Revisions in State Establishment-based Employment Estimates Effective January 2016

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Introduction

With the release of the payroll employment estimates for January 2016, nonfarm payroll employment, hours, and earnings data for states and areas were revised to reflect the incorporation of the 2015 benchmarks and the recalculation of seasonal adjustment factors for payroll employment estimates. The revisions affect all not seasonally adjusted data from April 2014 to December 2015, all seasonally adjusted data from January 2011 to December 2015[1], and select series subject to historical revisions before April 2014. This article provides background information on benchmarking methods, business birth/death modeling, seasonal adjustment of employment data, and details of the effects of the 2015 benchmark revisions on state and area payroll employment estimates.

Summary of benchmark revisions

The average absolute percentage revision across all states for total nonfarm payroll employment is 0.4 percent for March 2015. This compares to the average of 0.5 percent for the same measure during the five prior benchmark years of 2010 to 2014. For March 2015, the range of the percentage revision for total nonfarm payroll employment across all states is from -1.8 to 1.3 percent.

Benchmark methods

The Current Employment Statistics (CES) program, also known as the payroll survey, is a federal and state cooperative program that provides, on a timely basis, estimates of payroll employment, hours, and earnings for states and areas by sampling the population of employers. Each month the CES program surveys about 146,000 businesses and government agencies, representing approximately 623,000 individual worksites, in order to provide detailed industry level data on employment and the hours and earnings of employees on nonfarm payrolls for all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and about 450 metropolitan areas and divisions.[2]

As with data from other sample surveys, CES payroll employment estimates are subject to both sampling and nonsampling error. Sampling error is an unavoidable byproduct of forming an inference about a population based on a limited sample. The larger the sample is, relative to the population, the smaller the sampling error. The sample-to-population ratio varies across states and industries. Nonsampling error, by contrast, generally refers to errors in reporting and processing.[3]

In order to control both sampling and nonsampling error, CES payroll employment estimates are benchmarked annually to employment counts from a census of the employer population. These counts are derived primarily from employment data provided in unemployment insurance (UI) tax reports that nearly all employers are required to file with state workforce agencies. The UI tax reports are collected, reviewed, and edited as part of the BLS Quarterly Census of Employment and Wages (QCEW) program.[4] As part of the benchmark process for benchmark year 2015, census-derived employment counts replace CES payroll employment estimates for all 50 states and the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and about 450 metropolitan areas and divisions for the period of April 2014 to September 2015.

UI tax reports are not collected on a timely enough basis to allow for replacement of CES payroll estimates for the fourth quarter, October 2015 to December 2015. For this period, estimates based on existing sample information

[1] Further information regarding the difference in historical reconstruction between not seasonally adjusted data and seasonally adjusted data is available in the seasonal adjustment section of this article and at http://www.bls.gov/sae/790over.htm

[2] Further information on the sample size for each state is available at www.bls.gov/sae/sample.htm.

[3] Further information on the reliability of CES estimates is contained in the Technical Note of the latest Regional and State Employment and Unemployment press release and is available at www.bls.gov/sae/news.htm.

[4] Further information on the BLS Quarterly Census of Employment and Wages program is available at www.bls.gov/cew/.

are revised using the new September 2015 series level derived from census employment counts and incorporate updated business birth/death factors.[5]

Special notice regarding industry reconstructions and series structure changes

Reconstruction of individual and family services series in California
North American Industry Classification System (NAICS) code 624120 services for the elderly and persons with disabilities was previously reconstructed with the 2013 benchmark due to a correction in the coding of UI records for several state programs that provide funding for services for the elderly and persons with disabilities. That reconstruction was developed based upon the best information available at the time for the programs.[6]

Since this initial reconstruction, the State of California Labor Market Information (LMI) agency continued to work on analyzing the data for the In-Home Support Services (IHSS) program with the authorized payroll agent, which had switched to a new payroll processing system, providing more accurate employment counts. Further examination of this information led the California LMI agency and BLS to conclude that additional refinement to the services for the elderly and persons with disabilities employment (NAICS 624120) reconstruction was appropriate.[7]

This reconstruction resulted in revisions to the not seasonally adjusted data for California series 65-624100 individual and family services and its aggregates from January 2000 to March 2015. Seasonally adjusted data for series 65-620000 and its aggregates were subject to revision back to January 1990.

Addition of mining, logging, and construction series
With the release of the 2015 benchmark, BLS previously published mining and logging (series 10-000000) and construction (series 20-000000) for some states, and will now also publish mining, logging, and construction (series 15-000000) as an aggregate of both mining and logging and construction. Four states (Maryland, Nebraska, South Dakota, and Tennessee) that previously only published mining, logging, and construction (15-000000) will now publish both mining and logging (10-000000) and construction (20-000000), and estimate mining, logging, and construction as an aggregate of the two.[8]

Additionally, the series codes for construction of buildings, heavy and civil engineering construction, and specialty trade contractors (previously 15-236000, 15-237000, and 15-238000, respectively) have been recoded under construction (now 20-236000, 20-237000, and 20-238000, respectively).

