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Purchasing power: using wage statistics with regional price parities to create a standard for comparing wages across U.S. areas

The U.S. Bureau of Labor Statistics Occupational Employment Statistics (OES) program has long produced actual wages by occupation that allow data users to compare wages across geographic regions. For the purpose of this article, the OES program has produced price-adjusted wages, which incorporate the costs of goods and services in an area to produce a figure that more accurately represents the real value of earnings for cross-area comparisons. This article explores how measures of price-adjusted wages and employment concentration are used to compare employment across areas.

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For jobseekers who wonder if they might earn higher wages by moving to a different area of the country, an important consideration is the relative value of wages earned. Even if wages in a new area are higher, a wage earner's purchasing power will decrease if the cost of living in the new area offsets the higher wage.[1] When actual wages are adjusted for regional prices, the resulting figures offer data users a more accurate representation of purchasing power for cross-area comparisons. This article will discuss how regional differences affect purchasing power in general, how price-adjusted wages are used to compare purchasing power across areas and occupations, and how specific occupations are affected by regional prices and employment concentrations in different areas.

The U.S. Bureau of Labor Statistics (BLS) Occupational Employment Statistics (OES) program produces employment and wage estimates for more than 800 occupations. OES wage data have long been the go-to source for jobseekers and employers who want to know the average (or range) of wages by occupation at the national, state, and area levels. These wages are generally expressed as actual wages, that is the actual amount that a worker is paid by their employer. Because costs for goods and services tend to fluctuate across different areas of the country, actual wages alone rarely provide a useful metric for comparing purchasing power across areas. But by incorporating regional price parities (RPPs) from the Bureau of Economic Analysis, OES can produce a price-adjusted wage that offers data users a standard for comparing wages across Metropolitan Statistical Areas (hereinafter referred to as *areas*).[2]

RPPs, expressed as a percentage of the overall national price level (equal to 100), measure the differences in the price levels of goods and services across areas for a given year. If an area's RPP is greater than 100, it means that goods and services are more expensive than the national average; if an area's RPP is less than 100, goods and services are less expensive than the national average. In areas where goods and services are more expensive, actual wages tend to be higher. By adjusting the actual wage based on an area's RPP, OES produces

a price-adjusted wage that gives data users a comparable standard for assessing purchasing power across different areas.

In May 2014, the average actual wage in San Jose–Sunnyvale–Santa Clara, CA ($75,770), was much higher than the average wage in Durham–Chapel Hill, NC ($55,840). But when the RPPs are taken into account to adjust for average price level, the gap between the two areas shrinks, producing price-adjusted wages of $62,107 and $58,779, respectively. (See table 1.) Data users comparing wages for San Francisco–Oakland–Fremont, CA, and the Durham area will notice the following: San Francisco area wages decrease after adjusting for average price level, while wages in the Durham area increase after the adjustment.

The San Jose and San Francisco areas, as well as New York–Northern New Jersey–Long Island, NY–NJ–PA, and Washington–Arlington–Alexandria, DC–VA–MD–WV, are among the areas where wages are highest. But when the actual wages are adjusted for average price level to show purchasing power, the rankings change. (See table 1.) The San Jose, San Francisco, and Washington areas remain among the highest paying areas, but the New York area is no longer among the highest paying. Despite the fact the New York area has high actual wages across the board, the cost of living is so high that the area's price-adjusted wages are much lower. The San Jose area remains the highest paying, even with its relatively high RPP. Actual wages in the San Jose area are so high that they offset the high cost of living. The San Francisco area falls from 2 to 10 and the New York area falls to 61. Some areas with high price-adjusted wages that may surprise data users include the Durham area; Huntsville, AL; Hartford–West Hartford–East Hartford, CT; and Springfield, IL. Table 1 shows areas with the highest average price-adjusted wages in May 2014.

