was significantly above the national figure in several states along the East Coast and in Colorado. Most of the states with the lowest shares are located in the South, but Nevada ranked last.

In four of the nation's 50 largest metro areas — Washington D.C., San Jose, San Francisco, and Boston — more than half of the employed individuals between 25 and 64 years of age had earned at least a bachelor's degree. The figure for the Phoenix area was 33.7 percent, ranking 39th among the 50 largest metros. Of the 21 metros with at least 1 million workers, the Phoenix area's share was considerably less than the 41.1 percent average, with only Riverside-San Bernardino and Tampa-St. Petersburg having a lower share. The Tucson area was not as far below the average of metros of similar size: 33.1 percent versus the average of 36.5 percent. The below-average shares of workers with a university degree in the Tucson and Phoenix metro areas are inconsistent with their above-average shares of university students.

Reports of the change in the educational attainment of the workforce by metropolitan area have been published in recent years, but data limitations make conclusions unreliable. Sampling error is a major concern and the data series with the least survey error is available only for the relatively short period of 2005 through 2013. Moreover, the changes measured for this period have not varied widely by state or metro area.

The change in the share of the workforce with at least a bachelor's degree is correlated to metro area size, but this size relationship is not as strong as with the share in 2013. The largest areas posted the greatest average gain between 2005 and 2013. University enrollment as a share of the number of workers is not related to the change in educational attainment, but the change in share is more closely related to the region than the share itself. The Pacific and West South Central regions had significantly lesser gains in educational attainment than most of the rest of the country after controlling for the other factors. The largest gains were in the Northeast.

INTRODUCTION

The purpose of this analysis is to examine variations in educational attainment across the country, both in the current level and in the change over time. This paper is partially in response to reports focusing on the change in attainment by metropolitan area.¹ In particular, an analysis by Cleveland State University² examined the change between 2005 and 2013 in the percentage of the workforce with an advanced degree in 40 large metro areas. Unfortunately, the Cleveland State University analysis used data from the Current Population Survey (CPS) that are not suitable for such an analysis. According to the U.S. Census Bureau, “the CPS data provide reliable estimates at the state level and for 12 of the largest metropolitan statistical areas.”³

While the Census Bureau’s statement regarding reliability may be reasonable for indicators of the population as a whole, the survey error for subsets of the population are much larger. For example, the Phoenix metropolitan area was the nation’s 12th-most populous in 2013, but only 10 percent of those between the ages of 25 and 64 had earned an advanced degree, or about 230,000.⁴ According to the U.S. Bureau of Labor Statistics, “on average, each estimate of 5,000 represents only two sample cases with that characteristic.”⁵ Thus, the CPS sample in the Phoenix area included only approximately 92 people — 230,000 divided by 5,000 times 2 — between the ages of 25 and 64 with an advanced degree. With so few observations, survey error is very large.

Instead of the CPS, the analyses in this paper are based on data from the American Community Survey (ACS). While survey error is an issue with ACS data, the magnitude of the error is not nearly as large as with CPS data. Moreover, the ACS survey error can be reduced by combining observations for more than one year.

The educational attainment of the workforce has taken on added importance over time, as the economy has shifted from a manufacturing basis to one increasingly information driven and dependent on innovation. In terms of regional⁶ economic development, the quality and availability of the workforce is the most important factor cited by export businesses⁷ in determining where to locate. This factor has become more important over time. Educational attainment and achievement are key components determining workforce quality. Educational attainment is measured by the number of years of schooling. Educational achievement is a more nebulous concept that includes how well an individual does in school and the level and types of

¹ See, for example, “Measuring Economic Growth, By Degrees” at <http://www.newgeography.com/content/004816-measuring-economic-growth-degrees>.

² Cleveland State University, Center for Population Dynamics, “A Newer Geography of Jobs: Where Workers With Advanced Degrees Are Concentrating the Fastest,” September 2014, http://urban.csuohio.edu/cpd/reports_and_blogs.

³ U.S. Department of Commerce, Census Bureau, <http://www.census.gov/cps/about/faq.html>. The CPS is sponsored jointly by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics.

⁴ These figures come from the American Community Survey. Since the ACS does not report advanced degrees for workers, all individuals between the ages of 25 and 64 regardless of work status, were used as a proxy for this example.

⁵ U.S. Department of Labor, Bureau of Labor Statistics, <http://www.bls.gov/gps/notescps.htm>.

⁶ In this paper, a region is defined as either a state or a metropolitan area.

⁷ An export business is one that can locate anywhere since its customers are spread across the nation or world. This is in contrast to a business that serves local residents — local demand is the most important location factor for such a population-support business, which is not mobile.

skills learned. Educational attainment is the focus of this paper, in part due to its data availability, but it does not fully measure workforce quality.

DATA DESCRIPTION AND LIMITATIONS

Historically, the only reasonably accurate regional data on educational attainment came from the long form of the decennial census that was completed by approximately one-in-six households. The annual American Community Survey replaced the long form of the decennial census; data for all regions are available for 2005 through 2013. The U.S. Census Bureau is the source of the decennial census and the ACS.⁸ The ACS sampling error is greater than the sampling error in the long form of the decennial census, even with the combination of five years of ACS observations.

The significance of the sampling error varies greatly with the size of the population being analyzed. The Census Bureau expresses sampling error as the margin of error, publishing the 90 percent margin of error with every estimate. For example, the number of employed residents of the Flagstaff metro area between the ages of 25 and 64 who were not high school graduates in 2013 is published as 3,003 +/-1,071, where 1,071 is the margin of error. The interpretation is that there is a 90 percent probability that the true value is between 1,932 and 4,074. Most surveys use the 95 percent margin of error, which produces a broader range in which the true value may fall, but only a 1-in-20 chance that the real value is not within this interval.

One means of reducing the sampling error in the ACS is to combine data for multiple years. The Census Bureau provides such data for three-year and five-year periods. However, in the case of a small subset of the population, the sampling error still is large even when combining five years. Moreover, it difficult to interpret multiyear data, especially for measures affected by the economic cycle. For example, the latest five-year data for 2009 through 2013 include a year of a deep recession as well as years of economic expansion.

Examples of survey error are shown in Table 1 for Flagstaff, a small metropolitan area, and for Phoenix-Mesa-Scottsdale, a large metro area. The ACS results are shown for both a one-year sample and a sample that combines three years.⁹ The margin of error of the three-year sample is considerably less than for the one-year sample, particularly for small metro areas. Also apparent is that the relative margin of error is smaller for larger subsets of the population. While the survey error in the estimate for the bachelor's degree or more category (the focus in this paper) generally would be considered to be acceptable in large metro areas in the three-year sample, it is a concern in small metro areas.

Sampling error is not the only issue when accessing ACS/decennial census data. While the Census Bureau provides a number of standard tables, the detailed information needed for a specific analysis may not be available from any of these tables. In order to obtain such specific data, the Public Use Microdata Sample (PUMS) — available for the ACS and decennial census — must be accessed. However, only a small percentage of all respondents are included in the

⁸ Data from the ACS and 2000 census are available from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>. Limited data from earlier censuses are available online.

⁹ The three-year sample instead of the five-year sample was selected for this illustration because the three-year sample is used later in this paper for metropolitan areas.