Business birth/death modeling

Sample-based estimates are adjusted each month by a statistical model designed to reduce a primary source of non-sampling error: the inability of the sample to capture employment growth generated by new business formations on a timely basis. There is an unavoidable lag between an establishment opening for business and its appearance in the sample frame making it available for sampling. Because new firm births generate a portion of employment growth each month, nonsampling methods must be used to estimate this growth.

Earlier research indicated that, while both the business birth and death portions of total employment are generally significant, the net contribution is relatively small and stable. To account for this net birth/death portion of total employment, BLS uses an estimation procedure with two components. The first component excludes employment losses due to business deaths from sample-based estimation in order to offset the missing employment gains from

[5] Further information on the monthly estimation methods of the CES program can be found in Chapter 2 of the *BLS Handbook of Methods* and is available at www.bls.gov/opub/hom/pdf/homch2.pdf.
[6] For more information see the 2013 State and Area Benchmark article at http://www.bls.gov/sae/benchmark2014.pdf.
[7] For more information see the 2015 National Benchmark article at http://www.bls.gov/web/empsit/cesbmart.pdf.
[8] A full list of published series by state is available at http://www.bls.gov/sae/saeseries.htm.

business births. This is incorporated into the sample-based estimate procedure by simply not reflecting sample units going out of business, but rather imputing to them the same employment trend as the other continuing firms in the sample. This step accounts for most of the birth and death changes to employment.[9]

The second component is an autoregressive integrated moving average (ARIMA) time series model designed to estimate the residual birth/death change to employment not accounted for by the imputation. To develop the history for modeling, the same handling of business deaths as described for the CES monthly estimation is applied to the population data. Establishments that go out of business have employment imputed for them based on the rate of change of the continuing units. The employment associated with continuing units and the employment imputed from deaths are aggregated and compared to actual population levels. The differences between the two series reflect the actual residual of births and deaths over the past five years. The historical residuals are converted to month-to-month differences and used as input series to the modeling process. Models for the residual series are then fit and forecasted using X-13 ARIMA-SEATS software.[10] The residuals exhibit a seasonal pattern and may be negative for some months. This process is performed at the national level and for each individual state. Finally, differences between forecasts of the nationwide birth/death factors and the sum of the states' birth/death factors are reconciled through a ratio-adjustment procedure, and the factors are used in monthly estimation of payroll employment in 2016. The updated birth/death factors are also used as inputs to produce the revised estimates of payroll employment for October 2015 to December 2015.

Seasonal adjustment

CES payroll employment data are seasonally adjusted by a two-step process.[11] BLS uses the X-13 ARIMA-SEATS program to remove the seasonal component of month-to-month employment changes. This process uses the seasonal trends found in census-derived employment counts to adjust historical benchmark employment data while also incorporating sample-based seasonal trends to adjust sample-based employment estimates. These two series are independently adjusted then spliced together at the benchmark month (in this case September 2015).[12] By accounting for the differing seasonal patterns found in historical benchmark employment data and the sample-based employment estimates, this technique yields improved seasonally adjusted series with respect to analysis of month-to-month employment change.[13] Seasonally adjusted employment data for the most recent 13 months are published regularly in table D-1.[14]

The aggregation method of seasonally adjusted data is based upon the availability of underlying industry data. For all 50 states, the District of Columbia, and Puerto Rico, the following series are sums of underlying industry data: total private, goods-producing, service-providing, and private service-providing. The same method is applied for the Virgin Islands with the exception of goods-producing, which is independently seasonally adjusted because of data limitations. For all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands, data for manufacturing, trade, transportation, and utilities, financial activities, education and health services, leisure and hospitality, and government are aggregates wherever exhaustive industry components are available; otherwise these industries' employment data are directly seasonally adjusted. In a very limited number of cases, the not seasonally adjusted data for mining, construction, manufacturing, trade, transportation, and utilities, financial activities, education and health services, leisure and hospitality, and government do not exhibit enough seasonality to be

[9] Technical information on the estimation methods used to account for employment in business births and deaths is available at http://www.bls.gov/web/empsit/cesbd.htm.
[10] Further information on the X-13 ARIMA-SEATS is available on the US Census Bureau website at https://www.census.gov/srd/www/x13as/.
[11] Research from the Dallas Federal Reserve has shown that CES benchmarked population data exhibits a seasonal pattern different from the sample-based estimates. Please see Berger, Franklin D. and Keith R. Phillips (1994) "Solving the Mystery of the Disappearing January Blip in State Employment Data," Federal Reserve Bank of Dallas, Economic Review, April, 53-62, available at: http://www.dallasfed.org/assets/documents/research/er/1994/er9402d.pdf.
[12] The two-step seasonal adjustment process is explained in detail by Scott, Stuart; Stamas, George; Sullivan, Thomas; and Paul Chester (1994), "Seasonal Adjustment of Hybrid Economic Time Series," *Proceedings of the Section on Survey Research Methods*, American Statistical Association, available at: http://www.bls.gov/osmr/abstract/st/st940350.htm.
[13] A list of all seasonally adjusted employment series are available at www.bls.gov/sae/saeseries.htm.
[14] Table D-1 can be viewed at www.bls.gov/sae/tables.htm.