Table 1. Annual mean wage, regional price parity, and purchasing power for the 10 Metropolitan Statistical Areas with the highest purchasing power, May 2014

Area	Annual mean wage	Regional price parity	Purchasing power
San Jose–Sunnyvale–Santa Clara, CA	$75,770	122.0	$62,107
Durham–Chapel Hill, NC	55,840	95.0	58,779
Huntsville, AL	51,730	91.3	56,659
Hartford–West Hartford–East Hartford, CT	55,580	100.9	55,084
Boston–Cambridge–Quincy, MA–NH	60,540	111.6	54,247
Washington–Arlington–Alexandria, DC–VA–MD–WV	64,930	120.4	53,929
Springfield, IL	49,760	92.4	53,853
Trenton–Ewing, NJ	60,020	111.5	53,830
Seattle–Tacoma–Bellevue, WA	57,370	107.0	53,617
San Francisco–Oakland–Fremont, CA	64,990	121.3	53,578

Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

Purchasing power by occupation

The relationship between wages and relative prices becomes even more interesting when occupational data is included in the analysis. Workers employed in the arts, design, entertainment, sports, and media occupational group earn higher wages in Los Angeles–Long Beach–Santa Ana, CA, and the New York, San Jose, and Washington areas than in any other areas of the United States. This remains true both before and after adjusting for prices. Computer and mathematical occupations have high wages in Seattle–Tacoma–Bellevue, WA, along with the San Jose and Durham areas both before and after adjusting the wages for regional prices. However, these occupational groups are the exceptions. Out of the 220 occupational groups in the 10 areas with the highest mean wages, the 18 occupational groups listed in table 2 are the only groups that remain among the 10 highest paying areas after adjusting wages for regional prices.

Table 2. Annual mean wage, regional price parity, and purchasing power for major occupational groups in the 10 Metropolitan Statistical Areas (MSAs) with the highest overall purchasing power, May 2014

Area and major occupational group	Annual mean wage	Regional price parity	Purchasing power

See footnotes at end of table.

Table 2. Annual mean wage, regional price parity, and purchasing power for major occupational groups in the 10 Metropolitan Statistical Areas (MSAs) with the highest overall purchasing power, May 2014

Area and major occupational group	Annual mean wage	Regional price parity	Purchasing power
Durham–Chapel Hill, NC, all occupations	$55,840	95.0	$58,779
Management occupations	131,080	95.0	137,979
Business and financial operations occupations	76,890	95.0	80,937
Computer and mathematical occupations	89,960	95.0	94,695
Education, training, and library occupations	70,780	95.0	74,505
Arts, design, entertainment, sports, and media occupations	57,860	95.0	60,905
Sales and related occupations	43,600	95.0	45,895
Office and administrative support occupations	36,870	95.0	38,811
San Jose–Sunnyvale–Santa Clara, CA, all occupations	75,770	122.0	62,107
Management occupations	160,080	122.0	131,213
Computer and mathematical occupations	123,910	122.0	101,566
Legal occupations	142,030	122.0	116,418
Arts, design, entertainment, sports, and media occupations	70,940	122.0	58,148
Office and administrative support occupations	47,380	122.0	38,836
Seattle–Tacoma–Bellevue, WA, all occupations	57,370	107.0	53,617
Computer and mathematical occupations	104,320	107.0	97,495
Trenton–Ewing, NJ, all occupations	60,020	111.5	53,830
Protective service occupations	68,310	111.5	61,265
Washington–Arlington–Alexandria, DC–VA–MD–WV, all occupations	64,930	120.4	53,929
Arts, design, entertainment, sports, and media occupations	74,860	120.4	62,176
New York–Northern New Jersey–Long Island, NY–NJ–PA, all occupations	59,060	122.2	48,331
Arts, design, entertainment, sports, and media occupations	76,110	122.2	62,283
Boulder, CO, all occupations	56,510	108.9	51,892
Sales and related occupations	49,230	108.9	45,207
Bridgeport–Stamford–Norwalk, CT, all occupations	61,650	121.5	50,741
Sales and related occupations	55,770	121.5	45,901
Boston–Cambridge–Quincy, MA–NH, all occupations	60,540	111.6	54,247
San Francisco–Oakland–Fremont, CA, all occupations	64,990	121.3	53,578

Note: The criterion for inclusion of a major occupational group under an MSA in the table required that the MSA was among the top 10 areas for purchasing power in the group. Accordingly, not all major occupational groups are included in the table and not all MSAs have a major occupational group listed.

Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

Because wages for all occupations in an area are adjusted by the same RPP, relative rankings within an area remain the same after adjusting for prices. But because actual wages and RPPs differ across areas, pay rankings for specific occupations tend to fluctuate in cross-area comparisons, creating variances. For some occupations, adjusting for regional prices decreases the difference between the highest and lowest paying areas, while for others the difference increases. This holds true for two related occupations—bookkeepers and accountants.

After adjusting wages for regional prices, the difference between the highest and lowest paying areas decreases for bookkeepers and increases for accountants. In May 2014, the preadjustment difference in wages for bookkeepers was $21,470 (a high of $49,580 in San Jose and low of $28,110 in Laredo, TX) and the postadjustment the difference was $14,096 (a high of $45,544 in Columbus, OH and low of $31,448 in Jacksonville, NC.). For accountants, the preadjustment difference was $43,920 (a high of $93,160 in New York and

a low of $49,240 in Danville, IL) and the postadjustment difference was $54,162 (a high of $105,859 in Dothan, AL, and a low of $51,697 in Flagstaff, AZ).

The wages for detailed occupations by area before and after adjusting wages for regional purchasing power are available at https://www.bls.gov/oes/purchasing_power.xlsx. A sample of this listing is provided in table 3.

Table 3. Mean wage, regional price parity, and purchasing power for Metropolitan Statistical Areas with the highest purchasing power for cashiers, May 2014

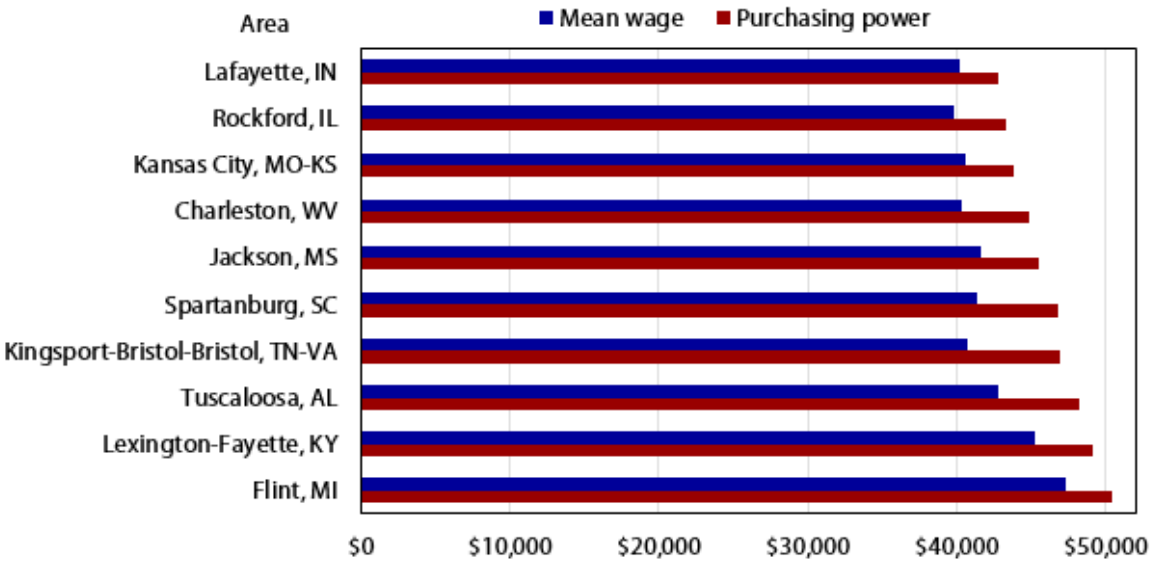
Area	Mean wage	Regional price parity	Purchasing power
Bremerton-Silverdale, WA	$28,060	104.6	$26,826
Spokane, WA	25,120	95.9	26,194
Mount Vernon-Anacortes, WA	25,780	98.7	26,120
Olympia, WA	27,140	104.6	25,946
Bellingham, WA	25,740	99.3	25,921
Seattle-Tacoma-Bellevue, WA	27,470	107.0	25,673
Yuba City, CA	24,940	98.3	25,371
Danville, IL	19,920	79.4	25,088
Medford, OR	24,580	98.0	25,082
Yakima, WA	23,700	94.8	25,000

Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

Across most occupations, the highest actual wages are generally earned in areas with high RPPs, such as New York and San Francisco. But after adjusting wages for regional prices, occupational differences tend to have a more pronounced effect on purchasing power than geography alone. In particular, occupations with relatively low wages tend to exhibit the greatest pre and postadjustment change. For example, food-service workers and cashiers earn more in San Francisco and San Jose than most other areas of the country before adjusting for regional prices. But after adjusting wages for prices, these workers' wages are in the bottom 25 percent nationally. After price adjustments, purchasing power for fast-food workers tends to increase in areas of Illinois, Washington, and Colorado.