TABLE 1
EXAMPLES OF SURVEY ERROR IN THE AMERICAN COMMUNITY SURVEY

	Estimate	2013 Margin of Error		2011 Through 2013 Margin of Error		
		Number	Percent	Estimate	Number	Percent
Flagstaff Metropolitan Area						
Population Age 25-to-64	66,061	992	1.5%	65,748	272	0.4%
Employed Individuals by Educational Attainment:						
Less Than High School Diploma	3,003	1,071	35.7	3,798	707	18.6
High School Diploma	10,530	1,539	14.6	9,821	838	8.5
Some College/Associate Degree	17,271	2,224	12.9	16,088	1,160	7.2
Bachelor's Degree or More	18,307	1,758	9.6	17,731	945	5.3
Phoenix Metropolitan Area						
Population Age 25-to-64	2,258,251	1,330	0.1	2,229,310	652	0.0
Employed Individuals by Educational Attainment:						
Less Than High School Diploma	163,949	8,028	4.9	162,379	4,342	2.7
High School Diploma	334,691	9,454	2.8	326,782	7,341	2.3
Some College/Associate Degree	545,592	10,851	2.0	548,013	7,031	1.3
Bachelor's Degree or More	537,270	10,674	2.0	527,304	6,754	1.3

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, one-year estimates for 2013 and three-year estimates for 2011-13, Table B23006, obtained from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

PUMS file. Thus, the sampling error using PUMS is much larger than it is for the standard tables produced by the Census Bureau.

Geographic Limitations

States often are used for various socioeconomic analyses, but most economists view labor markets as the preferred level of geography, particularly for economic analyses. In urban areas, the geography of labor markets essentially is the same as metropolitan areas.

Metropolitan statistical areas are geographic entities delineated by the federal Office of Management and Budget. A metro area contains a core urban area of 50,000 or more population and consists of one or more counties: the county (or counties) containing the core urban area and any adjacent counties that have a high degree of social and economic integration with the urban core, as measured by commuting to work.

A metropolitan area's geographic composition, or list of geographic components at a particular point in time, is referred to as its "delineation" and results from the application of published standards to Census Bureau data. The standards for delineating the areas are reviewed and revised once every ten years, prior to each decennial census. Metro areas are delineated using the most recent set of standards following each decennial census. Between censuses, the delineations are updated annually to reflect the most recent Census Bureau population estimates. Thus, the delineation of metro areas is constantly changing.

While metro areas conceptually are the preferred geography for the analysis of educational attainment, various data issues limit the use of the ACS for metro areas, particularly for a time series analysis:

- Sampling error is substantial in less-populous metro areas.
- Historical ACS data are not revised to reflect changes in the geographic delineation of metro areas.
- In metro areas that have experienced a change in delineation, the time series of ACS data must be adjusted so that all years reflect the same geographic delineation. Conceptually, this can be done by accessing county-level data. However, sampling error is sizable for most counties and ACS data are not available for all counties. Because of the high sampling error, the Census Bureau does not publish annual data from the ACS for counties and other geographies of less than 65,000 residents. The three-year sample is available only for geographies of at least 20,000 residents.
- Thus, in order to ensure the comparability of the geographic definitions of metro areas over time, the five-year ACS data must be used. However, the earliest five-year period of 2005-to-2009 overlaps with the most recent period of 2009-to-2013. Therefore, the existing five-year data are not useful to determine the change over time in educational attainment.

Two other options are available to analyze metro areas over time:

- Single-year ACS data can be used, but changes in geographic definitions cannot be included for counties with fewer than 65,000 residents. Further, the sampling error of single-year estimates for less-populous metro areas is severe, as seen in Table 1.
- Three-year ACS data can be used, but changes in geographic definitions cannot be included for counties with fewer than 20,000 residents.

The three-year data are used in this paper, comparing the 2005-to-2007 period to the 2011-to-2013 period. Adjustments were made for changes in metro area delineations except for counties with less than 20,000 residents.

Because of the limitations in the metro area data, educational attainment by state also is analyzed in this paper. The analysis by state uses annual data as well as the three-year data used for metro areas. State data are less desirable from an economic perspective. While labor markets within the same state share various commonalities, significant differences also may exist.

Data on Educational Attainment

The educational attainment of a regional workforce has two components:

- The attainment of those who were educated in the region.
- The attainment of those who were educated elsewhere and later migrated to the region.

In a growing state such as Arizona, much of the workforce consists of those who migrated to the state as adults. In recent decades, these migrants have on average been better educated than individuals growing up in Arizona. The educational attainment of the latter group has been below the national average. While migration of workers can offset to some extent deficiencies in the educational attainment of those educated in the state, hiring qualified workers from outside the region is an added cost for employers. Further, as Arizona has grown, an increasing share of the working-age population have been educated in Arizona. This growing share pushes down the

overall educational attainment of Arizona residents. Businesses consider the educational attainment of the workforce when making location decisions.

There are other reasons to concentrate on the educational attainment and achievement of those who grow up in Arizona. Those with less educational attainment are likely to remain in the state. They are less likely to be employed; if working, they are more likely to earn lower wages. Thus, they are likely to contribute less to government revenues and to use more public services.

The ideal analysis would separately track over time the educational attainment of workers educated in Arizona and the attainment of workers who migrate to and from the state. This would allow more informed public policies related to education to be made.

Migrants Versus Those Educated in the Same Region in Which They Work

Data on migration are available from the ACS, which asks respondents to indicate where they were living one year before.¹⁰ Since only a small proportion of the population make a long-distance move in a year, this subset of the population is very small in size in the ACS and sampling error therefore is very large. Given that this small population of migrants needs to be further subdivided by educational attainment and by workforce status for this analysis, the sampling error at a regional level is so large as to render these data unusable for such an analysis.

Beyond the issue of sampling error, the standard table on migration by educational attainment is limited to the entire population 25 or older. With the inclusion of retirees and others who are not working, these data are not of much value given this paper's focus. For example, in 2013 in Arizona, 62 percent of the net migrants age 25 or older were of age 60 or older — a very high proportion of whom likely were retired.

Information on the educational attainment of those who received their education in the same region in which they work also is problematic. A history of an individual's migration and at what age a person migrated is not available. If the place of birth is the same as an adult's current residence, one might assume that the individual received their education in the region, but there are cases of individuals who moved from the region as a child and returned as an adult. Further, the use of place of birth would exclude a large number of individuals who moved to the region as a child and were largely educated in the region.

Thus, it is impossible to adequately track the change in educational attainment of those educated in a region versus migrants to and from the region. Therefore, the analysis in this paper is limited to workforce participants regardless of where they were educated. While this is unfortunate from a policy perspective, a company hiring workers from within the local labor market is largely indifferent to where an individual was educated.¹¹

Standard Tables Reporting Educational Attainment

From the ACS, a standard table (B23006) of educational attainment by workforce status is available for the population between the ages of 25 and 64. The Census Bureau generally limits

¹⁰ The decennial census asked respondents where they lived five years before.

¹¹ In the case of university graduates, the perceived quality of the university attended may be considered in the hiring process.

educational attainment figures to those 25 and older because a relatively large share of those under 25 are still attending school. This particular table also excludes those 65 and older; workforce participation in this age group is low, with a disproportionate percentage of those 65 and older who are working doing so part time.

