

# CES National Benchmark Article ([HTML](#))

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## BLS Establishment Survey National Estimates Revised to Incorporate March 2017 Benchmarks

**Authors:** Caila Pinkleton and Frances Tirado

**About the authors:**

Caila Pinkleton is an economist and Frances Tirado is a statistician in the Division of Current Employment Statistics – National, Office of Employment and Unemployment Statistics, Bureau of Labor Statistics.

**Telephone:** (202) 691-6555

**Email:** [Contact CES](#)

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## Introduction

With the release of January 2018 data on February 2, 2018, 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.

Additionally, with the release of January 2018 data on February 2, 2018, the CES program updated the national nonfarm payroll series to the 2017 North American Industry Classification System (NAICS) from the NAICS 2012 basis.

## Summary of the benchmark revisions

The March 2017 benchmark level for total nonfarm employment is 145,078,000.

Compared with the sample-based, published estimate for March 2017, total nonfarm employment had an upward revision of 138,000, or 0.1 percent.

With the implementation of the March 2017 benchmark, historical data have been reconstructed back to October 2016 for CES series 60-561613, security guards and patrols and armored car services. As a result of this reconstruction, the March 2017 employment level for total nonfarm has also been revised upwards by 3,000. More information on this historical reconstruction is available in the [Reconstructions](#) section below.

After accounting for the effect of this reconstruction, total nonfarm employment for March 2017 had an upward revision of 135,000, or 0.1 percent. *The tables in this article reflect this process.*

[Table 1](#) below shows the recent history of total nonfarm percent and level benchmark revisions. Over the prior 10 years, the annual benchmark revision at the total nonfarm level has averaged 0.2 percent (in absolute terms), with a range of -0.7 percent to 0.3 percent.

**Table 1. Percent and level differences between nonfarm employment benchmarks and estimates by industry supersector, March 2007-2017 (in thousands)<sup>(1)</sup>**

CES Industry Code	CES Industry Title	Type	2007	2008	2009	2010	2011 <sup>(2)</sup>	2012	2013 <sup>(3)</sup>	2014	2015 <sup>(4)</sup>	2016	2017 <sup>(5)</sup>
00-000000	Total nonfarm	Percent	-0.2	-0.1	-0.7	-0.3	0.1	0.3	-0.1	<sup>(6)</sup>	-0.1	-0.1	0.1
		Level	-293	-89	-902	-378	162	424	-119	67	-172	-81	135
05-000000	Total private	Percent	-0.2	-0.1	-0.9	-0.4	0.1	0.4	-0.1	0.1	-0.2	-0.1	0.1
		Level	-241	-137	-933	-391	134	481	-126	105	-232	-151	133
10-000000	Mining and logging	Percent	0.0	0.4	-3.5	-3.0	-0.4	1.6	-1.2	-1.8	-2.2	-3.2	-4.6
		Level	0	3	-25	-20	-3	13	-10	-16	-19	-22	-30
20-000000	Construction	Percent	0.1	0.7	-2.9	-1.3	-0.5	1.8	0.3	1.6	0.6	0.7	0.8
		Level	6	49	-171	-67	-26	93	14	90	39	47	52
30-000000	Manufacturing	Percent	-1.0	-0.1	-0.7	-1.0	0.1	-0.2	0.2	0.4	-0.1	0.5	0.1
		Level	-137	-17	-84	-119	9	-25	23	43	-12	58	15
40-000000	Trade, transportation, and utilities	Percent	0.5	0.2	-1.2	-0.6	0.4	0.6	-0.5	-0.1	<sup>(6)</sup>	-0.4	0.3
		Level	140	65	-300	-143	95	145	-131	-31	-5	-110	75
41-420000 <sup>(7)</sup>	Wholesale trade	Percent	0.4	-0.7	-1.2	-2.3	-0.2	0.8	-0.4	-0.8	-0.7	-1.1	-0.4
		Level	21.5	-43.1	-68.0	-124.5	-13.1	45.3	-20.2	-45.4	-41.3	-66.6	-21.2
42-000000 <sup>(7)</sup>	Retail trade	Percent	0.7	0.6	-1.6	-0.1	0.6	0.5	-0.8	<sup>(6)</sup>	-0.2	-0.8	0.1
		Level	107.5	92.8	-235.6	-18.4	83.8	78.9	-110.3	5.5	-23.5	-118.2	15.4
43-000000 <sup>(7)</sup>	Transportation and warehousing	Percent	0.3	0.3	0.2	0.1	0.5	0.7	0.1	0.2	1.4	1.7	1.6
		Level	11.5	15.0	9.9	3.1	22.4	29.4	3.6	9.7	65.3	83.5	79.8
44-220000 <sup>(7)</sup>	Utilities	Percent	<sup>(6)</sup>	<sup>(6)</sup>	-1.2	-0.6	0.5	-1.5	-0.8	-0.1	-0.8	-1.6	0.2
		Level	-0.2	-0.2	-6.8	-3.4	2.8	-8.5	-4.6	-0.6	-4.7	-8.7	1
50-000000	Information	Percent	-1.8	0.3	-1.5	-0.4	-0.4	1.8	-0.2	2.4	-1.6	-0.1	2.5
		Level	-54	8	-42	-11	-12	47	-5	66	-44	-2	70
55-000000	Financial activities	Percent	-1.3	-0.3	-0.1	0.4	0.9	0.6	-0.1	0.2	-0.1	<sup>(6)</sup>	0.1
		Level	-111	-23	-4	34	69	45	-10	19	-9	-4	7
60-000000	Professional and business services	Percent	0.2	-0.4	-0.8	<sup>(6)</sup>	0.7	<sup>(6)</sup>	<sup>(6)</sup>	-0.8	-0.6	-0.6	-1.3
		Level	44	-63	-137	-3	125	2	4	-147	-110	-125	-270
65-000000	Education and health services	Percent	-0.2	-0.1	-0.3	<sup>(6)</sup>	-0.5	<sup>(6)</sup>	-0.3	-0.1	<sup>(6)</sup>	-0.4	0.3
		Level	-39	-17	-56	7	-108	-2	-61	-16	-7	-83	70
70-000000	Leisure and hospitality	Percent	-0.8	-1.1	-0.6	-0.6	0.7	0.8	0.5	0.3	-0.3	0.7	0.8
		Level	-108	-151	-72	-80	93	104	72	38	-45	102	126

CES Industry Code	CES Industry Title	Type	2007	2008	2009	2010	2011 <sup>(2)</sup>	2012	2013 <sup>(3)</sup>	2014	2015 <sup>(4)</sup>	2016	2017 <sup>(5)</sup>
80-000000	Other services	Percent	0.3	0.2	-0.8	0.2	-2.0	1.1	-0.4	1.1	-0.4	-0.2	0.3
		Level	18	9	-42	11	-108	59	-22	59	-20	-12	18
90-000000	Government	Percent	-0.2	0.2	0.1	0.1	0.1	-0.3	<sup>(6)</sup>	-0.2	0.3	0.3	<sup>(6)</sup>
		Level	-52	48	31	13	28	-57	7	-38	60	70	2

#### Footnotes

- <sup>(1)</sup> 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.
- <sup>(2)</sup> A review of industries for the possible presence of noncovered employment yielded 13 additional industries. As a result of including these industries, employment in the amount of 95,000 was added to the benchmark nonfarm level. For more information, see the Changes to noncovered employment section of the [2011 Benchmark Article](#).
- <sup>(3)</sup> 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), 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](#) or the special notice regarding reconstructed data section of the [2013 CES Benchmark Article](#).
- <sup>(4)</sup> With the 2015 benchmark, CES reconstructed the national employment 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. For more information about this reconstruction, see the Reconstruction section of the [2015 Benchmark Article](#).
- <sup>(5)</sup> With the 2017 benchmark, CES reconstructed the national employment series 60-561613, security guards and patrols and armored car services back to October 2016 to correct a microdata error. The inclusion of the reconstructed series resulted in total nonfarm and total private employment that was 3,000 more than the originally published March 2017 estimate level. The difference between the benchmarked and originally published March 2017 estimate level is 138,000 or 0.1 percent. This table displays March 2017 data after accounting for the increase of 3,000 from the reconstructed series. Similarly, for the professional and business services supersector, this table displays March 2017 data after incorporating the reconstructed series. For more information, see the [Reconstructions](#) section in the 2017 Benchmark Article.
- <sup>(6)</sup> Absolute revision is less than 0.05 percent.
- <sup>(7)</sup> Indented series are part of trade, transportation, and utilities.

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[Table 2](#) shows the nonfarm employment benchmarks for March 2017, not seasonally adjusted, by industry. The revision to the reconstructed total nonfarm employment is 135,000.

Nine supersectors saw upward revisions. The largest upward revision occurred in leisure and hospitality by an amount of 126,000, or 0.8 percent; within this supersector, the largest revision was in accommodation and food services (72,800, or 0.5 percent). The next largest upward revision occurred in trade, transportation, and utilities, by an amount of 75,000, or 0.3 percent; within this supersector, the largest revision was in transportation and warehousing (79,800, or 1.6 percent). The next largest upward revision occurred in education and health services by an amount of 70,000, or 0.3 percent; within this supersector, the largest revision was in social assistance (62,000, or 1.6 percent). The next largest upward revision occurred in information by an amount of 70,000, or 2.5 percent; within this supersector, the largest revision was in motion picture and sound recording industries (20,900, or 4.9 percent). The next largest upward revision occurred in construction by an amount of 52,000, or 0.8 percent; within this supersector, the largest revision occurred in nonresidential building (24,300, or 3.2 percent). The four supersectors with the smallest upward revisions occurred in: other services (18,000, or 0.3 percent), manufacturing (15,000, or 0.1 percent), financial activities (7,000, or 0.1 percent), and government (2,000, or less than 0.05 percent).

