

# Revisions in State Establishment-based Employment Estimates Effective January 2006

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With the release of estimates for January 2006, 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 2005 benchmarks and the recomputation of seasonal adjustment factors (State estimates). The revisions affect all unadjusted data from April 2004 forward, all seasonally adjusted data from January 2001 forward, and selected series subject to historical revision. This article offers background information on benchmarking methods and details the effects of the March 2005 benchmark revisions on State and area employment estimates.

## Benchmark methods

The Current Employment Statistics (CES), 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 nonsampling error. Sampling error is an unavoidable byproduct of forming an inference about a population on the basis of a sample. The larger the sample relative to the population, the smaller is the sampling error. The sample-to-population ratio varies across States and industries. Nonsampling error includes errors in reporting and processing.

To help control both sampling and nonsampling error, the 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 2005 benchmark, estimates from April 2004 to March 2005 were replaced with UI-based universe counts. Once the new level for March 2005 had been determined, the appropriate sample links were applied to that level, and the estimates

were recalculated for April 2005 forward. The sample links capture the over-the-month change in 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 links used during the benchmark process may differ slightly from those used to derive the original estimates because they include (1) data from respondents who reported too late to be included in the previously published estimates, (2) the use of new sample weights, and (3) updated estimates of net births. This process was completed and the revised data were released with the January 2006 estimates.

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 2005 benchmark, 39 States and the District of Columbia used third-quarter 2005 UI data (that is, through September 2005) in their benchmarking, and 11 States used second-quarter 2005 UI data (through June 2005). Recalculated sample links were then applied to these new levels to derive revised estimates for months after the replacement quarter.

## Benchmark revisions

The percentage differences between March 2005 sample-based estimates and the revised March 2005 benchmark levels are commonly used to report the magnitude of the revisions. The average absolute percentage revision for State total nonfarm estimates was 0.5 percent for March 2005, up slightly from 0.4 percent in March 2004. The average absolute revision from 2000 to 2005 was 0.6 percent. The range of the percentage revision for the States at the total nonfarm level was from -1.2 to 1.2 percent in March 2005. (See table 1.)

For the 2005 benchmark, comparisons between major industry sectors may be made only from 2003 forward. (See table 1.) The noncomparability 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 unbenchmarked NAICS data does not exist for previous years. Total nonfarm data remain comparable and are included for the past 5 years.

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Table 1. Differences between State employment estimates and benchmarks by industry, March 2000-05

Industry	2000	2001	2002	2003	2004	2005
Average absolute percentage differences						
Total nonfarm .....	0.7	0.7	0.9	0.6	0.4	0.5
Natural resources and mining .....	(1)	(1)	(1)	3.8	5.8	6.5
Construction .....	(1)	(1)	(1)	2.6	2.4	2.8
Manufacturing .....	(1)	(1)	(1)	1.4	1.2	1.3
Trade, transportation, and utilities .....	(1)	(1)	(1)	1.0	.8	.7
Information .....	(1)	(1)	(1)	2.5	2.5	2.2
Financial activities .....	(1)	(1)	(1)	1.7	1.0	1.2
Professional and business services .....	(1)	(1)	(1)	2.1	1.9	1.7
Education and health services .....	(1)	(1)	(1)	1.0	1.1	.6
Leisure and hospitality .....	(1)	(1)	(1)	1.3	1.4	1.4
Other services .....	(1)	(1)	(1)	2.1	2.0	1.9
Government .....	(1)	(1)	(1)	.8	.7	.6
Average percentage revisions						
Total nonfarm:						
Range .....	-1.1 : 3.3	-2.9 : 0.9	-2.1 : 2.1	-1.9 : 1.4	-0.9 : 1.8	-1.2 : 1.2
Mean .....	.4	-.5	-.6	-.2	.2	.1
Standard deviation .....	.8	.7	.9	.7	.5	.6

<sup>1</sup> Due to noncomparability between NAICS and SIC industry definitions below total nonfarm levels, 2000-02 differences are unavailable at the major industry sector level.