ACS Table B23006 places individuals into one of four categories: armed forces, civilian employed, unemployed, and not in the labor force. The focus in this analysis is the educational attainment of those employed in civilian jobs. Only four educational attainment categories — not a high school graduate, high school diploma,¹² some college/associate's degree, and bachelor's degree or more¹³ — are available from ACS Table B23006. A comparable standard table of educational attainment by workforce status is not available from the decennial census, so this labor force analysis is limited to the 2005-to-2013 period.

Because of the limitations to the educational attainment by workforce status data, the analysis in this paper for states is supplemented by a table (standard table B15001 from the ACS) of educational attainment of individuals 18 and older by age group, regardless of workforce status. Since a comparable table (PCT025) is available from the 2000 decennial census, the time period analyzed is extended to 2000 to 2013. Moreover, tables B15001 and PCT025 provide seven categories of educational attainment, distinguishing between those with a bachelor's degree and those with a graduate degree.

Comparison of the Educational Attainment of Those Employed to the Entire Population

Arizona provides a good example of how the overall educational attainment figures differ from those of workforce participants. The educational attainment of those who move to Arizona after retirement (which may be before age 65) is considerably higher than the attainment of the rest of the state's population. Thus, the state's overall educational attainment is misleadingly high for purposes of labor force analyses.

Since the ACS table (B23006) of employment status and educational attainment is limited to those 25-to-64 years old, the same age group was extracted from ACS Table B15001. The correlation in educational attainment, as defined as the percentage with at least a bachelor's degree in 2013, across the states between these two tables exceeds 0.98 (where 1.0 indicates perfect correlation). Such a high correlation is not a surprise since a high percentage of this age group is employed; in 2013, 71.6 percent were employed nationally.

Despite the high correlation, differences in the share with at least a bachelor's degree between all individuals 25-to-64 years of age and employed individuals 25-to-64 years of age vary by state. In 2013 nationally, the share of those 25-to-64 years old with at least a bachelor's degree was 35.7 percent among those employed, higher than the 31.1 percent among the entire population. The 4.6 percentage-point differential in share equates to a 14.8 percent difference. The share with at least a bachelor's degree was higher among those employed than among all individuals in

¹² The "high school diploma" category includes those receiving a certificate of high school equivalency by passing the general educational development (GED) tests.

¹³ Since those with a graduate degree are not differentiated from those with a bachelor's degree as their maximum attainment, a direct comparison cannot be made to the results of the Cleveland State University analysis.

the 25-to-64 age group in every state, but the magnitude of the difference varied by state, from 8-to-29 percent. In 2005, the difference between the shares was 11.3 percent nationally and ranged from 5-to-26 percent across the states.

In Arizona, the share of those between the ages of 25 and 64 who were employed was 68.1 percent, less than the national figure. Arizona's share was lower in each of the age groups within the 25-to-64 age bracket, with the largest differential among those 55-to-64, presumably due to early retirees migrating to Arizona. The share with a bachelor's degree was lower in Arizona than the nation for the entire population 25-to-64 years old (27.6 percent) and for workers (32.1 percent), but the percent difference between these shares was similar to the national average.

Nationally between 2005 and 2013, the share with at least a bachelor's degree rose 1.9 percentage points among the entire population between the ages of 25 and 64 and 3.2 percentage points among those employed. The share increased more among those employed in all but one of the states, but the magnitude of the difference between those employed and the entire population varied by state. The correlation across the states in the two population subsets was 0.89 for the change in the percentage with at least a bachelor's degree between 2005 and 2013. Advances in the share with a bachelor's degree were smaller in Arizona than the nation: 1.2 percentage points among all residents 25-to-64 years old and 2.8 percentage points among those employed.

A DETAILED LOOK AT EDUCATIONAL ATTAINMENT IN ARIZONA

The analysis in this section is for all residents at least 18 years of age and comes from annual data for 2005 through 2013 from ACS Table B15001 and from the 2000 Census Table PCT025. It looks at educational attainment broken into seven categories for five age groups. In addition, three of the age groups are combined to provide figures for those 25-to-64 years old, the age group analyzed later in the report for those employed.

In the 25-to-64 age group, a larger-than-average share of Arizonans had attended college but not received a bachelor's degree in 2013, as seen in Table 2. Lower-than-average shares had received bachelor's degrees and advanced degrees.¹⁴ The percentage who had not graduated from high school was somewhat above average.

Between 2000 and 2013, educational attainment rose nationally among those 25-to-64 years old, with increases in the share in each of the categories of an associate's degree or more attainment. Arizona did not experience as large an increase among those with at least a bachelor's degree and did not have as much of a decline among those without a high school diploma.

By Attainment Category and Age Group

Chart 1 provides an overview of educational attainment by age in Arizona relative to the national average in 2013. Measured both as the percentage of high school graduates and the percentage earning at least a bachelor's degree, Arizona's attainment was considerably less than the national average among those younger than 45. The differential was smaller in the 45-to-64 age group. In the 65 and older age group, educational attainment in Arizona exceeded the national average.

¹⁴ Advanced degrees include master's degrees, professional specialty degrees such as law school, and doctorates.

TABLE 2
MAXIMUM EDUCATIONAL ATTAINMENT IN ARIZONA AND THE NATION
AMONG THOSE 25-TO-64 YEARS OLD

	United States	Arizona	Difference
2013			
Less Than Ninth Grade	4.7%	5.9%	1.2
Ninth to 12th Grade, No Diploma	7.2	8.1	0.9
High School Graduate*	26.4	23.9	-2.5
Some College, No Degree	21.8	25.2	3.4
Associate's Degree	8.8	9.3	0.5
Bachelor's Degree	19.8	17.8	-2.0
Advanced Degree	11.3	9.7	-1.6
2000-to-2013 Change			
Less Than Ninth Grade	-0.64	-0.98	-0.32
Ninth to 12th Grade, No Diploma	-3.50	-2.48	1.02
High School Graduate*	-1.47	0.96	2.43
Some College, No Degree	-0.57	-2.11	-1.54
Associate's Degree	1.62	1.71	0.09
Bachelor's Degree	2.72	1.67	-1.05
Advanced Degree	1.84	1.23	-0.61

* Includes those receiving a certificate of high school equivalency by passing the general educational development (GED) tests.

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, one-year estimate for 2013, Table B15001, and 2000 Census, Table PCT025, each obtained from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

Table 3 displays Arizona's rank among the states on maximum educational attainment in 2013 in the various age groups and attainment categories. The rank of the change between 2000 and 2013 also is shown in Table 3.