The remaining two supersectors had negative revisions. The largest downward revision occurred in professional and business services, -270,000, or -1.3 percent; within this supersector, the largest downward revision was in professional and technical services (-147,100, or -1.6 percent). Mining and logging was revised downward by an amount of -30,000, or -4.6 percent; within this supersector, the largest downward revision was in oil and gas extraction (-32,900, or -22.9 percent).

*Table 2. Nonfarm employment benchmarks for industries released with first preliminary estimates, March 2017 (in thousands) <sup>(1)</sup>*

CES Industry Code	CES Industry Title	Benchmark	Estimate <sup>(2)</sup>	Differences	
				Amount	Percent <sup>(3)</sup>
00-000000	Total nonfarm	145,078	144,943	135	0.1
05-000000	Total private	122,385	122,252	133	.1
06-000000	Goods-producing	19,624	19,587	37	.2
07-000000	Service-providing	125,454	125,356	98	.1
08-000000	Private service-providing	102,761	102,665	96	.1
10-000000	Mining and logging	650	680	-30	-4.6
10-113300	Logging	48.0	48.6	-.6	-1.3
10-210000	Mining	601.7	631.4	-29.7	-4.9
10-211000	Oil and gas extraction	143.9	176.8	-32.9	-22.9
10-212000	Mining, except oil and gas	179.2	179.8	-.6	-.3
10-212100	Coal mining	51.0	50.1	.9	1.8
10-212200	Metal ore mining	38.8	39.1	-.3	-.8
10-212300	Nonmetallic mineral mining and quarrying	89.4	90.6	-1.2	-1.3
10-213000	Support activities for mining	278.6	274.8	3.8	1.4
20-000000	Construction	6,634	6,582	52	.8
20-236000	Construction of buildings	1,487.3	1,478.4	8.9	.6
20-236100	Residential building	723.3	738.7	-15.4	-2.1
20-236200	Nonresidential building	764.0	739.7	24.3	3.2
20-237000	Heavy and civil engineering construction	912.2	888.6	23.6	2.6
20-238000	Specialty trade contractors	4,234.5	4,215.0	19.5	.5
20-238001	Residential specialty trade contractors	1,850.3	1,842.4	7.9	.4
20-238002	Nonresidential specialty trade contractors	2,384.2	2,372.6	11.6	.5
30-000000	Manufacturing	12,340	12,325	15	.1
31-000000	Durable goods	7,687	7,706	-19	-.2
31-321000	Wood products	393.5	392.0	1.5	.4
31-327000	Nonmetallic mineral products	403.0	407.5	-4.5	-1.1
31-331000	Primary metals	368.0	379.0	-11.0	-.3
31-332000	Fabricated metal products	1,414.5	1,425.6	-11.1	-.8
31-333000	Machinery	1,067.5	1,079.8	-12.3	-1.2
31-334000	Computer and electronic products	1,035.9	1,034.8	1.1	.1
31-334100	Computer and peripheral equipment	156.2	160.5	-4.3	-2.8
31-334200	Communications equipment	86.5	84.5	2.0	2.3
31-334400	Semiconductors and electronic components	360.7	359.9	.8	.2
31-334500	Electronic instruments	398.5	396.3	2.2	.6
31-334600	Miscellaneous computer and electronic products	34.0	33.6	.4	1.2
31-335000	Electrical equipment and appliances	383.8	385.7	-1.9	-.5

CES Industry Code	CES Industry Title	Benchmark	Estimate <sup>(2)</sup>	Differences	
				Amount	Percent <sup>(3)</sup>
31-336000	Transportation equipment	1,637.2	1,620.2	17.0	1
31-336001	Motor vehicles and parts	959.8	946.5	13.3	1.4
31-337000	Furniture and related products	393.2	391.1	2.1	.5
31-339000	Miscellaneous durable goods manufacturing	590.4	590.4	.0	.0
32-000000	Nondurable goods	4653	4619	34	.7
32-311000	Food manufacturing	1,567.8	1,560.3	7.5	.5
32-313000	Textile mills	112.8	110.8	2.0	1.8
32-314000	Textile product mills	115.5	111.7	3.8	3.3
32-315000	Apparel	122.6	124.0	-1.4	-1.1
32-322000	Paper and paper products	368.6	368.7	-.1	.0
32-323000	Printing and related support activities	442.1	439.2	2.9	.7
32-324000	Petroleum and coal products	111.1	108.3	2.8	2.5
32-325000	Chemicals	819.1	816.6	2.5	.3
32-326000	Plastics and rubber products	713.1	701.7	11.4	1.6
32-329000	Miscellaneous nondurable goods manufacturing	280.6	278.0	2.6	.9
40-000000	Trade, transportation, and utilities	27,104	27,029	75	.3
41-420000	Wholesale trade	5,854.8	5,876.0	-21.2	-.4
41-423000	Durable goods	2,940.4	2,931.7	8.7	.3
41-424000	Nondurable goods	2,030.6	2,044.7	-14.1	-.7
41-425000	Electronic markets and agents and brokers	883.8	899.6	-15.8	-1.8
42-000000	Retail trade	15,628.7	15,613.3	15.4	.1
42-441000	Motor vehicle and parts dealers	1,992.1	1,999.1	-7.0	-.4
42-441100	Automobile dealers	1,289	1,297.4	-8.4	-.7
42-441200	Other motor vehicle dealers	150.2	149.9	.3	.2
42-441300	Auto parts, accessories, and tire stores	552.9	551.8	1.1	.2
42-442000	Furniture and home furnishings stores	471.2	479.5	-8.3	-1.8
42-443000	Electronics and appliance stores	508.1	508.6	-.5	-.1
42-444000	Building material and garden supply stores	1,269.2	1,285.5	-16.3	-1.3
42-445000	Food and beverage stores	3,065.6	3,061.4	4.2	.1
42-446000	Health and personal care stores	1,065.2	1,054.1	11.1	1
42-447000	Gasoline stations	920.1	928.2	-8.1	-.9
42-448000	Clothing and clothing accessories stores	1,339.5	1,298.4	41.1	3.1
42-451000	Sporting goods, hobby, book, and music stores	582.1	583.2	-1.1	-.2
42-452000	General merchandise stores	3,053.4	3,058.2	-4.8	-.2
42-452200	Department stores	1,136.7	1,226.8	-90.1	-7.9
42-452300	General merchandise stores, including warehouse clubs and supercenters	1,916.7	1,831.4	85.3	4.5

CES Industry Code	CES Industry Title	Benchmark	Estimate <sup>(2)</sup>	Differences	
				Amount	Percent <sup>(3)</sup>
42-453000	Miscellaneous store retailers	807.1	809.8	-2.7	-.3
42-454000	Nonstore retailers	555.1	547.3	7.8	1.4
43-000000	Transportation and warehousing	5,065.6	4,985.8	79.8	1.6
43-481000	Air transportation	486.7	481.6	5.1	1
43-482000	Rail transportation	217.5	209.7	7.8	3.6
43-483000	Water transportation	62.7	62.6	.1	.2
43-484000	Truck transportation	1,429.4	1,448.8	-19.4	-1.4
43-485000	Transit and ground passenger transportation	502.1	484.5	17.6	3.5
43-486000	Pipeline transportation	49.5	48.6	.9	1.8
43-487000	Scenic and sightseeing transportation	27.0	27.5	-.5	-1.9
43-488000	Support activities for transportation	682.2	659.2	23.0	3.4
43-492000	Couriers and messengers	636.3	627	9.3	1.5
43-493000	Warehousing and storage	972.2	936.3	35.9	3.7
44-220000	Utilities	554.5	553.5	1	.2
50-000000	Information	2803	2,733	70	2.5
50-511000	Publishing industries, except Internet	726.5	725.2	1.3	.2
50-512000	Motion picture and sound recording industries	425.9	405.0	20.9	4.9
50-515000	Broadcasting, except Internet	270.8	266.5	4.3	1.6
50-517000	Telecommunications	789.8	769.3	20.5	2.6
50-518000	Data processing, hosting and related services	312.6	299.0	13.6	4.4
50-519000	Other information services	277.0	267.5	9.5	3.4
55-000000	Financial activities	8,363	8,356	7	.1
55-520000	Finance and insurance	6,225.6	6,206.8	18.8	.3
55-521000	Monetary authorities - central bank	19.1	18.8	.3	1.6
55-522000	Credit intermediation and related activities	2,636.2	2,644.0	-7.8	-.3
55-522100	Depository credit intermediation	1,711.3	1,714.2	-2.9	-.2
55-522110	Commercial banking	1,323.2	1,315.2	8.0	.6
55-522200	Nondepository credit intermediation	618.2	621.1	-2.9	-.5
55-522300	Activities related to credit intermediation	306.7	308.7	-2.0	-.7
55-523000	Securities, commodity contracts, investments, and funds and trusts	927.8	932.1	-4.3	-.5
55-524000	Insurance carriers and related activities	2,642.5	2,611.9	30.6	1.2
55-530000	Real estate and rental and leasing	2,136.9	2,149.2	-12.3	-.6
55-531000	Real estate	1,568.8	1,577.3	-8.5	-.5
55-532000	Rental and leasing services	544.2	548.9	-4.7	-.9
55-533000	Lessors of nonfinancial intangible assets	23.9	23.0	.9	3.8

