

CES National Benchmark Article

BLS Establishment Survey National Estimates Revised to Incorporate March 2016 Benchmarks

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Introduction

With the release of January 2017 data on February 3, 2017, the Bureau of Labor Statistics (BLS) introduced its annual revision of national estimates of employment, hours, and earnings from the Current Employment Statistics (CES) monthly survey of nonfarm establishments. Each year, the CES survey realigns its sample-based estimates to incorporate universe counts of employment—a process known as benchmarking. Comprehensive counts of employment, or benchmarks, are derived primarily from unemployment insurance (UI) tax reports that nearly all employers are required to file with State Workforce Agencies.

Summary of the benchmark revisions

The March 2016 benchmark level for total nonfarm employment is 142,814,000.

Compared with the sample-based, published estimate for March 2016, the March 2016 benchmark level is 81,000 lower. This is a downward adjustment of -0.1 percent.

[Table 1](#) below shows the recent history of total nonfarm percent and level benchmark revisions. Over the prior ten years, the annual benchmark revision at the total nonfarm level has averaged 0.3 percent (in absolute terms), with an absolute range of 0.0 percent to 0.7 percent.

Table 1. Percent and level differences between nonfarm employment benchmarks and estimates by industry supersector, March 2006-2016 (in thousands)⁽¹⁾

Industry Code	CES Industry Title	Type	2006	2007	2008	2009	2010	2011 ⁽²⁾	2012	2013 ⁽³⁾	2014	2015 ⁽⁴⁾	2016
00-000000	Total nonfarm	Percent	0.6	-0.2	-0.1	-0.7	-0.3	0.1	0.3	-0.1	0.0	-0.1	-0.1
		Level	752	-293	-89	-902	-378	162	424	-119	67	-172	-81
05-000000	Total private	Percent	0.7	-0.2	-0.1	-0.9	-0.4	0.1	0.4	-0.1	0.1	-0.2	-0.1
		Level	749	-241	-137	-933	-391	134	481	-126	105	-232	-151
10-000000	Mining and logging	Percent	1.2	0.0	0.4	-3.5	-3.0	-0.4	1.6	-1.2	-1.8	-2.2	-3.2
		Level	8	0	3	-25	-20	-3	13	-10	-16	-19	-22
20-000000	Construction	Percent	2.6	0.1	0.7	-2.9	-1.3	-0.5	1.8	0.3	1.6	0.6	0.7
		Level	189	6	49	-171	-67	-26	93	14	90	39	47
30-000000	Manufacturing	Percent	-0.1	-1.0	-0.1	-0.7	-1.0	0.1	-0.2	0.2	0.4	-0.1	0.5
		Level	-21	-137	-17	-84	-119	9	-25	23	43	-12	58
40-000000	Trade, transportation, and utilities	Percent	0.6	0.5	0.2	-1.2	-0.6	0.4	0.6	-0.5	-0.1	0.0	-0.4
		Level	158	140	65	-300	-143	95	145	-131	-31	-5	-110
41-420000 ⁽⁵⁾	Wholesale trade	Percent	0.8	0.4	-0.7	-1.2	-2.3	-0.2	0.8	-0.4	-0.8	-0.7	-1.1
		Level	47.0	21.5	-43.1	-68.0	-124.5	-13.1	45.3	-20.2	-45.4	-41.3	-66.6
42-000000 ⁽⁵⁾	Retail trade	Percent	0.5	0.7	0.6	-1.6	-0.1	0.6	0.5	-0.8	0.0	-0.2	-0.8
		Level	78.0	107.5	92.8	-235.6	-18.4	83.8	78.9	-110.3	5.5	-23.5	-118.2
43-000000 ⁽⁵⁾	Transportation and warehousing	Percent	1.0	0.3	0.3	0.2	0.1	0.5	0.7	0.1	0.2	1.4	1.7
		Level	44.9	11.5	15.0	9.9	3.1	22.4	29.4	3.6	9.7	65.3	83.5
44-220000 ⁽⁵⁾	Utilities	Percent	-2.1	0.0	0.0	-1.2	-0.6	0.5	-1.5	-0.8	-0.1	-0.8	-1.6
		Level	-11.4	-0.2	-0.2	-6.8	-3.4	2.8	-8.5	-4.6	-0.6	-4.7	-8.7
50-000000	Information	Percent	-0.5	-1.8	0.3	-1.5	-0.4	-0.4	1.8	-0.2	2.4	-1.6	-0.1
		Level	-15	-54	8	-42	-11	-12	47	-5	66	-44	-2
55-000000	Financial activities	Percent	0.4	-1.3	-0.3	-0.1	0.4	0.9	0.6	-0.1	0.2	-0.1	0
		Level	35	-111	-23	-4	34	69	45	-10	19	-9	-4
60-000000	Professional and business services	Percent	1.3	0.2	-0.4	-0.8	0.0	0.7	0.0	0.0	-0.8	-0.6	-0.6
		Level	230	44	-63	-137	-3	125	2	4	-147	-110	-125
65-000000	Education and health services	Percent	0.5	-0.2	-0.1	-0.3	0.0	-0.5	0.0	-0.3	-0.1	0.0	-0.4
		Level	96	-39	-17	-56	7	-108	-2	-61	-16	-7	-83
70-000000	Leisure and hospitality	Percent	0.3	-0.8	-1.1	-0.6	-0.6	0.7	0.8	0.5	0.3	-0.3	0.7
		Level	42	-108	-151	-72	-80	93	104	72	38	-45	102

CES Industry Code		CES Industry Title	Type	2006	2007	2008	2009	2010	2011 ⁽²⁾	2012	2013 ⁽³⁾	2014	2015 ⁽⁴⁾	2016
80-000000	Other services	Percent	0.5	0.3	0.2	-0.8	0.2	-2.0	1.1	-0.4	1.1	-0.4	-0.2	
		Level	27	18	9	-42	11	-108	59	-22	59	-20	-12	
90-000000	Government	Percent	0.0	-0.2	0.2	0.1	0.1	0.1	-0.3	0.0	-0.2	0.3	0.3	
		Level	3	-52	48	31	13	28	-57	7	-38	60	70	

Footnotes

⁽¹⁾ The differences listed in this table reflect the error due to normal benchmarking procedures. Typically this error is equal to the March benchmarked level minus the published March estimated level. However in some years, other factors beyond normal benchmarking procedures influence the difference between the benchmarked and published March estimate levels. Those years are footnoted.

⁽²⁾ A review of industries for the possible presence of noncovered employment in benchmark 2011 yielded 13 additional industries. As a result of including these industries, employment for total nonfarm was 95,000 more than the originally published March 2011 estimate level. The difference between the benchmarked and published March 2011 estimate level was 162,000. For this table, the 95,000 amount was added to the original published total nonfarm and total private March 2011 estimates before calculating the percent and level differences. Similarly, for the financial activities and education and health services supersectors, this table displays March 2011 data after incorporating the employment from the additional industries.

