News

United States Department of Labor

OCCUPATIONAL PAY RELATIVES, 2005

The Bureau of Labor Statistics (BLS) of the U.S. Department of Labor produces relative occupational pay comparisons between metropolitan areas and the United States as a whole. Using data from the National Compensation Survey (NCS), pay relatives—a means of assessing relative pay differences—have been prepared for 2005 for each of the 9 major occupational groups within 78 Metropolitan Statistical Areas (MSAs), as well as averaged across all occupations for each area. (See table 1.) In addition, for the first time, similar area-to-area comparisons have been calculated for all 78 areas and soon will be available on the BLS website at http://www.bls.gov/ncs/ocs/payrel.htm.

The pay relative in 2005 for workers in construction and extraction occupations in the San Francisco MSA was 123, meaning the pay in San Francisco in that occupational group averaged 23 percent more than the national average pay for that occupational group. The pay relative averaged across all occupations in the San Francisco MSA was 117, meaning that pay on average was 17 percent above the national average. By contrast, the pay relative for workers in construction and extraction occupations in the Brownsville, Texas MSA was 72, meaning pay for workers in those occupations averaged 28 percent less than the national average. Pay averaged across all occupations in the Brownsville area was 19 percent below the national average. Pay relatives calculated for all occupations were significantly different from the national average in 64 of the 78 areas.

The National Compensation Survey (NCS), introduced in 1997, collects earnings and other data on employee compensation covering over 820 detailed occupations in 152 metropolitan and non-metropolitan areas. Average occupational earnings from the NCS are published annually for more than 80 metropolitan areas and for the United States as a whole.

What is a pay relative?

A pay relative is a calculation of pay—wages, salaries, commissions, and production bonuses—for a given metropolitan area relative to the nation as a whole. The calculation controls for differences among areas in occupational composition, establishment and occupational characteristics, and the fact that data are collected for areas at different times during the year.

Metropolitan areas differ greatly in the types of occupations that are available to the local workforce. For example, in Brownsville, Texas, the ratio of workers in the high-paying management, business, and financial occupational group to the number of workers in all occupations is approximately 5 percent, whereas nationally this ratio is nearly 9 percent.[1] Similarly, the composition of establishment and occupational characteristics varies by area. In addition to these factors, the NCS collects compensation data for metropolitan areas at different times during the year. Payroll reference dates differ between areas which makes direct comparisons between areas difficult.

The pay relative approach controls for these differences to isolate the geographic effect on wage determination. To illustrate the importance of controlling for these effects, consider the following example. The average pay for professional workers in San Francisco is $39.41 and the average pay for professional workers in the entire United States is $30.24.[2] A simple pay comparison can be calculated from the ratio of the two average pay levels, multiplied by 100 to express the comparison as a percentage. The pay comparison in the example is calculated as:

$$(\$39.41 \div \$30.24) \times 100 \cong 130$$

However, this comparison does not control for the interarea difference in occupational composition. Some of the 30 percent pay premium in San Francisco relative to the nation as a whole is due to the higher concentration of highly compensated professional workers in San Francisco. A more accurate estimate of the geographic effect on wage determination in San Francisco can be obtained by taking into account this and other differences. Controlling for the differences in occupational composition, establishment and occupational characteristics, and the payroll reference date in San Francisco relative to the nation as the whole, the pay relative for professional and related occupations in San Francisco is equal to 117.

Using pay relative data

Because the NCS is a sample survey, pay relatives derived from the NCS will differ to some extent from the true pay relatives that could be calculated only by collecting information on every job in every establishment. For similar reasons, pay relatives derived from the NCS may fluctuate from one year to the next. To assist data users with the use of these data, tests have been conducted to determine whether differences between each pay relative and the pay relative for the nation as a whole are statistically significant (that is, the pay for the given occupation in that area is too different from the national average to be accounted for by the randomness of the survey's sample). Similar tests are conducted for the area-to-area comparisons. In all tables, statistically significant pay relatives are denoted with an asterisk (*). More information on significance testing is available in the Technical Note.

Also because of sample variation from year to year, data users are cautioned about inferring that there have been actual changes in underlying economic conditions from changes in the estimated pay relatives between 2004 and 2005. This caution applies even more strongly to estimates by occupational group.