CES Industry Code	CES Industry Title	Benchmark	Estimate <sup>(2)</sup>	Differences	
				Amount	Percent <sup>(3)</sup>
60-000000	Professional and business services	20,070	20,340	-270	-1.3
60-540000	Professional and technical services	8,972.8	9,119.9	-147.1	-1.6
60-541100	Legal services	1,126.8	1,118.7	8.1	.7
60-541200	Accounting and bookkeeping services	1,089.0	1,105.3	-16.3	-1.5
60-541300	Architectural and engineering services	1,406.3	1,429.0	-22.7	-1.6
60-541400	Specialized design services	138.1	141.3	-3.2	-2.3
60-541500	Computer systems design and related services	2,012.0	2,027.6	-15.6	-.8
60-541600	Management and technical consulting services	1,367.0	1,410.9	-43.9	-3.2
60-541700	Scientific research and development services	651.5	696.9	-45.4	-.7
60-541800	Advertising and related services	490.0	487.0	3.0	.6
60-541900	Other professional and technical services	692.1	703.2	-11.1	-1.6
60-550000	Management of companies and enterprises	2,276.1	2,260.8	15.3	.7
60-560000	Administrative and waste services	8,820.9	8,959.1	-138.2	-1.6
60-561000	Administrative and support services	8,415.7	8,551.4	-135.7	-1.6
60-561100	Office administrative services	501.3	515.7	-14.4	-2.9
60-561200	Facilities support services	147.7	139.5	8.2	5.6
60-561300	Employment services	3,452.4	3,547.7	-95.3	-2.8
60-561320	Temporary help services	2,811.0	2,900.3	-89.3	-3.2
60-561400	Business support services	904.3	912.4	-8.1	-.9
60-561500	Travel arrangement and reservation services	217.8	215.2	2.6	1.2
60-561600	Investigation and security services	906.4	908.3	-1.9	-.2
60-561700	Services to buildings and dwellings	1,969.0	1,992.7	-23.7	-1.2
60-561900	Other support services	316.8	319.9	-3.1	-1.0
60-562000	Waste management and remediation services	405.2	407.7	-2.5	-.6
65-000000	Education and health services	23,185	23,115	70	.3
65-610000	Educational services	3,819.2	3,788.2	31.0	.8
65-620000	Health care and social assistance	19,365.9	19,326.6	39.3	.2
65-620001	Health care	15,593.1	15,615.8	-22.7	-.1
65-621000	Ambulatory health care services	7,206.6	7,212.9	-6.3	-.1
65-621100	Offices of physicians	2,558.5	2,562.4	-3.9	-.2
65-621200	Offices of dentists	927.0	937.5	-10.5	-1.1
65-621300	Offices of other health practitioners	875.4	888.1	-12.7	-1.5
65-621400	Outpatient care centers	886.4	897.0	-10.6	-1.2
65-621500	Medical and diagnostic laboratories	267.6	257.9	9.7	3.6
65-621600	Home health care services	1,393.0	1,382.6	10.4	.7

CES Industry Code	CES Industry Title	Benchmark	Estimate <sup>(2)</sup>	Differences	
				Amount	Percent <sup>(3)</sup>
65-621900	Other ambulatory health care services	298.7	287.4	11.3	3.8
65-622000	Hospitals	5,059.0	5,090.3	-31.3	-.6
65-623000	Nursing and residential care facilities	3,327.5	3,312.6	14.9	.4
65-623100	Nursing care facilities	1,625.8	1,633.8	-8	-.5
65-623200	Residential mental health facilities	625.9	618.1	7.8	1.2
65-623300	Community care facilities for the elderly	911.0	897.6	13.4	1.5
65-623900	Other residential care facilities	164.8	163.1	1.7	1.0
65-624000	Social assistance	3,772.8	3,710.8	62	1.6
65-624100	Individual and family services	2,318.3	2,278.9	39.4	1.7
65-624200	Emergency and other relief services	168.7	169.0	-.3	-.2
65-624300	Vocational rehabilitation services	338.3	331.8	6.5	1.9
65-624400	Child day care services	947.5	931.1	16.4	1.7
70-000000	Leisure and hospitality	15,524	15,398	126	.8
70-710000	Arts, entertainment, and recreation	2,120.3	2,067.0	53.3	2.5
70-711000	Performing arts and spectator sports	452.0	424.3	27.7	6.1
70-712000	Museums, historical sites, and similar institutions	152.6	153.2	-.6	-.4
70-713000	Amusements, gambling, and recreation	1,515.7	1,489.5	26.2	1.7
70-720000	Accommodation and food services	13,403.5	13,330.7	72.8	.5
70-721000	Accommodation	1,926.1	1,883.1	43	2.2
70-722000	Food services and drinking places	11,477.4	11,447.6	29.8	.3
80-000000	Other services	5,712	5,694	18	.3
80-811000	Repair and maintenance	1,305.0	1,293.3	11.7	.9
80-812000	Personal and laundry services	1,455.0	1,458.7	-3.7	-.3
80-813000	Membership associations and organizations	2,952.2	2,942.3	9.9	.3
90-000000	Government	22,693	22,691	2	.0
90-910000	Federal	2,793.0	2,796.0	-3.0	-.1
90-911000	Federal, except U.S. Postal Service	2,177.9	2,179.9	-2.0	-.1
90-919120	U.S. Postal Service	615.4	615.6	-.2	.0
90-920000	State government	5,318.0	5,250.0	68.0	1.3
90-921611	State government education	2,633.7	2,578.2	55.5	2.1
90-922000	State government, excluding education	2,683.9	2,671.9	12.0	.4
90-930000	Local government	14,582.0	14,645.0	-63.0	-.4
90-931611	Local government education	8,252.7	8,300.7	-48.0	-.6
90-932000	Local government, excluding education	6,328.8	6,344.1	-15.3	-.2

**Footnotes**

<sup>(1)</sup> The CES industries in this table contain series that were affected by the NAICS 2017 conversion. For more information, see the [Conversion to the 2017 North American Industry Classification System](#) section in the 2017 Benchmark Article.

<sup>(2)</sup> With the 2017 benchmark, CES reconstructed the national employment series 60-561613, security guards and patrols and armored car services back to October 2016 to correct a microdata error. For more information about impacted series, see the [Reconstructions](#) section in the 2017 Benchmark Article.

<sup>(3)</sup> Percent revisions of 0.0 indicate the absolute revision is less than 0.05 percent.

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## Revisions in the post-benchmark period

From April 2017 to December 2017, also known as the post-benchmark period, estimates were recalculated for each month based primarily 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 values for the supersectors over the post-benchmark period. From April 2017 to December 2017, the net birth/death model cumulatively added 1,112,000, compared with 972,000 in the previously published April 2017 to December 2017 employment estimates.

**Table 3. Net birth/death estimates by industry supersector, April to December 2017 (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	0	1	0	1	0	0	3
20-000000	Construction	35	42	23	13	11	6	17	-8	-16	123
30-000000	Manufacturing	1	7	4	0	3	2	5	3	1	26
40-000000	Trade, transportation, and utilities	5	28	12	15	21	12	40	13	7	153
41-420000 <sup>(1)</sup>	Wholesale trade	-5	5	-1	-1	2	-2	7	2	2	9
42-000000 <sup>(1)</sup>	Retail trade	7	16	8	13	12	8	23	5	2	94
43-000000 <sup>(1)</sup>	Transportation and warehousing	3	7	5	3	7	6	10	6	3	50
44-220000 <sup>(1)</sup>	Utilities	0	0	0	0	0	0	0	0	0	0
50-000000	Information	2	5	-1	4	4	-3	8	4	-1	22
55-000000	Financial activities	0	6	1	6	5	-3	20	2	9	46
60-000000	Professional and business services	97	24	-1	48	22	-18	87	6	-22	243
65-000000	Education and health services	28	17	-18	34	20	1	56	8	-5	141
70-000000	Leisure and hospitality	86	93	82	80	24	-36	6	-20	6	321
80-000000	Other services	11	9	7	0	4	-2	7	0	-2	34
<b>Total nonfarm birth/death adjustment</b>		<b>264</b>	<b>232</b>	<b>110</b>	<b>200</b>	<b>115</b>	<b>-41</b>	<b>247</b>	<b>8</b>	<b>-23</b>	<b>1,112</b>

### Footnote

<sup>(1)</sup> 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 2017 through December 2017. The revised data for April 2017 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 2017 (in thousands)**

2017	Levels			Over-the-month Changes		
	As Previously Published	As Revised	Difference	As Previously Published	As Revised	Difference
January	145,541	145,696	155	216	259	43
February	145,773	145,896	123	232	200	-32
March	145,823	145,969	146	50	73	23
April	146,030	146,144	114	207	175	-32
May	146,175	146,299	124	145	155	10
June	146,385	146,538	153	210	239	29
July	146,523	146,728	205	138	190	52
August	146,731	146,949	218	208	221	13
September	146,769	146,963	194	38	14	-24
October	146,980	147,234	254	211	271	60
November	147,232	147,450	218	252	216	-36
December <sup>(p)</sup>	147,380	147,610	230	148	160	12

**Footnotes**

<sup>(p)</sup> Preliminary

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## Changes to the CES published series

With the release of the January 2018 first preliminary estimates on February 2, 2018, CES incorporated series changes related to annual sample adequacy and disclosure review.

### *Series changes due to annual sample review*

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](http://www.bls.gov/web/empsit/cesnewseries.htm).

A list of currently published CES series is available at [www.bls.gov/web/empsit/cesseriespub.htm](http://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 new 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
337211,2,4	31-337212	Wood office furniture and custom architectural woodwork and millwork	31-337214	Office furniture and custom architectural woodwork and millwork

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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 types<sup>1</sup> are included in the exhibits:

- All Employees (AE)
- AE Average Weekly Hours (AE AWH)
- AE Average Hourly Earnings (AE AHE)
- AE Average Weekly Overtime Hours (AE AWOH)
- Production and Nonsupervisory Employees (PE)
- PE Average Weekly Hours (PE AWH)
- PE Average Hourly Earnings (PE AHE)
- PE Average Weekly Overtime Hours (PE AWOH)
- 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 and because 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 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.

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<sup>1</sup> 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](#).