adjusted; in those cases the not seasonally adjusted data are used to sum to higher level industries. The seasonally adjusted total nonfarm data for all metropolitan statistical areas (MSAs) and Metropolitan Divisions are not an aggregation but are derived directly by applying the seasonal adjustment procedure to the not seasonally adjusted total nonfarm level.[15]

Variable survey intervals
BLS utilizes special model adjustments to control for survey interval variations, sometimes referred to as the 4 vs. 5 week effect, for all nonfarm seasonally adjusted series. Although the CES survey is referenced to a consistent concept, the pay period including the 12th day of each month, inconsistencies arise because there are sometimes 4 and sometimes 5 weeks between the weeks including the 12th day in a given pair of months. In highly seasonal industries, these variations can be an important determinant of the magnitude of seasonal hires or layoffs that have occurred at the time the survey is taken.[16]

Series updates
With the release of the 2015 benchmark, BLS previously published mining and logging (series 10-000000) and construction (series 20-000000) seasonally adjusted for some states, and will now also publish mining, logging, and construction (series 15-000000) as an aggregate of both mining and logging and construction. Where either mining and logging or construction are not seasonally adjusted, series 15-000000 will be aggregated using the not seasonally adjusted data. Four states (Maryland, Nebraska, South Dakota, and Tennessee) that added the publication of mining and logging and construction will not publish these series on a seasonally adjusted basis due to the lack of previously published sample data which is necessary as input to the previously mentioned two-step seasonal adjustment process. In addition, Delaware, the District of Columbia, Hawaii, and Virgin Islands will continue to publish series 15-000000 as an independently seasonally adjusted series since they do not publish either series 10-000000 or 20-000000.

Area updates
With the 2014 benchmark, CES updated its area definitions to reflect new area delineations announced by the Office of Management and Budget (OMB) based on the application of new data standards from the 2010 Census.[17] For new areas resulting from the BLS update in the 2014 benchmark to official 2010 area delineations, only one year of published sample data was available as input to the two-step seasonal adjustment process. Therefore, BLS will not be publishing any seasonally adjusted data for these areas for at least 2 more years.[18]

For redelineated areas, BLS conducted research to test for breaks in the seasonality of new series. The goal was to balance the statistical integrity of what is published with the overall demand for seasonally adjusted data. BLS determined, through a number of statistical tests for series breaks, that most areas that had an absolute compositional change equal to or more than 4 percent would be more certain of having a break in the seasonality of the sample-based series, and therefore not be eligible for seasonal adjustment. Conversely, impacted areas that had an absolute compositional change of less than 4 percent would be eligible to be published seasonally adjusted. There were 57 compositionally changing areas that underwent an absolute percentage change of less than 4 percent and were published in 2015 on a seasonally adjusted basis. The series will be published seasonally adjusted in 2016 as well. The 59 compositionally changing areas that underwent an absolute percentage change of 4 percent or greater, and were not published seasonally adjusted in 2015, will again not be published on a seasonally adjusted basis for 2016.[19] BLS will be able to publish seasonally adjusted data for these missing areas as more sample-based data become available, which will likely be at least 2 more years.

[15] A list of BLS MSAs is available at http://download.bls.gov/pub/time.series/sm/sm.area.
[16] For more information on the presence and treatment of calendar effects in CES data, see www.bls.gov/ore/pdf/st960190.pdf.
[17] For a summary of changes to statistical areas made with the 2014 benchmark, see www.bls.gov/sae/benchmark2015.pdf.
[18] The X-13 ARIMA-SEATS software used by BLS requires a minimum of 3 years of data to process a time series. A list of new areas added in the 2014 benchmark is available in table A2 of the Appendix.
[19] A list of compositionally changed areas for which seasonally adjusted data is not published is available in table A1 of the Appendix.

Benchmark revisions

Revisions by industry

The magnitude of benchmark revisions is commonly gauged by the percentage difference between the sample-based estimates of payroll employment and the revised benchmark payroll employment levels for March of the benchmark year, presently March 2015. As noted earlier, the average absolute percentage revision across all states for total nonfarm payroll employment is 0.4 percent for March 2015. This compares to the average of 0.5 percent for the same measure during the five prior benchmark years of 2010 to 2014. For March 2015, the range of the percentage revision for total nonfarm payroll employment across all states is from -1.8 to 1.3 percent. (See table 1a.)

For December 2015, the average absolute percentage revision for state total nonfarm payroll employment is 0.5 percent. This compares to the average of 0.7 percent for the same measure during the five prior benchmark years of 2010 to 2014. The range of the percentage revision for state total nonfarm payroll employment is from –1.5 to 1.6 percent for December 2015. (See table 1a.)

Absolute level revisions provide further insight on the magnitude of benchmark revisions. Absolute level revisions are measured as the absolute difference between the sample-based estimates of payroll employment and the benchmark levels of payroll employment for March 2015. A relatively large benchmark revision in terms of percentage can correspond to a relatively small benchmark revision in terms of level due to the amount of employment in the industry.