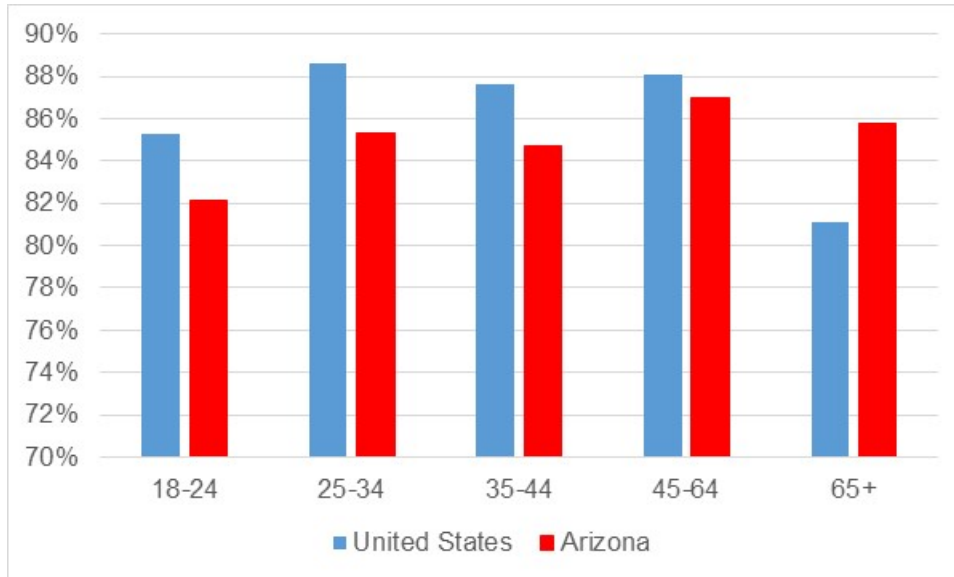
Attainment Categories

In 2013, relative to the nation, a disproportionate share of Arizonans younger than 65 had not earned a high school diploma. Arizona ranked 43rd or lower in each of the four age groups younger than 65 among those with less than a ninth grade education and nearly as low among those who had attended high school without graduating. The shares of those who had not graduated from high school became smaller in each age group nationally between 2000 and 2013, except for those 35-to-44 years old who had less than a ninth grade education. The declines between 2000 and 2013 were greater in Arizona among those younger than 35, with Arizona ranking among the top five states in the category of less than ninth grade. In contrast, the decreases were not as large in Arizona among those 45 and older, with the state ranking among the bottom 11 states in each of the age groups among those who had attended high school without graduating.

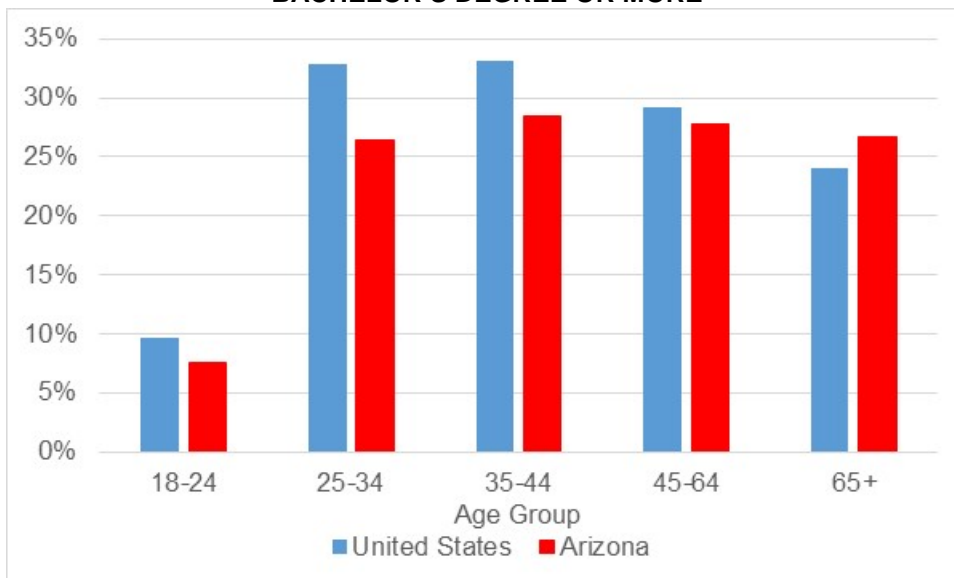
The proportion of Arizonans who had attended college or earned an associate's degree was higher than the national average in 2013 among those 25 and older, with the state ranking between sixth and 11th in each of the age groups in the category of some college. The shares rose nationally between 2000 and 2013 except among those 35-to-64 years old with some

**CHART 1
EDUCATIONAL ATTAINMENT IN ARIZONA AND THE NATION
BY AGE GROUP IN 2013**

HIGH SCHOOL GRADUATES



BACHELOR'S DEGREE OR MORE



Source: U.S. Department of Commerce, Census Bureau, American Community Survey, one-year estimates for 2013, Table B15001, obtained from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

**TABLE 3
MAXIMUM EDUCATIONAL ATTAINMENT IN ARIZONA
EXPRESSED AS THE RANK AMONG THE STATES***

	Rank, With the Lowest Percentage Assigned to 1			Rank, With the Highest Percentage Assigned to 1			
	Less Than Ninth Grade	High School, No Diploma	High School Graduate	Some College	Associate's Degree	Bachelor's Degree	Graduate Degree
2013							
18-24	43	45	37	46	20	38	28
25-34	49	45	23	11	25	44	37
35-44	48	45	14	9	32	40	36
45-64	46	33	7	9	20	32	24
65+	23	7	9	6	7	13	17
25-64	49	37	11	9	22	39	29
2000 to 2013							
18-24	3	18	50	30	12	26	20
25-34	5	12	50	32	16	42	36
35-44	20	42	49	41	34	40	43
45-64	35	50	42	48	35	42	38
65+	47	41	12	41	16	40	27
25-64	18	39	49	47	31	47	41

* 50 states plus the District of Columbia.

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, one-year estimate for 2013, Table B15001, and 2000 Census, Table PCT025, each obtained from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

college. Arizona underperformed the nation in each age group in the category of some college, ranking among the bottom 11 states in each age group of 35 and older.

In the categories of bachelor's degree and advanced degree, Arizona had lesser shares than the nation in each age group younger than 65 in 2013, but ranked among the bottom 10 states only in the bachelor's degree category in the 25-to-34 age group. The shares rose nationally between 2000 and 2013 except among those 45-to-64 years old with an advanced degree. Arizona underperformed the nation in both categories in each age group 25 and older, ranking among the bottom 11 states in each age group in the bachelor's degree category and nearly as low in the graduate degree category.

Age Groups

Many individuals in the 18-to-24 age group are still enrolled in school, accounting for the lesser attainment than in the older age groups. Relative to the nation, a disproportionately high share of Arizonans in this age group in 2013 had a maximum educational attainment of high school graduate or less, with a below-average share in each of the categories of higher educational attainment. Nationally between 2000 and 2013, attainment rose substantially in this age group,

with lesser percentages not earning a high school diploma and higher shares in the other categories, particularly some college. The share with less than a ninth-grade attainment declined more in Arizona than nationally, likely due to the out-migration of undocumented immigrants due to the implementation of the employer sanctions law and the severity of the recession. This larger decline was offset by a greater gain in those graduating from high school.

In the 25-to-34 age group in 2013, relative to the nation, disproportionately high shares of Arizonans had a maximum educational attainment of less than a bachelor's degree, with below-average shares in the bachelor's degree and advanced degree categories. Nationally between 2000 and 2013, shares fell among those with a high school diploma or less and rose in the associate's degree and higher categories. Arizona did not keep pace with the nation on gains in the bachelor's degree and advanced degree categories, but had larger declines in the share in the two categories with less than a high school diploma.