**AE exhibits**

***Exhibit 2. Discontinued AE series***

NAICS Code	CES Industry Code	CES Industry Title	Next Highest Published Industry Title (CES Industry Code)
321211,2	31-321212	Hardwood and softwood veneer and plywood	Plywood and engineered wood products (31-321200)
321213,4,9	31-321214	All other plywood and engineered wood products	Plywood and engineered wood products (31-321200)
3131	32-313100	Fiber, yarn, and thread mills	Textile mills (32-313000)
31321	32-313210	Broadwoven fabric mills	Fabric mills (32-313200)
3133	32-313300	Textile and fabric finishing mills	Textile mills (32-313000)

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***Exhibit 3. Collapsed AE series***

Previous			New		
NAICS Code	CES Industry Code	CES Industry Title	NAICS Code	CES Industry Code	CES Industry Title
337211,2	31-337212	Wood office furniture and custom architectural woodwork and millwork	337211,2,4	31-337214	Office furniture and custom architectural woodwork and millwork
337214	31-337214	Office furniture, except wood			

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***Exhibit 4. New AE series***

There are no new AE series published as a result of annual sample review.

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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)
2372	20-237200	Land subdivision	PE, PE AWH, PE AHE	Heavy and civil engineering construction (20-237000)
2379	20-237900	Other heavy construction	PE, PE AWH, PE AHE	Heavy and civil engineering construction (20-237000)
3152	32-315200	Cut and sew apparel	WE	Apparel (32-315000)
3151,9	32-315900	All other apparel manufacturing	WE	Apparel (32-315000)
32612	32-326120	Plastics pipe, fittings, and profile shapes	WE	Plastics products (32-326100)
32613,6	32-326160	Plastics bottles and laminated plastics plate, sheet, and shapes	WE	Plastics products (32-326100)
42332	41-423320	Masonry materials	PE, PE AWH, PE AHE	Lumber and construction supplies (41-423300)
42333,9	41-423390	Roofing, siding, and other construction materials	PE, PE AWH, PE AHE	Lumber and construction supplies (41-423300)
42385	41-423850	Service establishment equipment	WE	Machinery and supplies (41-423800)
42386	41-423860	Other transportation goods	WE	Machinery and supplies (41-423800)
42511	41-425110	Business to business electronic markets	PE, PE AWH, PE AHE	Electronic markets and agents and brokers (41-425000)
42512	41-425120	Wholesale trade agents and brokers	PE, PE AWH, PE AHE	Electronic markets and agents and brokers (41-425000)
45112	42-451120	Hobby, toy, and game stores	PE, PE AWH, PE AHE	Sporting goods and musical instrument stores (42-451100)
486	43-486000	Pipeline transportation	AE AWH, AE AHE	Transportation and warehousing (43-000000)
517911	50-517911	Telecommunications resellers	PE, PE AWH, PE AHE	Other telecommunications (50-517900)
52221	55-522210	Credit card issuing	AE AWH, AE AHE	Nondepository credit intermediation (55-522200)
52222	55-522220	Sales financing	AE AWH, AE AHE	Nondepository credit intermediation (55-522200)

NAICS Code	CES Industry Code	CES Industry Title	Discontinued From Publication	Next Highest Published Industry Title (CES Industry Code)
52232	55-522320	Financial transaction processing and clearing	PE, PE AWH, PE AHE	Activities related to credit intermediation (55-522300)

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***Exhibit 6. Collapsed non-AE series***

There are no collapsed non-AE series as a result of annual sample review.

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***Exhibit 7. New non-AE series***

There are no new non-AE series published as a result of annual sample review.

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## *Conversion to the 2017 North American Industry Classification System*

With the release of January 2018 data on February 2, 2018, the CES program updated the national nonfarm payroll series to the 2017 North American Industry Classification System (NAICS) from the NAICS 2012 basis. This change implements the final decision from the Office of Management and Budget (OMB) on recommendations by its Economic Classification Policy Committee (ECPC) in the [Federal Register, Volume 81, Number 152](#). For more information about the NAICS 2017 updates, see the OMB's decision and directive on the NAICS 2017 update, see [Federal Register, Volume 80, Number 149](#). For more information about NAICS 2012 and NAICS 2017 classifications, see the [Census Bureau's NAICS page](#). For more information about other Federal Register notices involving NAICS, see the Census Bureau's [Federal Register Notices](#) page.

This conversion resulted in minor revisions reflecting content and coding changes within the retail trade, information, financial activities, and professional and business services major industry sectors, as well as a number of consolidations within the durable goods manufacturing, retail trade, and information major industry sectors. Several industry titles and descriptions were updated. Approximately 4 percent of CES employment was reclassified into different industries as a result of the revision. For more information about NAICS codes and CES industry codes, as well as previous NAICS conversions, see the [CES NAICS page](#).

Some of the changes associated with the NAICS 2017 update impacted levels of detail not published by CES; therefore, only cases where CES industries are impacted are discussed in detail here.

Only the following directly estimated data types are noted in the exhibits:

- All Employees (AE)
- AE Average Weekly Hours (AE AWH)
- AE Average Hourly Earnings (AE AHE)
- Production and Nonsupervisory Employees (PE)
- PE Average Weekly Hours (PE AWH)
- PE Average Hourly Earnings (PE AHE)
- 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 and because 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 conversion from NAICS 2012 to NAICS 2017 can affect CES industry codes in several ways. Some CES series were converted as a whole from their NAICS 2012 industry code to their new NAICS 2017 industry code. Some CES series were combined with other series because their underlying NAICS codes were combined. Other CES series were split into more detailed CES

series because their NAICS codes were changed to accommodate new distinct industries. Finally, some CES series are no longer published at the same level of detail under NAICS 2017.

Where reconstructions were necessary, ratios of employment moving from old CES industries based on NAICS 2012 to new CES industries based on NAICS 2017 were calculated for March 2017 and applied to historical CES data. These ratios were calculated by assigning both a NAICS 2012-based CES industry and a NAICS 2017-based CES industry to individual report-level data from the longitudinal database (LDB) from the Quarterly Census of Employment and Wages (QCEW) which is used as the CES sample frame. The March 2017 LDB employment was summed by old CES industry based on NAICS 2012 and by new CES industry based on NAICS 2017. Forward ratios were created by dividing the amount of each old NAICS 2012-based CES industry moving to a new NAICS 2017-based CES industry by its total for the old CES industry (see [exhibit 11](#) for AE ratios and [exhibit 16](#) for non-AE ratios). Reverse ratios were created by dividing the amount of each old NAICS 2012-based CES industry moving to a new NAICS 2017-based CES industry by its total for the new CES industry (see [exhibit 12](#) for AE reverse ratios and [exhibit 17](#) for non-AE reverse ratios).

Forward ratios were held constant and applied to each monthly CES employment estimate for the entire history of the series, usually back to 1990, to determine the amount of employment moving from a NAICS 2012-based CES industry to a NAICS 2017-based CES industry. Average weekly hours and average hourly earnings were recalculated by applying forward ratios to the amount of old total hours and old total payroll to move the correct amount of hours or earnings into the new CES industry. Total hours and total earnings were averaged using the new employment levels. More information about the calculation of CES estimates for employment, hours, and earnings estimates are available in the CES Technical Notes under [Estimation Methods](#).

### **AE exhibits**

[Exhibit 8](#) shows AE series that were partially or completely combined with other series.

For example, the CES industry department stores, except discount (42-452111) was combined with a portion of discount department stores (42-452112) to create the new CES industry department stores (42-452200). This is because the associated NAICS 2012 industry code 452111 became NAICS 2017 industry code 452210, and part of NAICS 2012 industry code 452112 became NAICS 2017 industry code 452210. The remainder of NAICS 2012 industry code 452112 became NAICS 2017 industry code 452311, along with all of NAICS 2012 industry code 452910.

**Exhibit 8. New AE series as a result of reclassification of NAICS 2012 to NAICS 2017**

NAICS 2012			Reclassification
NAICS Code	CES Industry Code	CES Industry Title	
452111	42-452111	Department stores, except discount	Combined into new NAICS 2017 department stores (42-452200)
452112	42-452112	Discount department stores	New NAICS 2017 department stores (42-452200) combined all of department stores, except discount (42-452111) and a portion of discount department stores (42-452112)
452112	42-452112	Discount department stores	New NAICS 2017 warehouse clubs and supercenters (42-452311) combined a portion of discount department stores (42-452112) and all of warehouse clubs and supercenters (42-452910)
45291	42-452910	Warehouse clubs and supercenters	Combined into new NAICS 2017 warehouse clubs and supercenters (42-452311)
45299	42-452990	All other general merchandise stores	Moved into new NAICS 2017 all other general merchandise stores (42-452319)
454112	42-454112	Electronic shopping and electronic auctions	Combined into new NAICS 2017 electronic shopping and mail-order houses (42-454100)
454113	42-454113	Mail-order houses	Combined into new NAICS 2017 electronic shopping and mail-order houses (42-454100)
5171	50-517100	Wired telecommunications carriers	Moved into new NAICS 2017 wired telecommunications carriers (50-517311)
5172	50-517200	Wireless telecommunications carriers (except satellite)	Moved into new NAICS 2017 wireless telecommunications carriers, except satellite (50-517312)
53223	55-532230	Video tape and disc rental	Combined into new NAICS 2017 consumer goods rental (55-532200)
53223	55-532230	Video tape and disc rental	Moved into new NAICS 2017 video tape and disc rental (55-532282)
53229	55-532290	Miscellaneous consumer goods rental	Combined into new NAICS 2017 consumer goods rental (55-532200)
532291	55-532291	Home health equipment rental	Moved into new NAICS 2017 home health equipment rental (55-532283)
541711	60-541711	Biotechnology research	New NAICS 2017 research and development in biotechnology, except nanobiotechnology (60-541714) is a portion of biotechnology research (60-541711)
541711	60-541711	Biotechnology research	New NAICS 2017 research and development in nanotechnology (60-541713) combined a portion of biotechnology research (60-541711) and a portion of physical, engineering, and life sciences research (60-541712)

NAICS 2012			Reclassification
NAICS Code	CES Industry Code	CES Industry Title	
541712	60-541712	Physical, engineering, and life sciences research	New NAICS 2017 research and development in nanotechnology (60-541713) combined a portion of biotechnology research (60-541711) and a portion of physical, engineering, and life sciences research (60-541712)
541712	60-541712	Physical, engineering, and life sciences research	New NAICS 2017 research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology (60-541715) is a portion of physical, engineering, and life sciences research (60-541712)

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[Exhibit 9](#) shows AE series that had changes in scope due to the conversion from NAICS 2012 to NAICS 2017. These new CES industries combined series that were previously published separately or as part of another series.