⁽³⁾ The percent and level differences in this column reflect reconstructions to series within CES supersectors financial activities and education and healthcare services. Each first quarter, the Quarterly Census of Employment and Wages (QCEW) program, whose data account for approximately 97 percent of the CES universe scope (see The Sample section of the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm), incorporates updated industry assignments. In 2013, these updates included two substantial groups of nonrandom, noneconomic code changes, one to funds, trusts, and other financial vehicles (NAICS 525), and the other, a reclassification of approximately 466,000 in employment from private households (NAICS 814), which is out of scope for CES, to services for the elderly and persons with disabilities (NAICS 62412), which is in scope. These changes also had an impact, beyond what would be considered typical for a given benchmark year, on corresponding CES series. For more information about the changes to these industries, see the QCEW First Quarter 2013 News Release available at www.bls.gov/news.release/archives/cewqtr_09262013.htm or the special notice regarding reconstructed data section of the 2013 CES Benchmark Article at www.bls.gov/ces/cesbmart13.pdf.

⁽⁴⁾ With the 2015 benchmark, CES reconstructed the national employment series for CES series 65-624120 services for the elderly and persons with disabilities back to January 2000. CES previously reconstructed this series with the 2013 benchmark; however, between the 2013 and 2015 benchmark, a better source of information for the employment within NAICS 62412 for the state of California was found. The inclusion of the reconstructed series resulted in total nonfarm and total private employment that was 27,000 less than the originally published March 2015 estimate level. The difference between the benchmarked and originally published March 2015 estimate level is -199,000 or -0.1 percent. This table displays March 2015 data after accounting for the decrease of 27,000 from the reconstructed series. Similarly, for the education and health services supersector, this table displays March 2015 data after incorporating the reconstructed series.

⁽⁵⁾ Indented series are part of trade, transportation, and utilities.

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[Table 2](#) shows the nonfarm employment benchmarks for March 2016, not seasonally adjusted, by industry. The revision to the reconstructed total nonfarm employment is –81,000.

Seven supersectors saw negative revisions. The largest downward revision occurred in professional and business services, –125,000, or –0.6 percent. Within this supersector, the largest revision was in professional and technical services (–51,800, or –0.6 percent).

The next largest downward revision occurred in trade, transportation, and utilities, –110,000, or –0.4 percent. This downward revision was driven by a large downward revision in retail trade (–118,200, or –0.8 percent). Education and health services was revised downward by –83,000, or –0.4 percent. This downward revision was driven by a large downward revision in health care (–120,600, or –0.8 percent). Mining and logging experienced the largest downward revision in percentage terms among supersectors with a revision of –22,000, or –3.2 percent, driven by a large downward revision in support activities for mining (–26,600, or –9.9 percent). Other services also experienced a downward revision of –12,000, or –0.2 percent. The two smallest downward revisions occurred in financial activities (–4,000, or 0.0 percent) and information (–2,000, or –0.1 percent).

The remaining four supersectors had upward revisions. The largest upward revision occurred in leisure and hospitality by an amount of 102,000, or 0.7 percent. Within this supersector, the largest revision was in accommodation and food service (101,600, or 0.8 percent). The next largest upward revision occurred in government, which experienced an upward revision of 70,000, or 0.3 percent. Manufacturing was revised upward 58,000, or 0.5 percent. Within this supersector, the largest revision was in food manufacturing (22,400, or 1.5 percent). Construction had an upward revision of 47,000, or 0.7 percent.

Table 2. Nonfarm employment benchmarks for industries released with first preliminary estimates, March 2016 (in thousands)

CES Industry		Benchmark	Estimate	Differences	
Code	CES Industry Title			Amount	Percent
00-000000	Total nonfarm	142,814	142,895	-81	-0.1
05-000000	Total private	120,262	120,413	-151	-.1
06-000000	Goods-producing	19,371	19,288	83	.4
07-000000	Service-providing	123,443	123,607	-164	-.1
08-000000	Private service-providing	100,891	101,125	-234	-.2
10-000000	Mining and logging	681	703	-22	-3.2
10-113300	Logging	50.4	49.1	1.3	2.6
10-210000	Mining	630.1	653.7	-23.6	-3.7
10-211000	Oil and gas extraction	181.8	176.2	5.6	3.1
10-212000	Mining, except oil and gas	178.5	181.1	-2.6	-1.5
10-212100	Coal mining	52.1	56.3	-4.2	-8.1
10-212200	Metal ore mining	38.8	38.2	.6	1.5
10-212300	Nonmetallic mineral mining and quarrying	87.6	86.6	1.0	1.1
10-213000	Support activities for mining	269.8	296.4	-26.6	-9.9
20-000000	Construction	6,402	6,355	47	.7
20-236000	Construction of buildings	1,440.4	1,415.6	24.8	1.7
20-236100	Residential building	696.3	689.5	6.8	1.0
20-236200	Nonresidential building	744.1	726.1	18.0	2.4
20-237000	Heavy and civil engineering construction	879.5	871.5	8.0	.9
20-238000	Specialty trade contractors	4,081.6	4,068.1	13.5	.3
20-238001	Residential specialty trade contractors	1,771.1	1,785.4	-14.3	-.8
20-238002	Nonresidential specialty trade contractors	2,310.5	2,282.7	27.8	1.2
30-000000	Manufacturing	12,288	12,230	58	.5
31-000000	Durable goods	7,710	7,680	30	.4
31-321000	Wood products	385.6	376.9	8.7	2.3
31-327000	Nonmetallic mineral products	397.1	391.9	5.2	1.3
31-331000	Primary metals	379.8	377.5	2.3	.6
31-332000	Fabricated metal products	1,425.4	1,428.1	-2.7	-.2
31-333000	Machinery	1,086.8	1,090.5	-3.7	-.3
31-334000	Computer and electronic products	1,050.3	1,040.8	9.5	.9
31-334100	Computer and peripheral equipment	164.3	162.8	1.5	.9
31-334200	Communications equipment	86.1	84.9	1.2	1.4
31-334400	Semiconductors and electronic components	368.6	362.5	6.1	1.7
31-334500	Electronic instruments	395.9	395.6	.3	.1
31-334600	Miscellaneous computer and electronic products	35.4	35.0	.4	1.1
31-335000	Electrical equipment and appliances	383.3	383.6	-.3	-.1