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[1] Data for this example are based on the May 2005 Occupational Employment and Wage Estimates, http://www.bls.gov/oes/current/oessrcma.htm.
[2] Average pay for professional workers in San Francisco and for the United States are based on wage estimates published in the San Francisco–Oakland–San Jose, CA National Compensation Survey, March 2005 and the National Compensation Survey: Occupational Wages in the United States, June 2005, http://www.bls.gov/ncs/ocs/compub.htm.

TABLE 1. **Pay relatives for major occupational groups in metropolitan areas, National Compensation Survey, July 2005**

(Average pay nationally for all occupations and for each occupational group shown = 100.)

Metropolitan Area1	All occupations	Management, business, and financial	Professional and related	Service	Sales and related	Office and administrative support	Construction and extraction	Installation, maintenance, and repair	Production	Transportation and material moving
United States	100	100	100	100	100	100	100	100	100	100
Amarillo, TX	89*	78*	87*	86*	91*	89*	85*	84*	94*	94*
Anchorage, AK	110*	112*	103	121*	106	107*	123*	108*	116*	114*
Atlanta, GA	103*	105	101	97*	101	106*	103	105*	99	112*
Augusta-Aiken, GA-SC	97*	90*	101	91*	84*	99	83*	100	102	93*
Austin-San Marcos, TX	96*	91*	93*	94*	101	98*	95*	98	98*	93*
Birmingham, AL	95*	91*	92*	100	97	97*	84*	90*	92*	96*
Bloomington, IN	94*	97	90*	93*	94*	90*	83*	98	98	108*
Boston-Worcester-Lawrence, MA-NH-ME-CT ..	112*	110*	107*	113*	113*	116*	118*	112*	109*	114*
Brownsville-Harlingen-San Benito, TX	81*	82*	97*	77*	86*	78*	72*	80*	73*	79*
Buffalo-Niagara Falls, NY	103*	87*	93*	109*	104*	99	108*	98*	110*	106*
Charleston-North Charleston, SC	92*	89*	94*	85*	100	96*	82*	87*	93*	108*
Charlotte-Gastonia-Rock Hill, NC-SC	97	93*	93*	98	85	99	96	98	100	104*
Chicago-Gary-Kenosha, IL-IN-WI	108*	107*	107*	106*	108*	111*	124*	111*	107*	105
Cincinnati-Hamilton, OH-KY-IN	100	97	99	101	108*	102	87*	99	102	101
Cleveland-Akron, OH	100	91*	99	98	98	102	102	108*	108*	104
Columbus, OH	101	107*	96	98	117	100	102	98	98	99
Corpus Christi, TX	87*	87*	92*	83*	92*	86*	78*	80*	88*	88*
Dallas-Fort Worth, TX	99	101	102	95*	107*	99	89*	95*	89*	102
Dayton-Springfield, OH	98*	100	95*	96*	99	92*	107*	106*	109*	97*
Denver-Boulder-Greeley, CO	101	94	103*	98	103	104*	95	110*	99	105*
Detroit-Ann Arbor-Flint, MI	106*	101	107*	103*	102	104*	112*	103	118*	105
Elkhart-Goshen, IN	98*	101	100	93*	97	92*	100	87*	98*	113*
Fort Collins-Loveland, CO	96*	90*	94*	91*	99*	96*	98	102	101	104*
Grand Rapids-Muskegon-Holland, MI	103*	98*	97*	105*	112*	101*	122*	96*	107*	103*
Great Falls, MT	90*	90*	84*	93*	90*	82*	125*	103	100	86*
Greensboro-Winston Salem-High Point, NC	99*	102	93*	98	104*	100	96*	98*	101	105*
Greenville-Spartanburg-Anderson, SC	97*	99	92*	95*	91*	98*	81*	87*	104*	101
Hartford, CT	112*	106	109*	121*	113*	112*	118*	107	108*	112*
Hickory-Morganton-Lenoir, NC	97*	90*	96*	92*	97*	100	83*	90*	100	107*
Honolulu, HI	103*	99	108*	106*	100	99	107	110*	96	101
Houston-Galveston-Brazoria, TX	97*	98	101	87*	98	98	91*	97	99	94*
Huntsville, AL	95*	98	96*	92*	95	96*	97	90*	97*	94
Indianapolis, IN	99	92*	98	101	96	98	96	102	106*	100
Iowa City, IA	101	94*	100	106*	95*	103*	104*	91*	95*	103
Johnstown, PA	89*	90*	89*	91*	89*	84*	91*	98	88*	83*
Kansas City, MO-KS	97*	94*	92*	95	96	100	96	100	104	98
Knoxville, TN	92*	96*	91*	90*	100	92*	84*	89*	89*	102
Lincoln, NE	89*	91*	87*	90*	81*	88*	85*	100	89*	91*
Los Angeles-Riverside-Orange County, CA	105*	104*	109*	108*	108*	107*	113*	107*	99	97
Louisville, KY-IN	99	101	99	101	94*	97*	106*	99	98*	94*
Melbourne-Titusville-Palm Bay, FL	91*	95*	83*	93*	94*	87*	93*	100	94*	101