For example, the new CES industry research and development in nanotechnology (60-541713) combined a portion of the old CES industry biotechnology research (60-541711) and a portion of the old CES industry physical, engineering, and life sciences research (60-541712). The remaining part of the old NAICS 2012-based CES industry biotechnology research (60-541711) became the new NAICS 2017-based CES industry research and development in biotechnology, except nanobiotechnology (60-541714). The remaining part of the old NAICS 2012-based CES industry physical, engineering, and life sciences research (60-541712) became the new NAICS 2017-based CES industry research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology (60-541715).

**Exhibit 9. Change in scope of AE series as a result of NAICS 2017**

NAICS 2017			Reclassification
NAICS Code	CES Industry Code	CES Industry Title	
4522	42-452200	Department stores	The new NAICS 2017 series department stores (42-452200) combined all of department stores, except discount (42-452111) and a portion of discount department stores (42-452112)
452311	42-452311	Warehouse clubs and supercenters	The new NAICS 2017 series warehouse clubs and supercenters (42-452311) combined a portion of department stores, except discount (42-452111) and all of warehouse clubs and supercenters (42-452910)
4541	42-454100	Electronic shopping and mail-order houses	The new NAICS 2017 series electronic shopping and mail-order houses (42-454100) combined electronic shopping and electronic auctions (42-454112) and mail-order houses (42-454113)
5322	55-532200	Consumer goods rental	The new NAICS 2017 series consumer goods rental (55-532200) combined video tape and disc rental (55-532230) and miscellaneous consumer goods rental (55-532290)
541713	60-541713	Research and development in nanotechnology	A portion of biotechnology research (60-541711) moved to into new NAICS 2017 research and development in nanotechnology (60-541713). The rest was reclassified into biotechnology, except nanobiotechnology (60-541714).
541713	60-541713	Research and development in nanotechnology	The new NAICS 2017 series research and development in nanotechnology (60-541713) is a portion of biotechnology research (60-541711) and a portion of physical, engineering, and life sciences research (60-541712)
541714	60-541714	Research and development in biotechnology, except nanobiotechnology	The new NAICS 2017 series research and development in biotechnology, except nanobiotechnology (60-541714) is a portion of biotechnology research (60-541711)
541715	60-541715	Research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology	The new NAICS 2017 series research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology (60-541715) is a portion of physical, engineering, and life sciences research (60-541712)

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[Exhibit 10](#) shows AE series that are no longer published under NAICS 2017.

For example, NAICS 2017 combines electronic shopping and electronic auctions (NAICS 454112) and mail-order houses (NAICS 454113) into electronic shopping and mail-order houses (NAICS 454110). The two CES industries associated with the NAICS 2012 industries are 42-454112 and 42-454113. These series were discontinued and the higher-level CES series electronic shopping and mail-order houses (42-454100) is the next highest published level.

***Exhibit 10. Discontinued NAICS 2012 AE series***

NAICS 2012			Next Highest Published Level (CES Industry Code)
NAICS Code	CES Industry Code	CES Industry Title	
<b>452111</b>	42-452111	Department stores, except discount	Department stores (42-452200)
<b>45291</b>	42-452910	Warehouse clubs and supercenters	Warehouse clubs and supercenters (42-452311)
<b>454112</b>	42-454112	Electronic shopping and electronic auctions	Electronic shopping and mail-order houses (42-454100)
<b>454113</b>	42-454113	Mail-order houses	Electronic shopping and mail-order houses (42-454100)
<b>53223</b>	55-532230	Video tape and disc rental	Consumer goods rental (55-532200)
<b>53229</b>	55-532290	Miscellaneous consumer goods rental	Consumer goods rental (55-532200)

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[Exhibit 11](#) shows the proportion of AE employment that moved from an old NAICS 2012-based CES industry code to a new NAICS 2017-based CES industry code.

Industries that moved completely from a NAICS 2012-based CES industry to a NAICS 2017-based CES industry have a ratio of 100. NAICS 2012-based CES industries that moved only a portion of their employment from the old NAICS 2012-based CES industry to a new NAICS 2017-based CES industry have ratios of less than 100. Old NAICS 2012-based CES industry codes with ratios of less than 100 are listed multiple times to account for the movement of all of their employment.

For example, 98.3 percent of discount department stores (42-452112) was moved into the new NAICS 2017-based CES industry department stores (42-452200). The remaining 1.7 percent was moved into the new CES industry warehouse clubs and supercenters (42-452311).

**Exhibit 11. NAICS 2012 to NAICS 2017 AE employment ratios**

NAICS 2012		NAICS 2017		Ratio
CES Industry Code	CES Industry Title	CES Industry Code	CES Industry Title	
42-452111	Department stores, except discount	42-452200	Department stores	100
42-452112	Discount department stores	42-452200	Department stores	98.3
42-452112	Discount department stores	42-452311	Warehouse clubs and supercenters	1.7
42-452910	Warehouse clubs and supercenters	42-452311	Warehouse clubs and supercenters	100
42-452990	All other general merchandise stores	42-452319	All other general merchandise stores	100
42-454112	Electronic shopping and electronic auctions	42-454100	Electronic shopping and mail-order houses	100
42-454113	Mail-order houses	42-454100	Electronic shopping and mail-order houses	100
50-517100	Wired telecommunications carriers	50-517311	Wired telecommunications carriers	100
50-517200	Wireless telecommunications carriers (except satellite)	50-517312	Wireless telecommunications carriers, except satellite	100
55-532230	Video tape and disc rental	55-532200	Consumer goods rental	100
55-532290	Miscellaneous consumer goods rental	55-532200	Consumer goods rental	100
55-532230	Video tape and disc rental	55-532282	Video tape and disc rental	100
55-532291	Home health equipment rental	55-532283	Home health equipment rental	100
60-541711	Biotechnology research	60-541713	Research and development in nanotechnology	4.9
60-541712	Physical, engineering, and life sciences research	60-541713	Research and development in nanotechnology	3.5
60-541711	Biotechnology research	60-541714	Research and development in biotechnology, except nanobiotechnology	95.1
60-541712	Physical, engineering, and life sciences research	60-541715	Research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology	96.5

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[Exhibit 12](#) shows the proportion of AE employment that moved to a new NAICS 2017-based CES industry that came from an old NAICS 2012-based CES industry.

For example, 37.8 percent of the new NAICS 2017-based CES industry department stores (42-452200) came from the old NAICS 2012-based CES industry department stores, except discount (42-452111). The remaining 62.2 percent of the new NAICS 2017-based CES industry department stores (42-452200) came from the old NAICS 2012-based CES industry discount department stores (42-452112).

***Exhibit 12. NAICS 2017 to NAICS 2012 AE employment ratios***

NAICS 2017		NAICS 2012		Ratio
CES Industry Code	CES Industry Title	CES Industry Code	CES Industry Title	
42-452200	Department stores	42-452111	Department stores, except discount	37.8
42-452200	Department stores	42-452112	Discount department stores	62.2
42-452311	Warehouse clubs and supercenters	42-452112	Discount department stores	0.9
42-452311	Warehouse clubs and supercenters	42-452910	Warehouse clubs and supercenters	99.1
42-452319	All other general merchandise stores	42-452990	All other general merchandise stores	100
42-454100	Electronic shopping and mail-order houses	42-454112	Electronic shopping and electronic auctions	66.8
42-454100	Electronic shopping and mail-order houses	42-454113	Mail-order houses	33.2
50-517311	Wired telecommunications carriers	50-517100	Wired telecommunications carriers	100
50-517312	Wireless telecommunications carriers, except satellite	50-517200	Wireless telecommunications carriers (except satellite)	100
55-532200	Consumer goods rental	55-532230	Video tape and disc rental	7.3
55-532200	Consumer goods rental	55-532290	Miscellaneous consumer goods rental	92.7
55-532282	Video tape and disc rental	55-532230	Video tape and disc rental	100
55-532283	Home health equipment rental	55-532291	Home health equipment rental	100
60-541713	Research and development in nanotechnology	60-541711	Biotechnology research	34.9
60-541713	Research and development in nanotechnology	60-541712	Physical, engineering, and life sciences research	65.1
60-541714	Research and development in biotechnology, except nanobiotechnology	60-541711	Biotechnology research	100
60-541715	Research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology	60-541712	Physical, engineering, and life sciences research	100

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## Non-AE exhibits

[Exhibit 13](#) shows non-AE series that were partially or completely combined with other series, just like their AE counterparts. Some series affected for AE were not affected for non-AE because non-AE data types are not published at the same level.