CES Industry Code	CES Industry Title	Benchmark	Estimate	Differences	
				Amount	Percent
31-336000	Transportation equipment	1,625.9	1,608.4	17.5	1.1
31-336001	Motor vehicles and parts	938.6	926.0	12.6	1.3
31-337000	Furniture and related products	388.7	388.0	.7	.2
31-339000	Miscellaneous durable goods manufacturing	586.8	594.4	-7.6	-1.3
32-000000	Nondurable goods	4,578	4,550	28	.6
32-311000	Food manufacturing	1,517.6	1,495.2	22.4	1.5
32-313000	Textile mills	115.0	114.3	.7	.6
32-314000	Textile product mills	115.4	116.5	-1.1	-1.0
32-315000	Apparel	132.6	133.7	-1.1	-.8
32-322000	Paper and paper products	370.6	370.4	.2	.1
32-323000	Printing and related support activities	448.5	444.4	4.1	.9
32-324000	Petroleum and coal products	109.0	112.7	-3.7	-3.4
32-325000	Chemicals	809.9	817.6	-7.7	-1.0
32-326000	Plastics and rubber products	698.4	690.1	8.3	1.2
32-329000	Miscellaneous nondurable goods manufacturing	260.9	255.5	5.4	2.1
40-000000	Trade, transportation, and utilities	26,855	26,965	-110	-.4
41-420000	Wholesale trade	5,828.4	5,895.0	-66.6	-1.1
41-423000	Durable goods	2,918.4	2,940.3	-21.9	-.8
41-424000	Nondurable goods	2,017.3	2,043.7	-26.4	-1.3
41-425000	Electronic markets and agents and brokers	892.7	911.0	-18.3	-2.0
42-000000	Retail trade	15,570.5	15,688.7	-118.2	-.8
42-441000	Motor vehicle and parts dealers	1,962.4	1,978.9	-16.5	-.8
42-441100	Automobile dealers	1,269.8	1,277.6	-7.8	-.6
42-441200	Other motor vehicle dealers	145.9	146.3	-.4	-.3
42-441300	Auto parts, accessories, and tire stores	546.7	555.0	-8.3	-1.5
42-442000	Furniture and home furnishings stores	464.7	472.2	-7.5	-1.6
42-443000	Electronics and appliance stores	520.7	522.9	-2.2	-.4
42-444000	Building material and garden supply stores	1,265.8	1,278.0	-12.2	-1.0
42-445000	Food and beverage stores	3,049.2	3,061.6	-12.4	-.4
42-446000	Health and personal care stores	1,038.5	1,035.7	2.8	.3
42-447000	Gasoline stations	909.5	908.8	.7	.1
42-448000	Clothing and clothing accessories stores	1,304.5	1,333.8	-29.3	-2.2
42-451000	Sporting goods, hobby, book, and music stores	610.1	616.7	-6.6	-1.1
42-452000	General merchandise stores	3,119.2	3,147.9	-28.7	-.9
42-452100	Department stores	1,280.8	1,289.2	-8.4	-.7
42-452900	Other general merchandise stores	1,838.4	1,858.7	-20.3	-1.1
42-453000	Miscellaneous store retailers	804.1	811.5	-7.4	-.9

CES Industry Code	CES Industry Title	Benchmark	Estimate	Differences	
				Amount	Percent
42-454000	Nonstore retailers	521.8	520.7	1.1	.2
43-000000	Transportation and warehousing	4,901.5	4,818.0	83.5	1.7
43-481000	Air transportation	469.6	462.5	7.1	1.5
43-482000	Rail transportation	215.8	218.8	-3.0	-1.4
43-483000	Water transportation	63.9	60.2	3.7	5.8
43-484000	Truck transportation	1,424.0	1,434.2	-10.2	-.7
43-485000	Transit and ground passenger transportation	497.4	490.6	6.8	1.4
43-486000	Pipeline transportation	49.7	48.6	1.1	2.2
43-487000	Scenic and sightseeing transportation	26.3	22.4	3.9	14.8
43-488000	Support activities for transportation	657.1	649.4	7.7	1.2
43-492000	Couriers and messengers	608.4	593.9	14.5	2.4
43-493000	Warehousing and storage	889.3	837.4	51.9	5.8
44-220000	Utilities	554.2	562.9	-8.7	-1.6
50-000000	Information	2,776	2,778	-2	-.1
50-511000	Publishing industries, except Internet	726.3	722.7	3.6	.5
50-512000	Motion picture and sound recording industries	422.3	421.3	1.0	.2
50-515000	Broadcasting, except Internet	272.1	280.8	-8.7	-3.2
50-517000	Telecommunications	803.3	800.3	3.0	.4
50-518000	Data processing, hosting and related services	297.1	297.3	-.2	-.1
50-519000	Other information services	255.0	255.7	-.7	-.3
55-000000	Financial activities	8,181	8,185	-4	.0
55-520000	Finance and insurance	6,095.8	6,105.8	-10.0	-.2
55-521000	Monetary authorities - central bank	18.4	17.8	.6	3.3
55-522000	Credit intermediation and related activities	2,592.7	2,584.2	8.5	.3
55-522100	Depository credit intermediation	1,693.2	1,682.6	10.6	.6
55-522110	Commercial banking	1,307.0	1,267.5	39.5	3.0
55-522200	Nondepository credit intermediation	605.5	601.8	3.7	.6
55-522300	Activities related to credit intermediation	294.0	299.8	-5.8	-2.0
55-523000	Securities, commodity contracts, investments, and funds and trusts	919.1	918.3	.8	.1
55-524000	Insurance carriers and related activities	2,565.6	2,585.5	-19.9	-.8
55-530000	Real estate and rental and leasing	2,085.0	2,078.7	6.3	.3
55-531000	Real estate	1,523.7	1,527.9	-4.2	-.3
55-532000	Rental and leasing services	538.0	527.6	10.4	1.9
55-533000	Lessors of nonfinancial intangible assets	23.3	23.2	.1	.4
60-000000	Professional and business services	19,704	19,829	-125	-.6

CES Industry Code	CES Industry Title	Benchmark	Estimate	Differences	
				Amount	Percent
60-540000	Professional and technical services	8,815.2	8,867.0	-51.8	-.6
60-541100	Legal services	1,115.6	1,120.1	-4.5	-.4
60-541200	Accounting and bookkeeping services	1,083.2	1,126.0	-42.8	-4.0
60-541300	Architectural and engineering services	1,383.3	1,414.4	-31.1	-2.2
60-541400	Specialized design services	134.5	137.4	-2.9	-2.2
60-541500	Computer systems design and related services	1,943.3	1,952.8	-9.5	-.5
60-541600	Management and technical consulting services	1,329.5	1,299.3	30.2	2.3
60-541700	Scientific research and development services	670.3	660.9	9.4	1.4
60-541800	Advertising and related services	483.0	488.7	-5.7	-1.2
60-541900	Other professional and technical services	672.5	667.4	5.1	.8
60-550000	Management of companies and enterprises	2,221.4	2,252.2	-30.8	-1.4
60-560000	Administrative and waste services	8,666.9	8,710.2	-43.3	-.5
60-561000	Administrative and support services	8,273.5	8,313.5	-40.0	-.5
60-561100	Office administrative services	485.7	483.9	1.8	.4
60-561200	Facilities support services	144.0	146.6	-2.6	-1.8
60-561300	Employment services	3,419.3	3,461.5	-42.2	-1.2
60-561320	Temporary help services	2,787.5	2,802.6	-15.1	-.5
60-561400	Business support services	899.0	903.0	-4.0	-.4
60-561500	Travel arrangement and reservation services	214.6	202.0	12.6	5.9
60-561600	Investigation and security services	883.7	881.2	2.5	.3
60-561700	Services to buildings and dwellings	1,919.4	1,917.5	1.9	.1
60-561900	Other support services	307.8	317.8	-10.0	-3.2
60-562000	Waste management and remediation services	393.4	396.7	-3.3	-.8
65-000000	Education and health services	22,590	22,673	-83	-.4
65-610000	Educational services	3,697.1	3,676.0	21.1	.6
65-620000	Health care and social assistance	18,892.8	18,997.0	-104.2	-.6
65-620001	Health care	15,263.5	15,384.1	-120.6	-.8
65-621000	Ambulatory health care services	6,988.7	7,041.1	-52.4	-.7
65-621100 ⁽¹⁾	Offices of physicians	2,502.5	2,531.1	-28.6	-1.1
65-621200	Offices of dentists	912.2	924.5	-12.3	-1.3
65-621300	Offices of other health practitioners	837.2	839.6	-2.4	-.3
65-621400 ⁽¹⁾	Outpatient care centers	840.6	820.3	20.3	2.4
65-621500	Medical and diagnostic laboratories	263.3	259.0	4.3	1.6
65-621600	Home health care services	1,345.2	1,374.1	-28.9	-2.1