Table 1a. Absolute percentage differences between state employment estimates and benchmarks by industry, March 2010–March 2015 and December 2015 (all values in percent)

Industry	Mar 2010	Mar 2011	Mar 2012[1]	Mar 2013[2]	Mar 2014	Mar 2015	Dec 2015
Total nonfarm	0.4	0.5	0.7	0.4	0.5	0.4	0.5
Mining and logging	7.5	3.2	4.7	3.7	2.8	4.2	7.1
Construction	3.6	3.2	4.4	3.1	3.0	2.6	3.4
Manufacturing	1.8	1.4	1.5	1.4	1.2	1.3	1.7
Trade, transportation, and utilities	1.2	0.9	1.1	1.0	0.7	0.6	1.3
Information	2.3	2.4	3.2	2.2	2.0	2.6	3.3
Financial activities	1.8	1.9	2.2	1.6	2.0	1.9	2.4
Professional and business services	2.2	1.8	1.9	1.8	1.6	1.6	1.8
Education and health services	1.0	0.9	1.4	1.6	0.9	0.9	1.2
Leisure and hospitality	1.8	1.9	2.3	1.4	1.4	1.4	1.4
Other services	1.9	2.4	2.7	2.1	2.4	2.1	2.5
Government	0.8	0.7	1.0	0.7	0.9	0.7	0.9
Total nonfarm:							
Range	-1.3 to 1.4	-1.8 to 1.4	-1.5 to 2.2	-0.7 to 2.9	-1.5 to 2.0	-1.8 to 1.3	-1.5 to 1.6
Mean	-0.1	0.2	0.6	0.3	0.1	(3)	0.1
Standard deviation	0.5	0.6	0.7	0.6	0.6	0.5	0.7

[1] CES State and Area payroll employment estimates are typically replaced with census derived employment counts through the third quarter of the benchmark year. However, in the 2011 benchmark year, CES estimates were replaced only through the second quarter of 2011 (through June 2011). As a result, the March 2012 benchmark revisions reflect revisions to cumulatively more months of sample-based estimates than is typical, contributing to generally higher rates of revision. For more information, see http://www.bls.gov/sae/benchmark2013.pdf.

[2] The CES estimates in this column were subject to large revisions and historical reconstructions due to substantial reclassifications by the QCEW program in the financial activities and education and health services sectors. For more information, see http://www.bls.gov/news.release/archives/cewqtr_09262013.htm.

(3) Less than +/- 0.05 percent.

The following example demonstrates the necessity of considering both percentage revision and level revision when evaluating the magnitude of a benchmark revision in an industry. The average absolute percentage benchmark revisions across all states for financial activities and for professional and business services are 2.4 and 1.8 percent, respectively, for December 2015. However, for December 2015 the absolute level revision across all states for the financial activities industry is 2,700, while the absolute level revision across all states for the professional and business services industry is 6,200. (See table 1b.) Relying on a single measure to characterize the magnitude of benchmark revisions in an industry can potentially lead to an incomplete interpretation.

Table 1b. Absolute level differences between state employment estimates and benchmarks by industry, March 2010–March 2015 and December 2015 (all values payroll employment)

Industry	Mar 2010	Mar 2011	Mar 2012[1]	Mar 2013[2]	Mar 2014	Mar 2015	Dec 2015
Total nonfarm	7,600	10,200	14,800	16,900	11,500	9,200	12,300
Mining and logging	600	500	600	600	400	800	1,400
Construction	2,900	3,300	4,200	2,700	2,800	2,500	3,100
Manufacturing	2,000	2,100	2,200	1,500	1,700	2,200	2,900
Trade, transportation, and utilities	4,500	2,800	3,900	3,900	2,600	2,700	5,200
Information	1,200	1,300	1,500	800	900	1,100	1,400
Financial activities	2,300	2,600	2,500	2,000	2,100	1,900	2,700
Professional and business services	4,600	4,700	5,500	4,100	3,900	5,100	6,200
Education and health services	2,800	3,000	4,600	12,000	3,400	3,700	4,600
Leisure and hospitality	3,500	3,100	5,200	2,900	3,500	2,600	3,100
Other services	1,600	1,900	2,300	2,000	2,000	1,800	2,100
Government	3,800	3,700	4,100	2,500	3,900	2,600	3,500
Total nonfarm:							
Range	-38,700 to 28,900	-15,300 to 57,500	-28,900 to 59,400	-13,700 to 428,200	-40,800 to 103,800	-103,600 to 21,200	-51,700 to 67,500
Mean	-1,700	6,100	13,100	13,800	5,500	-2,400	4,000
Standard deviation	11,300	15,300	16,200	60,800	20,200	17,400	18,500

[1] CES State and Area payroll employment estimates are typically replaced with census derived employment counts through the third quarter of the benchmark year. However, in the 2011 benchmark year, CES estimates were replaced only through the second quarter of 2011 (through June 2011). As a result, the March 2012 benchmark revisions reflect revisions to cumulatively more months of sample-based estimates than is typical, contributing to generally higher rates of revision. For more information, see http://www.bls.gov/sae/benchmark2013.pdf.

[2] The CES estimates in this column were subject to large revisions and historical reconstructions due to substantial reclassifications by the QCEW program in the financial activities and education and health services sectors. For more information, see http://www.bls.gov/news.release/archives/cewqtr_09262013.htm.

Revisions by state

For March 2015, 25 states and the District of Columbia revised nonfarm payroll employment upward, while 25 states revised payroll employment downward. (See table 2 or map 1.)

