Revisions in State Establishment-based Employment Estimates Effective January 2008

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W ith the release of the estimates for January 2008, nonfarm payroll employment, hours, and earnings data for States and areas (Tables B-6, B-12, B-13, B-17, and B-18) were revised to reflect the incorporation of March 2007 benchmarks and the recomputation of seasonal adjustment factors for State estimates. The revisions affect all not-seasonally adjusted data from April 2006 forward, all seasonally adjusted data from January 2003 forward, and selected series subject to historical revisions. This article offers background information on benchmarking methods and details the effects of the March 2007 benchmark revisions on State and area employment estimates.

Benchmark methods

The Current Employment Statistics (CES) survey, or nonfarm payroll survey, is a Federal/State cooperative program that provides employment, hours, and earnings estimates for States and areas on a timely basis by estimating the number of jobs in the population from a sample of that population. As with data from other sample surveys, CES estimates are subject to both sampling and non-sampling error. Sampling error is an unavoidable byproduct of forming an inference about a population based on a sample. The larger the sample relative to the population, the smaller the sampling error. The sample-to-population ratio varies across States and industries. Non-sampling error, by contrast, generally refers to errors in reporting and processing.

To help control both sampling and non-sampling error, estimates are benchmarked annually to universe employment counts. These counts are derived primarily from employment data reported on unemployment insurance (UI) tax reports that nearly all employers are required to file with State Workforce Agencies. Benchmark levels replace the original sample-based estimates from April of the previous year to March of the benchmark year for each month. For the current 2007 benchmark, estimates from April 2006 to March 2007 were replaced with UI-based universe counts.

Improvements in the receipt of UI data and in the standardization of State operations have enabled all States to replace estimates with UI data beyond March of the benchmark year. In the March 2007 benchmark, 42 States and the District of Columbia used third-quarter 2007 UI data (that is, through September 2007) in their benchmarking, and eight (8) States used second-quarter 2007 UI data (through June 2007).

Recalculated sample links and birth/death factors were then applied to these new levels to derive revised estimates for months after the replacement quarter. The sample links capture the over-the-month change of the sample estimates. A sample link for a given month is calculated by dividing employment reported by survey respondents for that month by employment reported by those same respondents for the previous month.

The birth/death factor is an ARIMA-based projection to account for the birth employment not captured through the exclusion of business deaths from the sample link. The over-the-month changes used during the benchmark process may differ slightly from those used to derive the original estimates because they include (1) data from respondents that reported too late for inclusion in the previously published estimates, (2) the use of new sample weights, and (3) the inclusion of updated net births estimates. This process was completed and the revised data were released with the January 2008 estimates.

Benchmark revisions

The percentage differences between March 2007 sample-based estimates and the revised March 2007 benchmark levels are commonly used to report the magnitude of the revisions. The average absolute percentage revision for State total nonfarm estimates is 0.4 percent for March 2007, a slight decrease from 0.5 percent in March 2006. The average absolute revision from 2002 to 2007 is 0.6 percent. The range of the percentage revision for the States at the total nonfarm level was from -1.5 to 1.2 percent in March 2007. (See Table 1.)

For the 2007 benchmark, comparisons between industry supersectors may be made only from 2003 forward. (See Table 1.) The incomparability in previous years is a result of the conversion from the Standard Industrial Classification (SIC) system to the 2002 North American Industry Classification System (NAICS); a historical time series of un-benchmarked NAICS data does not exist for previous years. Total nonfarm data remain comparable and are included for the past five (5) years.

The direction of the revisions indicates whether the March 2007 benchmark levels were greater or less than the original sample-based estimates. For the current benchmark,

Table 1. Differences between State employment estimates and benchmarks by industry, March 2002-December 2007

