

## Comparisons of hourly wage estimates by location, work levels, hours, and other factors

*By David Zook and Adam Issan*

Workers, economists, human resource professionals, and many others are interested in how much Americans earn. Do some workers in a particular city earn more than workers in another one? By how much? What if one worker has more experience, compared with a worker who is just starting out in their career?

The Bureau of Labor Statistics (BLS) produces two establishment surveys that report the wages and salaries of jobs: the National Compensation Survey (NCS) and the Occupational Employment Statistics (OES). NCS produces wage estimates that have detailed information on job characteristics, such as full-time and part-time or

union and nonunion job status. Estimates from the NCS also provide information on a worker's level, which measures knowledge, job controls and complexity, contacts, and physical environment required by an occupation.<sup>1</sup>

The NCS has a sample made up of about 12,800 private industry establishments and 1,500 state and local government establishments. However, the OES survey has a larger sample size of approximately 1.2 million establishments, which allows it to publish wage and employment estimates with great occupational and geographic detail. However, the estimates do not have information on job characteristics or levels.

Borrowing on the strengths of both surveys, BLS developed new wage estimates that provide richer information on wages for civilian workers than either program can provide separately. BLS has published modeled wage estimates annually since 2016.<sup>2</sup>

This **Beyond the Numbers** article shows ways in which modeled wage estimates can be used to compare wages by location, hours worked, pay method, and work level. The article also describes some enhancements to these data. It uses examples from the 2018 Modeled Wage Estimates publication, which has a reference year of 2017.

## Scope of the modeled wage estimates

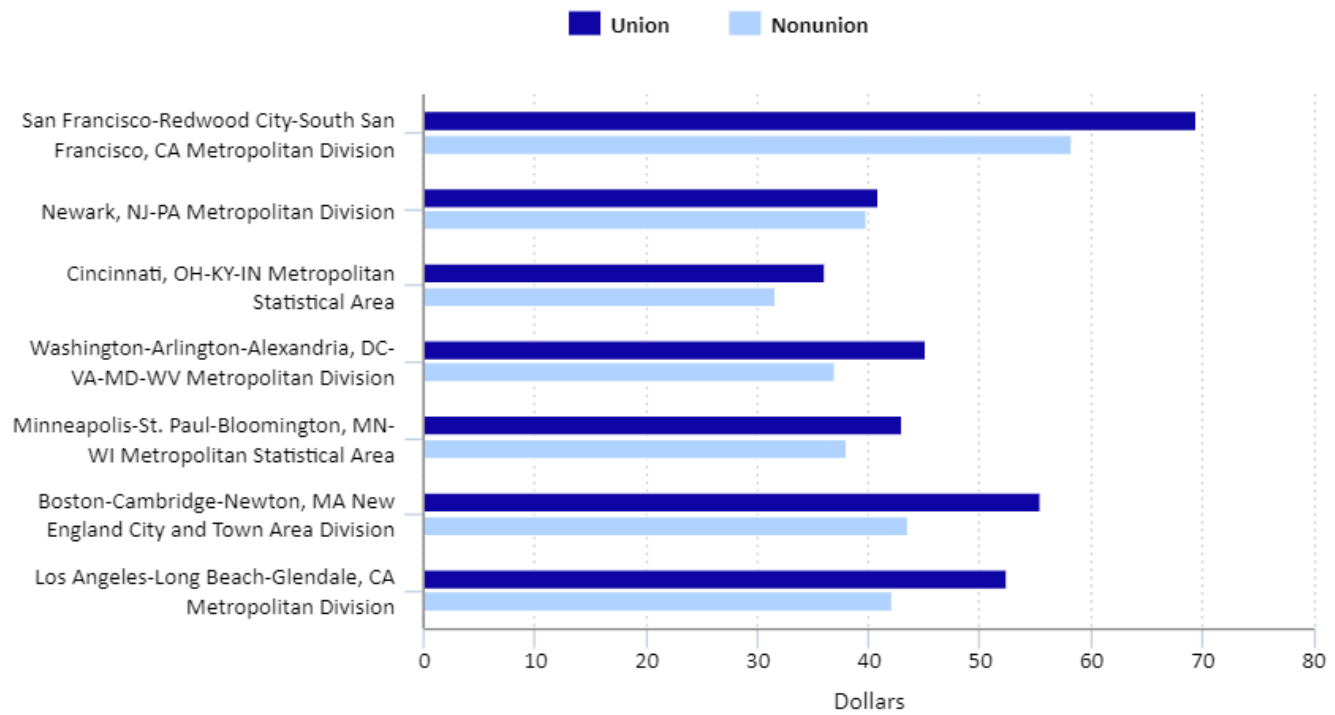
The modeled wage estimates provide a wealth of information on wages based on area, job characteristic, and work level. The most recent release of Modeled Wage Estimates, released in August 2019 for the 2018 reference year, contained 468,314 estimates for 521 unique Metropolitan Statistical Areas (MSAs) and Nonmetropolitan or Balance-of-State (BOS) Statistical Areas at the state and national level. Estimates were released for 633 occupational groups and detailed occupations. With so many areas, job types, and job characteristics, many interesting stories unfold when exploring the estimates.