Relative to the nation in the 35-to-44 age group in 2013, disproportionately high shares of Arizonans had a maximum educational attainment of less than a high school diploma. The share was below average in the high school graduate category and above average in the some college category. Below-average shares had earned at least a bachelor's degree. Nationally between 2000 and 2013, shares fell in the three categories ranging from attended high school without graduating through some college, offset by increases in the associate's degree and higher categories. The changes in educational attainment between 2000 and 2013 in Arizona differed from the nation, with smaller declines in the high school shares, both with and without a diploma, and lesser increases in the shares with at least a bachelor's degree.

A disproportionately high share of Arizonans 45-to-64 years old had a maximum educational attainment of some college relative to the nation in 2013, offset by a below-average share of high school graduates. Somewhat below-average shares in the categories of bachelor's degree or more were offset by above-average shares in the remaining categories. Nationally between 2000 and 2013, shares increased in the associate's and bachelor's degree categories, with decreases in the two categories without a high school diploma. Relative to the nation, improvements in educational attainment in the 45-to-64 age group were lesser in Arizona, lagging behind in each category from some college to graduate degree.

In the 65 and older age group in 2013, relative to the nation, a disproportionately high share of Arizonans had a maximum educational attainment of some college or more, with a below-average share in each of the categories of lesser educational attainment. Nationally between 2000 and 2013, shares fell substantially among those with a high school diploma or less and rose in the other categories, particularly among university graduates. Relative to the nation, the declines in Arizona in the two categories of not a high school graduate were not as large.

HISTORICAL LOOK AT EDUCATIONAL ATTAINMENT BY STATE

Educational attainment data for the population age 25 and older is available from the decennial censuses from 1940 through 2000 by state. Annual figures are available from the ACS for 2005 through 2013. In earlier decades, the national focus was on the share with at least a high school diploma. With increases in educational attainment throughout this time period and the transition of the economy to a higher proportion of jobs that require higher educational attainment, the

focus in recent years has been on the percentage with at least a bachelor's degree. Both attainment measures are displayed in Chart 2.

The state's educational attainment relative to the nation is much different today than the historical norm, when educational attainment in Arizona was higher than the national average. Though attainment in Arizona as a ratio to the national average had already fallen by 1970, the state was still well positioned then, with the percentages with at least a high school diploma and with at least a bachelor's degree well above the national average. Since then, attainment in Arizona has steadily declined relative to the national average. As the share with at least a bachelor's degree, the shift has been significant, with Arizona going from considerably above the nation in 1940 to equal to the nation in 1990 to below the nation since then. Measured as the percentage with at least a high school diploma, Arizona's share went from above average to slightly below the national average in recent years.

Compared to the 50 states and the District of Columbia, the educational attainment of Arizonans 25 and older based on the share with at least a high school diploma ranked between 11th and 17th highest from 1940 through 1980, but the rank dropped to 35th in 2013. In contrast, Arizona's rank among 10 western states (Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Texas, Utah, and Washington) was only seventh or eighth from 1940 through 1980, but was sixth in 2013. Each of the other western states has experienced a decline in its national ranking since 1980.

Based on the share with at least a bachelor's degree, Arizona ranked among the top five states nationally in 1940 and 1950, but the rank dropped to 30th in 2013. Most of the western states have not experienced much of a decline in the national ranking; Arizona's rank among the 10 western states fell from third in 1940 to seventh in 2013.

Based on the percentage with at least a high school diploma, each of the 10 western states has lost ground relative to the nation since 1940, with significant declines in rank in Arizona, California, Nevada, and Texas. In 26 of the other 41 states, the rank has climbed over time, though generally by relatively small amounts.

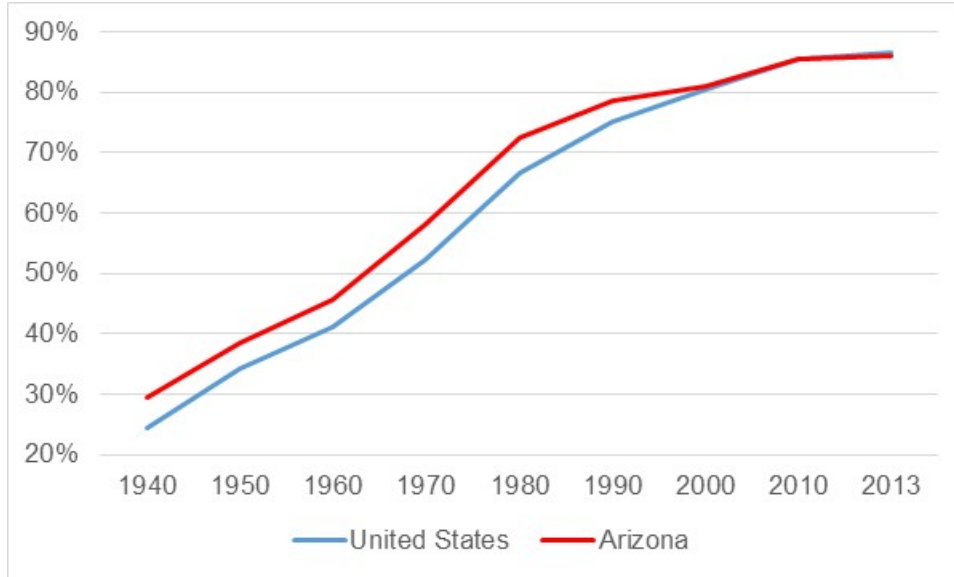
The geographic pattern is more complex based on the percentage with at least a bachelor's degree. The rank has fallen in nine of the 10 western states, though generally not by much. Only Arizona and Nevada have experienced a significant drop. Several other states have had large decreases in rank. Several states along the East Coast have experienced sizable gains in rank, though South Carolina and Florida have seen their rank fall.

Recent Changes Among Those of Workforce Age

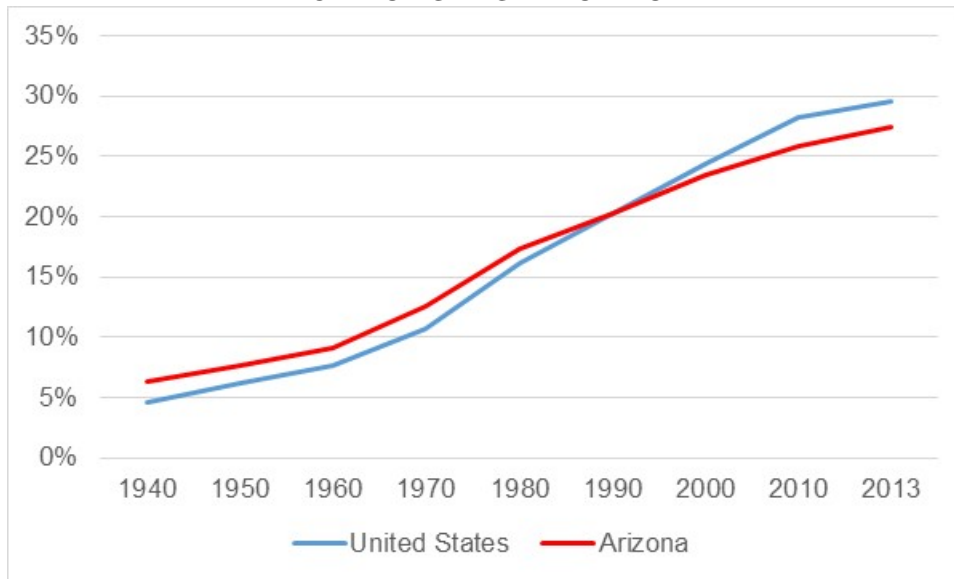
Focusing on recent changes in educational attainment as measured by the share of those 25-to-64 years of age with a university degree, most of the states with the greatest improvement between 2000 and 2013 are located along or near the East Coast, north of Georgia. Particularly large gains occurred in the District of Columbia, New York, Virginia, Massachusetts, and New Jersey. Illinois (ninth) and Minnesota (11th) were the highest ranked states not located near the Atlantic Coast. Among the 10 western states, only Oregon (25th) was ranked in the top half, and only New Mexico (51st) ranked below Arizona (46th).