For December 2015, 26 states revised nonfarm payroll employment upward, while 24 states and the District of Columbia revised payroll employment downward. (See table 2 or map 2.) The percentiles of percent revisions for March 2015 and December 2015 can be found below. (See Exhibit 1.)

Table 2. Percent differences between nonfarm payroll employment benchmarks and estimates by state, March 2010–March 2015 and December 2015 (all values in percent)

State	Mar 2010	Mar 2011	Mar 2012	Mar 2013	Mar 2014	Mar 2015	Dec 2015
Alabama	0.3	-0.1	0.6	0.4	-0.1	-0.3	-0.2
Alaska	-1.3	-0.2	0.8	0.1	-0.2	0.2	-0.2
Arizona	-0.3	0.6	0.3	0.3	0.1	-0.2	0.5
Arkansas	-0.3	-1.1	1.2	-0.5	-0.7	-0.6	0.4
California	-0.1	(1)	0.3	2.9	0.7	-0.7	-0.3
Colorado	0.5	0.7	0.2	0.5	0.5	0.7	1.5
Connecticut	-1.3	(1)	0.6	0.2	-0.1	-1.0	-1.3
Delaware	-0.4	0.7	0.1	0.2	0.3	0.4	1.5
District of Columbia	-0.4	1.4	-0.8	1.1	0.3	0.4	-0.5
Florida	-0.2	0.5	0.5	0.3	-0.1	-0.2	0.2
Georgia	0.2	1.4	0.7	(1)	0.7	-0.3	0.4
Hawaii	-0.5	(1)	0.5	1.0	0.6	0.7	(1)
Idaho	-0.2	-0.4	0.3	0.2	2.0	-0.4	-0.2
Illinois	0.1	(1)	0.7	0.1	0.5	0.2	1.1
Indiana	-0.2	0.7	0.7	-0.2	-0.1	-0.1	-0.3
Iowa	-0.5	-0.2	0.8	-0.1	(1)	-0.5	-0.7
Kansas	-0.3	1.2	0.9	-0.2	0.5	-0.2	-0.4
Kentucky	-0.4	-0.3	-0.1	-0.3	0.3	-0.6	-0.5
Louisiana	-0.6	0.9	-1.5	-0.1	0.5	0.3	0.1
Maine	0.3	-0.4	0.3	(1)	-0.7	0.3	-0.3
Maryland	-0.1	1.1	-0.2	-0.4	-0.3	-0.2	-0.4
Massachusetts	0.9	0.3	1.3	1.2	0.1	0.5	-0.2
Michigan	0.2	0.2	1.1	0.9	1.1	-0.6	-0.3
Minnesota	-0.4	0.8	0.8	(1)	-0.6	-0.1	0.1
Mississippi	-0.1	-0.4	1.1	-0.7	(1)	0.2	0.9
Missouri	-0.5	-0.4	0.4	1.1	-1.5	0.4	0.4
Montana	0.2	-0.7	2.1	0.6	0.2	1.3	0.8
Nebraska	-0.2	-0.6	1.5	1.3	0.7	(1)	0.4
Nevada	-0.6	-0.1	0.4	0.5	-0.6	0.7	0.7
New Hampshire	-0.7	(1)	0.8	(1)	-0.3	-0.1	0.7
New Jersey	-0.1	-0.2	0.3	-0.1	0.5	(1)	0.7
New Mexico	-0.1	(1)	-0.2	0.2	0.5	-0.4	-0.3
New York	0.3	0.7	(1)	(1)	0.6	0.1	-0.1
North Carolina	(1)	0.8	0.3	-0.3	-0.1	-0.5	-0.3
North Dakota	0.8	0.3	2.0	-0.2	-1.4	-1.8	-1.5
Ohio	(1)	-0.3	0.6	0.9	0.4	0.1	0.4
Oklahoma	0.1	(1)	1.5	0.4	-0.3	0.5	0.3
Oregon	0.1	-0.3	0.7	0.2	-0.4	(1)	0.3
Pennsylvania	0.3	0.3	0.4	(1)	0.2	-0.1	0.1
Rhode Island	1.4	(1)	1.7	0.4	-0.2	0.1	0.1
South Carolina	-1.2	0.3	0.3	0.2	0.5	-0.2	-0.1
South Dakota	-0.1	0.5	1.4	-0.1	0.8	(1)	-0.9
Tennessee	(1)	0.7	0.8	-0.2	0.4	0.4	1.1
Texas	(1)	-0.1	0.5	(1)	0.1	0.1	0.2
Utah	-0.5	0.2	0.9	-0.2	-0.1	-0.2	(1)
Vermont	0.1	-1.8	0.5	0.1	(1)	-0.8	-0.3
Virginia	(1)	0.5	0.1	0.3	-0.3	0.6	1.3
Washington	-0.7	0.1	0.1	1.9	0.6	-0.6	-0.5
West Virginia	0.8	0.4	1.0	-0.7	-0.9	1.3	1.6
Wisconsin	0.7	0.1	2.2	0.6	-0.3	0.2	0.3
Wyoming	-0.1	0.1	1.0	0.4	-0.7	-0.4	-0.8