CES Industry Code	CES Industry Title	Benchmark	Estimate	Differences	
				Amount	Percent
65-621900	Other ambulatory health care services	287.7	292.5	-4.8	-1.7
65-622000	Hospitals	4,979.9	5,036.0	-56.1	-1.1
65-623000	Nursing and residential care facilities	3,294.9	3,307.0	-12.1	-.4
65-623100	Nursing care facilities	1,632.4	1,645.9	-13.5	-.8
65-623200	Residential mental health facilities	613.2	612.5	.7	.1
65-623300	Community care facilities for the elderly	886.9	886.7	.2	.0
65-623900	Other residential care facilities	162.4	161.9	.5	.3
65-624000	Social assistance	3,629.3	3,612.9	16.4	.5
65-624100	Individual and family services	2,208.0	2,204.1	3.9	.2
65-624200	Emergency and other relief services	162.4	158.1	4.3	2.6
65-624300	Vocational rehabilitation services	336.5	333.0	3.5	1.0
65-624400	Child day care services	922.4	917.7	4.7	.5
70-000000	Leisure and hospitality	15,143	15,041	102	.7
70-710000	Arts, entertainment, and recreation	2,067.8	2,066.7	1.1	.1
70-711000	Performing arts and spectator sports	438.9	454.4	-15.5	-3.5
70-712000	Museums, historical sites, and similar institutions	148.6	145.8	2.8	1.9
70-713000	Amusements, gambling, and recreation	1,480.3	1,466.5	13.8	.9
70-720000	Accommodation and food services	13,075.4	12,973.8	101.6	.8
70-721000	Accommodation	1,878.6	1,861.5	17.1	.9
70-722000	Food services and drinking places	11,196.8	11,112.3	84.5	.8
80-000000	Other services	5,642	5,654	-12	-.2
80-811000	Repair and maintenance	1,291.8	1,289.7	2.1	.2
80-812000	Personal and laundry services	1,424.2	1,415.1	9.1	.6
80-813000	Membership associations and organizations	2,925.8	2,948.8	-23.0	-.8
90-000000	Government	22,552	22,482	70	.3
90-910000	Federal	2,767.0	2,758.0	9.0	.3
90-911000	Federal, except U.S. Postal Service	2,162.7	2,153.9	8.8	.4
90-919120	U.S. Postal Service	604.6	604.5	.1	.0
90-920000	State government	5,247.0	5,234.0	13.0	.2
90-921611 ⁽²⁾	State government education	2,573.0	2,565.7	7.3	.3
90-922000	State government, excluding education	2,673.6	2,667.9	5.7	.2
90-930000	Local government	14,538.0	14,490.0	48.0	.3
90-931611 ⁽²⁾	Local government education	8,243.6	8,208.1	35.5	.4
90-932000	Local government, excluding education	6,294.6	6,281.5	13.1	.2

Footnotes

⁽¹⁾ During processing for the 2016 benchmark it was found that several establishments originally coded in CES industry 65-621111 (offices of physicians, except mental health) should have been coded in CES industry 65-621491 (HMO medical centers) back to January 1990. For more information, see the [Reconstruction](#) section in the 2016 Benchmark Article.

⁽²⁾ The CES estimates in these rows contain series that were affected by a reconstruction that shifted some employment from state government education to local government education. With the 2016 benchmark, CES reconstructed the CES national employment series for 90-921611 (state government education) and 90-931611 (local government education) back to April 2014 to address an ownership reclassification of some colleges and universities. For more information, see the [Reconstruction](#) section in the 2016 Benchmark Article.

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Revisions in the postbenchmark period

From April 2016 to December 2016, also known as the post-benchmark period, estimates were recalculated for each month based on new benchmark levels and new net birth/death factors. Net birth/death factors were revised to incorporate information from the most recent year of universe employment counts. [Table 3](#) shows the net birth/death model values for the supersectors over the post-benchmark period. From April 2016 to December 2016, the net birth/death model cumulatively added 1,021,000, compared with 881,000 in the previously published April 2016 to December 2016 employment estimates.

Table 3. Net birth/death estimates by industry supersector, April to December 2016 (in thousands)

CES Industry Code	CES Industry Title	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Cumulative Total
10-000000	Mining and logging	-1	1	1	1	0	0	1	0	0	3
20-000000	Construction	35	42	23	12	12	5	16	-9	-16	120
30-000000	Manufacturing	1	8	4	-1	4	2	4	3	1	26
40-000000	Trade, transportation, and utilities	4	25	8	8	16	7	30	7	4	109
41-420000 ⁽¹⁾	Wholesale trade	-4	5	-1	-1	3	-2	7	3	1	11
42-000000 ⁽¹⁾	Retail trade	5	15	6	8	8	5	18	4	2	71
43-000000 ⁽¹⁾	Transportation and warehousing	3	5	3	1	5	4	5	0	1	27
44-220000 ⁽¹⁾	Utilities	0	0	0	0	0	0	0	0	0	0
50-000000	Information	2	5	-2	4	5	-4	7	4	-1	20
55-000000	Financial activities	1	7	0	4	5	-4	20	2	9	44
60-000000	Professional and business services	91	24	-2	40	22	-23	97	8	-13	244
65-000000	Education and health services	26	17	-19	20	20	-2	59	11	-7	125
70-000000	Leisure and hospitality	84	93	80	68	24	-36	-2	-21	8	298
80-000000	Other services	12	9	6	-2	5	-3	5	2	-2	32
Total nonfarm birth/death adjustment		255	231	99	154	113	-58	237	7	-17	1,021

Footnote

⁽¹⁾ Indented series are part of trade, transportation, and utilities.

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[Table 4](#) presents revised total nonfarm employment data on a seasonally adjusted basis for January 2016 through December 2016. The revised data for April 2016 forward incorporate the effect of applying the rate of change measured by the sample to the new benchmark level, as well as updated net birth/death model adjustments and new seasonal adjustment factors. Revisions to November and December also reflect incorporation of additional sample receipts.