**CHART 2
EDUCATIONAL ATTAINMENT IN ARIZONA AND THE NATION OVER TIME,
ALL INDIVIDUALS AGE 25 AND OLDER**

HIGH SCHOOL GRADUATES



BACHELOR'S DEGREE OR MORE



Source: U.S. Department of Commerce, Census Bureau, American Community Survey, single-year estimates for 2010 and 2013, Table B15001, obtained from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml> and decennial censuses from 1940 through 2000.

Though the rank of some states based on the change in share with an advanced degree was different from the rank based on the change in share with at least a bachelor's degree, the geographic patterns are similar. Arizona ranked 41st in the change in share with an advanced degree. Among the western states, Nevada, Idaho, and New Mexico had lesser gains.

EDUCATIONAL ATTAINMENT OF THE WORKFORCE BY STATE

The comparison between Arizona and the nation provided in Chart 2 is misleading from the perspective of the workforce and economic development. As was seen in Chart 1, relative to the nation, educational attainment of the population age 25 and older in Arizona is boosted by those of retirement age. Arizona continues to attract highly educated migrants from other states who move after they retire. In contrast, educational attainment as measured by the share with at least a bachelor's degree is considerably below the nation among those 25-to-44 years old in Arizona. The remainder of this paper focuses on the educational attainment of the workforce between the ages of 25 and 64.

In 2013, the share of employed individuals between 25 and 64 years of age who had earned at least a bachelor's degree was 32.1 percent in Arizona, less than the national figure of 35.7 percent. Arizona ranked 33rd nationally and seventh among 10 western states in 2013. The share was significantly above the national figure in several states along the East Coast and in Colorado. Most of the states with the lowest shares are located in the South, but Nevada ranked last.

Nationally, the share of employed individuals between 25 and 64 years of age who had earned at least a bachelor's degree rose 3.2 percentage points between 2005 and 2013, an average of 0.4 percentage points per year. The annual increase was not steady over the eight years, ranging from 0.0 to 1.0, but this variation may in part reflect sampling error. The increase in the share in Arizona was a little smaller at 2.8 percentage points. The year-to-year changes were more volatile than for the nation, ranging from -0.4 to 1.4, illustrating the greater sampling error at the state level. The volatility in the annual figures by state are large enough to affect the interpretation of a state's performance over time if the estimate in 2005 and/or 2013 is out-of-line with the figures for the rest of the time series.

Arizona's change between 2005 and 2013 ranked 39th nationally and sixth among the 10 western states. The greatest increase by far occurred in the District of Columbia (10.6). The other states in the top 10 had gains between 4.1-and-5.2 percentage points. All of the top-10 states are in the eastern half of the country and include four states in the Southeast — Kentucky, Tennessee, North Carolina, and South Carolina — but of this group none had a percentage in 2013 as high as the national average. In contrast, most of the other states experiencing the largest gains had shares above the national average: District of Columbia, Delaware, Illinois, Massachusetts, and Pennsylvania.

The states experiencing the 10 smallest gains in the share are geographically diverse, though no state in the northeastern part of the country is among the bottom 10. Three western states are among the laggards: California, Nevada, and New Mexico. The smallest gains were in Alaska (0.8) and North Dakota (1.0).

In order to be consistent with the subsequent analysis of metro areas, which compare three years of ACS results for 2005-07 to 2011-13, the changes by state also were examined on this basis.

Nationally, the increase was 2.7 percentage points for what is effectively a change over six years. This is less than the 3.2 point change over the eight years between 2005 and 2013. The gain in Arizona was 2.8 points between 2005-07 and 2011-13 and ranked tied for 24th. The correlation across states in the change over time between the annual dataset and the three-year dataset is 0.91.

EDUCATIONAL ATTAINMENT OF THE WORKFORCE BY METROPOLITAN AREA

In order to compare educational attainment across metropolitan areas, three years of ACS data were combined, with the 2011-to-2013 period compared to the 2005-to-2007 period. The analysis focuses on the share with at least a bachelor’s degree among those 25-to-64 years old who were employed.

Currently, 381 metro areas are defined. Their size varies widely. In terms of the number employed between the ages of 25 and 64, values ranged from less than 25,000 to 7.9 million in 2011-13.

Over the 2011-13 period, the share of workers between the ages of 25 and 64 who had earned at least a bachelor’s degree was 35.3 percent nationally. The population-weighted figure for the 381 metro areas was higher at 37.3 percent. However, the median value of the 381 metro areas was only 30.2 percent. The share ranged from 15-to-64 percent across the 381 areas.

The large difference between the median and the population-weighted mean indicates that on average educational attainment is higher in the largest metro areas, as illustrated in Table 4. In

**TABLE 4
POPULATION-WEIGHTED SHARE OF WORKERS 25-TO-64 YEARS OLD
WHO HAVE EARNED AT LEAST A BACHELOR’S DEGREE
BY METROPOLITAN AREA SIZE**

Number of Workers in Metropolitan Area	Number of Metro Areas	Share With at Least a Bachelor’s Degree	
		2011-13	Change from 2005-07 to 2011-13
Total	381	37.3%	2.6
More Than 1 Million	21	41.1	2.9
500,000 to 999,999	20	37.9	3.1
300,000 to 499,999	25	36.5	2.7
200,000 to 299,999	29	33.3	2.3
150,000 to 199,999	29	31.0	2.1
100,000 to 149,999	46	31.8	2.0
50,000 to 99,999	109	30.4	1.7
Less Than 50,000	102	27.0	1.9

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, three-year estimates for 2005-07 and 2011-13, Table B23006, obtained through from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

only 80 of the 381 areas was the share of workers between the ages of 25 and 64 who had earned at least a bachelor's degree greater than the weighted average.

In addition to metro area size, two other basic factors have been identified that are correlated to the share of workers with a university degree:

- A weak geographic relationship is present. Compared to the Pacific region, metro areas in the northeastern part of the country have greater educational attainment after controlling for other factors and metros in the West South Central region have lesser attainment.
- University enrollment¹⁵ as a share of employment has a strong relationship with educational attainment, particularly in metro areas of fewer than 300,000 workers. In these smaller metros, the enrollment share is a strong predictor of the widely variant shares of the workforce with at least a bachelor's degree.