(1) Less than +/- 0.05 percent

Exhibit 1. Percentiles of percent revisions March 2015 and December 2015 (all values in percent)

Percentiles of Percent Revisions	March 2015	December 2015
20th percentile.....	-0.4	-0.3
40th percentile.....	-0.2	-0.2
60th percentile.....	0.1	0.2
80th percentile.....	0.4	0.7
100th percentile.....	1.3	1.6

Revisions by metropolitan statistical areas (MSAs)

For all metropolitan statistical areas (MSAs) published by the CES program, the percentage revisions ranged from –6.4 to 6.0 percent, with an average absolute percentage revision of 1 percent across all MSAs for March 2015. (See table 3a.) Comparatively, at the statewide level the range was -1.8 to 1.3 percent, with an average absolute percentage revision of 0.4 percent for March 2015. (See table 1a.) As MSA size decreases so does the sample size, resulting in larger relative standard errors and therefore increasing both the range of percent revisions and the average absolute percent revision. Metropolitan areas with 1 million or more employees during March 2015 had an average absolute revision of 0.4 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.2 percent. (See table 3a.)

For December 2015, the percentage revisions ranged from –12.5 to 8 percent, with an average absolute percentage revision of 1.3 percent across all published MSAs. (See table 3b.) Comparatively, at the statewide level the range was –1.5 to 1.6 percent, with an average absolute percentage revision of 0.5 percent for December 2015. (See table 1a.) As noted previously, both the range of percentage revisions and the average absolute percentage revision generally increase as the amount of employment in an MSA decreases. Metropolitan areas with 1 million or more employees during December 2015 had an average absolute revision of 0.6 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.7 percent. (See table 3b.)

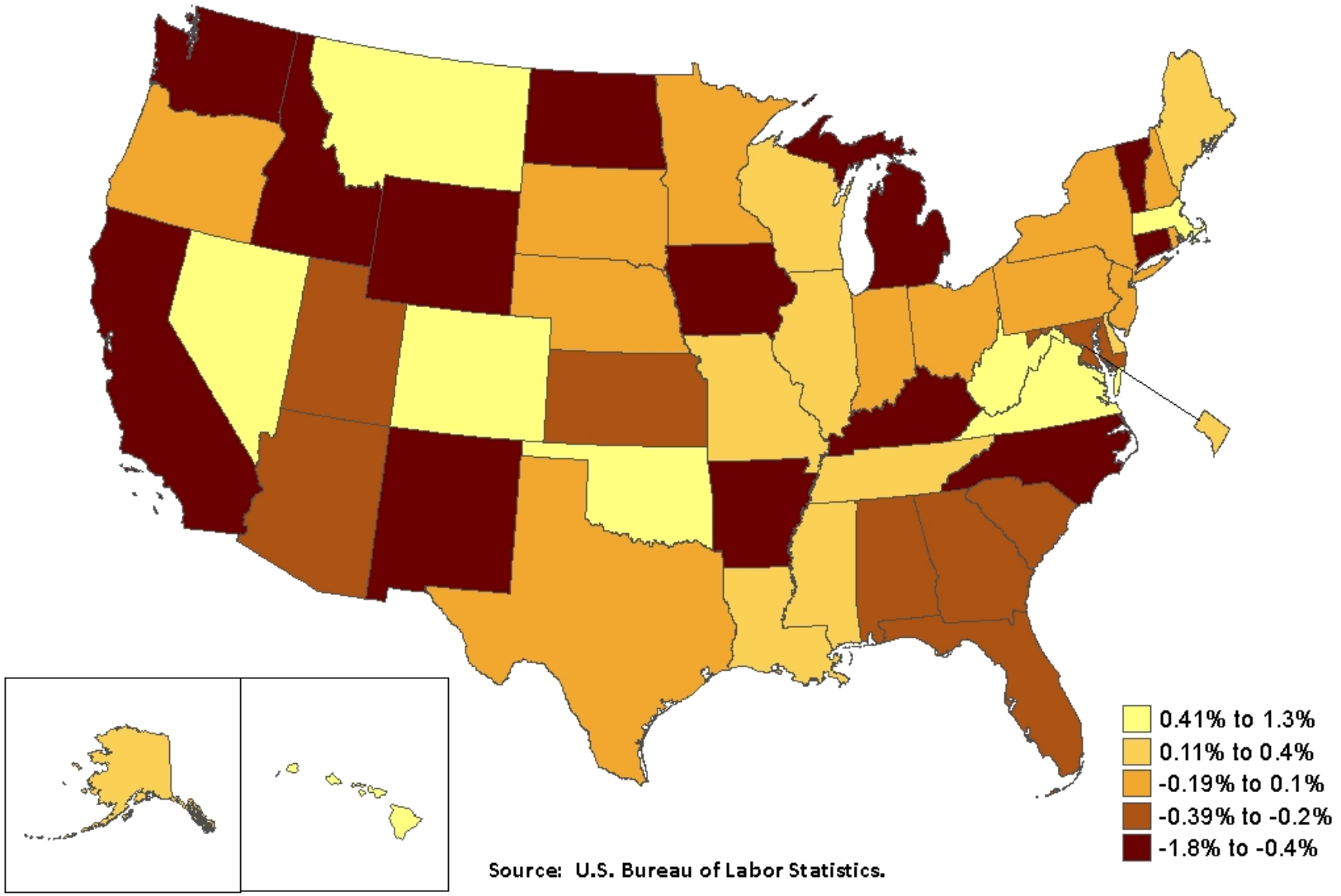
Table 3a. Benchmark revisions for nonfarm employment in metropolitan areas, March 2015

