

# News

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## OCCUPATIONAL PAY RELATIVES FOR METROPOLITAN AREAS IN NEW ENGLAND: 2006

Pay relatives averaged across all occupations in 2006 for the four major New England Metropolitan Statistical Areas (MSAs) were significantly higher than the national average. The pay relative of workers in both the Boston-Worcester-Lawrence and the Hartford MSAs was 112, meaning that pay, on average, was 12 percent higher in these areas than it was for the nation as a whole. In the two remaining MSAs of Springfield and Providence-Fall River-Warwick, pay relatives averaged 109 and 108, respectively. (See table A.) In 2006, Boston and Hartford had the fourth highest pay relative in the nation among the 78 metropolitan areas in the National Compensation Survey (NCS), the source for this data.

**Table A. Pay relatives for major occupational groups in New England, area-to-nation comparisons, National Compensation Survey, June 2006** (Average pay nationally for all occupations and for each occupational group shown = 100.)

New England Metropolitan Area <sup>1</sup>	All occupations	Management, business, and financial	Professional and related	Service	Sales and related
<b>United States</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Boston-Worcester-Lawrence, MA-NH-ME-CT	112*	110*	108*	113*	106*
Hartford, CT	112*	108*	108*	119*	108*
Providence-Fall River-Warwick, RI-MA	108*	109*	111*	112*	103*
Springfield, MA	109*	104*	109*	105*	113*
New England Metropolitan Area <sup>1</sup>	Office and administrative support	Construction and extraction	Installation, maintenance, and repair	Production	Transportation and material moving
<b>United States</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Boston-Worcester-Lawrence, MA-NH-ME-CT	113*	124*	115*	108*	111*
Hartford, CT	112*	114	108	111*	107*
Providence-Fall River-Warwick, RI-MA	106*	104*	108*	112*	105*
Springfield, MA	110*	105*	110*	108*	115*

\* 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.

<sup>1</sup> 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

Using data from the NCS, BLS produces occupational pay relatives, a calculation of pay which includes wages, salaries, commissions, and production bonuses, to facilitate comparisons of occupational pay between metropolitan areas and the United States as a whole, and between one metropolitan area and another. Pay relatives have also been prepared for each of the major occupational groups within 78 Metropolitan Statistical Areas for 2006. 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.

### **Area-to-Nation Comparisons**

Workers in the Boston area, when compared to their national counterparts, had significantly higher pay relatives in all nine occupational groupings for which pay relatives were prepared. Construction and extraction workers in Boston earned 24 percent more than the national average with a pay relative of 124. For management, business, and financial, and professional and related occupational groups, pay relatives were 110 and 108, respectively.

Hartford area workers had pay relatives that were significantly above the national average in seven of the nine occupational groups; the exceptions were construction and extraction and installation, maintenance, and repair. Service workers had a pay relative of 119 and for office and administrative workers, the pay relative was 112. Among management, business, and financial workers, the pay relative was 108.

In Springfield, workers earned significantly higher pay than their counterparts nationally in the nine occupational groups. Pay relatives for transportation and material moving and sales and related occupations in Springfield were 115 and 113, respectively. The management, business, and financial occupational group had a pay relative of 104.

Workers in Providence had significantly higher pay relatives in all nine occupational groups when compared to their national counterparts. Pay relatives for both service and production occupations were 112 and for professional and related, it was 111.

### **Area-to-Area Comparisons**

Area-to-area pay comparisons are useful in determining the differences in pay levels between two metropolitan areas. This type of comparison requires that the base area changes from the nation to a specific metropolitan area. For example, table 1 illustrates the pay relatives for metropolitan areas in New England when Boston was the base area (pay relative = 100). The pay in Providence was 4 percent lower than in Boston, and in Springfield, it was 2 percent lower. Tables 2 through 4 recalculate the pay differentials using the other three metropolitan areas in New England as the base areas. Pay relatives for all 78 metropolitan areas are available on the BLS website at <http://www.bls.gov/ncs/ocs/payrel.htm>.

### **Using pay relative data**

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 table 1, statistically significant pay relatives are denoted with an asterisk (\*). Data users are cautioned not to use yearly differences in area and occupational pay group differences in pay relatives to infer changes in underlying economic conditions. More information on significance testing is available in the Technical Note.

Beginning in 2006, the NCS implemented a number of significant survey changes including imputing for temporary non-response situations and benchmarking estimated employment. For more details on these changes, see the article at <http://www.bls.gov/opub/cwc/cm20070122ar01p1.htm>.

**TABLE 1. Pay relatives for major occupational groups in New England metropolitan areas, National Compensation Survey, June 2006**

(Average pay for all occupations and for each occupational group shown in the Boston-Worcester-Lawrence, MA-NH-ME-CT metropolitan area = 100.)