The population-weighted average gain in the share between 2005-07 and 2011-13 was 2.6 percentage points, compared to a national figure of 2.7 points. The median gain in the metro areas was 2.2 points, with a range from a decrease of 4.4 points to an increase of 9.7 points.

The change between 2005-07 and 2011-13 in the share with at least a bachelor's degree also was correlated to size across the nation's 381 metro areas, though this size relationship is not as strong as with the share in 2013. The largest areas posted the greatest average gain.

University enrollment as a share of the number of workers is not related to the change in educational attainment, but the change in the share with at least a bachelor's degree is more closely related to the region than the share itself. The Pacific and West South Central regions had significantly lesser gains in educational attainment than most of the rest of the country after controlling for the other factors. The largest gains were in the Northeast.

A regression analysis with the independent variables of region, enrollment share, and employment size explains 44 percent of the variation across the 381 metro areas in the share of workers 25-to-64 years old with at least a bachelor's degree. This regression specification does not explain a significant portion of the variation in metro areas of at least 300,000 workers, but explains 68 percent of the variation in metro areas with fewer than 50,000 workers. The same independent variables explain just 8 percent of the change in attainment over time, though these results are statistically significant.

Arizona's Metropolitan Areas

Of the seven metro areas in Arizona, the Phoenix-Mesa-Scottsdale area is by far the largest, ranking 12th nationally with nearly 1.6 million workers in 2011-13. Of the 21 metro areas with at least 1 million workers only Riverside-San Bernardino-Ontario and Tampa-St. Petersburg-Clearwater had a lower share with at least a bachelor's degree than the Phoenix metro; its 33.7 percent of workers with at least a bachelor's degree was considerably less than the 41.1 percent average of the 21 metros. Phoenix-Mesa-Scottsdale ranked 39th among the 50 largest metros.

¹⁵ University enrollment by metro area was calculated from enrollment data reported by the U.S. Department of Education, National Center for Education Statistics at <http://nces.ed.gov/collegenavigator/>. Universities with fewer than 1,000 students and institutions that grant some bachelor's degrees but primarily grant associate's degrees were not included.

The Tucson area is the only other sizable metro area in Arizona, with 331,000 workers in 2011-13. Its educational attainment was not as far below the average of metros of similar size: 33.1 percent with at least a bachelor's degree versus 36.5 percent nationally. The below-average shares in the Tucson and Phoenix-Mesa-Scottsdale metro areas are inconsistent with the above-average share of university students relative to the size of the workforce in each metro area.

Among the five much smaller metro areas in Arizona, the share with at least a bachelor's degree was far below the size norm in Yuma and Lake Havasu City-Kingman (which had the lowest share of any metro area) and was below average in Prescott. In contrast, the share was a little above the size average in Sierra Vista-Douglas and considerably above the norm in Flagstaff. The high educational attainment in the Flagstaff metro area is consistent with its much above-average share of university students. In contrast, few university students are present in Arizona's four other small metro areas.

The change between 2005-07 and 2011-13 in the share with at least a bachelor's degree was relatively large in the Phoenix-Mesa-Scottsdale metro area; its gain of 3.6 percentage points was above the size-class average of 2.9. However, among Arizona's other metro areas, only Sierra Vista-Douglas outpaced the size-class average; the Yuma area was close to average. The share hardly changed in the Flagstaff, Lake Havasu City-Kingman, Prescott, and Tucson metro areas, with the change considerably below average.

Metropolitan Areas Nationwide

Most Highly Educated in 2013

Of the 21 metro areas with more than 1 million workers in 2011-13, Washington-Arlington-Alexandria had the highest share of workers between the ages of 25 and 64 with at least a bachelor's degree, at 53.1 percent. In two other metros — Boston-Cambridge-Newton and San Francisco-Oakland-Hayward — the share exceeded 50 percent. The next-highest percentage was 44.6 in Denver-Aurora-Lakewood. Several other areas had a share of at least 40 percent: New York-Newark-Jersey City, Minneapolis-St. Paul-Bloomington, Baltimore-Columbia-Towson, Seattle-Tacoma-Bellevue, Philadelphia-Camden-Wilmington, Chicago-Naperville-Elgin, Atlanta-Sandy Springs-Roswell, and San Diego-Carlsbad. In contrast, the share was only 23.2 percent in Riverside-San Bernardino-Ontario. Other metros with a share of less than 35 percent include Tampa-St. Petersburg-Clearwater, Phoenix-Mesa-Scottsdale, Miami-Ft. Lauderdale-West Palm Beach, and Houston-The Woodlands-Sugar Land.

Compared to the 21 largest metros, a lesser proportion of the next 29 largest metros — those with 415,000 to 934,000 workers — had a share of workers between the ages of 25 and 64 with at least a bachelor's degree of at least 40 percent. However, the percentage was 52.0 in San Jose-Sunnyvale-Santa Clara, 48.8 in Raleigh, and 45.1 in Austin-Round Rock. Hartford-West Hartford-East Hartford and Columbus also had figures of more than 40 percent. Only Las Vegas had a share less than 30 percent (24.8).

Other than the 50 largest metros, a list was made of the 50 metros with the highest shares of workers between the ages of 25 and 64 with a university degree. Some of these metros are relatively small and are known as "university towns." In a couple of these — Ames (Iowa State

University) and Corvallis (Oregon State University) — university enrollment was as large as the workforce between the ages of 25 and 64. Presumably, many of the highly educated workers in such metro areas are employed by a university. Another way to look at the importance of universities is to list the metro areas with the highest shares of highly educated workers relative to their size-class average. All of the leaders on this list are relatively small metro areas with a major university.

In contrast, some of the metro areas on the list of metros with the highest shares of highly educated workers had few if any university students. Rochester, Minnesota, for example, makes the list presumably because it is the home of the Mayo Clinic. Santa Fe, New Mexico is another example, presumably due to its being a state capital and the home of so many artists.

In 10 metro areas other than the 50 largest, the share of workers between the ages of 25 and 64 with at least a bachelor's degree exceeded 50 percent. The highest share was 64 percent in Boulder, home of the University of Colorado. Ann Arbor (the University of Michigan and Eastern Michigan University) was second at 59 percent. Corvallis was third at 56 percent.

Change in Educational Attainment Over Time

Generally, the percentage-point increase between 2005-07 and 2011-13 in the share of workers between the ages of 25 and 64 with at least a bachelor's degree did not vary too widely by metro area. Six years is not a long period in which to expect to see significant differences in this share. Moreover, given the sampling error, one is cautioned not to make too much of apparent differences between metro areas.

Particularly among the 50 largest metros, the range in the percentage-point increase in the share of workers between the ages of 25 and 64 with at least a bachelor's degree was not substantial, from 1.2 percentage points in New Orleans-Metairie to 4.7 in Charlotte-Concord-Gastonia and Nashville-Davidson-Murfreesboro-Franklin. Other large metro areas with a relatively large increase in share included Buffalo-Cheektowaga-Niagara Falls (4.2), Denver-Aurora-Lakewood (4.2), Louisville/Jefferson County (4.1), and Baltimore-Columbia-Towson (4.0). Large metro areas with a relatively small increase in share included Sacramento-Roseville-Arden-Arcade (1.3), Riverside-San Bernardino-Ontario (1.5), Orlando-Kissimmee-Sanford (1.5), San Diego-Carlsbad (1.7), Miami-Fort Lauderdale-West Palm Beach (1.7), and Oklahoma City (1.7).