***Exhibit 13. New non-AE series as a result of reclassification of NAICS 2012 to NAICS 2017***

NAICS 2012			Reclassification
NAICS Code	CES Industry Code	CES Industry Title	
454112	42-454112	Electronic shopping and electronic auctions	Combined into new NAICS 2017 electronic shopping and mail-order houses (42-454100)
454113	42-454113	Mail-order houses	Combined into new NAICS 2017 electronic shopping and mail-order houses (42-454100)
5171	50-517100	Wired telecommunications carriers	Moved into new NAICS 2017 wired telecommunications carriers (50-517311)
5172	50-517200	Wireless telecommunications carriers (except satellite)	Moved into new NAICS 2017 wireless telecommunications carriers, except satellite (50-517312)
532291	55-532291	Home health equipment rental	Moved into new NAICS 2017 home health equipment rental (55-532283)
541711	60-541711	Biotechnology research	New NAICS 2017 research and development in biotechnology, except nanobiotechnology (60-541714) is a portion of biotechnology research (60-541711)
541711	60-541711	Biotechnology research	New NAICS 2017 research and development in nanotechnology (60-541713) combined a portion of biotechnology research (60-541711) and a portion of physical, engineering, and life sciences research (60-541712)
541712	60-541712	Physical, engineering, and life sciences research	New NAICS 2017 research and development in nanotechnology (60-541713) combined a portion of biotechnology research (60-541711) and a portion of physical, engineering, and life sciences research (60-541712)
541712	60-541712	Physical, engineering, and life sciences research	New NAICS 2017 research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology (60-541715) is a portion of physical, engineering, and life sciences research (60-541712)

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[Exhibit 14](#) shows non-AE series that had changes in scope due to the conversion from NAICS 2012 to NAICS 2017. These series reflect the same changes as their AE counterparts, but at less detailed levels, and some series affected for AE are not affected for non-AE.

***Exhibit 14. Change in scope of non-AE series as a result of NAICS 2017***

NAICS 2017			Reclassification
NAICS Code	CES Industry Code	CES Industry Title	
4541	42-454100	Electronic shopping and mail-order houses	The new NAICS 2017 series electronic shopping and mail-order houses (42-454100) combined electronic shopping and electronic auctions (42-454112) and mail-order houses (42-454113)
541713	60-541713	Research and development in nanotechnology	The new NAICS 2017 series research and development in nanotechnology (60-541713) is a portion of biotechnology research (60-541711) and a portion of physical, engineering, and life sciences research (60-541712)
541714	60-541714	Research and development in biotechnology, except nanobiotechnology	The new NAICS 2017 series research and development in biotechnology, except nanobiotechnology (60-541714) is a portion of biotechnology research (60-541711)
541715	60-541715	Research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology	The new NAICS 2017 series research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology (60-541715) is a portion of physical, engineering, and life sciences research (60-541712)

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[Exhibit 15](#) shows non-AE series that are no longer published under NAICS 2017. Some AE series that were discontinued were already not published for non-AE series, and therefore, are unaffected by NAICS 2017 discontinuations for non-AE.

***Exhibit 15. Discontinued non-AE series as a result of NAICS 2017***

NAICS 2012			Next Highest Published Level (CES Industry Code)
NAICS Code	CES Industry Code	CES Industry Title	
454112	42-454112	Electronic shopping and electronic auctions	Electronic shopping and mail-order houses (42-454100)
454113	42-454113	Mail-order houses	Electronic shopping and mail-order houses (42-454100)

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[Exhibit 16](#) shows the proportion of non-AE employment that moved from an old NAICS 2012-based CES industry code to a new NAICS 2017-based CES industry code.

Industries that moved directly and completely from an old NAICS 2012-based CES industry to a new NAICS 2017-based CES industry have a ratio of 100. Old NAICS 2012-based CES industries that moved only a portion of their employment from the old NAICS 2012-based CES industry to a new NAICS 2017-based CES industry have ratios of less than 100. Old NAICS 2012-based CES industry codes with ratios of less than 100 are listed multiple times to account for the movement of all of their employment.

For example, 4.9 percent of biotechnology research (60-541711) moved into the new NAICS 2017-based CES industry research and development in nanotechnology (60-541713). The remaining 95.1 percent moved into the new NAICS 2017-based CES industry research and development in biotechnology, except nanobiotechnology (60-541714).

***Exhibit 16. NAICS 2012 to NAICS 2017 non-AE employment ratios***

NAICS 2012		NAICS 2017		Ratio
CES Industry Code	CES Industry Title	CES Industry Code	CES Industry Title	
42-454112	Electronic shopping and electronic auctions	42-454100	Electronic shopping and mail-order houses	100
42-454113	Mail-order houses	42-454100	Electronic shopping and mail-order houses	100
50-517100	Wired telecommunications carriers	50-517311	Wired telecommunications carriers	100
50-517200	Wireless telecommunications carriers (except satellite)	50-517312	Wireless telecommunications carriers, except satellite	100
55-532291	Home health equipment rental	55-532283	Home health equipment rental	100
60-541711	Biotechnology research	60-541713	Research and development in nanotechnology	4.9
60-541712	Physical, engineering, and life sciences research	60-541713	Research and development in nanotechnology	3.5
60-541711	Biotechnology research	60-541714	Research and development in biotechnology, except nanobiotechnology	95.1
60-541712	Physical, engineering, and life sciences research	60-541715	Research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology	96.5

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[Exhibit 17](#) shows the proportion of non-AE employment that moved to a new NAICS 2017-based CES industry that came from an old NAICS 2012-based CES industry.

For example, 66.8 percent of the new NAICS 2017-based CES industry electronic shopping and mail-order houses (42-454100) came from the old NAICS 2012-based CES industry electronic shopping and electronic auctions (42-454112). The remaining 33.2 percent of the new NAICS 2017-based CES industry electronic shopping and mail-order houses (42-454100) came from the old NAICS 2012-based CES industry mail-order houses (42-454113).

***Exhibit 17. NAICS 2017 to NAICS 2012 non-AE employment ratios***

NAICS 2017		NAICS 2012		Ratio
CES Industry Code	CES Industry Title	CES Industry Code	CES Industry Title	
42-454100	Electronic shopping and mail-order houses	42-454112	Electronic shopping and electronic auctions	66.8
42-454100	Electronic shopping and mail-order houses	42-454113	Mail-order houses	33.2
50-517311	Wired telecommunications carriers	50-517100	Wired telecommunications carriers	100
50-517312	Wireless telecommunications carriers, except satellite	50-517200	Wireless telecommunications carriers (except satellite)	100
55-532283	Home health equipment rental	55-532291	Home health equipment rental	100
60-541713	Research and development in nanotechnology	60-541711	Biotechnology research	34.9
60-541713	Research and development in nanotechnology	60-541712	Physical, engineering, and life sciences research	65.1
60-541714	Research and development in biotechnology, except nanobiotechnology	60-541711	Biotechnology research	100
60-541715	Research and development in the physical, engineering, and life sciences, except nanotechnology and biotechnology	60-541712	Physical, engineering, and life sciences research	100

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## Reconstructions

Several series were reconstructed as part of the 2017 CES benchmark. Two summary-level series were reconstructed for pre-1990 data. In addition, errors were corrected for: security guards and patrols and armored car services; PE and WE series in 5 smaller series within financial activities, professional and business services, and leisure and hospitality; and a strike adjustment error was corrected for seasonally adjusted women employees series.

### *Pre-1990 reconstructed series*

Two summary-level series were affected by reconstructions in prior years, but had not seen revisions to their pre-1990 histories. [Exhibit 18](#) outlines the CES industries, data types, and time spans that were involved in the pre-1990 reconstructions.

### *Exhibit 18. CES summary series involved in pre-1990 data reconstructions*

CES Industry Code	CES Industry Title	Data Type(s) Involved <sup>(1)</sup>	Time Span
55-524200	Insurance agencies, brokerages, and related services	AE	January 1985 – December 1989
65-621100	Offices of physicians	AE	January 1972 – December 1989
		PE, PE AHE, PE AWH, WE	January 1982 – December 1989

#### Footnotes

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

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### **Insurance agencies, brokerages, and related services reconstructed, January 1985 to December 1989**

During processing for the 2013 benchmark, a recoding effort moved the majority of employment out of funds, trusts, and other financial vehicles and into other series within the financial activities major industry sector. Impacted basic-level series were reconstructed back to January 1990; summary-level series were affected indirectly through aggregation. For more information about this reconstruction, see the special notice regarding reconstructed data in the [2013 CES Benchmark Article](#).

The 4-digit level series insurance agencies, brokerages, and related services (55-524200) was affected by this 2013 reconstruction back to January 1990 through aggregation. This series goes back further than January 1990, creating a break in the time series from December 1989 to January 1990.

To correct for this break, monthly growth rates for the January 1985 to December 1989 period were applied to the revised January 1990 levels, including a revised over-the-month change for

December 1989 to January 1990 based on historical data from the pre-revised series (55-524200 prior to the 2013 benchmark), in order to derive new monthly levels. The December 1989 to January 1990 growth rate from the pre-revised series was applied to the January 1990 level in order to derive the new level for December 1989. The growth rates as previously published for January 1985 to November 1989 were then applied backwards through time, yielding new levels and a continuous time series from January 1985 forward.

### **Offices of physicians, January 1972 to December 1989**

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 noneconomic and affected the entire series going back to 1990. Impacted basic-level series were reconstructed back to January 1990; summary-level series were affected indirectly through aggregation. For more information about this reconstruction, see the Reconstruction section of the [2016 CES Benchmark Article](#).

The 4-digit level series offices of physicians (65-621100) was affected by this 2016 reconstruction back to January 1990 through aggregation. This series goes back further than January 1990, creating a break in the time series from December 1989 to January 1990.

With 2017 benchmark processing, the pre-1990 history of 65-621100 was reconstructed back to January 1972 for AE. A ratio of the employment in the reclassified establishments to the employment originally in 65-621100 was calculated for March 2016. This March 2016 ratio was applied to each month's employment level for 65-621100 from December 1989 back to January 1972. The resulting employment amounts were taken out of 65-621100 to create a reconstructed AE series. This change also affected PE, PE hours and earnings, and WE series back to January 1982. Derivatives of directly estimated data types may also be impacted by this reconstruction.