NOTE: The range indicates the lowest and highest percentage revision at the total nonfarm level. The mean is the sum of all of 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 2000 (0.8). This is an indication that there is higher variation among State total nonfarm revisions in March 2000 (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.

The direction of the revisions indicates whether the March 2005 benchmark levels were greater or less than the original sample-based estimates. Historically, State estimates have underestimated March employment levels during periods of economic growth and overestimated those levels during periods of economic decline. For the current benchmark, 27 States and the District of Columbia revised total nonfarm payroll employment upward, while 20 States had downward revisions. (See table 2.) The tendency toward underestimation of employment is reflected by the mean 0.1-percent revision across all States for total nonfarm employment.

For metropolitan statistical areas (MSAs) published by the CES program, the percentage revisions ranged from -7.2 to 6.0 percent, with an average absolute percentage revision of 1.1 percent across all MSAs.<sup>1</sup> Comparatively at the State level, the range was from -1.2 to 1.2 percent, with an average absolute percentage revision of 0.5 percent. (See table 1.) Generally, as MSA size decreases, both the range of percentage revisions and the average absolute percentage revision increases. (See table 3.) Metropolitan areas with an annual average employment level of 1 million or more in 2005 had an

average absolute revision of 0.7 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.3 percent.

The benchmarking process for Louisiana and Mississippi has been particularly difficult because of the displacement of establishments as a result of Hurricane Katrina. BLS is continuing to validate responses and nonresponse imputation procedures for establishments from both the CES sample data and the UI universe data. In tabulating the universe data, BLS is following procedures similar to those applied to the sample data for imputing nonresponses of establishments known to be in operation before Hurricane Katrina hit the Gulf Coast in late August 2005. For Mississippi, the benchmark data from UI tax reports replace estimates through the third quarter (through September 2005). For Louisiana, the benchmark data replace estimates through the second quarter (through June 2005).

### Seasonal adjustment

BLS uses a two-step seasonal adjustment process to adjust State nonfarm payroll employment estimates. The process utilizes 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.

<sup>1</sup> The CES program published employment series for 367 MSAs in 2005. The list of BLS standard MSAs is available at <http://www.bls.gov/sae/>.

Table 2. Percent differences between nonfarm payroll employment benchmarks and estimates by State, March 2000-05

