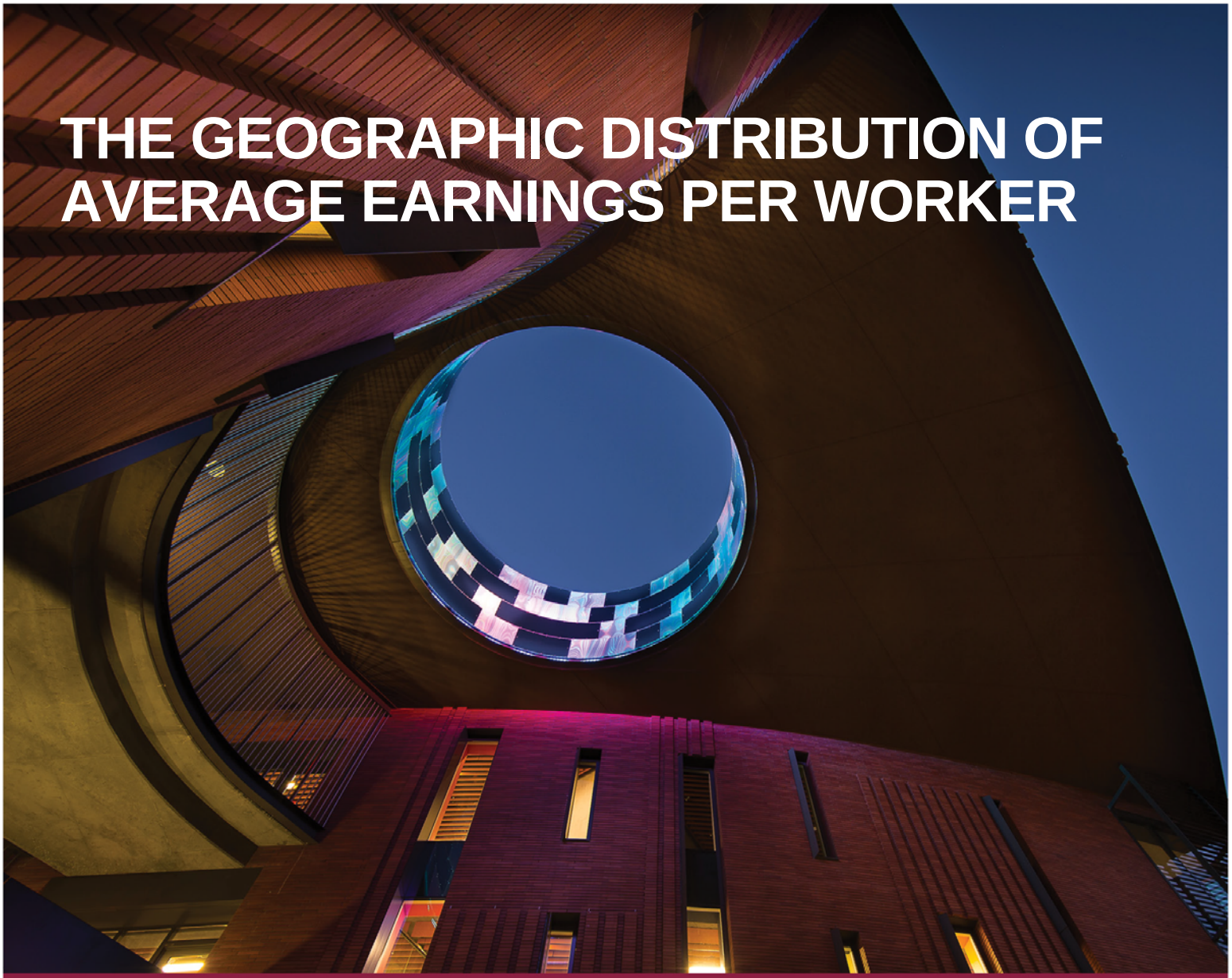
THE GEOGRAPHIC DISTRIBUTION OF AVERAGE EARNINGS PER WORKER



May 2017

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P3 | PRODUCTIVITY AND PROSPERITY PROJECT

ASU W. P. CAREY SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

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A Report from the Productivity and Prosperity Project (P3), Supported by the Office of the University Economist

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SUMMARY

Average earnings per worker varies widely across the nation's metropolitan areas. This variation largely reflects geographic differences in the cost of living, job quality, and metro area size, each of which is positively correlated to average earnings per worker. After adjusting for each of these factors, the variation in average earnings per worker across metro areas is greatly reduced. Based on occupational earnings data, the relationship with metro area size disappears, but based on industrial earnings data, some relationship remains. A slight relationship between adjusted earnings per worker and geographic region also is present. Adjusted earnings per worker is lowest in the Rocky Mountain region and highest in the Great Lakes region.