Estimates for all data in this article correspond with a margin of error at the 90-percent confidence interval.<sup>3</sup> Click on the view chart data link (below the chart) to see how far the estimate may be from the true value and to note the estimate's precision.

## Union or nonunion

Understanding the differences in occupational wages across the U.S. economy by bargaining status (union and nonunion) can be useful. Chart 1 shows that average hourly wages for registered nurses differ by bargaining status in seven areas. Unionized registered nurses earn \$52.41 per hour in the Los Angeles Metropolitan Division, whereas nonunionized nurses earn \$42.19 per hour. Similarly, registered nurses in the Cincinnati MSA earn \$36.06 per hour if they are union workers or \$31.58 per hour as nonunion workers.

**Chart 1. Average hourly wages for registered nurses, by bargaining status, civilian workers, 2017**



Click legend items to change data display. Hover over chart to view data.  
 Note: Margin of errors can be viewed in the chart data link.  
 Source: U.S. Bureau of Labor Statistics, Modeled Wage Estimates.

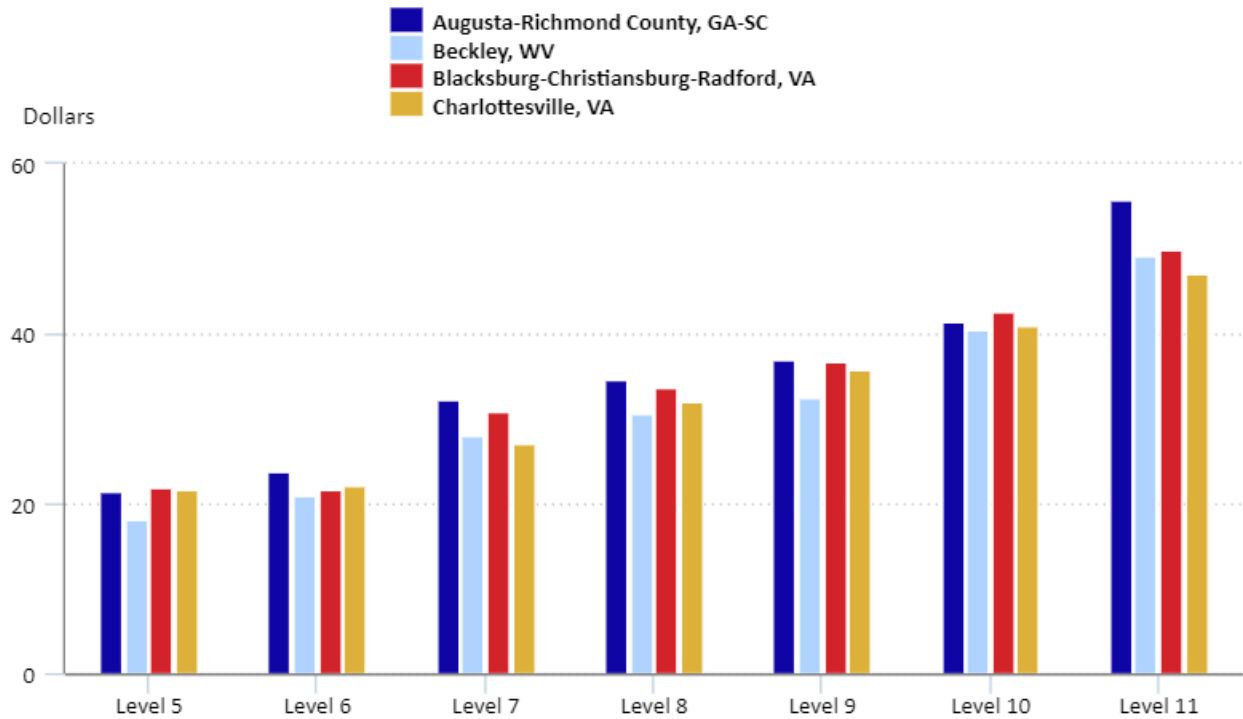
## Work level and geographical area

Another way modeled wage estimates can be used is to compare a job by work level and geographical area. A work level, ranging from 1 to 15, is determined by a field economist for each NCS sampled job based on a job’s duties and responsibilities.<sup>4</sup> There are four factors used to determine the work level: knowledge, job controls and complexity, contacts, and physical environment. The more complex the job, the higher the job level number.

Estimates for geographical areas include the entire nation, states, and metropolitan and nonmetropolitan areas.<sup>5</sup>

Chart 2 shows how wages for architecture and engineering occupations vary by location and level. For example, the Beckley, West Virginia area had a wage of \$18.13 per hour at level 5 and had a wage of \$49.26 per hour at level 11. These hourly wages can be compared with other areas, such as the Charlottesville, Virginia area, which had a wage of \$21.56 per hour at level 5 and a wage of \$47.09 per hour at level 11.