Table 4. Differences in seasonally adjusted levels and over-the-month changes, total nonfarm employment, January to December 2016 (in thousands)

2016	Levels			Over-the-month Changes		
	As Previously Published	As Revised	Difference	As Previously Published	As Revised	Difference
January	143,314	143,211	-103	168	126	-42
February	143,547	143,448	-99	233	237	4
March	143,733	143,673	-60	186	225	39
April	143,877	143,826	-51	144	153	9
May	143,901	143,869	-32	24	43	19
June	144,172	144,166	-6	271	297	26
July	144,424	144,457	33	252	291	39
August	144,600	144,633	33	176	176	0
September	144,808	144,882	74	208	249	41
October	144,943	145,006	63	135	124	-11
November	145,147	145,170	23	204	164	-40
December ^(p)	145,303	145,327	24	156	157	1

Footnotes

^(p) Preliminary

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Changes to the CES published series

With the release of the January 2017 first preliminary estimates on February 3, 2017, CES incorporated series changes related to annual sample adequacy and disclosure review.

Series changes

All CES series are evaluated annually for sample size, coverage, and response rates. The following changes result from a re-evaluation of the sample and universe coverage for CES industries, which are based on North American Industry Classification System (NAICS) industries. Some small industries no longer have sufficient sample to be estimated and published separately and were combined with other similar industries for estimation and publication purposes. The following information is also available at www.bls.gov/web/empsit/cesnewseries.htm.

A list of currently published CES series is available at www.bls.gov/web/empsit/cesseriespub.htm.

Some series have new CES industry codes or titles as a result of the series changes ([Exhibit 1](#)). These CES industry code or title changes have been applied to all data types published for the designated series. Historical data for these series with new CES industry codes or CES industry titles are impacted as noted on the remainder of this page; historical data are available under the new CES industry codes or CES industry titles.

Exhibit 1. Series with CES industry code or title changes

NAICS Code	Previous		New	
	CES Industry Code	CES Industry Title	CES Industry Code	CES Industry Title
335313,4	31-335314	Relays and industrial controls	31-335314	Switchgears, switchboard apparatus, relays, and industrial controls
3122,60	32-329200	Tobacco and tobacco products	32-329900	Other miscellaneous nondurable goods manufacturing
51114,9	50-511140	Directory and mailing list publishers	50-511190	Directory, mailing list, and other publishers

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[Exhibit 2](#) through [Exhibit 7](#) reference the new CES industry codes and titles, not the previous CES industry codes and titles, as noted in [Exhibit 1](#).

Only directly estimated data types¹ are included in the exhibits:

- Employment of All Employees (AE)
- AE Average Weekly Hours (AE AWH)
- AE Average Hourly Earnings (AE AHE)
- AE Average Weekly Overtime Hours (AE AWOH)
- Employment of Production and Nonsupervisory Employees (PE)
- PE Average Weekly Hours (PE AWH)
- PE Average Hourly Earnings (PE AHE)
- PE Average Weekly Overtime Hours (PE AWOH)
- Employment of Women Employees (WE)

The directly estimated data types listed except for AE are collectively called non-AE data types. In order to more easily identify affected series, since AE series are published at a more detailed industry level than non-AE series, series changes are shown for [AE](#) and [non-AE](#) data types. The non-AE tables cover all directly estimated non-AE data types.

The first three exhibits reference the AE data type and the second three exhibits reference all non-AE data types. The three exhibits in each group display the discontinued, collapsed, and new series. Discontinued series exhibits ([Exhibit 2](#) and [Exhibit 5](#)) display series for which the data

¹ CES estimates data in two ways: directly and indirectly. Directly estimated data types refer to data types for which estimates are calculated directly from the responding sample. Indirectly estimated data types refer to data types for which estimates are calculated from other directly estimated data types. Average weekly earnings of all employees and indexes of aggregate weekly hours of all employees are examples of indirectly estimated data types. For more information on indirectly estimated data types, see the CES Technical Notes available at www.bls.gov/web/empsit/cestn.htm.

types noted are no longer published. Collapsed series exhibits ([Exhibit 3](#) and [Exhibit 6](#)) display series for which the data types noted are no longer published because the industry no longer has sufficient sample to be estimated and published separately. Affected industries have been combined with other similar industries for estimation and publication purposes. Historical data for these series were reconstructed to provide consistent time series. New series exhibits ([Exhibit 4](#) and [Exhibit 7](#)) display series for which the data types noted are now published.

AE exhibits

Exhibit 2. Discontinued AE series

There are no new discontinued AE series.

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Exhibit 3. Collapsed AE series

NAICS Code	CES Industry Code	CES Industry Title	Collapsed into CES Industry Title (CES Industry Code)
335313	31-335313	Switchgear and switchboard apparatus	Collapsed into switchgears, switchboard apparatus, relays, and industrial controls (31-335314)
316	32-329300	Leather and allied products	Collapsed into other miscellaneous nondurable goods manufacturing (32-329900)
51114	50-511140	Directory and mailing list publishers	Collapsed into directory, mailing list, and other publishers (50-511190)

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Exhibit 4. New AE series

There are no new AE series published.

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Non-AE exhibits

Exhibit 5. Discontinued Non-AE series

NAICS Code	CES Industry Code	CES Industry Title	Discontinued From Publication	Next Highest Published Industry Title (CES Industry Code)
3314	31-331400	Other nonferrous metal production	AE AWOH	Primary metals (31-331000)
33391	31-333910	Pumps and compressors	AE AWH, AE AHE	Other general purpose machinery (31-333900)
33399	31-333990	All other general purpose machinery	AE AWH, AE AHE	Other general purpose machinery (31-333900)

NAICS Code	CES Industry Code	CES Industry Title	Discontinued From Publication	Next Highest Published Industry Title (CES Industry Code)
33422	31-334220	Broadcast and wireless communications equipment	AE AWH, AE AHE	Communications equipment (31-334200)
33611	31-336110	Automobiles and light trucks	AE AWH, AE AHE	Motor vehicles (31-336100)
33612	31-336120	Heavy duty trucks	AE AWH, AE AHE	Motor vehicles (31-336100)
33635	31-336350	Motor vehicle power train components	AE AWH, AE AHE, AE AWOH	Motor vehicle parts (31-336300)
3372	31-337200	Office furniture and fixtures	WE	Furniture and related products (31-337000)
337215	31-337215	Showcases, partitions, shelving, and lockers	AE AWOH	Furniture and related products (31-337000)
3379	31-337900	Other furniture-related products	WE	Furniture and related products (31-337000)
3117	32-311700	Seafood product preparation and packaging	PE AWOH	Food manufacturing (32-311000)
3141	32-314100	Textile furnishings mills	AE AWH, AE AHE, AE AWOH	Textile product mills (32-314000)
3149	32-314900	Other textile product mills	AE AWH, AE AHE, AE AWOH	Textile product mills (32-314000)
4542	42-454200	Vending machine operators	AE AWH, AE AHE	Nonstore retailers (42-454000)
4543	42-454300	Direct selling establishments	AE AWH, AE AHE	Nonstore retailers (42-454000)
45431	42-454310	Fuel dealers	AE AWH, AE AHE	Nonstore retailers (42-454000)
45439	42-454390	Other direct selling establishments	AE AWH, AE AHE	Nonstore retailers (42-454000)

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Exhibit 6. Collapsed Non-AE series

There are no collapsed non-AE series.

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Exhibit 7. New Non-AE series

There are no new non-AE series published.