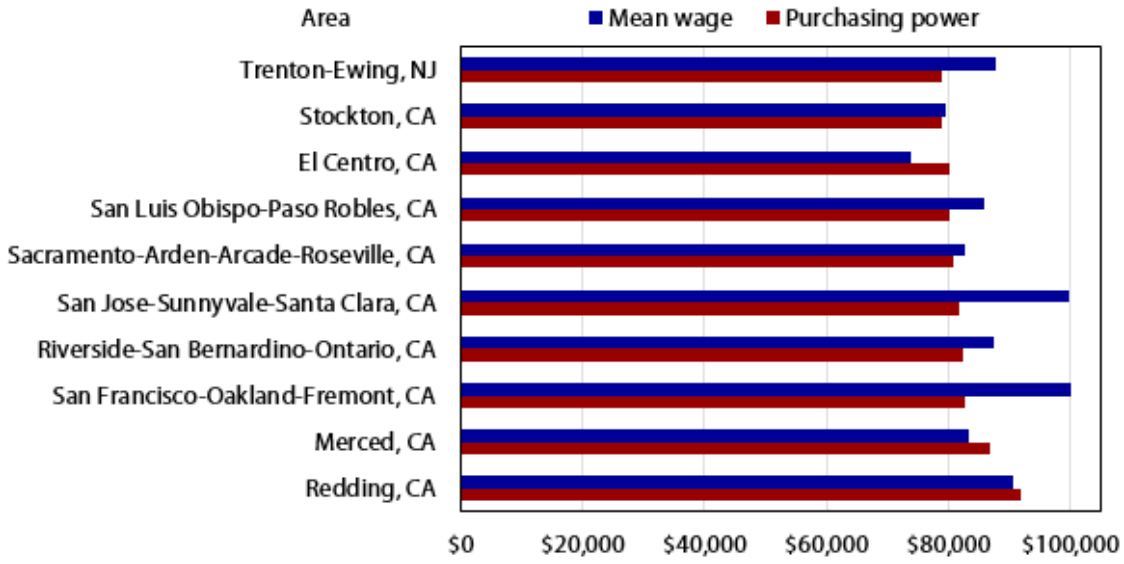
Figures 1 and 2 show purchasing power and mean wages for team assemblers[3] and police officers, respectively, in selected areas. The areas in figure 1 all have an RPP of less than 100. Accordingly, the price-adjusted wage for all areas is higher than the mean wage, effectively increasing the purchasing power of team assemblers in these areas. Figure 2 includes a mix of areas, some with high RPPs and others with low RPPs. Most of the areas with high wages for police and sheriff's patrol officers had mean wages for all occupations well above the U.S. average, as well as high RPPs. For police and sheriff's patrol officers, the high occupational mean wage outweighs those factors and still produces a high rate of purchasing power. Simply put, police officers are often better off in high-wage, high-RPP areas. This differs from team assemblers, as they generally do better in low-wage, low-RPP areas.

Figure 1. Mean wage versus purchasing power (in dollars) for team assemblers in selected areas, May 2014



Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

Figure 2. Mean wage versus purchasing power (in dollars) for police and sheriff's patrol officers in selected areas, May 2014



Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

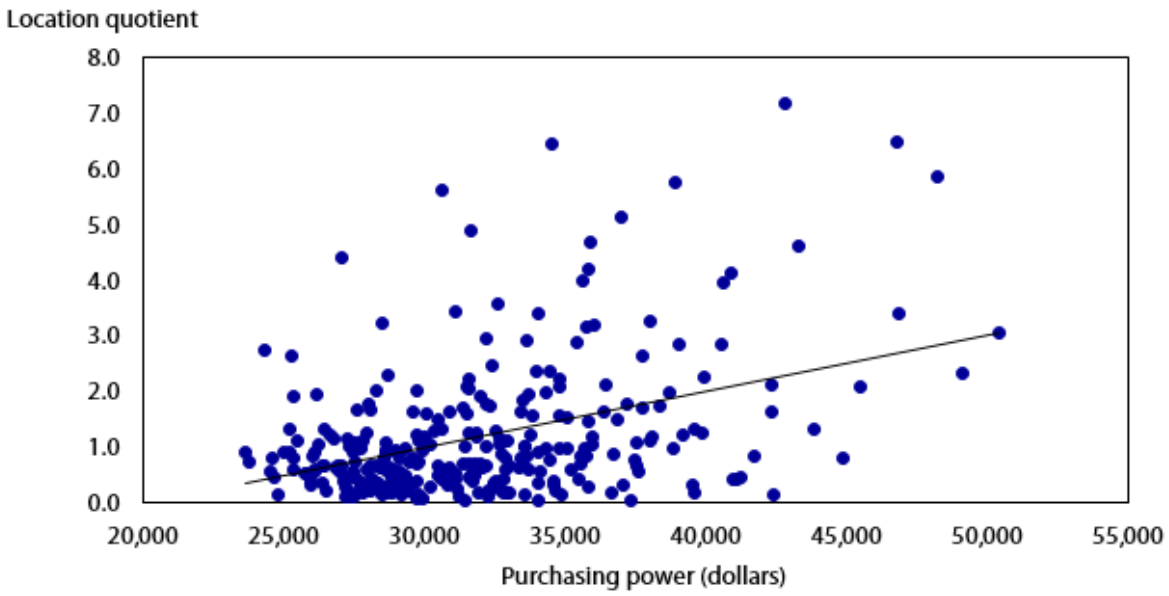
Employment effects on average wages before and after price adjustments

Data in tables 1 and 2 may appear to have some inconsistencies when compared. For instance, one may wonder why Boston–Cambridge–Quincy, MA–NH, and the San Francisco area are among the top-paying areas after price adjustments in table 1, but do not appear in the top paying areas for *any* of the 22 occupational groups in table 2. The reason for this lies in the employment composition of the areas. Boston and San Francisco have high wages because they have a higher share of workers in high-paying occupations, not because they have high wages after adjusting wages for prices. Similarly, Bridgeport–Stamford–Norwalk, CT, appears in table 2 with high price-adjusted wages for sales and related occupations not because the area has higher wages for low-paying sales occupations such as cashiers, but because the area has relatively few cashiers and a high share of financial services sales agents. Some areas have heavy concentrations of workers in particular fields. For some occupations, a correlation exists between employment concentration and wages.

Employers generally want to locate where labor costs are low and they can attract needed workers. Of course, not all employers can relocate. Service workers and employees of local government may need to stay near their customers or constituents. For employers who are able to relocate, the location quotient can be an invaluable tool for determining the best place to set up shop. The location quotient compares the employment of an occupation in an area relative to the average for the nation. Its formula is the share of employment in an area divided by the share of the U.S. employment. If an area's location quotient for an occupation is higher than 1.0, it means that employment for the occupation is more highly concentrated in the area than the national average.

The areas in figure 1 all have location quotients greater than 1.0 for team assemblers. For example, in May 2014, the location quotient for team assemblers in Flint, MI, was 3.04 (see figure 3 data), indicating the area had 3 times the national average employment concentration for that occupation. This indicates a high concentration of team assemblers in Flint, MI, and greater purchasing power relative to team assemblers in other areas of the country. Figure 3 shows the location quotients relative to purchasing power for team assemblers.