		MSAs grouped by level of total nonfarm employment			
Measure	All MSAs	Less than 100,000	100,000 to 499,999	500,000 to 999,999	1 million or more
Number of MSAs……..	387	188	147	22	30
Average absolute percentage revision……	1.0	1.2	0.8	0.8	0.4
Range……	-6.4 to 6.0	-6.4 to 6.0	-3.7 to 2.8	-1.1 to 1.6	-1.9 to 0.7
Mean.....	-0.3	-0.5	-0.2	0.2	-0.1
Standard deviation……...	1.3	1.6	1.0	0.9	0.6

Table 3b. Benchmark revisions for nonfarm employment in metropolitan areas, December 2015

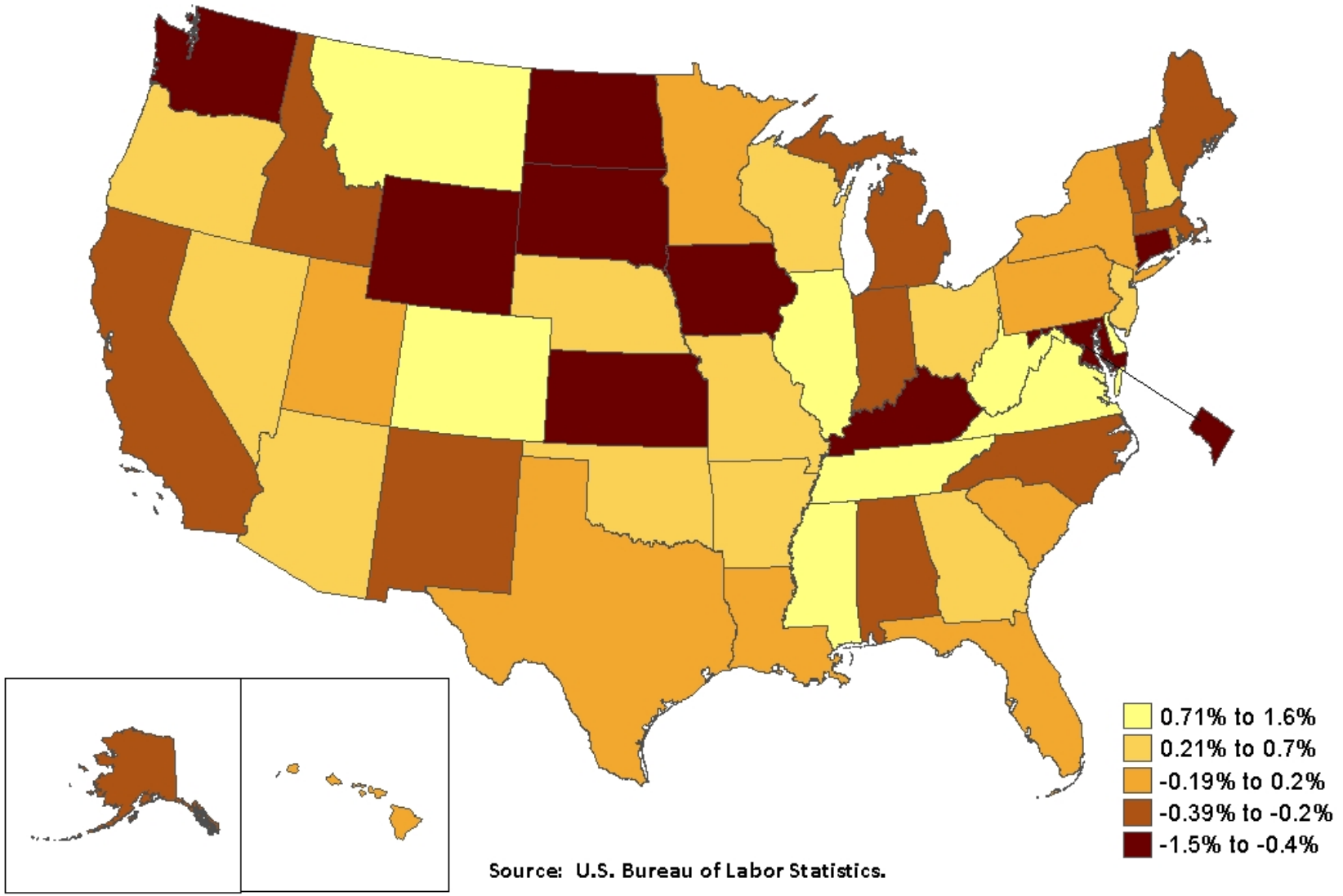
Measure	All MSAs	MSAs grouped by level of total nonfarm employment			
		Less than 100,000	100,000 to 499,999	500,000 to 999,999	1 million or more
Number of MSAs……..	387	188	147	22	30
Average absolute percentage revision……	1.3	1.7	1.1	1.0	0.6
Range……	-12.5 to 8.0	-12.5 to 8.0	-5.8 to 4.2	-1.4 to 3.6	-1.5 to 1.3
Mean.....	0.2	0.3	0.1	0.4	0.1
Standard deviation……...	1.9	2.3	1.4	1.2	0.8

Map 1. Percent differences between nonfarm payroll employment benchmarks and estimates by state, March 2015



Source: U.S. Bureau of Labor Statistics.