Of the other 331 metro areas, 12 had an increase between 2005-07 and 2011-13 in the share of workers between the ages of 25 and 64 with at least a bachelor's degree larger than in any of the 50 largest metro areas, and six matched the change in the leading large metro. Most of these 18 metro areas are quite small; sampling error easily could account for the seemingly large increase. Despite the large increase, the share in 2011-13 still was well below average in several of these metro areas. The largest of these metro areas were Winston-Salem and Asheville, each with an increase of 4.8 percentage points.

Comparison to Cleveland State University's Results

For the 40 large metropolitan areas included in the Cleveland State University (CSU) analysis, their results were compared to those from this analysis of the ACS Table B23006 data. Three factors vary between the two analyses:

- The time period. CSU compared 2005 to 2013; the ACS analysis compared 2005-07 to 2011-13. As noted earlier, this difference in time period has only a minor effect on the results. The correlation from the ACS between the annual data and the three-year grouping is 0.91.
- The population subset. CSU focused on workers with an advanced degree while the ACS data are for workers between the ages of 25 and 64 with at least a bachelor's degree. Though the different population subset should reduce the correlation between the CSU and ACS results, conceptually the correlation between the two population subsets should still be relatively high.
- The dataset. The CSU data are from the Current Population Survey, which has a significant survey error even for large metro areas. Survey error could substantially reduce the correlation between the two studies.

No correlation exists between the CSU results and those from the ACS; the correlation coefficient is -0.11.

A second comparison was made between the CSU results and those from the ACS. In this comparison, Table B15001 from the ACS is used. This allows the time period of the two studies to be standardized for 2005 to 2013 and also standardizes the attainment measure to be those with an advanced degree. In addition, in order to be consistent with the CSU study, the geographic definitions of metro areas in earlier years were not modified to be consistent with subsequent changes in delineation. However, Table B15001 includes all people age 25 and older, rather than just those in the workforce.

The correlation between the CSU study and ACS Table B15001 is -0.09, consistent with the first comparison, suggesting that the main difference in results between the analyses in this paper and the CSU analysis is due to the dataset used. While sampling error from the ACS is a concern, the results from this dataset are far more reliable than those from the CPS. The range of the eight-year change in the share with an advanced degree across the 40 largest metro areas supports this conclusion regarding sampling error. In the CSU study, the change ranges from -1.5 to 5.9 percentage points. The range from ACS Table B15001 is only from 0.5 to 3.0. A comparison of the results for the 40 large metro areas reported by CSU is provided in Table 5.

TABLE 5
PERCENTAGE-POINT CHANGE IN EDUCATIONAL ATTAINMENT
IN 40 LARGE METROPOLITAN AREAS

	Change			Rank		
	CSU*	ACS**	ACS^	CSU*	ACS**	ACS^
Washington-Arlington-Alexandria, DC-VA-MD-WV	5.9	2.0	2.4	1	7	32
Providence-Warwick, RI	5.6	1.1	2.7	2	28	28
Indianapolis-Carmel-Anderson, IN	5.5	1.1	3.3	3	29	14
San Francisco-Oakland-Hayward, CA	5.4	1.6	2.0	4	12	35
Cleveland-Elyria, OH	5.3	1.4	3.7	5	21	6
Kansas City, MO-KS	4.6	1.6	2.2	6	13	34
Jacksonville, FL	4.5	0.8	3.2	7	34	18
San Antonio-New Braunfels, TX	3.8	0.7	2.5	8	37	30
Denver-Aurora-Lakewood, CO	3.8	1.6	4.2	9	10	3
Sacramento-Roseville-Arden-Arcade, CA	3.7	1.0	1.3	10	31	40
Detroit-Warren-Dearborn, MI	3.6	1.1	3.2	11	27	17
Minneapolis-St. Paul-Bloomington, MN-WI	3.3	1.5	3.1	12	18	20
Riverside-San Bernardino-Ontario, CA	3.0	0.7	1.5	13	36	39
Pittsburgh, PA	2.9	2.4	3.7	14	3	8
Chicago-Naperville-Elgin, IL-IN-WI	2.8	1.5	3.7	15	16	7
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	2.7	1.5	3.7	16	17	9
Charlotte-Concord-Gastonia, NC-SC	2.5	1.3	4.7	17	25	1
Orlando-Kissimmee-Sanford, FL	2.5	0.5	1.5	18	40	38
Boston-Cambridge-Newton, MA-NH	2.4	2.0	3.3	19	6	13
Seattle-Tacoma-Bellevue, WA	2.4	1.9	3.0	20	8	22
Phoenix-Mesa-Scottsdale, AZ	2.3	1.3	3.6	21	24	12
Milwaukee-Waukesha-West Allis, WI	1.6	1.5	3.1	22	19	19
Las Vegas-Henderson-Paradise, NV	1.5	0.9	2.3	23	32	33
Portland-Vancouver-Hillsboro, OR-WA	1.5	1.7	3.6	24	9	10
New York-Newark-Jersey City, NY-NJ-PA	1.4	1.3	2.7	25	23	27
Columbus, OH	1.4	0.8	3.2	26	33	15
St. Louis, MO-IL	1.3	2.2	3.6	27	4	11
Dallas-Fort Worth-Arlington, TX	1.3	1.5	2.9	28	20	23
Baltimore-Columbia-Towson, MD	1.2	2.6	4.0	29	2	4
Virginia Beach-Norfolk-Newport News, VA-NC	1.0	1.1	2.7	30	30	26
Houston-The Woodlands-Sugar Land, TX	1.0	1.6	2.9	31	14	24
Miami-Fort Lauderdale-West Palm Beach, FL	0.9	0.6	1.7	32	38	37
San Diego-Carlsbad, CA	0.8	0.5	1.7	33	39	36
Los Angeles-Long Beach-Anaheim, CA	0.7	0.8	2.5	34	35	31
San Jose-Sunnyvale-Santa Clara, CA	0.2	3.0	3.2	35	1	16
Nashville-Davidson-Murfreesboro-Franklin, TN	-0.3	1.6	4.7	36	11	2
Atlanta-Sandy Springs-Roswell, GA	-0.7	1.2	3.0	37	26	21
Cincinnati, OH-KY-IN	-1.0	2.1	3.8	38	5	5
Tampa-St. Petersburg-Clearwater, FL	-1.3	1.6	2.6	39	15	29
Austin-Round Rock, TX	-1.6	1.4	2.8	40	22	25

* Workers with an advanced degree, 2005 to 2013.

** Population 25 and older with an advanced degree, 2005 to 2013.

^ Workers between 25-and-64 years old with at least a bachelor's degree, 2005-07 to 2011-13; modifications to metropolitan area delineations included.

Sources: Cleveland State University, Center for Population Dynamics, "A Newer Geography of Jobs: Where Workers With Advanced Degrees Are Concentrating the Fastest," September 2014, http://urban.csuohio.edu/cpd/reports_and_blogs; and U.S. Department of Commerce, Census Bureau, American Community Survey, three-year estimates for 2005-07 and 2011-13, Table B23006, and one-year estimates for 2005 through 2013, Table B15001, obtained through from American FactFinder, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.