State	2000	2001	2002	2003	2004	2005
Alabama .....	-1.0	-0.7	-0.8	( <sup>1</sup> )	0.5	0.1
Alaska .....	.9	.4	1.0	0.6	-.3	.2
Arizona .....	-.2	.2	.5	.2	.8	.9
Arkansas .....	-.2	-.4	-.6	-.6	.7	.5
California .....	.7	-.4	-1.2	-.5	( <sup>1</sup> )	( <sup>1</sup> )
Colorado .....	-.3	-.5	-.6	-.9	.8	-.1
Connecticut .....	.1	-.7	-.1	-.6	.3	-.7
Delaware .....	-.2	-.4	-1.2	.1	1.8	-.8
District of Columbia .....	3.3	.3	2.1	.2	.1	.7
Florida .....	-1.1	-.6	-.3	( <sup>1</sup> )	.6	.5
Georgia .....	-.3	-1.6	1.0	-1.3	.1	1.2
Hawaii .....	.9	-.5	.3	.2	.2	.4
Idaho .....	-.8	.9	-1.2	.7	.2	.9
Illinois .....	.6	-.7	-.9	-.9	-.1	-.1
Indiana .....	.7	-1.5	-.8	.6	.1	-.8
Iowa .....	-.1	-1.3	-1.2	-.4	.1	.8
Kansas .....	-.5	-.4	-2.1	-1.8	-.3	-.3
Kentucky .....	.2	-1.3	-2.0	-.2	-.1	-.2
Louisiana .....	.8	-1.4	-1.9	.4	.7	( <sup>1</sup> )
Maine .....	.7	-.6	-.8	-.2	.4	-1.2
Maryland .....	.2	-.4	.9	-.3	.1	-.7
Massachusetts .....	.6	-.3	-1.4	-.9	.3	-.6
Michigan .....	1.6	-1.6	-2.0	-.4	.2	.3
Minnesota .....	.6	.4	-.5	-.1	-.2	-.5
Mississippi .....	-.1	-.9	-.8	-1.1	.3	.1
Missouri .....	.2	-.4	.6	1.4	-.6	.2
Montana .....	-.3	-.5	-.2	1.0	.9	.8
Nebraska .....	1.4	-.7	-.6	-.2	1.5	-.2
Nevada .....	.1	-.4	-2.1	1.4	.4	-.2
New Hampshire .....	.8	.6	-1.2	-.6	.5	-.6
New Jersey .....	1.8	( <sup>1</sup> )	-.2	-1.0	-.9	-.6
New Mexico .....	.2	.7	.1	-.4	.1	( <sup>1</sup> )
New York .....	.2	-.5	-.9	.2	( <sup>1</sup> )	-.1
North Carolina .....	.1	-1.3	-.9	-1.3	-.5	.9
North Dakota .....	.7	-.1	-1.1	.2	.1	.2
Ohio .....	.8	-.1	-1.5	-.1	.3	-0.3
Oklahoma .....	-.5	.8	-1.8	-.9	.8	.5
Oregon .....	.2	.2	-.7	-.2	( <sup>1</sup> )	.4
Pennsylvania .....	1.2	-.4	( <sup>1</sup> )	-.5	.4	-.2
Rhode Island .....	1.0	-.1	-.5	.3	-.4	-.8
South Carolina .....	( <sup>1</sup> )	-2.9	-1.6	.9	-.3	1.0
South Dakota .....	-.7	-.5	-1.0	-.5	-.1	.1
Tennessee .....	.5	-.9	-2.1	-.4	.4	.4
Texas .....	.4	-.5	-.2	-.6	.3	.8
Utah .....	.2	-.4	-.1	-.2	.9	.2
Vermont .....	.9	( <sup>1</sup> )	.6	-1.9	( <sup>1</sup> )	-.7
Virginia .....	.7	-.3	-.3	-.1	-.3	.2
Washington .....	1.1	-.8	-.2	-.4	-.2	.4
West Virginia .....	.8	-.2	-.1	-.8	1.4	-.1
Wisconsin .....	.7	-.6	-1.4	-.5	-.6	.2
Wyoming .....	1.9	.5	-.5	-.3	.7	.8

<sup>1</sup> Less than 0.05 percent.

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 changes. A minimum of 3 years of data is required to perform seasonal adjustment. Sample-based NAICS data are available only from 2003 forward. Concurrent with the 2005 benchmark, 3 years of sample-based NAICS data are now available. Prior to the current benchmark, to forecast seasonal adjustment factors, CES developed a historical NAICS time series using a system of ratios in conjunction with SIC data from the previous decade. CES currently uses both the historical NAICS time series and the NAICS sample data when forecasting seasonal adjustment factors. The latest seasonally adjusted nonfarm payroll employment data for all States and the District of Columbia are available on the BLS Internet.<sup>2</sup> Data for the most recent 13 months are regularly shown in table B-6 of

this publication.

#### Additional information

Historical State and area employment, hours, and earnings data are available at <http://www.bls.gov/sae/> on the BLS Web 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*.

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

Table 3. Benchmark revisions for total nonfarm employment in metropolitan statistical areas, March 2005

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 .....	367	178	140	25	24
Average absolute percentage revision .....	1.1	1.3	1.1	0.6	0.7
Range .....	-7.2 : 6.0	-7.2 : 6.0	-5.4 : 5.9	-1.3 : 1.7	-1.6 : 3.5
Mean .....	( <sup>1</sup> )	-.2	.2	.2	.3
Standard deviation .....	1.6	1.7	1.5	.8	1.0

<sup>1</sup> Less than 0.05 percent.