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Reconstructions

Several series were reconstructed as part of the 2016 CES benchmark. [Exhibit 8](#) outlines the CES industries, data types, and timespans that were impacted by the reconstructions.

Exhibit 8. CES detailed series involved in data reconstructions

CES Industry Code	CES Industry Title	Data Type(s) Involved ⁽¹⁾	Earliest Month Impacted
65-621111	Offices of physicians, except mental health	AE, AE AWH, AE AHE, PE, PE AWH, PE AHE, WE	January 1990
65-621491	HMO medical centers	AE	January 1990
90-921611	State government education	AE, WE	April 2014
90-931611	Local government education	AE, WE	April 2014

Footnotes

⁽¹⁾ For definitions of directly estimated data types, see the [Changes to CES published series](#) section.

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HMO medical centers and offices of physicians, except mental health reconstructed from January 1990 forward

During processing for the 2016 benchmark, a change to NAICS codes for reports in health care services affecting two industries was discovered. This change was determined to be non-economic and affected the entire series going back to 1990.

Several establishments originally coded in CES industry 65-621111 (offices of physicians, except mental health) should have been coded in CES industry 65-621491 (HMO medical centers). A ratio of the employment in the reclassified establishments to the employment originally in 65-621111 was calculated for March 2016. This March 2016 ratio was applied back to January 1990 to each month's employment level for 65-621111. The resulting employment amounts were taken out of 65-621111 and put in industry 65-621491. This change affected all employees (AE) for 65-621491 and AE, production and nonsupervisory employment (PE), and women's employment (WE) for 65-621111. At higher levels of aggregation, average weekly hours and average hourly earnings for both AE and PE (AE AWH, AE AHE, PE AWH, and PE AHE) were affected for 65-621111. Aggregate levels of AE, WE, and PE were unaffected at the 3-digit level. All industries impacted by this reconstruction are included in [Exhibit 9](#) below.

This series was benchmarked according to the usual methodology after the reconstruction. The reconstruction and subsequent benchmark resulted in revisions to seasonally and not seasonally adjusted data from January 1990 forward. Due to the time span of the reconstruction, the entire series was re-seasonally adjusted back to 1990. More information about CES benchmarking methods is available in the CES Technical Notes at

www.bls.gov/web/empsit/cestn.htm#section7b. More information about seasonal adjustment of CES series is available in the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm#section6e.

Exhibit 9. Industries impacted by CES reconstruction of HMO medical centers and offices of physicians, except mental health, January 1990 forward

CES Industry Code	CES Industry Title
65-621100	Offices of physicians
65-621111	Offices of physicians, except mental health
65-621400	Outpatient care centers
65-621490	Outpatient care centers, except mental health
65-621491	HMO medical centers

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State and local government education reconstructed from April 2014 forward

A reclassification of some colleges and universities from state to local ownership caused a shift in employment from CES series 90-921611 (state government education) into 90-931611 (local government education). Prior to benchmarking, sample-based links² for AE were constructed from original matched sample data after accounting for the ownership change. These sample-based links were applied to AE from July 2014 to the March 2015 benchmark, after which the series were wedged back to April of 2014. The months following March 2015 were re-projected forward using the newly calculated sample links for AE. The previous level of employment was maintained for government by calculating the differences in employment between the summed state, federal, and local government employment and the previous aggregate government employment. Differences were raked proportionally into 90-921611 and 90-931611.

New ratios of WE to AE employment were calculated from the reclassified sample data. The new WE ratios were applied to the reconstructed AE series from April 2014 forward to create a reconstructed WE series.

The reconstruction resulted in state government education AE that was 35,700 less than the originally published March 2016 estimate level and local government education AE that was 34,800 more than the originally published March 2016 estimate level. All industries impacted by this reconstruction are included in [Exhibit 10](#) below.

The series were benchmarked according to the usual methodology after the reconstruction. The reconstruction and subsequent benchmark resulted in revisions to the not seasonally adjusted data from April 2014 forward. Seasonally adjusted series are subject to revisions back 5 years. More information about CES benchmarking methods is available in the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm#section7b. More information about seasonal adjustment of

² A matched sample link is defined to be all sample members that have reported data for the reference month and the month prior. Excluded from the matched sample link is any sample unit that reports that it is out-of-business and has zero employees. For more information, please refer to the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm.

CES series is available in the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm#section6e.

Exhibit 10. Industries impacted by CES reconstruction of state and local government education, April 2014 forward

CES Industry Code	CES Industry Title
90-920000	State government
90-921611	State government education
90-930000	Local government
90-931611	Local government education

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Why benchmarks differ from estimates

A benchmark revision is the difference between the benchmark employment level for a given March and its corresponding sample-based estimate. The overall accuracy of the establishment survey is usually gauged by the size of this difference. The benchmark revision often is regarded as a proxy for total survey error, but this does not take into account error in the universe data or infrequent events such as historical reconstructions. The employment counts obtained from quarterly UI tax forms are administrative data that reflect employer record-keeping practices and differing state laws and procedures. The benchmark revision can be more precisely interpreted as the difference between two independently derived employment counts, each subject to its own error sources.

Like all sample surveys, the establishment survey is susceptible to two sources of error: sampling error and nonsampling error. Sampling error is present any time a sample is used to make inferences about a population. The magnitude of the sampling error, or variance, relates directly to sample size and the percentage of the universe covered by that sample. The CES monthly survey captures slightly under one-third of the universe, exceptionally high by usual sampling standards. This coverage ensures a small sampling error at the total nonfarm employment level. More information on the reliability of CES estimates is available in the Reliability section of the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm.

Both the universe counts and the establishment survey estimates are subject to nonsampling errors common to all surveys – measurement, response, and processing errors. The error structures for both the CES monthly survey and the UI universe are complex. Still, the two programs generally produce consistent total employment figures, each validating the other.

Benchmark revision effects for other data types

The routine benchmarking process results in revisions to the series for employment of production and nonsupervisory employees (PE) and employment of women employees (WE). There are no benchmark employment levels for these series; they are revised by preserving ratios of employment for the particular data type to employment of all employees (AE) prior to benchmarking, and then applying these ratios to the revised employment of all employees. These figures are calculated at the basic cell level and then aggregated to produce the summary estimates.

Average weekly hours, average hourly earnings, and in manufacturing industries, average weekly overtime hours are not benchmarked; they are estimated solely from reports supplied by survey respondents at the basic estimating cell level.

The aggregate industry levels of the hours and earnings series are derived as a weighted average. The employment of all employees estimates or the employment of production and nonsupervisory employees estimates for the basic cells essentially act as weights for their respective hours and earnings estimates for broader industry groupings. Adjustments of the employment of all employees estimates to new benchmarks may alter the weights used for both

AE and PE hours and earnings, which, in turn, may change the estimates for both AE and PE hours and earnings at higher levels of aggregation.