Figure 3. Purchasing power and location quotients for team assemblers, May 2014

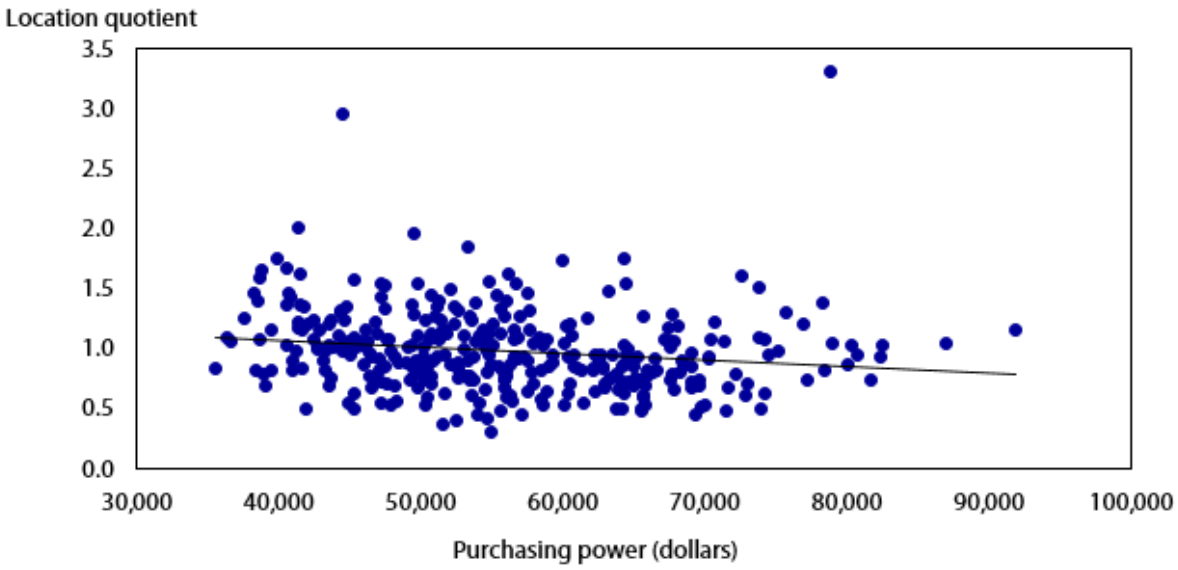


Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

In May 2014, the overall correlation between location quotient and purchasing power for team assemblers in the 297 areas in figure 3 was 0.42. The upward sloping line in the figure suggests that as employment concentration increases, the purchasing power of wages generally increases. For team assemblers, areas with high purchasing power and low price parities tend to have lower mean wages. For other occupations, areas with a high overall mean wage generally have higher regional prices.

Not all occupations show a relationship between location quotient and purchasing power. For example, the data for police and sheriff's patrol officers suggest little to no correlation between purchasing power and location quotients. The overall correlation between the two variables was −0.17. For this occupation, there is less variation in the location quotient when compared with team assemblers. Figure 4 shows the purchasing power and location quotients for police and sheriff's patrol officers.

Figure 4. Purchasing power and location quotients for police and sheriff's patrol officers, May 2014



Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

Summary

In summary, this article has introduced the use of RPPs to calculate the purchasing power of wages earned in different areas and explored the relationship between wages, price-adjusted wages, and employment concentrations. It might seem obvious high-priced urban areas would offer high wages, but the actual wages of an area only tell part of the story. When wages are adjusted to account for cost of living, low-wage areas often grant workers superior purchasing power. For jobseekers, the overall purchasing power of a wage in a given area is often more important than the wage itself. For employers, the concentration of labor in an area may be as important as the impact of wages on labor cost. Accordingly, some occupations may seem more attractive in different areas. The areas with highest and lowest price-adjusted wages for occupations depend on the occupation, as does the relationship between wages and employment concentrations. For some occupations, purchasing power increases with employment concentration, while for others, purchasing power may be unaffected by the concentration of employment in an area.

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NOTES

1 Here, purchasing power is defined as the mean wage for an area divided by its regional price parity and multiplied by 100. Both the wage estimates and the RPP estimates are subject to sampling error, so the purchasing power estimates are subject to error as well. Because this error range has not been calculated, some of the rankings and differences in this article may not be statistically significant.

2 Regional Price Parities are available online at the Bureau of Economic Analysis website. Not all areas that have OES data have an exact regional price area. In some cases, an adjusted wage cannot be calculated. For regions where OES uses New England County and Town Areas, OES used wage data from the closest area match available to calculate the adjusted wage.

[3] Team assemblers are defined as employees who work as part of a team having responsibility for assembling an entire product or component of a product.

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