Certain unmeasured factors, including productivity and demographic characteristics of the workforce, account for some of the variation in average earnings per worker that remains after adjusting for living costs, the job mix, and metro size. If these other factors could be measured and also used to adjust average earnings per worker, then any remaining variation would reflect labor force supply and demand conditions. Metro areas that receive net in-migration for other than economic reasons, such as climate and lifestyle, effectively have a disproportionately large labor force supply that puts downward pressure on earnings per worker. For example, metro areas in some parts of the country, such as in much of the Rocky Mountain region, disproportionately attract workers from other regions. This effectively increases the supply of labor in these labor markets, even though some of the supply may not yet be physically located in the labor market. A large supply of labor in desirable regions reduces earnings per worker — workers are willing to accept lower earnings than they would in other labor markets in exchange for perceived nonpecuniary quality-of-place benefits, such as climate or lifestyle.

For example, the popularity of Arizona as a destination for migrants is largely responsible for the state's average earnings per worker being below the U.S. average even after adjusting for the cost of living and the job mix. Unadjusted average earnings per worker in Arizona in 2015 was 10.5 percent below the national figure based on industrial data and 6.8 percent below the U.S. average based on occupational data. Adjusting for both cost of living and job mix, average industrial earnings per worker still was 6.6 percent below the national figure and average occupational earnings per worker was 3.8 percent below the norm in Arizona.

Adjusting for the cost of living, job mix, and metropolitan area size, six of Arizona's seven metro areas ranked far below the median metro area on average earnings per worker, based on both the industrial and occupational data. Metro Sierra Vista was the exception, with adjusted earnings per worker slightly above average and ranking above the middle of the nation's metro areas based on both the occupational data and the industrial data. Based on the average of the industrial and occupational data, adjusted earnings per worker in Metro Sierra Vista ranked 159th among the nation's 381 metro areas at 1.1 percent above average. Within Arizona, Metro Phoenix was next highest, but ranked 321st at 5.1 percent below average. Metro Yuma was next at 336th and 6.0 percent below average. The state's other four metro areas ranked between 356th and 374th, from 7.2-to-10.1 percent below average.

INTRODUCTION

For an individual, "earnings" is defined as the sum of wages and salaries received plus self-employment income. Average earnings per worker is calculated as the total earnings of all workers divided by the number of workers (the sum of the number of wage and salary employees and the number of people self-employed).

In this paper, average earnings per worker is analyzed by metropolitan area and by state. As in many economic analyses, metropolitan areas are the preferred geographic unit of measure. Earnings per worker are determined primarily by conditions in labor markets, such as supply and demand and the cost of living. Within any state, such conditions vary from one labor market to another. Labor markets essentially are synonymous with metropolitan areas. However, state policies also can have an effect on earnings. For example, some states have a minimum wage higher than the federal figure.

Multiple sources of earnings data are available for states and metropolitan areas, but figures for all industries or all occupations are not available from public sources. Instead, estimates made by Economic Modeling Specialists International (Emsi) were used for this report.[1] The earnings per worker data by industry and by occupation come directly from Emsi; in addition, earnings per worker and employment data from Emsi were used to calculate job quality, which is correlated to earnings per worker. [2] Data for 2015 were obtained from Emsi since the source data used by Emsi to create its estimates for 2016 are incomplete and subject to revision.

Two sets of earnings data are available from Emsi: annual earnings per worker by industry and hourly earnings per worker by occupation. The primary source of the industrial data is the Quarterly Census of Employment and Wages (QCEW), produced by the U.S. Department of Labor's Bureau of Labor Statistics (BLS). The QCEW includes wage and salary employees who are covered by the unemployment insurance program. Each quarter, employers report actual wages paid and the number of employees. Limitations of the QCEW data include no indication of the part-time/full-time status of employees, incomplete coverage of wage and salary employees, and no coverage of the self-employed. Emsi estimates employment and earnings for workers not included in the QCEW and provides estimates of QCEW data that are withheld from publication due to the federal disclosure laws. For most metropolitan areas, employment and/or earnings are not disclosed for a substantial number of industries.

The primary source of the occupational data is the Occupational Employment Statistics (OES) program of the BLS. Data on employment and hourly wages by occupation are reported annually for states and metropolitan areas; the reporting of the hourly wage removes the issue of part-time/full-time employment. However, the OES data are subject to serious limitations. Since the data are derived from a survey of employers, sampling error is a concern. Further, the survey

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[1] The data from Emsi are described on pages 9-10 of the March 2017 report from the Office of the University Economist, "Job Quality in 2015 and the Change in Job Quality Between 2001 and 2015," https://wpcarey.asu.edu/sites/default/files/jobquality03-17.pdf. The fourth category of workers provided by Emsi — individuals with earnings from self-employment, but whose self-employment does not make up the majority of their earnings or time spent at work — was not included in the dataset used to generate this report on earnings per worker.

[2] In order to measure job quality accurately, complete data are required by industry and occupation. Job quality is the average of the industrial mix value and the occupational mix value.

instructs employers to report the number of employees in each occupation by wage range rather than report actual wages. In addition, the survey is conducted over a three-year period — two-thirds of the responses used for the 2016 data release were collected before 2016 (the wage data from the earlier periods was adjusted for inflation). As with the industrial data, Emsi must estimate employment and earnings for workers not covered by the OES survey and for the substantial number of OES occupations in most metro areas for which employment and/or earnings data are withheld from publication.