Generally, new employment benchmarks have little effect on hours and earnings estimates for major industry groupings. To influence the hours and earnings estimates of a broader industry group, employment revisions have to be relatively large and must affect industries that have hours or earnings averages that are substantially different from those of other industries in their broader group. [Table 5](#) and [Table 6](#) provide information on the levels of specific hours and earnings series resulting from the March 2016 benchmark. At the total private level, there was no change in average weekly hours estimates for both AE and PE from the previously published level. Total private average hourly earnings increased by one cent for AE from the previously published level and did not change for PE.

Table 5. Effect of March 2016 benchmark revisions to AE AWH and AE AHE estimates, selected industries

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated	Revised	Difference	Estimated	Revised	Difference
05-000000	Total private	34.2	34.2	0.0	\$25.48	\$25.49	\$0.01
06-000000	Goods-producing	39.9	39.9	.0	26.7	26.69	-.01
08-000000	Private service-providing	33.1	33.1	.0	25.2	25.21	.01
10-000000	Mining and logging	42.1	42.1	.0	31.97	32.18	.21
20-000000	Construction	38.3	38.3	.0	27.94	27.95	.01
30-000000	Manufacturing	40.6	40.6	.0	25.78	25.76	-.02
31-000000	Durable goods	41.1	41.1	.0	27.08	27.09	.01
31-321000	Wood products	40.2	40.2	.0	19.17	19.14	-.03
31-327000	Nonmetallic mineral products	40.3	40.3	.0	23.67	23.69	.02
31-331000	Primary metals	42.6	42.6	.0	25.41	25.44	.03
31-332000	Fabricated metal products	40.9	40.9	.0	23.78	23.77	-.01
31-333000	Machinery	40.7	40.7	.0	27.47	27.46	-.01
31-334000	Computer and electronic products	40.2	40.2	.0	34.71	34.71	.00
31-335000	Electrical equipment and appliances	41.3	41.3	.0	25.62	25.62	.00
31-336000	Transportation equipment	43.3	43.3	.0	30.39	30.39	.00
31-336001	Motor vehicles and parts	44.2	44.1	-.1	25.31	25.25	-.06
31-337000	Furniture and related products	39.3	39.3	.0	20.31	20.35	.04
31-339000	Miscellaneous durable goods manufacturing	39.4	39.4	.0	25.07	25.06	-.01
32-000000	Nondurable goods	39.7	39.7	.0	23.5	23.45	-.05
32-311000	Food manufacturing	39.8	39.8	.0	19.81	19.85	.04
32-313000	Textile mills	41.7	41.7	.0	19.49	19.49	.00
32-314000	Textile product mills	38	38.1	.1	16.87	16.84	-.03
32-315000	Apparel	36.6	36.6	.0	17.9	17.88	-.02
32-322000	Paper and paper products	40.6	40.6	.0	26.79	26.78	-.01
32-323000	Printing and related support activities	37.9	37.9	.0	22.75	22.75	.00
32-324000	Petroleum and coal products	42.7	42.6	-.1	41.82	41.54	-.28
32-325000	Chemicals	40.7	40.7	.0	30.58	30.58	.00

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated	Revised	Difference	Estimated	Revised	Difference
32-326000	Plastics and rubber products	41.1	41.1	.0	21.15	21.15	.00
32-329000	Miscellaneous nondurable goods manufacturing	34.4	34.4	.0	23.56	23.56	.00
40-000000	Trade, transportation, and utilities	34	34	.0	22.21	22.21	.00
41-420000	Wholesale trade	38.5	38.5	.0	29.17	29.17	.00
42-000000	Retail trade	30.6	30.7	.1	17.81	17.83	.02
43-000000	Transportation and warehousing	38.6	38.6	.0	23.06	23.01	-.05
44-220000	Utilities	41.8	41.8	.0	38.11	38.16	.05
50-000000	Information	35.6	35.6	.0	36	36.02	.02
55-000000	Financial activities	37.3	37.3	.0	32.13	32.1	-.03
60-000000	Professional and business services	35.8	35.8	.0	30.61	30.61	.00
65-000000 ⁽¹⁾	Education and health services	32.7	32.6	-.1	25.54	25.61	.07
70-000000	Leisure and hospitality	26	26	.0	14.74	14.72	-.02
80-000000	Other services	31.7	31.7	.0	22.84	23.01	.17

Footnotes

⁽¹⁾ During processing for the 2016 benchmark, several establishments originally coded in CES industry 65-621111 (offices of physicians, except mental health) were corrected to be coded in CES industry 65-621491 (HMO medical centers). Estimates for these industries were adjusted back to 1990 to account for this change. All employees (AE) for 65-621491 and AE; women employees (WE); production employees (PE); and average weekly hours, average hourly earnings, and average weekly earnings for both AE and PE (AE AWH, PE AWH, AE AHE, PE AHE, AE AWE, PE AWE) were affected for 65-621111. At aggregate levels AE, PE, and WE were not affected, although there were changes to hours and earnings estimates for both AE and PE. For more information, see the [Reconstruction](#) section in the 2016 Benchmark Article.

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Table 6. Effect of March 2016 benchmark revisions to PE AWH and PE AHE estimates, selected industries

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated	Revised	Difference	Estimated	Revised	Difference
05-000000	Total private	33.4	33.4	0.0	\$21.42	\$21.42	\$0.00
06-000000	Goods-producing	40.7	40.7	.0	22.29	22.27	-.02
08-000000	Private service-providing	32.2	32.2	.0	21.24	21.25	.01
10-000000	Mining and logging	44	44	.0	26.92	26.96	.04
20-000000	Construction	38.7	38.8	.1	25.62	25.62	.00
30-000000	Manufacturing	41.6	41.6	.0	20.29	20.27	-.02
31-000000	Durable goods	42.1	42.1	.0	21.34	21.34	.00
31-321000	Wood products	41.2	41.2	.0	16.66	16.62	-.04
31-327000	Nonmetallic mineral products	40.9	41	.1	20	20.03	.03
31-331000	Primary metals	43.2	43.2	.0	22.86	22.93	.07
31-332000	Fabricated metal products	41.8	41.8	.0	19.51	19.51	.00
31-333000	Machinery	41.7	41.7	.0	21.69	21.68	-.01
31-334000	Computer and electronic products	41.2	41.2	.0	23.92	23.92	.00
31-335000	Electrical equipment and appliances	42.8	42.8	.0	19.12	19.12	.00
31-336000	Transportation equipment	44.1	44.1	.0	25.07	25.05	-.02
31-336001	Motor vehicles and parts	44.8	44.8	.0	21.56	21.51	-.05
31-337000	Furniture and related products	39.9	40	.1	16.49	16.5	.01
31-339000	Miscellaneous durable goods manufacturing	40.7	40.7	.0	18.33	18.33	.00
32-000000	Nondurable goods	40.9	40.9	.0	18.56	18.51	-.05
32-311000	Food manufacturing	40.8	40.8	.0	16.27	16.28	.01
32-313000	Textile mills	40.9	40.9	.0	15.85	15.85	.00
32-314000	Textile product mills	37.7	37.7	.0	13.49	13.49	.00
32-315000	Apparel	36.9	36.9	.0	14.01	14.02	.01
32-322000	Paper and paper products	42	42	.0	21.72	21.69	-.03
32-323000	Printing and related support activities	39.4	39.4	.0	18.58	18.58	.00
32-324000	Petroleum and coal products	45.2	45	-.2	38.54	38.17	-.37
32-325000	Chemicals	41.8	41.8	.0	21.94	21.94	.00
32-326000	Plastics and rubber products	42	42	.0	17.05	17.05	.00
32-329000	Miscellaneous nondurable goods manufacturing	37.5	37.5	.0	19.71	19.71	.00