Industry	2002	2003	2004	2005	2006	Mar 2007	Dec 2007
	Average absolute percentage differences						
Total nonfarm......................................	0.9	0.6	0.4	0.5	0.5	0.4	0.6
Natural Resources and Mining................	N/A	3.8	5.8	6.5	3.4	3.8	4.3
Construction...	N/A	2.6	2.4	2.8	2.7	2.2	2.8
Manufacturing..	N/A	1.4	1.2	1.3	1.7	1.2	1.6
Trade, Transportation, and Utilities........	N/A	1	0.8	0.7	0.5	0.7	0.8
Information...	N/A	2.5	2.5	2.2	1.9	2.2	2.2
Financial Activities................................	N/A	1.7	1	1.2	0.9	1.1	1.9
Professional and Business Services........	N/A	2.1	1.9	1.7	2.1	1.5	1.8
Education and Health Services...............	N/A	1	1.1	0.6	0.9	0.7	0.9
Leisure and Hospitality...........................	N/A	1.3	1.4	1.4	1.2	1.1	1.1
Other Services..	N/A	2.1	2	1.9	1.7	1.5	1.9
Government...	N/A	0.8	0.7	0.6	0.7	0.5	0.8
	Average percentage revisions						
Total nonfarm:							
Range..	-2.1:2.1	-1.9:1.4	-0.9:1.8	-1.2:1.2	-0.8:4.2	-1.5:1.2	-2.5:1.3
Mean...	-0.6	-0.2	0.2	0.1	0.3	0.0	-0.2
Standard deviation................................	0.9	0.7	0.5	0.6	0.7	0.5	0.7

NOTE: The range indicates the lowest and highest percentage revision at the total nonfarm level. The mean is the sum of all the items in a series divided by the number of items. The standard deviation is a widely used measure of dispersion. It measures the extent to which the individual items in a series are scattered about the mean of the series and indicates the reliability of the mean. For example, the March 2004 standard deviation (0.5) is lower than that of March 2001 (0.7). This is an indication that there is higher variation among State total nonfarm revisions in March 2002 (that is, the mean is less representative of the group) than in March 2004 (that is, the mean is more representative of the group). The standard deviation is found by taking the difference of each item in a series from the mean of the series, squaring each difference, summing the squared differences, dividing the result by the number of items, and obtaining the square root of that figure.

Table 2. Percent differences between nonfarm payroll employment benchmarks and estimates by State, March 2002-December 2007