Because of the limitations to the industrial and occupational data, average earnings per worker by state and metropolitan area relative to the national average differs slightly between the industrial and occupational datasets. Whether measured by industry or by occupation, average earnings per worker varies widely across states and metropolitan areas.

Among the factors responsible for the variation across metropolitan areas in average earnings per worker, three are of considerable importance and can be measured:

- Cost of living. The cost of living varies by metropolitan area size and by region of the country. It ranges widely across the nation's metro areas. Variations across metro areas in average earnings per worker in part reflect the cost of living. Historically, comprehensive and consistent estimates of the cost of living by state or metro area were not available. Such estimates — called "regional price parities" (RPPs) — now are available from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA) for states, metropolitan areas, and the nonmetropolitan portion of each state. Annual estimates are available for 2008 through 2014 — the RPPs for 2014 were used to adjust the 2015 average earnings by worker data.[3]
- Job quality. Job quality — the average of the industrial job mix and the occupational job mix — also varies by metropolitan area, with the size of the metro area having a strong relationship with job quality. Average earnings per worker is highly related to the industrial job mix and the occupational job mix. Estimates of job quality recently became available for states and metropolitan areas.[4] The 2015 estimates of the industrial mix value were used to adjust the 2015 average industrial earnings by worker data. The occupational mix value was used to adjust average occupational earnings by worker data.
- Metropolitan area size. Employment was used as the measure of metro area size; it is related to the cost of living, job quality, and average earnings per worker.

At the state level, cost of living and job quality were used to adjust the earnings per worker data. Size is not directly relevant to the state adjustment, but the variation across states in average earnings per worker adjusted for the cost of living and job quality reflect the distribution of metropolitan areas by size within a state.

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[3] The RPP data are available at https://www.bea.gov/regional/index.htm. For a discussion of the regional price parities, see the August 2014 report from the Office of the University Economist, "Measures of Prosperity and Productivity Adjusted for the Cost of Living," http://wpcarey.asu.edu/sites/default/files/prosperitycol8-14.pdf.

[4] Job quality and the job mixes are described in the March 2017 report from the Office of the University Economist, "Job Quality in 2015 and the Change in Job Quality Between 2001 and 2015," https://wpcarey.asu.edu/sites/default/files/jobquality03-17.pdf. Job quality for all metropolitan areas is provided in the May 2017 report from the Office of the University Economist, "Job Quality in the Metropolitan Areas of the United States," https://wpcarey.asu.edu/sites/default/files/jobquality05-17.pdf.

For the nation's 381 metropolitan areas, the cost of living was highly correlated with average earnings per worker (0.67 with earnings determined from industrial data and 0.74 with occupational data).[5] Job quality was similarly correlated with earnings per worker (0.78 industrially and 0.75 occupationally). Size as measured by employment was moderately correlated with earnings per worker (0.51 industrially and 0.48 occupationally) and with the cost of living (0.45). The correlation between size and job quality was 0.35; the correlation between job quality and the cost of living was 0.31.

A number of other factors also influence the average earnings per worker figures by state and metropolitan area. For example, productivity is positively associated with average earnings per worker, but estimates of productivity are not available by state or metro area. Presumably, much but not all of the geographic variation in productivity is captured in the job quality estimate. A variety of demographic factors also may have an effect on average earnings per worker. For example, earnings rise with age (actually, with the length of time in the workforce); even within a specific occupation, the average number of years of work experience may vary geographically. Earnings may also differ based on other characteristics, such as sex. Average earnings per worker conceptually could be adjusted for some demographic variations in the workforce using demographic data from the American Community Survey (ACS). However, given the magnitude of sampling error in the ACS for subpopulations (such as female Hispanics between 25 and 34 years old) at the metro level and the amount of effort required to adjust for demographic differences in every metro area, such an adjustment is not feasible.

If it were possible to control for productivity and demographic factors as well as the cost of living, job mix, and metropolitan area size, adjusted average earnings per worker still would vary geographically based on the supply and demand for labor. For example, labor markets in some parts of the country, such as in much of the Rocky Mountain region, disproportionately attract workers from other regions. This effectively increases the supply of labor in these labor markets, even though some of the supply may not yet be physically located in the labor market. A large supply of labor in desirable regions reduces earnings per worker — workers are willing to accept lower earnings than they would in other labor markets in exchange for perceived nonpecuniary quality-of-place benefits, such as climate or lifestyle.

In this report, average earnings per worker by state is measured in four ways: unadjusted, adjusted for the cost of living, adjusted for the job mix, and adjusted for both the job mix and the cost of living. For metropolitan areas, each of these measures are compared to size-class averages.

[5] The 381 metropolitan areas are as officially defined in 2013 based on 2010 decennial census data. In this report, abbreviated versions of the official names of metro areas are used.

