CES National Benchmark Article (HTML)

BLS Establishment Survey National Estimates Revised to Incorporate March 2022 Benchmarks

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Summary of the revisions

With the release of January 2023 data on February 3, 2023, the Bureau of Labor Statistics (BLS) introduced its annual revision to national estimates of employment, hours, and earnings from the Current Employment Statistics (CES) monthly survey of nonfarm establishments.

The March 2022 benchmarked seasonally adjusted employment level for total nonfarm employment is 151,424,000. The not seasonally adjusted benchmarked employment level is 150,411,000.

Compared with the sample-based, seasonally adjusted published estimate for March 2022, total nonfarm employment had a revision of 568,000, or 0.4 percent. The not seasonally adjusted total nonfarm employment estimate was revised by 506,000, or 0.3 percent.

Table 1 presents revised total nonfarm employment data on a seasonally adjusted basis for January 2022 through December 2022. The revised data for April 2022 forward incorporate the effect of applying the rate of change measured by the sample to the new benchmark employment level, as well as updated net birth-death model forecasts and new seasonal adjustment factors. Revisions to November and December also reflect incorporation of additional sample receipts. For more information about the methodology of benchmarking in the CES program, see the Benchmark section in the CES Handbook of Methods.

Table 1. Differences in seasonally adjusted levels and over-the-month changes, total nonfarm employment, January to December 2022 (in thousands)

	Levels			Over-the-month Changes		
2022	As Revised	As Previously Published	Difference	As Revised	As Previously Published	Difference
January	150,106	149,744	362	364	504	-140
February	151,010	150,458	552	904	714	190
March	151,424	150,856	568	414	398	16
April	151,678	151,224	454	254	368	-114
May	152,042	151,610	432	364	386	-22
June	152,412	151,903	509	370	293	77
July	152,980	152,440	540	568	537	31
August	153,332	152,732	600	352	292	60
September	153,682	153,001	681	350	269	81
October	154,006	153,264	742	324	263	61
November	154,296	153,520	776	290	256	34
December[(p)]	154,556	153,743	813	260	223	37

Footnotes
(p) Preliminary

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Overview

Establishment survey benchmarking is done each year to align employment estimates from the survey with employment counts 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 state UI agency four times per year. The UI data are obtained and edited by each state's Labor Market Information agency. They are tabulated and published through the BLS Quarterly Census of Employment and Wages (QCEW) program. Both the QCEW and CES categorize their data using the North American Industry Classification System (NAICS). About 97 percent of total nonfarm employment within the scope of the establishment survey is covered by UI and is available to the CES program via QCEW records.

An employment count for the remaining 3 percent is constructed from other sources, primarily records from the Railroad Retirement Board and Census Bureau data from County Business Patterns and the Annual Survey of Public Employment and Payroll. This 3 percent is referred to as noncovered employment. The combination of QCEW and noncovered employment data make up the benchmark level. The full benchmark employment level developed for March replaces the March sample-based estimate for each basic cell.

The total annual revision is the difference between the benchmark level for a given March and the published March sample-based employment estimate. The overall accuracy of the establishment survey is usually gauged by the size of the benchmark revision, which is often regarded as a proxy for total survey error. Typically, the total revision is equal to the benchmark revision. However, in years with historical reconstructions, affected CES series are re-estimated prior to benchmarking. Historical reconstructions sometimes are needed to correct errors, reflect updates to industry classification, or address other issues so that users can have continuous, comparable estimates suitable for economic analysis. The benchmark revision, in these cases, is the difference between the benchmark level and the newly reconstructed sample-based estimate. The benchmark revision is the difference between two independently derived employment counts, each subject to its own error sources.

To create a continuous time series between the new March benchmark level and historical sample-based data from the prior March benchmark level, 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. This procedure assumes that the total estimation error accumulated at a steady rate since the last benchmark. For the 9 months following the March benchmark (also called the post-benchmark period), BLS applies previously derived over-the-month sample changes to the revised March level to get the revised estimates. New net birth-death model forecasts are also 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 and in the October 2017 Monthly Labor Review, "Benchmarking the Current Employment Statistics National Estimates."