### ***Reconstructions due to errors in CES estimates***

#### **Security guards and patrols and armored car services, October 2016 to December 2017**

An error was found in the CES microdata for security guards and patrols and armored car services (60-561613). AE series were affected for 60-561613 and AE, AE hours and earnings, PE, PE hours and earnings, and WE were affected for 60-561610. This error affected data from October 2016 to December 2017.

[Exhibit 19](#) outlines the CES industries, data types, and time spans that were involved in the reconstruction of 60-561613.

***Exhibit 19. CES industries involved in the reconstruction of 60-561613***

<b>CES Industry Code</b>	<b>CES Industry Title</b>	<b>Data Type(s) Involved<sup>(1)</sup></b>	<b>Time Span</b>
<b>60-561610</b>	<b>Security and armored car services</b>	AE, AE AWH, AE AHE, PE, PE AWH, PE AHE, WE	October 2016 – December 2017
<b>60-561613</b>	<b>Security guards and patrols and armored car services</b>	AE	

**Footnotes**

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

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Using corrected AE microdata, 60-561613 was reconstructed using amended sample links for each month to recalculate the AE series. The AE series was then summed with investigation services (60-561611) to create AE data at the 60-561610 level. Corrected microdata for non-AE data types in 60-561610 and the new summary-level AE series were used to calculate AE hours and earnings, PE, PE hours and earnings, and WE. More information about sample links and monthly estimation is available in the CES Technical Notes under [Monthly Estimation](#).

The reconstruction resulted in security and armored car services AE that was 3,000 greater than the originally published March 2017 estimate level. All aggregate CES industries that were impacted by this reconstruction are included in [exhibit 20](#) below.

***Exhibit 20. CES aggregate series impacted by reconstruction of 60-561613***

<b>CES Industry Code</b>	<b>CES Industry Title</b>	<b>Time Span</b>
<b>00-000000</b>	Total nonfarm	October 2016 – December 2017
<b>05-000000</b>	Total private	
<b>07-000000</b>	Service providing	
<b>08-000000</b>	Private service-providing	
<b>60-000000</b>	Professional and business services	
<b>60-560000</b>	Administrative and waste services	
<b>60-561000</b>	Administrative and support services	
<b>60-561600</b>	Investigation and security services	

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Reconstructed series were benchmarked according to the usual methodology. The reconstruction and subsequent benchmark resulted in revisions to seasonally and not seasonally adjusted data. More information about CES benchmarking methods is available in the CES Technical Notes under [Benchmarks](#). More information about seasonal adjustment of CES series is available in the CES Technical Notes under [Seasonal Adjustment](#).

## Non-AE data types for 5 smaller series, November 2012 to May 2017

The CES program found processing errors in the estimates for PE and WE series in five smaller industries within financial activities, professional and business services, and leisure and hospitality. The timeframe of the errant data ranges from November 2012 (3<sup>rd</sup> closing) until May 2017; however, not all data during this timeframe are errant.

For some months, errors in detailed-level WE impacted aggregate WE estimates up through total nonfarm, and errors in detailed-level PE impacted aggregate PE estimates up through total private. The errors in detailed-level PE also resulted in minor errors in hours and earnings for aggregated PE (PE AWH and PE AHE), because hours and earnings are weighted by PE employment in the aggregation process. For more information about this processing error, see the BLS errata page at [www.bls.gov/bls/errata/ces-women-production-correction.htm](http://www.bls.gov/bls/errata/ces-women-production-correction.htm).

[Exhibit 21](#) outlines the CES industries, data types, and time spans that were involved in the reconstruction of the five smaller industries for non-AE data types.

### *Exhibit 21. CES series involved in non-AE reconstruction for 5 smaller industries*

CES Industry Code	CES Industry Title	Data Type(s) Involved <sup>(1)</sup>	Time Span
55-524110	Direct life and health insurance carriers	PE, PE AWH, PE AHE, WE	November 2012 – May 2017
60-541200	Accounting and bookkeeping services		
60-541600	Management and technical consulting services		
60-562900	Remediation and other waste services		
70-721200	RV parks and recreational camps		

#### Footnotes

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

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To correct for these errors, PE and WE were re-estimated at the detailed level using corrected PE-to-AE and WE-to-AE ratios. After correcting PE and WE at the detailed level, there were no changes to PE hours and earnings. Using corrected detailed-level PE and WE estimates, employment estimates were re-aggregated up to total private for PE and total nonfarm for WE. Derivatives of directly estimated data types may also be impacted by this reconstruction.

Reconstructed series were benchmarked according to the usual methodology. The reconstruction and subsequent benchmark resulted in revisions to seasonally and not seasonally adjusted data. More information about CES benchmarking methods is available in the CES Technical Notes under [Benchmarks](#). More information about seasonal adjustment of CES series is available in the CES Technical Notes under [Seasonal Adjustment](#).

[Exhibit 22](#) outlines the aggregate CES industries that were impacted by the reconstruction of the five smaller industries for non-AE data types.

***Exhibit 22. CES aggregate series impacted by non-AE reconstruction***

CES Industry Code	CES Industry Title	Time Span
00-000000	Total nonfarm	November 2012 – May 2017
05-000000	Total private	
07-000000	Service providing	
08-000000	Private service-providing	
55-000000	Financial activities	
55-524000	Insurance carriers and related activities	
55-524100	Insurance carriers	
60-000000	Professional and business services	
60-540000	Professional and technical services	
60-560000	Administrative and waste services	
60-562000	Waste management and remediation services	
70-000000	Leisure and hospitality services	
70-720000	Accommodation and food services	
70-721000	Accommodation	

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**Seasonally adjusted data for women employees due to strike adjustment processing error**

When generating seasonally adjusted estimates, the CES program sometimes modifies the not seasonally adjusted estimates before running X-13ARIMA-SEATS to ensure that nonseasonal events, such as strikes, are not included in the calculation of the seasonal factors. Once the seasonal factors are calculated, they are applied to the not seasonally adjusted data used as inputs. Then, the prior adjustments that were removed before running X-13ARIMA-SEATS are incorporated to create the seasonally adjusted estimates. More information about seasonal adjustment of CES series is available in the CES Technical Notes under [Seasonal Adjustment](#).

During processing for the 2017 benchmark, it was discovered that the effects of several strikes were not removed before running seasonal adjustment for several women employees series. The WE strike adjustment was incorporated during seasonal adjustment processing for the 2017 benchmark, and affected series were seasonally adjusted back to January 1990. This correction has also been made to the latest prior adjustment file, which can be downloaded from [www.bls.gov/web/empsit/cesseasadj.htm](http://www.bls.gov/web/empsit/cesseasadj.htm). The correction resulted in small changes to historical data for several seasonally adjusted WE series.

[Exhibit 23](#) outlines the CES industries that were involved in the strike adjustment correction for seasonally adjusted WE series.

***Exhibit 23. Seasonally adjusted series involved in WE strike adjustment correction***

<b>CES Industry Code</b>	<b>CES Industry Title</b>
<b>31-336400</b>	Aerospace products and parts
<b>42-445110</b>	Supermarkets and other grocery stores
<b>44-221120</b>	Electric power transmission and distribution
<b>44-221200</b>	Natural gas distribution
<b>50-517311</b>	Wired telecommunications carriers

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[Exhibit 24](#) outlines the aggregate CES industries that were impacted by the strike adjustment correction for seasonally adjusted WE series.

***Exhibit 24. Seasonally adjusted aggregate series impacted by WE strike adjustment correction***

<b>CES Industry Code</b>	<b>CES Industry Title</b>
<b>00-000000</b>	Total nonfarm
<b>05-000000</b>	Total private
<b>06-000000</b>	Goods-producing
<b>07-000000</b>	Service-providing
<b>08-000000</b>	Private service-providing
<b>30-000000</b>	Manufacturing
<b>31-000000</b>	Durable goods
<b>31-336000</b>	Transportation equipment
<b>42-000000</b>	Retail trade
<b>42-445000</b>	Food and beverage stores
<b>42-445100</b>	Grocery stores
<b>44-220000</b>	Utilities
<b>44-221100</b>	Power generation and supply
<b>50-000000</b>	Information
<b>50-517000</b>	Telecommunications
<b>50-517300</b>	Wired and wireless telecommunications carriers

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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 Unemployment Insurance (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.

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 production and nonsupervisory employees (PE) and 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 all employees (AE) level prior to benchmarking, and then applying these ratios to the revised all employees level. 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. All employees estimates and production and nonsupervisory employees estimates for the basic cells act as weights for their respective hours and earnings estimates for broader industry groupings. Adjustments 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 2017 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 did not change for both AE and PE from the previously published level.