METROPOLITAN AREAS

The nation's 381 metropolitan areas were grouped into five size classes based on the number of workers. As seen in Table 1, a significant relationship existed in 2015 between metro size and unadjusted average earnings per worker — as calculated from the industrial data and from the occupational data. The range across the size classes was greater in the industrial data than the occupational data. Average earnings per worker in 2015 (industrially or occupationally) was above the national average only in the largest size class. The size-class average for earnings per worker declined with decreasing metro size.

Adjusting average earnings per worker by either the cost of living or the job mix reduced the differences between the size-class averages, but large variations remained. In contrast, adjusting for both factors eliminated the relationship between metropolitan area size and average earnings per worker based on the occupational data, though some variation remained in the industrial data.

Across the 381 metropolitan areas, unadjusted average earnings per worker based on the 2015 industrial data had a range of $86,870, from a low of $37,986 to a high of $124,856. Adjusting average earnings per worker by the cost of living and by the job mix, the range across the 381 metro areas was just one-third as much, from $46,924 to $75,610.

Using the occupational data, the range across the 381 metropolitan areas in unadjusted average earnings per worker — from $16.10 to $35.99 — was not as wide as in the industrial data. After adjusting for both the cost of living and the job mix, the range in the occupational data was from $18.89 to $29.17.

TABLE 1
AVERAGE EARNINGS PER WORKER BY METROPOLITAN AREA SIZE CLASS IN 2015, EXPRESSED AS THE PERCENT DIFFERENCE FROM THE U.S. AVERAGE

Employment Size Class	Unadjusted	Adjusted for Cost of Living	Adjusted for Job Mix	Adjusted for Both Factors
Industrial Data				
1 Million or More	9.0%	5.3%	4.6%	1.4%
350,000 to 999,999	-6.7	-4.0	-5.8	-3.0
200,000 to 349,999	-12.7	-9.3	-9.6	-6.1
100,000 to 199,999	-16.2	-11.0	-11.0	-6.4
Less Than 100,000	-20.8	-13.5	-14.7	-6.9
Occupational Data				
1 Million or More	7.0	3.8	3.0	0.2
350,000 to 999,999	-4.3	-1.3	-4.0	-0.9
200,000 to 349,999	-7.5	-3.8	-5.0	-1.2
100,000 to 199,999	-10.8	-5.4	-5.4	-0.7
Less Than 100,000	-14.5	-6.6	-8.6	-0.1

Source: Center for Competitiveness and Prosperity Research, L. William Seidman Research Institute, W. P. Carey School of Business, Arizona State University from data supplied by Economic Modeling Specialists International (Emsi), www.economicmodeling.com. The cost of living (regional price parity) is from the U.S. Department of Commerce, Bureau of Economic Analysis — the latest estimates for 2014 were used to adjust the 2015 earnings data.

The correlation across the 381 metropolitan areas in unadjusted average earnings per worker calculated from the industrial data and calculated from the occupational data on was 0.92. The correlations were only slightly lower after adjusting for either the cost of living or the job mix, but after adjusting for both factors, average earnings per worker based on the industrial data had a correlation of only 0.56 with the occupational data. The adjustments had a greater impact on average earnings per worker calculated from the occupational data than from the industrial data.

Average industrial earnings per worker adjusted for both the cost of living and the job mix was moderately correlated (0.30) to metropolitan area size, as measured by employment. There was no correlation among metro areas with employment of less than 350,000, but as metro size increased above 350,000, adjusted average industrial earnings per worker also rose. In contrast, adjusted average occupational earnings per worker was not correlated (-0.03) to metro area size.

After adjusting for the cost of living, the job mix, and the size-class average, most of the metropolitan areas with the highest average earnings per worker, measured as the average of the industrial and occupational data, are relatively small, with Hanford, California; Burlington, North Carolina; and California-Lexington Park, Maryland the highest, each at least 13 percent above average. Of the more-populous metro areas, the San Jose metro area ranked fourth at 12.5 percent above average. Other metro areas in the largest size class with high ranks included Cleveland at 27th and Houston at 28th. Two Connecticut metro areas in the second size class (Bridgeport and Hartford) ranked in the top 20.

The metropolitan areas with the lowest adjusted average earnings per worker figures ranged from small to large in size. Based on the average of the industrial and occupational data, Honolulu had the lowest figure at 15 percent below average. Three metro areas in Utah — St. George, Provo, and Logan — were next lowest. Miami and Tampa, each with more than 1 million workers, were among the bottom 10. Other large metro areas with low figures included Orlando and three Southern California metros: San Diego, Los Angeles, and Riverside.

The metropolitan areas were grouped into eight geographic regions. Average earnings per worker adjusted for the cost of living, the job mix, and metro area size were lower in the Rocky Mountain region, with a correlation of -0.33 with the industrial data and -0.31 with the occupational data. Correlations in other regions were weaker, with the Great Lakes region having the highest adjusted average earnings per worker.