Benchmark level adjustments to services for the elderly and persons with disabilities

During benchmark processing, the CES program found that some first quarter 2022 QCEW employment microdata for services for the elderly and persons with disabilities (NAICS 624120) were erroneously reported. After further research, CES concluded that the incorrectly reported data for this industry should not be used and the first quarter 2022 QCEW employment data should be imputed for the series. The decision to impute was reached because corrected QCEW microdata would not have been received in time for CES production purposes. Therefore, CES used the QCEW average over-the-month employment change for services for the elderly and persons with disabilities from the prior 3 years (2019, 2020, and 2021) for each month between December 2021 and March 2022 to arrive at an imputed March 2022 level. This imputed level was approximately 83,000 greater than the originally reported QCEW level for services for the elderly and persons with disabilities. The final benchmark revision to CES not seasonally adjusted all employee employment for services for the elderly and persons with disabilities (65-624120) was 24,800.

Seasonally adjusted estimates

BLS seasonally adjusts 5 years of CES data with each annual benchmark for all industries and directly estimated data types. However, reconstructed series are seasonally adjusted over their revised time spans if the revised timespan is greater than 5 years. Details about seasonal adjustment during the 2022 benchmark are described below.

Seasonally adjusted revisions

Table 2 presents revised employment data on a seasonally adjusted basis for March 2022 by major industry sector. The revision to seasonally adjusted total nonfarm employment is 568,000.

Table 2. Seasonally adjusted employment revisions for major industry sectors, March 2022 (in thousands)

CES Industry Code	CES Industry Title	As Revised	As Previously Published	Differences	
				Amount	Percent
00-000000	**Total nonfarm**	151,424	150,856	568	0.4
05-000000	**Total private**	129,351	128,680	671	0.5
06-000000	**Goods-producing**	20,997	20,922	75	0.4
07-000000	**Service-providing**	130,427	129,934	493	0.4
08-000000	**Private service-providing**	108,354	107,758	596	0.6
10-000000	**Mining and logging**	589	605	-16	-2.7
20-000000	**Construction**	7,692	7,628	64	0.8
30-000000	**Manufacturing**	12,716	12,689	27	0.2
31-000000	**Durable goods**	7,902	7,887	15	0.2
32-000000	**Nondurable goods**	4,814	4,802	12	0.2
40-000000	**Trade, transportation, and utilities**	28,600	28,569	31	0.1

CES Industry Code	CES Industry Title	As Revised	As Previously Published	Differences	
				Amount	Percent
41-420000	Wholesale trade	5,917.9	5,814.7	103.2	1.7
42-000000	Retail trade	15,542.0	15,804.9	-262.9	-1.7
43-000000	Transportation and warehousing	6,588.7	6,410.6	178.1	2.7
44-220000	Utilities	551.7	538.3	13.4	2.4
50-000000	Information	3,018	2,936	82	2.7
55-000000	Financial activities	8,997	8,905	92	1
60-000000	Professional and business services	22,439	22,090	349	1.6
65-000000	Private education and health services	24,050	24,124	-74	-0.3
70-000000	Leisure and hospitality	15,590	15,471	119	0.8
80-000000	Other services	5,660	5,663	-3	-0.1
90-000000	Government	22,073	22,176	-103	-0.5

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Not seasonally adjusted estimates

Benchmark employment levels for March are compared to CES estimates that have not been seasonally adjusted to calculate the new March employment level. Twenty-one months of not seasonally adjusted CES estimates for all data types are revised based on this new March level, prior to seasonal adjustment. Revisions to not seasonally adjusted CES estimates are described below.

Not seasonally adjusted revisions

Table 3 presents the employment benchmarks for March 2022, not seasonally adjusted, by major industry sector. The total revision to not seasonally adjusted total nonfarm employment is 506,000.

Table 3. Not seasonally adjusted employment benchmarks for major industry sectors, March 2022 (in thousands)

CES Industry Code	CES Industry Title	Benchmark	Estimate	Differences	
				Amount	Percent
00-000000	Total nonfarm	150,411	149,905	506	0.3
05-000000	Total private	128,085	127,478	607	0.5
06-000000	Goods-producing	20,719	20,645	74	0.4
07-000000	Service-providing	129,692	129,260	432	0.3
08-000000	Private service-providing	107,366	106,833	533	0.5
10-000000	Mining and logging	583	601	-18	-3.1
20-000000	Construction	7,463	7,393	70	0.9
30-000000	Manufacturing	12,673	12,651	22	0.2
31-000000	Durable goods	7,888	7,873	15	0.2