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated	Revised	Difference	Estimated	Revised	Difference
40-000000	Trade, transportation, and utilities	33.1	33.2	.1	18.94	18.94	.00
41-420000	Wholesale trade	38.2	38.2	.0	23.94	23.94	.00
42-000000	Retail trade	29.3	29.3	.0	15.04	15.06	.02
43-000000	Transportation and warehousing	38.6	38.6	.0	20.95	20.88	-.07
44-220000	Utilities	41.9	41.9	.0	34.7	34.77	.07
50-000000	Information	35.1	35.1	.0	29.52	29.52	.00
55-000000	Financial activities	36.7	36.7	.0	26.11	26.08	-.03
60-000000	Professional and business services	35.3	35.3	.0	25.25	25.25	.00
65-000000 ⁽¹⁾	Education and health services	32	32	.0	22.36	22.41	.05
70-000000	Leisure and hospitality	24.8	24.8	.0	12.79	12.77	-.02
80-000000	Other services	30.6	30.6	.0	19.24	19.38	.14

Footnotes

⁽¹⁾ During processing for the 2016 benchmark, several establishments originally coded in CES industry 65-621111 (offices of physicians, except mental health) were corrected to be coded in CES industry 65-621491 (HMO medical centers). Estimates for these industries were adjusted back to 1990 to account for this change. All employees (AE) for 65-621491 and AE; women employees (WE); production employees (PE); and average weekly hours, average hourly earnings, and average weekly earnings for both AE and PE (AE AWH, PE AWH, AE AHE, PE AHE, AE AWE, PE AWE) were affected for 65-621111. At aggregate levels AE, PE, and WE were not affected, although there were changes to hours and earnings estimates for both AE and PE. For more information, see the [Reconstruction](#) section in the 2016 Benchmark Article.

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Methods

Benchmark sources and procedures

Establishment survey benchmarking is done on an annual basis to a population derived primarily from the administrative file of employees covered by UI. All employers covered by UI laws are required to report employment and wage information to the appropriate Labor Market Information (LMI) agency four times per year. Approximately 97 percent of total nonfarm employment within the scope of the establishment survey is covered by UI. A benchmark for the remaining 3 percent is constructed from alternate sources, primarily records from the Railroad Retirement Board (RRB), County Business Patterns (CBP), and Annual Survey of Public Employment and Payroll (ASPEP). This 3 percent is collectively referred to as noncovered employment. Noncovered employment data from these sources are available only on a lagged basis. More information on calculating noncovered employment in the CES program is available in the Benchmarks section of the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm.

The time required to complete the benchmark revision process—from the full collection of the UI population data to publication of the revised industry estimates—is about ten months. The benchmark adjustment procedure replaces the March sample-based employment estimates with UI-based population counts for March. The benchmark therefore determines the final employment levels, while sample movements capture month-to-month trends.

On a not seasonally adjusted basis, the sample-based estimates for the year preceding and the nine months following the benchmark month (March) are also subject to revision; seasonally adjusted data are subject to revision back five years. Employment estimates for the months between the most recent March benchmark and the previous year's benchmark are adjusted using a linear "wedge-back" procedure, which assumes that the total estimation error accumulated at a steady rate since the last benchmark. For the nine months following the March benchmark (also referred to as the postbenchmark period), CES applies previously derived over-the-month sample changes to the revised March level to get the revised estimates (see [Revisions in the postbenchmark period](#)). New net birth/death model estimates also are calculated and applied during postbenchmark estimation. More information on benchmarks in the CES program is available in the Benchmarks section of the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm.

Birth/Death

The CES sample alone is not sufficient for estimating the total nonfarm employment level because each month new firms generate employment that cannot be captured through the sample. There is an unavoidable lag between a firm opening for business and its appearance on the CES sample frame. The sample frame is built from Unemployment Insurance (UI) quarterly tax records. These records cover virtually all U.S. employers and include business births, but they only become available for updating the CES sampling frame 7 to 9 months after the reference month. After the births appear on the frame, there is also time required for sampling, contacting, and soliciting cooperation from the firm, and verifying the initial data provided. In practice, BLS cannot sample and begin to collect data from new firms until they are at least a year old.

BLS has researched both sample-based and model-based approaches to measuring birth units that have not yet appeared on the UI universe frame. The research demonstrated that sampling for births was not feasible in the very short CES production timeframes, so the Bureau utilizes a model-based approach for this component. This model incorporates two components; the first component is an indirect imputation for business deaths and the second component is an Autoregressive Integrated Moving Average (ARIMA) time series model designed to estimate the net birth/death employment not accounted for by the imputation from the first component. More information on the CES birth/death model is available in the Birth/Death Model section of the CES Technical Notes at www.bls.gov/web/empsit/cestn.htm.

Only error from the second component is directly measurable. Error from this component is measured by comparing the actual net of births and deaths with the model-based adjustment that was used in the CES sample-based estimates. Most recently, the data from April 2015 to March 2016 can be measured. As [Table 7](#) shows, the actual net birth/death for April 2015 to March 2016 was approximately 99,000 above the forecasted amount used in the CES monthly estimates for the same time period.

Table 7. Differences between forecasted and actual net birth/death, total private employment, April 2015-March 2016 (in thousands)

	2015									2016			Total
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Actual Net Birth/Death	324	256	97	187	121	-75	288	-2	-28	-289	113	-5	987
Forecast Net Birth/Death	223	217	114	115	115	-31	178	13	-16	-233	129	64	888
Difference	101	39	-17	72	6	-44	110	-15	-12	-56	-16	-69	99
Cumulative Difference	101	140	123	195	201	157	267	252	240	184	168	99	

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Seasonal adjustment

Typically, five years' worth of seasonally adjusted data are revised with each CES annual benchmark. As with the not seasonally adjusted data, if additional seasonally adjusted revisions to the seasonal adjustment data are made with a benchmark, those revisions will be noted in previous sections of this article.

For technical information on how seasonal adjustment is performed in the CES program, refer to the Seasonal Adjustment section of the CES Technical Notes, available at www.bls.gov/web/empsit/cestn.htm#section6.

For information on seasonal adjustment model specifications and special model adjustments, see the CES Seasonal Adjustment Files and Documentation page, available at www.bls.gov/web/empsit/cesseasadj.htm.

Availability of revised data

[LABSTAT](#), the BLS public database, contains all historical employment, hours, and earnings data revised as a result of this benchmark, including both not seasonally adjusted and seasonally adjusted data. The data can be accessed at www.bls.gov/ces, the CES homepage.

Previously published data are available on both a not seasonally adjusted and seasonally adjusted basis for all CES industries down to the 3-digit level from the CES Vintage Data page, available at www.bls.gov/web/empsit/cesvininfo.htm.

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