STATES

Across the 50 states, unadjusted average earnings per worker based on the 2015 industrial data had a range of $35,027, from a low of $44,539 (27.7 percent less than the national figure of $61,586) in Mississippi to a high of $79,566 (29.2 percent higher than the nation) in New York. The figure for the District of Columbia was considerably higher at $108,271 (75.8 percent above the nation). Adjusting average earnings per worker by the cost of living and by the industrial job mix greatly reduced the range across the states. After adjusting for both factors, the range was just 44 percent as much, from $51,702 (16.0 percent below the nation) in Idaho to $66,968 (8.7 percent above the nation) in Massachusetts. The figure was higher in the District of Columbia at $72,818.

Using the occupational data, the range across the states in unadjusted average earnings per worker — from $18.35 in Arkansas (19.3 percent less than the national figure of $22.75) to $27.60 in Massachusetts (21.3 percent above the nation) — was not as wide as in the industrial data. The figure for the District of Columbia was considerably higher at $37.44. After adjusting for both the cost of living and the occupational job mix, the range in occupational average earnings per worker was from $19.89 in Hawaii (12.6 percent below the nation) to $24.52 in North Dakota (7.8 percent above average).

The adjustments to the industrial and occupational earnings data narrow the range across the states in average earnings per worker and substantially change the relative ranking of many of the states. However, a geographic pattern is not present in the adjusted earnings figures, suggesting that the distribution of metropolitan areas by size and/or unmeasured factors such as worker demographics and productivity are causing variations by state even within a region. The unadjusted and adjusted average earnings per worker figures, expressed relative to the national average, are shown in Table 2 for each state.

Unadjusted average industrial earnings per worker and unadjusted average occupational earnings per worker were highly correlated (0.98) across the states. The correlation did not drop much after adjusting for either the cost of living or the job mix, but fell to 0.63 after adjusting for both factors. The adjustments had a greater impact on average earnings per worker calculated from the occupational data than from the industrial data.

Both before and after adjustment, the variation across the states in average occupational earnings per worker was less than in average industrial earnings per worker. In most states, the ratio to the national average was higher based on the occupational data than on the industrial data, both before and after adjustment.

TABLE 2
AVERAGE EARNINGS PER WORKER BY STATE IN 2015, EXPRESSED AS THE PERCENT DIFFERENCE FROM THE U.S. AVERAGE

	Industrial Data				Occupational Data			
	Unadjusted	Adjusted for Cost of Living	Adjusted for Job Mix	Adjusted for Both Factors	Unadjusted	Adjusted for Cost of Living	Adjusted for Job Mix	Adjusted for Both Factors
Alabama	-16.2%	-12.5%	-4.6%	-0.4%	-14.9%	-9.0%	-3.0%	3.6%
Alaska	8.4	12.7	2.6	6.6	6.4	12.1	0.6	6.1
Arizona	-10.5	-6.8	-7.2	-3.3	-9.9	-7.2	-6.6	-3.8
Arkansas	-22.7	-19.3	-11.6	-7.8	-19.4	-15.9	-7.9	-3.9
California	15.4	11.6	2.7	-0.7	15.2	9.4	2.5	-2.6
Colorado	-2.0	4.4	-4.0	2.3	-4.2	1.1	-6.1	-0.9
Connecticut	22.0	15.4	12.1	6.1	17.2	9.4	7.8	0.5
Delaware	3.6	3.3	1.6	1.4	-0.9	1.9	-2.8	0.0
District of Columbia	75.8	64.6	48.9	39.3	39.6	24.4	18.2	5.3
Florida	-12.8	-11.3	-12.0	-10.4	-7.8	-7.5	-7.0	-6.7
Georgia	-6.6	-6.2	1.5	2.0	-7.0	-7.0	1.1	1.1
Hawaii	-6.6	-2.4	-20.0	-16.5	3.0	2.1	-11.8	-12.6
Idaho	-25.7	-16.0	-20.5	-10.1	-21.6	-13.1	-16.0	-7.0
Illinois	6.4	3.5	5.6	2.8	4.9	0.8	4.2	0.1
Indiana	-16.2	-11.8	-8.3	-3.5	-13.3	-8.0	-5.1	0.7
Iowa	-16.1	-12.8	-7.1	-3.5	-12.4	-9.0	-2.9	0.8
Kansas	-16.1	-11.2	-7.5	-2.1	-16.2	-8.9	-7.6	0.4
Kentucky	-15.8	-14.5	-5.1	-3.7	-12.9	-10.7	-1.8	0.7
Louisiana	-13.4	-13.9	-5.2	-5.8	-13.0	-10.5	-4.8	-2.1
Maine	-20.4	-10.7	-18.0	-8.1	-14.8	-9.2	-12.3	-6.5
Maryland	9.8	13.7	-0.4	3.1	6.1	6.8	-3.8	-3.2
Massachusetts	22.8	21.3	14.7	13.3	16.5	11.0	8.7	3.6
Michigan	-4.8	-4.3	1.1	1.7	-3.5	-4.4	2.5	1.5
Minnesota	-0.9	2.8	1.6	5.3	-2.2	1.3	0.2	3.8
Mississippi	-27.7	-18.3	-16.6	-5.8	-22.8	-13.2	-10.9	0.2
Missouri	-12.8	-9.5	-2.5	1.2	-12.0	-7.9	-1.6	3.1
Montana	-23.8	-15.9	-19.1	-10.7	-18.3	-11.2	-13.3	-5.8
Nebraska	-17.9	-12.0	-9.4	-2.8	-15.5	-9.0	-6.8	0.5