See footnotes at end of table.

(Average pay nationally for all occupations and for each occupational group shown = 100.)

Metropolitan Area[1]	All occupations	Management, business, and financial	Professional and related	Service	Sales and related	Office and administrative support	Construction and extraction	Installation, maintenance, and repair	Production	Transportation and material moving
Memphis, TN-AR-MS	94*	92*	88*	88*	97*	96*	89*	106*	97*	95*
Miami-Fort Lauderdale, FL	95*	97	94*	92*	94*	97	84*	101	97	96
Milwaukee-Racine, WI	101	102	94*	104	110	102	110*	101	103	104
Minneapolis-St. Paul, MN-WI	108*	106*	103*	120*	109*	106*	110*	109*	113*	110*
Mobile, AL	94*	103	92*	86*	103*	94*	98	93*	94*	95*
New Orleans, LA	93*	100	97*	86*	106*	92*	84*	92*	91*	91*
New York-Northern New Jersey- Long Island, NY-NJ-CT-PA	112*	113*	114*	114*	108*	113*	128*	112*	103	113*
Norfolk-VA Beach-Newport News, VA-NC	93*	92*	94*	92*	94*	95*	87*	95*	88*	94*
Ocala, FL	90*	91*	86*	91*	93*	92*	79*	88*	88*	100
Oklahoma City, OK	91*	97*	86*	90*	87*	87*	91*	99	94*	98
Orlando, FL	93*	93	91*	88*	100	93*	87*	97	91	100
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	106*	109*	109*	107*	99	108*	107*	106*	105	108*
Phoenix-Mesa, AZ	100	95	102	97	107	103	89*	99	95*	103
Pittsburgh, PA	96*	94*	95*	97	93*	98	97	94*	95	99
Portland-Salem, OR-WA	101	101	94*	112*	106	100	119*	104	95*	98
Providence-Fall River-Warwick, RI-MA	108*	115*	110*	116*	104*	108*	103*	95*	104*	107*
Reading, PA	103*	122*	98*	100	102	99	108*	101	103*	105*
Reno, NV	97*	93*	95*	99	101	94*	92*	106*	95*	100
Richland-Kennewick-Pasco, WA	102*	100	96*	112*	107*	98*	106*	91*	94*	97*
Richmond-Petersburg, VA	98*	99	97*	98*	97*	99*	87*	101	96*	106*
Rochester, NY	98*	97*	98*	105*	93*	97*	90*	85*	98*	102*
Rockford, IL	101*	88*	99	101	100	93*	112*	103*	106*	104*
Sacramento-Yolo, CA	107*	107*	106*	116*	108	105*	100	114*	104	113*
Salinas, CA	113*	115*	122*	117*	119*	105*	119*	117*	103	96
San Antonio, TX	90*	92*	93*	84*	98	90*	89*	89*	98	90*
San Diego, CA	105*	100	110*	114*	107*	103	102	103	102	97
San Francisco-Oakland-San Jose, CA	117*	112*	117*	123*	113*	121*	123*	112*	109*	112*
Seattle-Tacoma-Bremerton, WA	107*	96	100	121*	108*	108*	113*	105	112*	106*
Springfield, MA	97	105*	112*	108*	108*	112*	110*	108*	116*	73*
Springfield, MO	90*	86*	92*	87*	89*	87*	85*	96*	95*	92*
St. Louis, MO-IL	100	99	96*	96	98	100	117*	101	102	112*
Tallahassee, FL	87*	76*	88*	89*	92*	88*	90*	85*	90*	105*
Tampa-St. Petersburg-Clearwater, FL	93*	93*	90*	91*	89*	98	96	94*	92*	98
Visalia-Tulare-Porterville, CA	95*	86*	98*	100	90*	95*	92*	94*	99	95*
Washington-Baltimore, DC-MD-VA-WV	106*	101	109*	107*	100	112*	102	111*	113*	99
York, PA	97*	104*	99	99*	94*	95*	93*	99	92*	99
Youngstown-Warren, OH	95*	86*	94*	87*	97*	87*	96*	96*	103*	110*