State	2002	2003	2004	2005	2006	Mar 2007	Dec 2007
Alabama................................	-0.8	(1)	0.5	0.1	0.2	0.0	-0.2
Alaska...................................	1.0	0.6	-0.3	0.2	0.6	-0.2	-0.3
Arizona.................................	0.5	0.2	0.8	0.9	0.7	-1.5	-2.5
Arkansas...............................	-0.6	-0.6	0.7	0.5	1.0	0.0	-0.2
California..............................	-1.2	-0.5	(1)	(1)	0.3	-0.4	-0.8
Colorado...............................	-0.6	-0.9	0.8	-0.1	0.3	0.4	0.0
Connecticut...........................	-0.1	-0.6	0.3	-0.7	0.3	-0.3	0.1
Delaware...............................	-1.2	0.1	1.8	-0.8	(1)	-0.8	-0.3
District of Columbia..............	2.1	0.2	0.1	0.7	-0.5	-0.1	-0.3
Florida..................................	-0.3	(1)	0.6	0.5	-0.1	-0.2	-1.5
Georgia.................................	1.0	-1.3	0.1	1.2	0.4	0.4	-0.4
Hawaii...................................	0.3	0.2	0.2	0.4	-0.3	0.0	-1.0
Idaho.....................................	-1.2	0.7	0.2	0.9	-0.2	-0.1	-0.4
Illinois..................................	-0.9	-0.9	-0.1	-0.1	0.4	0.0	-0.2
Indiana..................................	-0.8	0.6	0.1	-0.8	0.1	0.2	0.3
Iowa......................................	-1.2	-0.4	0.1	0.8	-0.1	-0.4	-0.5
Kansas...................................	-2.1	-1.8	-0.3	-0.3	0.5	0.0	-0.1
Kentucky...............................	-2.0	-0.2	-0.1	-0.2	0.4	0.2	1.2
Louisiana..............................	-1.9	0.4	0.7	(1)	4.2	0.4	0.4
Maine....................................	-0.8	-0.2	0.4	-1.2	0.4	0.1	0.0
Maryland...............................	0.9	-0.3	0.1	-0.7	0.4	0.0	-0.4
Massachusetts........................	-1.4	-0.9	0.3	-0.6	0.8	-0.2	0.1
Michigan...............................	-2.0	-0.4	0.2	0.3	-0.3	-0.6	-0.4
Minnesota…………………	-0.5	-0.1	-0.2	-0.5	0.7	-0.4	0.2
Mississippi............................	-0.8	-1.1	0.3	0.1	0.1	-0.5	-1.3
Missouri................................	0.6	1.4	-0.6	0.2	0.6	-0.1	0.0
Montana................................	-0.2	1.0	0.9	0.8	0.9	0.6	-0.8
Nebraska...............................	-0.6	-0.2	1.5	-0.2	-0.6	-0.5	0.3
Nevada..................................	-2.1	1.4	0.4	-0.2	0.2	-1.2	-1.1
New Hampshire.....................	-1.2	-0.6	0.5	-0.6	-0.2	0.3	0.8
New Jersey............................	-0.2	-1.0	-0.9	-0.6	0.1	-0.6	-0.8
New Mexico...........................	0.1	-0.4	0.1	(1)	0.7	0.1	-0.2
New York..............................	-0.9	0.2	(1)	-0.1	0.1	0.4	0.7
North Carolina......................	-0.9	-1.3	-0.5	0.9	0.6	1.2	1.3
North Dakota........................	-1.1	0.2	0.1	0.2	0.3	-0.3	-0.1
Ohio......................................	-1.5	-0.1	0.3	-0.3	(1)	-0.3	-0.1
Oklahoma..............................	-1.8	-0.9	0.8	0.5	0.5	0.0	-0.6
Oregon..................................	-0.7	-0.2	(1)	0.4	-0.8	0.6	0.0
Pennsylvania.........................	(1)	-0.5	0.4	-0.2	(1)	-0.2	-0.2
Rhode Island.........................	-0.5	0.3	-0.4	-0.8	-0.5	-0.5	-1.9
South Carolina......................	-1.6	0.9	-0.3	1.0	(1)	0.8	0.9
South Dakota........................	-1.0	-0.5	-0.1	0.1	-0.1	-0.4	-0.1
Tennessee..............................	-2.1	-0.4	0.4	0.4	0.4	-0.3	-0.4
Texas.....................................	-0.2	-0.6	0.3	0.8	0.6	0.9	0.8
Utah......................................	-0.1	-0.2	0.9	0.2	0.6	0.2	-0.7
Vermont................................	0.6	-1.9	(1)	-0.7	0.1	-0.3	-0.3
Virginia.................................	-0.3	-0.1	-0.3	0.2	0.1	-0.3	-1.0
Washington...........................	-0.2	-0.4	-0.2	0.4	-0.2	0.6	0.4
West Virginia........................	-0.1	-0.8	1.4	-0.1	0.7	-0.1	-0.7
Wisconsin..............................	-1.4	-0.5	-0.6	0.2	-0.2	0.6	-0.2
Wyoming...............................	-0.5	-0.3	0.7	0.8	1.6	0.9	0.7

[1]
  Less than ± 0.05 percent.

17 States revised total nonfarm payroll employment upward, while 26 States and the District of Columbia had downward revisions; seven states were unchanged. (See Table 2.)

      For metropolitan statistical areas (MSAs) published by the CES program, the percentage revisions ranged from -5.1 to 4.4 percent, with an average absolute percentage

revision of 0.9 percent across all MSAs[1] (See Table 3a.). Comparatively at the State level, the range was -1.5 to 1.2 percent, with an average absolute percentage revision of 0.4 percent. (See Table 1.) Generally, as MSA size decreases, both the range of percentage revisions and the average absolute percentage revision increases. Metropolitan areas with an annual average of one (1) million or more employees in 2007 had an average absolute revision of 0.6 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.1 percent. (See Table 3a.)

As states replace with population data through either the second or third quarter, the revision to their original estimates for that time period can be identified by examining the revisions to the estimates through December 2007. Since the states have replaced their estimates with benchmark data for months after March, the revision to a state's original sample-based estimates for those months will not contribute to the March 2008 benchmark revision. Therefore, including an analysis of the December revision is an important piece in analyzing the overall quality of the state estimates.