(continued)

TABLE 2 (continued)
AVERAGE EARNINGS PER WORKER BY STATE IN 2015,
EXPRESSED AS THE PERCENT DIFFERENCE FROM THE U.S. AVERAGE

	Industrial Data				Occupational Data			
	Unadjusted	Adjusted for Cost of Living	Adjusted for Job Mix	Adjusted for Both Factors	Unadjusted	Adjusted for Cost of Living	Adjusted for Job Mix	Adjusted for Both Factors
Nevada	-9.5%	-10.0%	-7.4%	-7.9%	1.8%	-0.3%	4.2%	2.0%
New Hampshire	0.7	1.6	-4.3	-3.4	1.1	0.8	-3.9	-4.1
New Jersey	17.7	17.1	2.8	2.3	14.6	14.3	0.1	-0.2
New Mexico	-18.3	-10.4	-14.1	-5.7	-18.1	-9.0	-13.8	-4.2
New York	29.2	15.8	11.7	0.1	24.9	12.6	8.0	-2.7
North Carolina	-11.9	-7.9	-3.9	0.5	-10.5	-5.4	-2.4	3.2
North Dakota	-8.8	-5.9	-0.4	2.9	-9.3	-1.4	-0.9	7.8
Ohio	-9.4	-6.9	1.4	4.2	-8.9	-5.9	2.1	5.3
Oklahoma	-16.3	-12.5	-7.1	-2.9	-17.8	-12.0	-8.8	-2.4
Oregon	-8.6	-2.8	-7.7	-1.8	-5.6	-1.9	-4.7	-1.0
Pennsylvania	0.5	-1.7	2.3	0.1	0.7	0.0	2.6	1.8
Rhode Island	-3.5	5.1	-2.2	6.5	-2.7	3.6	-1.5	5.0
South Carolina	-19.3	-13.4	-10.8	-4.3	-14.9	-9.4	-5.9	0.1
South Dakota	-22.8	-18.2	-12.3	-7.1	-18.6	-11.8	-7.5	0.3
Tennessee	-12.8	-13.0	-3.3	-3.6	-9.0	-10.1	0.9	-0.4
Texas	-0.3	-3.1	3.2	0.3	-2.5	-1.5	0.9	2.0
Utah	-14.6	-8.1	-12.0	-5.2	-17.0	-9.1	-14.4	-6.3
Vermont	-16.0	-5.2	-17.0	-6.4	-11.2	-3.3	-12.2	-4.5
Virginia	2.9	8.4	0.3	5.6	-0.5	4.9	-3.0	2.3
Washington	7.6	9.7	3.7	5.7	4.5	7.4	0.6	3.4
West Virginia	-19.3	-16.0	-9.2	-5.5	-19.2	-12.7	-9.2	-1.8
Wisconsin	-11.8	-8.4	-5.5	-2.0	-9.6	-5.0	-3.2	1.8
Wyoming	-10.3	-5.1	-6.8	-1.3	-11.7	-1.7	-8.2	2.2

Source: Center for Competitiveness and Prosperity Research, L. William Seidman Research Institute, W. P. Carey School of Business, Arizona State University from data supplied by Economic Modeling Specialists International (Emsi), www.economicmodeling.com. The cost of living (regional price parity) is from the U.S. Department of Commerce, Bureau of Economic Analysis — the latest estimates for 2014 were used to adjust the 2015 earnings data.

ARIZONA AND ITS METROPOLITAN AREAS

Unadjusted average earnings per worker in Arizona in 2015 was $55,123 based on the industrial data — 10.5 percent below the U.S. average — and $21.21 per hour based on the occupational data, 6.8 percent below average. Since the state's cost of living was 3.6 percent below average, the cost-of-living adjustment narrowed the differential from the national average to 7.2 percent based on the industrial data and 3.3 percent based on the occupational data. Arizona's job mix was similar to the national average — 0.6 percent lower industrially and 0.5 percent higher occupationally — so adjusting for job quality had only a little effect on the degree to which the state's average earnings per worker figures were below average. Adjusting for both the cost of living and the job mix, average industrial earnings per worker was 6.6 percent below average and average occupational earnings per worker was 3.8 percent below average.

Arizona's metropolitan areas vary greatly by size. Employment in 2015 was 2.06 million in the Phoenix area and approximately 409,000 in the Tucson area. In each of the other five metro areas, employment was considerably less than 100,000: about 75,000 in the Yuma area, about 71,000 in the Prescott area, about 68,000 in the Flagstaff area, about 54,000 in the Lake Havasu City-Kingman area, and about 44,000 in the Sierra Vista-Douglas area.