New England Metropolitan Area <sup>1</sup>	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
Boston-Worcester-Lawrence, MA-NH-ME-CT	100	100	100	100	100	100	100	100	100	100
Hartford, CT	100	99	100	105*	102	99	92	94	103	97
Providence-Fall River-Warwick, RI-MA	96*	99	103	100	97	93*	83*	94	103	95*
Springfield, MA	98*	95*	101	94*	107*	97*	85*	96	100	103

\* The pay relative for this area is significantly different from the average in the metropolitan area at the 10 percent level of significance. For additional details, see the Technical Note at <http://www.bls.gov/news.release/ncspay.tn.htm>.

<sup>1</sup> 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

**TABLE 2. Pay relatives for major occupational groups in New England metropolitan areas, National Compensation Survey, June 2006**

(Average pay for all occupations and for each occupational group shown in the Hartford, CT metropolitan area = 100.)

New England Metropolitan Area <sup>1</sup>	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
Hartford, CT	100	100	100	100	100	100	100	100	100	100
Boston-Worcester-Lawrence, MA-NH-ME-CT	100	101	100	95*	98	101	109	107	97	103
Providence-Fall River-Warwick, RI-MA	97*	101	102	95*	95	94*	91	100	100	98
Springfield, MA	98	96	101	89*	105	99	92	102	97	107

\* The pay relative for this area is significantly different from the average in the metropolitan area at the 10 percent level of significance. For additional details, see the Technical Note at <http://www.bls.gov/news.release/ncspay.tn.htm>.

<sup>1</sup> 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

**TABLE 3. Pay relatives for major occupational groups in New England metropolitan areas, National Compensation Survey, June 2006**

(Average pay for all occupations and for each occupational group shown in the Providence-Fall River-Warwick, RI-MA metropolitan area = 100.)

New England Metropolitan Area <sup>1</sup>	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
Providence-Fall River-Warwick, RI-MA	100	100	100	100	100	100	100	100	100	100
Boston-Worcester-Lawrence, MA-NH-ME-CT	104*	101	97	100	103	107*	120*	107	97	105*
Hartford, CT	104*	99	98	106*	105	106*	110	100	100	102
Springfield, MA	101	95*	98*	94*	110*	105*	102	102	97*	109*

\* The pay relative for this area is significantly different from the average in the metropolitan area at the 10 percent level of significance. For additional details, see the Technical Note at <http://www.bls.gov/news.release/ncspay.tn.htm>.

<sup>1</sup> 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

**TABLE 4. Pay relatives for major occupational groups in New England metropolitan areas, National Compensation Survey, June 2006**

(Average pay for all occupations and for each occupational group shown in the Springfield, MA metropolitan area = 100.)

New England Metropolitan Area <sup>1</sup>	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
Springfield, MA	100	100	100	100	100	100	100	100	100	100
Boston-Worcester-Lawrence, MA-NH-ME-CT	103*	105*	99	107*	93*	103*	118*	105	100	97
Hartford, CT	102	104	99	113*	95	101	109	98	103	94
Providence-Fall River-Warwick, RI-MA	99	105*	102*	107*	91*	96*	98	98	103*	92*

\* The pay relative for this area is significantly different from the average in the metropolitan area at the 10 percent level of significance. For additional details, see the Technical Note at <http://www.bls.gov/news.release/ncspay.tn.htm>.

<sup>1</sup> 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

### Pay relative controls and calculations

Pay relatives control for differences among areas in occupational composition as well as establishment and occupational characteristics. Metropolitan areas differ greatly in the types of occupations that are available to the local workforce. For example, in Boston, Massachusetts, the ratio of workers in the high-paying computer and mathematical science occupational group to the number of workers in all occupations is a little over 4 percent, whereas nationally this ratio is about half as much or just over 2 percent<sup>1</sup>. 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 and related workers in Boston is \$32.95 and the average pay for professional and related workers in the entire United States is \$29.76.<sup>2</sup> 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:  $(\$32.95/\$29.76) \times 100 \cong 111$ .

### Sampling errors and statistical significance

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, 2004, and 2005. There are several differences between the recent pay relatives and the pay relatives for earlier years, including different

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<sup>1</sup> Data for this example are based on the May 2006 Occupational Employment and Wage Estimates, <http://www.bls.gov/oes/home.htm#data>.

<sup>2</sup> Average pay for professional and related workers in Boston and for the United States are based on wage estimates published in the Boston-Worcester-Lawrence, MA-NH-ME-CT National Compensation Survey, October 2006 and the National Compensation Survey: Occupational Wages in the United States, June 2006, <http://www.bls.gov/ncs/ocs/sp/ncbl0910.pdf>.

industry and occupation classification systems, varying methodology, and different survey designs. These differences limit comparability. The pay relatives for 2004, 2005, and 2006 were calculated using the same industry and occupation classification systems, methodology, and survey design. Nonetheless, comparisons between the estimates for these 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.

This information will be made available to sensory impaired individuals upon request. Voice phone: (617) 565-2072, Federal Relay Services: 1-800-877-8339.