The average absolute percentage revision for State total nonfarm estimates is 0.6 percent for December 2007. The average absolute revision from 2002 to 2007 is 0.6 percent. The range of the percentage revision for the States at the total nonfarm level was from -2.5 to 1.3 percent in December 2007. (See Table 1.)

For metropolitan statistical areas (MSAs) published by the CES program, the percentage revisions ranged from -6.5 to 4.7 percent, with an average absolute percentage revision of 1.1 percent across all MSAs. (See Table 3b.) Comparatively at the State level, the range was -2.5 to 1.3 percent, with an average absolute percentage revision of 0.6 percent. (See Table 1.) Again, as MSA size decreases, both the range of percentage revisions and the average absolute percentage revision generally increase. Metropolitan areas with an annual average of one (1) million or more employees in 2007 had an average absolute revision of 0.9 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.2 percent. (See Table 3b.)

Seasonal adjustment

BLS uses a two-step seasonal adjustment process for adjusting State nonfarm payroll employment estimates. This process uses UI seasonal trends to adjust the benchmarked historical data but incorporates sample seasonal trends to adjust the current sample-based estimates in the post benchmark months. By accounting for the differing seasonal patterns of the benchmark data and the sample-based estimates, this technique yields an improved seasonally adjusted series for analyzing over-the-month employment change. For more information about seasonal adjustment and a list of all seasonally adjusted CES State and area employment series please visit http://www.bls.gov/sae/2007bmk.htm. The latest seasonally adjusted nonfarm payroll employment data for all States and the District of Columbia are available on the BLS Internet[2]. Data for the most recent 13 months are regularly shown in Table B-6 of this publication.

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[1] The CES program published employment series for 318 MSAs in 2008. The list of BLS standard MSAs is available at **http://www.bls.gov/sae/.**

[2] Seasonally adjusted and unadjusted data may be accessed via the public data retrieval engine at **http://data.bls.gov/cgi-bin/dsrv?sm**.

Table 3a. Benchmark revisions for total nonfarm employment in metropolitan areas, March 2007

Measure	All MSAs	MSA's grouped by level of total nonfarm employment			
		Less than 100,000	100,000 to 499,999	500,000 to 999,999	More than 1 million
Number of MSA's……..	318	117	144	28	29
Average absolute percentage revision………………	0.9	1.1	0.8	0.7	0.6
Range...........................…	-5.1:4.4	-5.1:4.4	-4.0:2.2	-1.2:3.1	-2.5:1.0
Mean…………………..	-0.2	-0.2	-0.2	0.2	-0.1
Standard Deviation……	1.2	1.4	1.0	1.0	0.8

[1] Less than ± 0.05 percent.

Table 3b. Benchmark revisions for total nonfarm employment in metropolitan areas, December 2007

Measure	All MSAs	MSA's grouped by level of total nonfarm employment			
		Less than 100,000	100,000 to 499,999	500,000 to 999,999	More than 1 million
Number of MSA's……..	318	117	144	28	29
Average absolute percentage revision………………	1.1	1.2	1.1	1.1	0.9
Range...........................…	-6.5:4.7	-4.4:3.8	-6.5:3.2	-3.4:4.7	-4.4:1.7
Mean…………………..	-0.4	-0.3	-0.5	0.2	-0.5
Standard Deviation……	1.5	1.6	1.6	1.5	1.2

[1] Less than ± 0.05 percent.

Additional information

Historical State and area employment, hours, and earnings data are available at **http://www.bls.gov/sae/** on the BLS Internet site. Users may access the data via various retrieval tools at this address. Any questions on how to access the data through the Internet should be directed to *webmaster@bls.gov*. Inquiries for additional information on the methods or estimates derived from the CES survey should be sent to: U.S. Bureau of Labor Statistics, Room 4860, 2 Massachusetts Avenue, NE, Washington, DC 20212-0001. The telephone number is (202) 691-6995; fax (202) 691-6820. The e-mail address is *sminfo@bls.gov.*