Before any adjustment, average industrial earnings per worker in 2015 varied by 38 percent across Arizona's seven metropolitan areas, from $57,464 in Metro Phoenix to $41,703 in Metro Lake Havasu City. At 25 percent, the range was less for average occupational earnings per worker (from $21.92 in Metro Phoenix to $17.53 in Metro Yuma). Since the cost of living in Arizona's metro areas varies only from 2.1-to-9.3 percent below average, the cost-of-living adjustment did not substantially reduce the range of average earnings per worker across the seven metro areas. In contrast, since both the industrial and occupational job mixes vary more widely across the metro areas, the adjustment for the job mix more substantially reduced the range in earnings per worker. After making both adjustments, the range across the seven metro areas was 15 percent on average industrial earnings per worker and 11 percent on average occupational earnings per worker.

After making adjustments for the cost of living and the job mix, some of the remaining range in average earnings per worker across the metropolitan areas is due to the relationship between metro area size and average earnings per worker. In Metro Phoenix, for example, average industrial earnings per worker was nearly the highest in the state, but the Phoenix area's difference from the size-class average was in the middle of the seven metro areas (see Table 3).

The nation's 381 metro areas were ranked on average earnings per worker (both industrially and occupationally) relative to the size-class average, adjusted for the cost of living and the job mix. Of Arizona's seven metro areas, Metro Sierra Vista ranked highest, at 144th on average industrial earnings per worker, 179th on the occupational measure, and 159th on the average of the two measures.

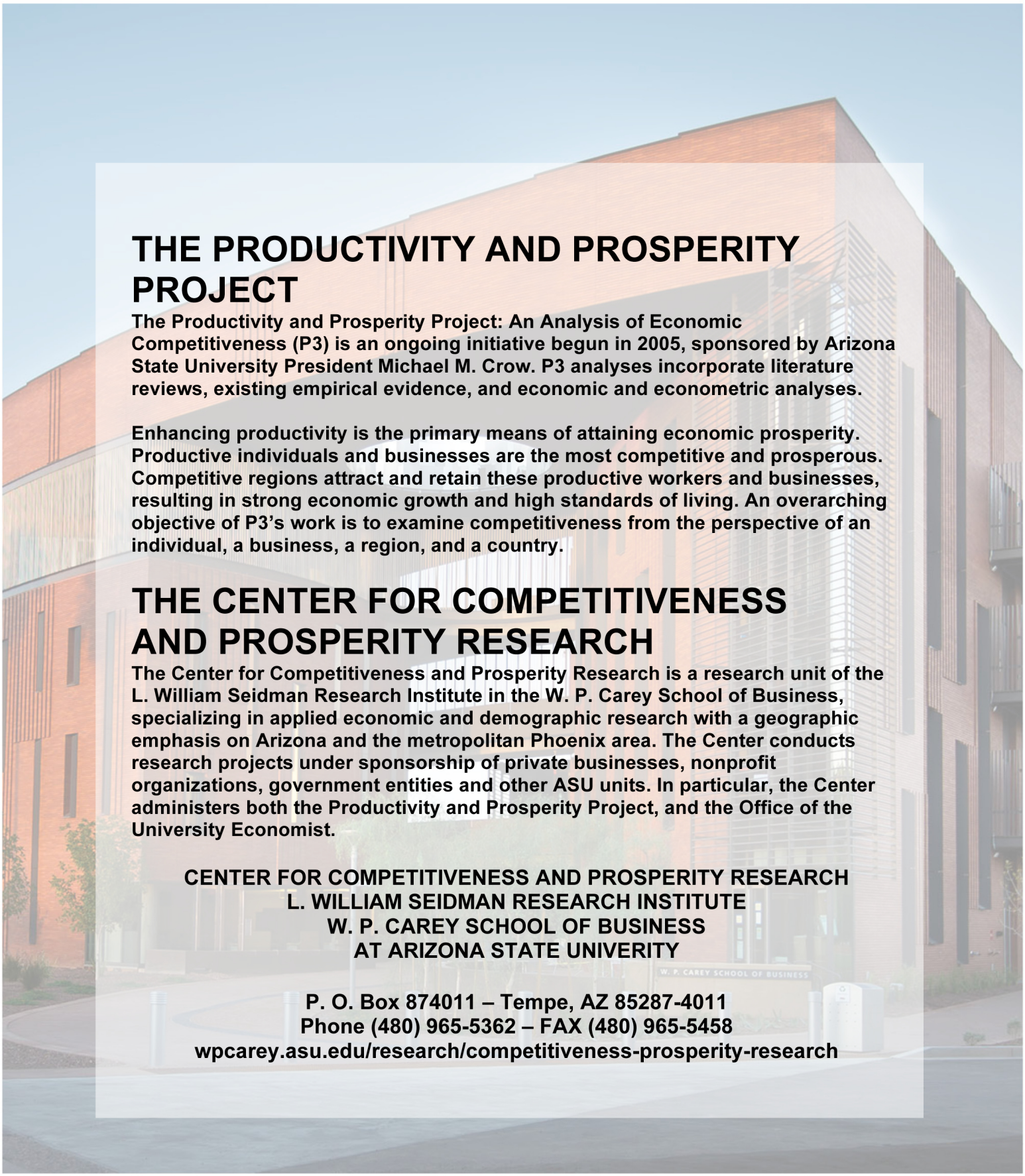
Each of Arizona's other metropolitan areas ranked below 300th both industrially and occupationally. Based on the industrial data, Metro Flagstaff ranked highest at 311th and Metro Tucson was lowest at 371st. Based on the occupational data, Metro Phoenix ranked highest at 305th and Metro Lake Havasu City was lowest at 370th. Averaging the industrial and