CES Industry Code	CES Industry Title	Benchmark	Estimate	Differences	
				Amount	Percent
32-000000	**Nondurable goods**	4,785	4,778	7	0.1
40-000000	**Trade, transportation, and utilities**	28,327	28,295	32	0.1
41-420000	**Wholesale trade**	5,890.4	5,789.3	101.1	1.7
42-000000	**Retail trade**	15,352.1	15,604.3	-252.2	-1.6
43-000000	**Transportation and warehousing**	6,533.9	6,363.8	170.1	2.6
44-220000	**Utilities**	551.0	537.7	13.3	2.4
50-000000	**Information**	3,006	2,926	80	2.7
55-000000	**Financial activities**	8,949	8,855	94	1.1
60-000000	**Professional and business services**	22,207	21,977	230	1
65-000000	**Private education and health services**	24,162	24,231	-69	-0.3
70-000000	**Leisure and hospitality**	15,103	14,942	161	1.1
80-000000	**Other services**	5,612	5,607	5	0.1
90-000000	**Government**	22,326	22,427	-101	-0.5

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Benchmarks for more detailed industries are available on the CES detailed industry tables page.

Table 4 below shows the recent history of not seasonally adjusted total nonfarm percent and level benchmark revisions. Over the prior 10 years, the annual benchmark revision at the total nonfarm level has averaged 0.1 percent (in absolute terms), with a range of -0.3 percent to 0.3 percent.

The differences listed in table 4 and beyond reflect the error due to normal benchmarking procedures after the incorporation of reconstructions. Those years are footnoted.

Table 4. Percent and level differences between nonfarm employment benchmarks and estimates by industry supersector, March 2012 to 2022 (in thousands)

CES Industry Code	CES Industry Title	Type	2012	2013[1]	2014	2015[2]	2016	2017[3]	2018[4]	2019[5]	2020	2021	2022[6]
00-000000	Total nonfarm	Percent	0.3	-0.1	[7]	-0.1	-0.1	0.1	[7]	-0.3	-0.1	[7]	0.3
		Level	424	-119	67	-172	-81	135	-16	-489	-121	-7	506
05-000000	Total private	Percent	0.4	-0.1	0.1	-0.2	-0.1	0.1	-0.1	-0.4	-0.1	-0.2	0.5
		Level	481	-126	105	-232	-151	133	-104	-505	-184	-256	607
10-000000	Mining and logging	Percent	1.6	-1.2	-1.8	-2.2	-3.2	-4.6	-1.1	-2.1	-4	-11.5	-3.1
		Level	13	-10	-16	-19	-22	-30	-8	-15	-27	-63	-18
20-000000	Construction	Percent	1.8	0.3	1.6	0.6	0.7	0.8	0.6	-0.1	[7]	-0.6	0.9
		Level	93	14	90	39	47	52	44	-4	2	-41	70
30-000000	Manufacturing	Percent	-0.2	0.2	0.4	-0.1	0.5	0.1	-0.1	[7]	-0.6	-0.3	0.2
		Level	-25	23	43	-12	58	15	-18	-4	-75	-42	22
40-000000	Trade, transportation, and utilities	Percent	0.6	-0.5	-0.1	[7]	-0.4	0.3	-0.3	-0.4	0.1	1.1	0.1
		Level	145	-131	-31	-5	-110	75	-77	-117	24	307	32
41-420000[8]	Wholesale trade	Percent	0.8	-0.4	-0.8	-0.7	-1.1	-0.4	-0.9	-0.7	-0.8	-0.4	1.7
		Level	45.3	-20.2	-45.4	-41.3	-66.6	-21.2	-54.4	-38.6	-48	-23.6	101.1
42-000000[8]	Retail trade	Percent	0.5	-0.8	[7]	-0.2	-0.8	0.1	-0.6	-1	-0.5	0.4	-1.6
		Level	78.9	-110.3	5.5	-23.5	-118.2	15.4	-96.4	-150.8	-78.3	57.9	-252.2
43-000000[8]	Transportation and warehousing	Percent	0.7	0.1	0.2	1.4	1.7	1.6	1.4	1.4	2.6	4.5	2.6
		Level	29.4	3.6	9.7	65.3	83.5	79.8	72.7	75.8	148.9	270.1	170.1
44-220000[8]	Utilities	Percent	-1.5	-0.8	-0.1	-0.8	-1.6	0.2	0.3	-0.7	0.2	0.5	2.4
		Level	-8.5	-4.6	-0.6	-4.7	-8.7	1	1.8	-4.1	1.1	2.8	13.3
50-000000	Information	Percent	1.8	-0.2	2.4	-1.6	-0.1	2.5	2.1	1.2	0.5	3	2.7
		Level	47	-5	66	-44	-2	70	59	35	14	84	80
55-000000	Financial activities	Percent	0.6	-0.1	0.2	-0.1	[7]	0.1	-0.1	0.8	0.3	-0.7	1.1
		Level	45	-10	19	-9	-4	7	-12	68	25	-64	94
60-000000	Professional and business services	Percent	[7]	[7]	-0.8	-0.6	-0.6	-1.3	-0.4	-0.8	-0.6	1	1
		Level	2	4	-147	-110	-125	-270	-72	-159	-123	218	230
65-000000	Private education and health services	Percent	[7]	-0.3	-0.1	[7]	-0.4	0.3	[7]	-0.4	-0.2	0.5	-0.3
		Level	-2	-61	-16	-7	-83	70	5	-95	-47	125	-69
70-000000	Leisure and hospitality	Percent	0.8	0.5	0.3	-0.3	0.7	0.8	[7]	-1.1	0.2	-4.4	1.1
		Level	104	72	38	-45	102	126	-4	-170	31	-572	161
80-000000	Other services	Percent	1.1	-0.4	1.1	-0.4	-0.2	0.3	-0.4	-0.8	-0.1	-3.9	0.1
		Level	59	-22	59	-20	-12	18	-21	-44	-8	-208	5
90-000000	Government	Percent	-0.3	[7]	-0.2	0.3	0.3	[7]	0.4	0.1	0.3	1.1	-0.5
		Level	-57	7	-38	60	70	2	88	16	63	249	-101