* The pay relative for this area is significantly different from the national average of all areas at the 10 percent level of significance. For additional details, see the Technical Note.
1 A metropolitan area can be a Metropolitan Statistical Area (MSA) or Consolidated Metropolitan Statistical Area (CMSA) as defined by the Office of Management and Budget, 1994.

Technical Note

Because the NCS is a sample survey, data are subject to sampling error. For the data presented here, sampling error are differences that occur between the pay relatives estimated from the sample and the true pay relatives derived from the population. It is important to assess whether differences between each pay relative and the pay relative for the nation as a whole is likely to be the result of sampling error or of true differences in pay levels. To perform this assessment, a test of statistical significance is conducted.

The test constructs a 90-percent confidence interval that assumes the given area's true pay relative is equal to the national average. The confidence interval is constructed so that there is a 90 percent probability the pay relative calculated from any one sample is contained within the confidence interval. If from a single sample a calculated pay relative falls within the confidence interval, then the pay relative is not statistically significant and the hypothesis that the true pay relative is equal to the national average is accepted. However, if the pay relative falls outside of the constructed confidence interval then the pay relative is statistically significant at the 10-percent level. The hypothesis that the given area's pay relative is equal to the pay relative for the nation is rejected and one can conclude with reasonable confidence that the true pay relative is different from the national average.

In addition to sampling error, pay relatives are subject to a variety of sources that can adversely influence the estimates. The NCS may be unable to obtain information for some establishments; there may be difficulties with survey definitions; respondents may be unable to provide correct information, or mistakes in recording or coding the data may occur. Non-sampling errors of these kinds were not specifically measured. However, they are expected to be minimal due to the extensive training of the field economists who gathered the survey data, computer edits of the data, and detailed data review.

Historical pay relative data are available for 1992-1996, 1998, 2002, and 2004. There are several differences between the recent pay relatives and the pay relatives for earlier years, including different industry and occupation classification systems, varying methodology, and different survey designs. These differences limit comparability. The pay relatives for 2004 and 2005 were calculated using the same industry and occupation classification systems, methodology, and survey design. Nonetheless, comparisons between the estimates for the two years should be made only with a high degree of caution.

Pay relatives were estimated using a multivariate regression technique methodology to control for interarea differences. This technique controls for the following ten characteristics:

- Occupational type
- Industry type
- Work level
- Full-time / part-time status
- Time / incentive status
- Union / nonunion status
- Ownership type
- Profit / non-profit status
- Establishment employment
- Payroll reference date

Even accounting for the characteristics used in the current regression analysis, there is still significant wage variation across the areas. The variation is due to differences in wage determinants that were not included in the model. Examples of these determinants include price levels, environmental amenities such as a pleasant climate, and cultural amenities.

The pay relative regression methodology introduces another type of error. Regression models are subject to specification error. The significance test does not specifically measure specification error. However, care was taken to minimize this form of error by an extensive search across specifications for the model that performs best in terms of predictive accuracy.

For more details, see Maury B. Gittleman, "Pay Relatives for Metropolitan Areas in the U.S." *Monthly Labor Review*, March 2005, pp. 46-53, and Parastou Karen Shahpoori, "Pay Relatives for Major Metropolitan Areas," *Compensation and Working Conditions*, Spring 2003.