**Chart 2. Hourly wages for civilian architecture and engineering occupations, by level and geographical area, 2017**

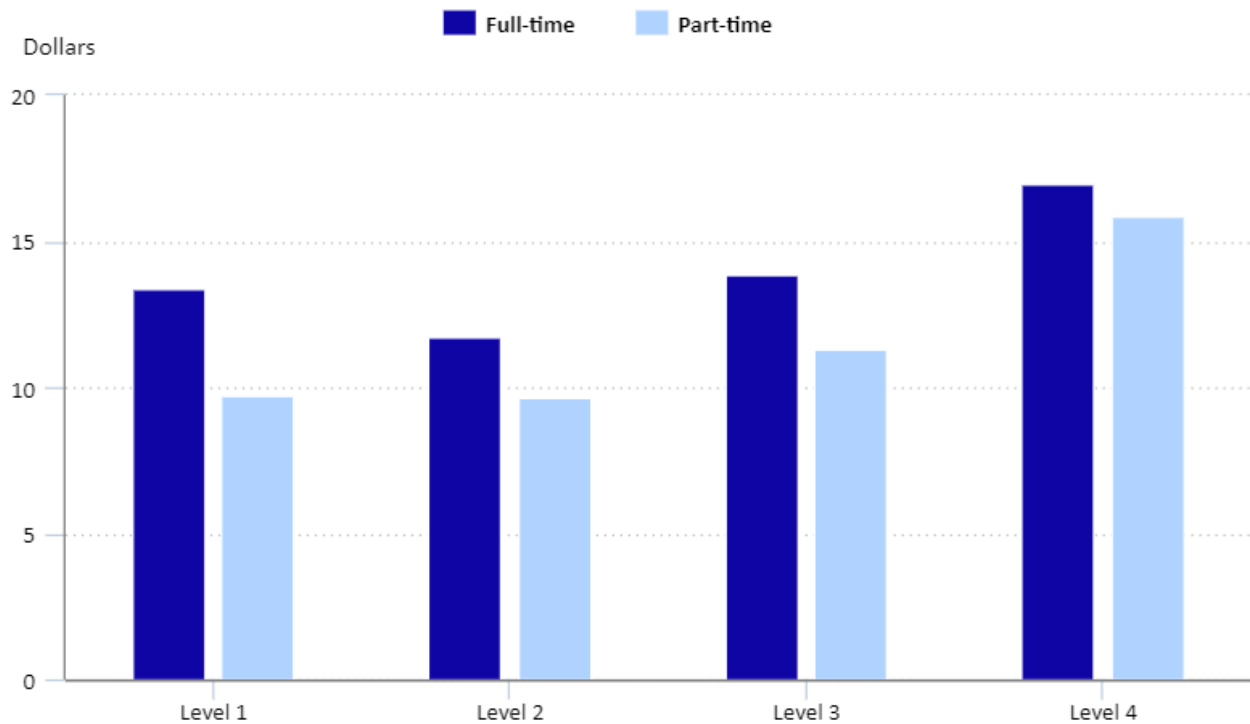


Click legend items to change data display. Hover over chart to view data.  
 Note: Margin of errors can be viewed in the chart data link.  
 Source: U.S. Bureau of Labor Statistics, Modeled Wage Estimates.

## Part-time or full-time, by level

Modeled wage estimates provide information on wages by part-time and full-time status by work level. Chart 3 shows estimates for part-time and full-time office and administrative support occupations in the Charlotte-Concord-Gastonia, North Carolina-South Carolina area. At level 1, part-time workers earned \$9.74 per hour, and full-time workers earned \$13.41 per hour. At level 4, part-time workers earned \$15.88 per hour, and full-time workers earned \$16.94 per hour.

**Chart 3. Average hourly wages for office and administrative support occupations in Charlotte-Concord-Gastonia, NC-SC, civilian workers, 2017**