**Table 5. Effect of March 2017 benchmark revisions to AE AWH and AE AHE estimates, selected industries**

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated <sup>(1)</sup>	Revised	Difference	Estimated <sup>(1)</sup>	Revised	Difference
05-000000	Total private	34.1	34.1	0.0	\$26.14	\$26.14	\$0.00
06-000000	Goods-producing	39.8	39.8	.0	27.37	27.36	-.01
08-000000	Private service-providing	33.0	33.0	.0	25.86	25.86	.00
10-000000	Mining and logging	44.2	44.3	.1	32.82	32.26	-.56
20-000000	Construction	38.2	38.3	.1	28.64	28.67	.03
30-000000	Manufacturing	40.5	40.5	.0	26.41	26.41	.00
31-000000	Durable goods	41.1	41.1	.0	27.64	27.65	.01
31-321000	Wood products	40.3	40.4	.1	19.62	19.62	.00
31-327000	Nonmetallic mineral products	40.7	40.7	.0	23.85	23.86	.01
31-331000	Primary metals	41.9	41.9	.0	26.46	26.42	-.04
31-332000	Fabricated metal products	41.0	41.0	.0	24.30	24.27	-.03
31-333000	Machinery	41.4	41.4	.0	28.24	28.23	-.01
31-334000	Computer and electronic products	40.3	40.3	.0	35.63	35.63	.00
31-335000	Electrical equipment and appliances	41.2	41.2	.0	26.18	26.18	.00
31-336000	Transportation equipment	42.7	42.8	.1	30.78	30.81	.03
31-336001	Motor vehicles and parts	43.3	43.4	.1	25.40	25.48	.08
31-337000	Furniture and related products	39.4	39.4	.0	21.06	21.07	.01
31-339000	Miscellaneous durable goods manufacturing	38.6	38.6	.0	25.42	25.43	.01
32-000000	Nondurable goods	39.4	39.5	.1	24.28	24.28	.00
32-311000	Food manufacturing	39.6	39.6	.0	20.43	20.44	.01
32-313000	Textile mills	41.2	41.2	.0	20.32	20.32	.00
32-314000	Textile product mills	38.3	38.3	.0	17.89	17.88	-.01
32-315000	Apparel	36.5	36.5	.0	18.66	18.66	.00
32-322000	Paper and paper products	41.0	41.0	.0	26.35	26.35	.00
32-323000	Printing and related support activities	37.6	37.6	.0	23.50	23.50	.00
32-324000	Petroleum and coal products	39.9	39.9	.0	43.91	44.00	.09
32-325000	Chemicals	40.2	40.2	.0	32.89	32.89	.00

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated <sup>(1)</sup>	Revised	Difference	Estimated <sup>(1)</sup>	Revised	Difference
32-326000	Plastics and rubber products	40.8	40.8	.0	21.43	21.44	.01
32-329000	Miscellaneous nondurable goods manufacturing	34.6	34.6	.0	24.67	24.67	.00
40-000000	Trade, transportation, and utilities	33.9	33.9	.0	22.63	22.61	-.02
41-420000	Wholesale trade	38.6	38.6	.0	29.76	29.72	-.04
42-000000	Retail trade	30.5	30.5	.0	18.03	18.03	.00
43-000000	Transportation and warehousing	38.1	38.1	.0	23.65	23.61	-.04
44-220000	Utilities	42.3	42.3	.0	39.04	39.07	.03
50-000000	Information	35.9	35.9	.0	37.41	37.49	.08
55-000000	Financial activities	37.0	37.0	.0	32.67	32.68	.01
60-000000	Professional and business services	35.7	35.7	.0	31.57	31.57	.00
65-000000	Education and health services	32.7	32.7	.0	26.07	26.11	.04
70-000000	Leisure and hospitality	25.9	25.9	.0	15.37	15.41	.04
80-000000	Other services	31.7	31.6	-.1	23.62	23.78	.16

**Footnotes**

<sup>(1)</sup> With the 2017 benchmark, CES reconstructed the national employment series 60-561613, security guards and patrols and armored car services back to October 2016 to correct a microdata error. The errors in employment resulted in errors in hours and earnings for aggregated series. For more information, see the [Reconstructions](#) section in the 2017 Benchmark Article.

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**Table 6. Effect of March 2017 benchmark revisions to PE AWH and PE AHE estimates, selected industries**

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated <sup>(1)</sup>	Revised	Difference	Estimated <sup>(1)</sup>	Revised	Difference
05-000000	Total private	33.3	33.3	0.0	\$21.91	\$21.91	\$0.00
06-000000	Goods-producing	40.7	40.7	.0	22.83	22.83	.00
08-000000	Private service-providing	32.1	32.1	.0	21.72	21.72	.00
10-000000	Mining and logging	45.3	45.6	.3	27.85	27.59	-.26
20-000000	Construction	38.6	38.6	.0	26.33	26.36	.03
30-000000	Manufacturing	41.6	41.6	.0	20.68	20.69	.01
31-000000	Durable goods	42.2	42.2	.0	21.64	21.65	.01
31-321000	Wood products	41.7	41.7	.0	17.17	17.18	.01
31-327000	Nonmetallic mineral products	41.8	41.8	.0	20.00	20.00	.00
31-331000	Primary metals	42.4	42.4	.0	23.07	23.03	-.04
31-332000	Fabricated metal products	41.9	41.9	.0	20.10	20.09	-.01
31-333000	Machinery	42.8	42.8	.0	22.09	22.09	.00
31-334000	Computer and electronic products	41.0	41.0	.0	24.54	24.54	.00
31-335000	Electrical equipment and appliances	42.5	42.5	.0	19.46	19.46	.00
31-336000	Transportation equipment	44.0	44.0	.0	24.86	24.90	.04
31-336001	Motor vehicles and parts	44.5	44.5	.0	21.29	21.36	.07
31-337000	Furniture and related products	39.9	40.0	.1	17.26	17.27	.01
31-339000	Miscellaneous durable goods manufacturing	40.4	40.4	.0	18.77	18.78	.01
32-000000	Nondurable goods	40.7	40.7	.0	19.12	19.13	.01
32-311000	Food manufacturing	40.6	40.6	.0	16.84	16.85	.01
32-313000	Textile mills	40.6	40.6	.0	15.75	15.75	.00
32-314000	Textile product mills	37.6	37.6	.0	14.41	14.41	.00
32-315000	Apparel	36.3	36.3	.0	13.75	13.75	.00
32-322000	Paper and paper products	42.4	42.4	.0	21.54	21.55	.01
32-323000	Printing and related support activities	39.5	39.5	.0	18.65	18.65	.00
32-324000	Petroleum and coal products	43.5	43.5	.0	40.21	40.34	.13
32-325000	Chemicals	41.5	41.5	.0	23.61	23.61	.00
32-326000	Plastics and rubber products	41.9	41.9	.0	17.47	17.48	.01

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated <sup>(1)</sup>	Revised	Difference	Estimated <sup>(1)</sup>	Revised	Difference
<b>32-329000</b>	<b>Miscellaneous nondurable goods manufacturing</b>	36.9	36.9	.0	20.10	20.10	.00
<b>40-000000</b>	<b>Trade, transportation, and utilities</b>	33.3	33.2	-.1	19.23	19.22	-.01
<b>41-420000</b>	<b>Wholesale trade</b>	38.5	38.5	.0	24.41	24.38	-.03
<b>42-000000</b>	<b>Retail trade</b>	29.7	29.6	-.1	15.22	15.22	.00
<b>43-000000</b>	<b>Transportation and warehousing</b>	37.6	37.6	.0	21.16	21.12	-.04
<b>44-220000</b>	<b>Utilities</b>	42.4	42.4	.0	36.42	36.46	.04
<b>50-000000</b>	<b>Information</b>	35.3	35.3	.0	30.24	30.28	.04
<b>55-000000</b>	<b>Financial activities</b>	36.6	36.6	.0	26.44	26.46	.02
<b>60-000000</b>	<b>Professional and business services</b>	35.0	35.1	.1	25.91	25.89	-.02
<b>65-000000</b>	<b>Education and health services</b>	32.0	31.9	-.1	22.87	22.90	.03
<b>70-000000</b>	<b>Leisure and hospitality</b>	24.7	24.7	.0	13.28	13.31	.03
<b>80-000000</b>	<b>Other services</b>	30.6	30.6	.0	19.86	20.00	.14

**Footnotes**

<sup>(1)</sup> With the 2017 benchmark, CES reconstructed several series. The CES national employment series 60-561613, security guards and patrols and armored car services was reconstructed back to October 2016 to correct a microdata error. The errors in employment resulted in errors in hours and earnings for aggregated series. CES also reconstructed 5 smaller industries within financial activities, professional and business services, and leisure and hospitality, to correct processing errors in estimates for women employees (WE) and production and nonsupervisory employees (PE). The errors in PE also resulted in minor errors in hours and earnings for aggregated PE. For more information, see the [Reconstructions](#) section in the 2017 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 Unemployment Insurance (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.

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 10 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 9 months following the benchmark month (March) are also subject to revision; seasonally adjusted data are subject to revision back 5 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 9 months following the March benchmark (also referred to as the post-benchmark period), CES applies previously derived over-the-month sample changes to the revised March level to get the revised estimates (see [Revisions in the post-benchmark period](#)). New net birth/death model estimates also are calculated and applied during post-benchmark estimation. More information on benchmarks in the CES program is available in the [Benchmarks](#) section of the CES Technical Notes.

### *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 uses a model-based approach to account for this employment. 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.

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 2016 to March 2017 can be measured. As [table 7](#) shows, the actual net birth/death for April 2016 to March 2017 was approximately 181,000 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 2016-March 2017 (in thousands)**

	2016								2017			Total	
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb		Mar
<b>Actual Net Birth/Death</b>	404	180	15	244	105	-38	255	-14	-35	-179	98	76	1,111
<b>Forecast Net Birth/Death</b>	255	231	99	154	113	-58	237	7	-17	-247	124	32	930
<b>Difference</b>	149	-51	-84	90	-8	20	18	-21	-18	68	-26	44	181
<b>Cumulative Difference</b>	149	98	14	104	96	116	134	113	95	163	137	181	

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### **Seasonal adjustment**

Typically, 5 years of seasonally adjusted data are revised with each CES annual benchmark. However, reconstructed series are seasonally adjusted over their revised time spans.

For technical information on how seasonal adjustment is performed in the CES program, refer to the [Seasonal Adjustment](#) section of the CES Technical Notes.

For information on seasonal adjustment model specifications and special model adjustments, see the [CES Seasonal Adjustment Files and Documentation](#) page.

## 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](http://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.

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Caila Pinkleton, Economist and Frances Tirado, Statistician  
U.S. Bureau of Labor Statistics | Division of Current Employment Statistics – National  
PSB Suite 4175, 2 Massachusetts Avenue, NE Washington, DC 20212-0001  
[www.bls.gov/CES](http://www.bls.gov/CES) | Telephone: 1-202-691-6555 | Email: [Contact CES](#)