Footnotes

(1) With the 2013 benchmark, BLS reconstructed several national employment series. 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 in the 2013 CES Benchmark Article.

(2) With the 2015 benchmark, BLS reconstructed the national employment series 65-624120, services for the elderly and persons with disabilities back to January 2000. BLS 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, see the Reconstructions section in the 2015 CES Benchmark Article.

(3) With the 2017 benchmark, BLS 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 CES Benchmark Article.

(4) With the 2018 benchmark, BLS reconstructed several national employment series. A recoding effort in the QCEW resulted in about 336,000 in employment in wholesale trade agents and brokers (41-425120) moving into other series within the wholesale trade, retail trade, transportation and warehousing, and professional and business services major industry sectors. Affected basic series were reconstructed for their entire history, generally back to January 1990. Additionally, a reclassification of a state employer to private ownership caused a shift of about 17,000 in employment from the CES series other state government (90-922999) into services for the elderly and persons with disabilities (65-624120). Affected basic series were reconstructed from March 2018 back to January 2018. For more information, see the Reconstructions section in the 2018 CES Benchmark Article.

(5) With the 2019 benchmark, BLS reconstructed some national employment series in transportation to correct an error in rail transportation (43-482000), which had resulted in 16,000 in employment being double counted. The reconstruction removed the doubled-counted employment and affected aggregates of rail transportation, up to and including total nonfarm, back to January 1990. While the difference between the benchmarked and originally published March 2019 estimate level is −505,000, or −0.3 percent, this table displays March 2019 data after accounting for the removal of 16,000 from the published series. For more information, see the Reconstructions section in the 2019 CES Benchmark Article.

(6) With the 2022 benchmark, BLS reconstructed several national employment series. A recoding effort in the QCEW resulted in about 68,000 in employment in electronic shopping and mail-order houses (42-454100) being moved into corporate, subsidiary, and regional managing offices (60-551114). Affected series were reconstructed for their entire history going back to January 1990. Additionally, the CES program found that some QCEW employment microdata submitted for services for the elderly and persons with disabilities (NAICS 624120) was erroneously reported for the first quarter of 2022. CES imputed the March 2022 level for this industry, and the new level was approximately 83,000 greater than the originally reported QCEW level. For more information, see the Reconstructions and Benchmark level adjustment to services for the elderly and persons with disabilities sections in the 2022 CES Benchmark Article.