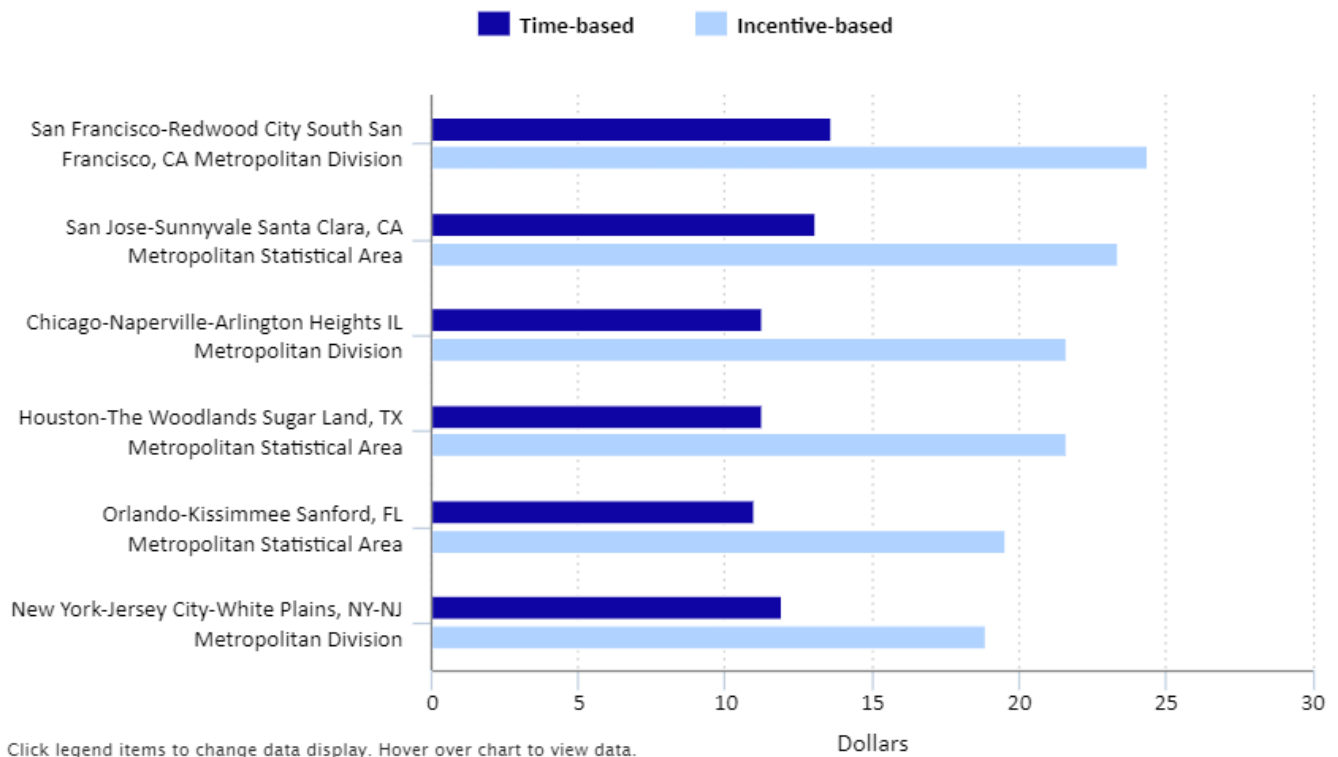


Click legend items to change data display. Hover over chart to view data.  
 Note: Margin of errors can be viewed in the chart data link.  
 Source: U.S. Bureau of Labor Statistics, Modeled Wage Estimates.

## Incentive- and time-based pay

Modeled wage estimates also provide information on incentive- and time-based pay workers. Time-based pay is wages and salaries based solely on a unit of time, such as an hourly rate or an annual salary. Incentive-based pay is wages and salaries at least partially based on productivity payments, such as nonproduction bonuses, commissions, or piece-rates. Chart 4 shows how incentive- and time-based pay differ by selected areas for retail salespersons. For example, in the New York-Jersey City-White Plains, NY-NJ Metropolitan Division, commissioned retail salespersons earned \$18.88 per hour while time-based pay retail salespersons earned \$11.92 per hour. In the San Francisco-Redwood City-South San Francisco, CA Metropolitan Division, incentive-based pay retail salespersons earned \$24.41 per hour, while time-based pay workers earned \$13.64 per hour.