Map 2. Percent differences between nonfarm payroll employment benchmarks and estimates by state, December 2015



Source: U.S. Bureau of Labor Statistics.

Appendix

Table A1. Areas where seasonally adjusted data are not published due to compositional changes in benchmark year 2014

Area Code	Area Title	Area Code	Area Title
10380	Aguadilla-Isabela, PR	38540	Pocatello, ID
14010	Bloomington, IL	38660	Ponce, PR
14020	Bloomington, IN	40340	Rochester, MN
14540	Bowling Green, KY	41540	Salisbury, MD-DE
16620	Charleston, WV	41884	San Francisco-Redwood City-South San Francisco, CA Metropolitan Division
16740	Charlotte-Concord-Gastonia, NC-SC	43340	Shreveport-Bossier City, LA
16974	Chicago-Naperville-Arlington Heights, IL Metropolitan Division	43580	Sioux City, IA-NE-SD
18880	Crestview-Fort Walton Beach-Destin, FL	43900	Spartanburg, SC
19660	Deltona-Daytona Beach-Ormond Beach, FL	44060	Spokane-Spokane Valley, WA
21060	Elizabethtown-Fort Knox, KY	45500	Texarkana, TX-AR
21780	Evansville, IN-KY	47020	Victoria, TX
24340	Grand Rapids-Wyoming, MI	47580	Warner Robins, GA
24780	Greenville, NC	48900	Wilmington, NC
24860	Greenville-Anderson-Mauldin, SC	49180	Winston-Salem, NC
25060	Gulfport-Biloxi-Pascagoula, MS	72104	Brockton-Bridgewater-Easton, MA NECTA Division
26580	Huntington-Ashland, WV-KY-OH	72850	Danbury, CT
26820	Idaho Falls, ID	73050	Dover-Durham, NH-ME
27180	Jackson, TN	73604	Haverhill-Newburyport-Amesbury Town, MA-NH NECTA Division
28940	Knoxville, TN	74204	Lawrence-Methuen Town-Salem, MA-NH NECTA Division
29020	Kokomo, IN	74804	Lowell-Billerica-Chelmsford, MA-NH NECTA Division
29180	Lafayette, LA	75550	New Bedford, MA
31540	Madison, WI	76524	Peabody-Salem-Beverly, MA NECTA Division
31740	Manhattan, KS	76600	Pittsfield, MA
34100	Morristown, TN	76900	Portsmouth, NH-ME
34820	Myrtle Beach-Conway-North Myrtle Beach, SC-NC	78100	Springfield, MA-CT
35084	Newark, NJ-PA Metropolitan Division	78254	Taunton-Middleborough-Norton, MA NECTA Division
36260	Ogden-Clearfield, UT	78700	Waterbury, CT
37460	Panama City, FL	79600	Worcester, MA-CT
37620	Parkersburg-Vienna, WV	93562	Orange-Rockland-Westchester, NY
37964	Philadelphia, PA Metropolitan Division		

Table A2. Areas where seasonally adjusted data are not published due to addition to CES publications in benchmark year 2014

Area Code	Area Title	Area Code	Area Title
10540	Albany, OR	26140	Homosassa Springs, FL
11640	Arecibo, PR	27980	Kahului-Wailuku-Lahaina, HI
13220	Beckley, WV	33220	Midland, MI
14100	Bloomsburg-Berwick, PA	33874	Montgomery County-Bucks County-Chester County, PA
15680	California-Lexington Park, MD	35100	New Bern, NC
16060	Carbondale-Marion, IL	35614	New York-Jersey City-White Plains, NY-NJ
16540	Chambersburg-Waynesboro, PA	42034	San Rafael, CA
19300	Daphne-Fairhope-Foley, AL	42700	Sebring, FL
20524	Dutchess County-Putnam County, NY	43420	Sierra Vista-Douglas, AZ
20700	East Stroudsburg, PA	44420	Staunton-Waynesboro, VA
20994	Elgin, IL	45540	The Villages, FL
23900	Gettysburg, PA	47460	Walla Walla, WA
24260	Grand Island, NE	48060	Watertown-Fort Drum, NY
24420	Grants Pass, OR	74854	Lynn-Saugus-Marblehead, MA
25220	Hammond, LA	93565	Middlesex-Monmouth-Ocean, NJ
25940	Hilton Head Island-Bluffton-Beaufort, SC	97962	Delaware County, PA

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Additional information

Historical state and area employment, hours, and earnings data are available on the BLS website at www.bls.gov/sae. Inquiries for additional information on the methods or estimates derived from the CES survey should be sent by email to ***sminfo@bls.gov***. Assistance and response to inquiries by telephone is available Monday through Friday, during the hours of 8:30 am to 4:30 pm EST by dialing (202) 691-6559.