TABLE 3
AVERAGE EARNINGS PER WORKER IN ARIZONA'S METRO AREAS IN 2015

Metropolitan Area	Unadjusted	Adjusted for Cost of Living	Adjusted for Job Mix	Adjusted for Both Factors
		DOLLARS		
Industrial Data (Annual Earnings)				
Phoenix	$57,464	$58,817	$56,929	$58,269
Tucson	50,193	51,692	51,390	52,924
Yuma	43,601	46,732	50,434	54,056
Prescott	41,905	43,926	48,632	50,977
Flagstaff	48,239	49,274	52,984	54,121
Lake Havasu City	41,703	44,554	48,861	52,202
Sierra Vista	52,612	58,007	52,956	58,386
Occupational Data (Hourly Earnings)				
Phoenix	$21.92	$22.44	$21.49	$21.99
Tucson	19.98	20.58	20.24	20.85
Yuma	17.53	18.79	19.89	21.32
Prescott	18.43	19.32	19.67	20.62
Flagstaff	19.48	19.90	20.30	20.74
Lake Havasu City	17.56	18.76	19.27	20.58
Sierra Vista	21.09	23.25	20.71	22.83
		PERCENT DIFFERENCE FROM U.S. AVERAGE		
Industrial Data				
Phoenix	-6.7%	-4.5%	-7.6%	-5.4%
Tucson	-18.5	-16.1	-16.6	-14.1
Yuma	-29.2	-24.1	-18.1	-12.2
Prescott	-32.0	-28.7	-21.0	-17.2
Flagstaff	-21.7	-20.0	-14.0	-12.1
Lake Havasu City	-32.3	-27.7	-20.7	-15.2
Sierra Vista	-14.6	-5.8	-14.0	-5.2
Occupational Data				
Phoenix	-3.6%	-1.4%	-5.5%	-3.3%
Tucson	-12.2	-9.5	-11.0	-8.3
Yuma	-22.9	-17.4	-12.6	-6.3
Prescott	-19.0	-15.1	-13.5	-9.3
Flagstaff	-14.4	-12.5	-10.7	-8.8
Lake Havasu City	-22.8	-17.5	-15.3	-9.5
Sierra Vista	-7.3	2.2	-9.0	0.4
		PERCENT DIFFERENCE FROM SIZE-CLASS AVERAGE		
Industrial Data				
Phoenix	-14.4%	-9.3%	-11.7%	-6.7%
Tucson	-12.6	-12.6	-11.5	-11.4
Yuma	-10.6	-12.3	-4.0	-5.7
Prescott	-14.1	-17.6	-7.4	-11.1
Flagstaff	-1.1	-7.5	0.8	-5.6
Lake Havasu City	-14.5	-16.4	-7.0	-8.9
Sierra Vista	7.8	8.9	0.8	1.8
Occupational Data				
Phoenix	-9.9%	-5.0%	-8.3%	-3.5%
Tucson	-8.3	-8.3	-7.3	-7.5
Yuma	-9.8	-11.6	-4.4	-6.2
Prescott	-5.3	-9.1	-5.4	-9.2
Flagstaff	0.1	-6.3	-2.3	-8.7
Lake Havasu City	-9.7	-11.7	-7.3	-9.4
Sierra Vista	8.4	9.4	-0.4	0.5

Source: Center for Competitiveness and Prosperity Research, L. William Seidman Research Institute, W. P. Carey School of Business, Arizona State University from data supplied by Economic Modeling Specialists International (Emsi), www.economicmodeling.com. The cost of living (regional price parity) is from the U.S. Department of Commerce, Bureau of Economic Analysis — the latest estimates for 2014 were used to adjust the 2015 earnings data.

occupational data, Metro Phoenix had the highest rank of the other six Arizona metro areas at 321st followed by Metro Yuma at 336th. The other four metros ranked between 356th and 374th. Various factors may contribute to these low ranks, but it is believed that the “sunshine factor” — workers in Arizona are willing to accept relatively low earnings in exchange for climate and other nonmonetary benefits — is the primary factor.



THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

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