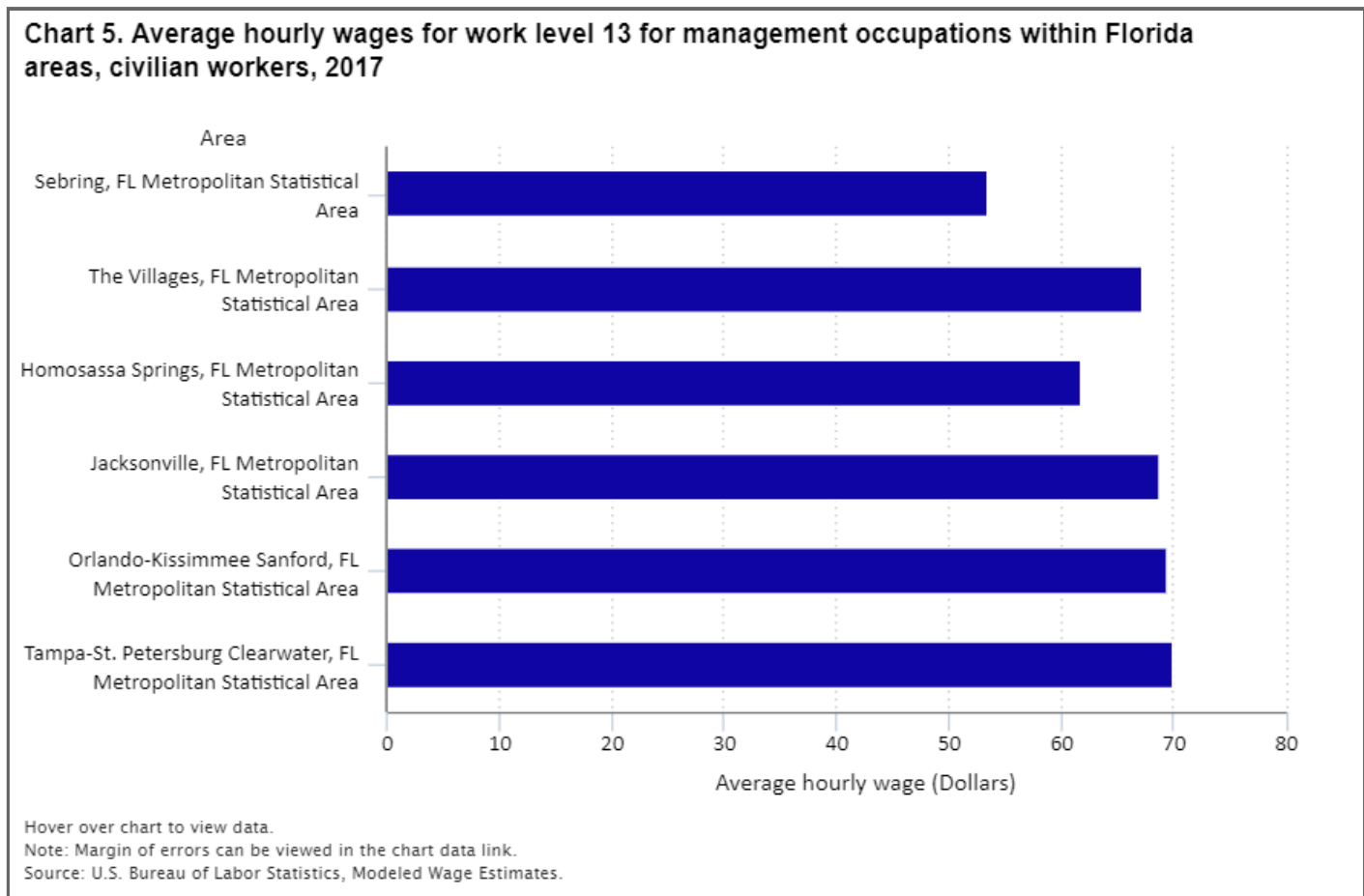
**Chart 4. Average hourly wages for retail salespersons by Metropolitan Statistical Area, civilian workers, 2017**



Click legend items to change data display. Hover over chart to view data.  
 Note: Margin of errors can be viewed in the chart data link.  
 Source: U.S. Bureau of Labor Statistics, Modeled Wage Estimates.

## Work level and Metropolitan Statistical Areas

Modeled wage estimates can also be used to compare specific work levels and occupations across different geographical areas. Chart 5 shows level 13 workers in management occupations in six Metropolitan Statistical Areas in Florida. Sebring, the Villages and Homosassa Springs are comparable by employment size.<sup>6</sup> Level 13 workers in the management occupational group earned \$68.83 per hour in Jacksonville, while workers in the same level and occupational group earned \$53.45 per hour in Sebring, Florida.



## Enhancements to the modeled wage estimates

Starting with the 2016 estimates, sample groups from 3 years were combined and aged to a common reference period, which almost doubled the number of modeled wage estimates, compared with the previous method. Aging factors were calculated using the Employment Cost Index (ECI) and applied to employee wages from prior years to adjust the wages to current levels.

Another enhancement to this series was the creation and publication of 16 new categories of estimates: all workers by level. These new estimates combine part-time and full-time workers within each level and supplement the existing level estimates, which are part-time by level and full-time by level.<sup>7</sup>

## Conclusion

The Modeled Wage Estimates combine data and information from two different BLS surveys in order to create wage estimates. These estimates allow us to see, for example, that commission-based retail salespersons in the San Francisco MSA make \$5.53 more per hour, on average, than those in the New York City MSA. Level 13 management workers earn \$68.83 per hour in Jacksonville, Florida, compared with \$53.45 per hour in Sebring, Florida. Readers are encouraged to explore the over 230,000 estimates published most recently and use them to understand differences in wages across the country. As this collaborative product with its accompanying estimates is still relatively new, the modeled wage estimation process and outputs will continue to be refined over time to create even more comprehensive and precise statistics.

This **Beyond the Numbers** article was prepared by David Zook, an economist, and Adam Issan, a statistician, in the Office of Compensation and Working Conditions, U.S. Bureau of Labor Statistics. Telephone: (202) 691-6199; Email: [NCSinfo@BLS.gov](mailto:NCSinfo@BLS.gov).

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## NOTES

<sup>1</sup> Levels reflect differences in duties and responsibilities within an occupation. When collecting data from respondents, NCS field economists use a point-factor method to determine the work level of sampled jobs being collected in the survey. The “NCS: Leveling Guide for Evaluating Your Firm’s Job and Pay” (available at [www.bls.gov/ncs/ocs/sp/ncbr0004.pdf](http://www.bls.gov/ncs/ocs/sp/ncbr0004.pdf)) provides more detail on how job levels are determined.

<sup>2</sup> The Modeled Wages Estimates are publicly available at [www.bls.gov/mwe/](http://www.bls.gov/mwe/).

<sup>3</sup> Because the NCS and OES are sample surveys, both are subject to sampling errors. Sampling errors are differences that occur between the results computed from a sample of observations and those computed from all observations in the population. The estimates derived from different samples selected using the same sample design may differ from each other. A measure of the variation among these differing estimates is the standard error. The relative standard error is the standard error expressed as a percentage of the hourly wage. It can be used to measure the precision with which an estimate from a particular sample approximates the expected result of all possible samples. The chances are about 68 out of 100 that an estimate from the survey differs from a complete population figure by less than the standard error. By selecting a 90-percent confidence interval, the chances are about 90 out of 100 that this difference would be less than 1.6 times the standard error.

<sup>4</sup> For more information on work levels and pay and benefits, see Kristen Monaco, “How pay and benefits change as job level rises: data from the National Compensation Survey,” [www.bls.gov/opub/btn/volume-6/how-pay-and-benefits-change-as-job-level-rises-data-from-the-national-compensation-survey.htm](http://www.bls.gov/opub/btn/volume-6/how-pay-and-benefits-change-as-job-level-rises-data-from-the-national-compensation-survey.htm).

<sup>5</sup> The OES areas are the scope of the geographic detail for Modeled Wage Estimates. For a listing of areas covered by the latest OES estimates, see; [www.bls.gov/oes/current/oessrcma.htm](http://www.bls.gov/oes/current/oessrcma.htm).

<sup>6</sup> For detailed area information, please see: [www.bls.gov/oes/current/oes\\_15980.htm](http://www.bls.gov/oes/current/oes_15980.htm).

<sup>7</sup> An additional improvement to the modeled wage estimate series is the publication of relative standard errors for the first time. As relative standard errors were only available for Metropolitan Statistical Areas (MSAs) and Balance-of-State (BOS) geographical areas, only wage estimates from these area breakouts were released for 2017. The processes for calculating relative standard errors have been implemented for national and state estimates and were released with the 2018 reference year estimates.



**SUGGESTED  
CITATION**

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