(7) Absolute revision is less than 0.05 percent.

(8) Indented industries are part of trade, transportation, and utilities.

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Benchmark revision effects for other data types

Benchmarking also affects 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 the all employee (AE) level prior to benchmarking, and then applying these ratios to the revised all employee level. These figures are calculated at the basic cell level and then aggregated to produce the summary estimates. Average weekly hours (AWH), average hourly earnings (AHE), and, in manufacturing industries, average weekly overtime hours (AWOH) are not benchmarked; they are estimated solely from reports supplied by survey respondents at the basic estimating cell level. New employment benchmarks can additionally affect indirectly estimated data types. For more information on indirectly estimated data types, see the Definitions for derivative series section in the CES Handbook of Methods.

Table 5 lists directly estimated data types and their common abbreviations. Directly estimated data types except for AE are collectively called non-AE data types.

Table 5. Directly estimated data types

Data Type	Abbreviation
All employees	AE
Production and nonsupervisory employees	PE
Women employees	WE
Average weekly hours of all employees	AE AWH
Average hourly earnings of all employees	AE AHE
Average weekly overtime hours of all employees	AE AWOH
Average weekly hours of production and nonsupervisory employees	PE AWH
Average hourly earnings of production and nonsupervisory employees	PE AHE
Average weekly overtime hours of production and nonsupervisory employees	PE AWOH

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The aggregate industry levels of the hours and earnings series are derived as a weighted average. AE and PE estimates for basic cells act as weights for their respective hours and earnings estimates for broader industry groupings. Adjustments of AE estimates to new benchmarks may alter the implicit 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 6 and table 7 provide information on the not seasonally adjusted levels of major industry sector hours and earnings series resulting from the March 2022 benchmark. At the total private level, there was no change in average weekly hours estimates for AE, and average weekly hours

for PE increased by 0.1 hour from the previously published level. Total private average hourly earnings increased by 8 cents for AE and PE from the previously published levels.

Benchmark effects on hours and earnings for more detailed industries are available on the CES detailed industry tables page.

Table 6. Effect of March 2022 benchmark revisions to all employee average weekly hours and average hourly earnings estimates, major industry sectors

CES Industry Code	CES Industry Title	Average Weekly Hours			Average Hourly Earnings		
		Estimated	Revised	Difference	Estimated	Revised	Difference
05-000000	Total private	34.4	34.5	0.1	$31.72	$31.80	$0.08
06-000000	Goods-producing	39.9	39.9	0.0	31.91	31.90	-0.01
08-000000	Private service-providing	33.4	33.4	0.0	31.67	31.77	0.10
10-000000	Mining and logging	45.4	45.6	0.2	35.90	35.63	-0.27
20-000000	Construction	38.3	38.3	0.0	34.04	34.03	-0.01
30-000000	Manufacturing	40.6	40.6	0.0	30.52	30.53	0.01
31-000000	Durable goods	41.1	41.1	0.0	32.03	32.05	0.02
32-000000	Nondurable goods	39.9	39.9	0.0	27.95	27.96	0.01
40-000000	Trade, transportation, and utilities	33.5	33.7	0.2	27.33	27.37	0.04
41-420000	Wholesale trade	39.1	39.1	0.0	34.46	34.51	0.05
42-000000	Retail trade	29.6	29.7	0.1	22.72	22.76	0.04
43-000000	Transportation and warehousing	37.4	37.4	0.0	27.62	27.35	-0.27
44-220000	Utilities	42.1	42.1	0.0	47.00	47.12	0.12
50-000000	Information	36.6	36.6	0.0	44.99	45.23	0.24
55-000000	Financial activities	37.4	37.4	0.0	40.93	40.98	0.05
60-000000	Professional and business services	36.5	36.5	0.0	38.22	38.22	0.00
65-000000	Private education and health services	33.3	33.3	0.0	31.20	31.39	0.19
70-000000	Leisure and hospitality	25.9	26.0	0.1	19.72	19.76	0.04
80-000000	Other services	32.2	32.2	0.0	28.31	28.68	0.37

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Table 7. Effect of March 2022 benchmark revisions to production and nonsupervisory employee average weekly hours and average hourly earnings estimates, major industry sectors

		Average Weekly Hours			Average Hourly Earnings		
CES Industry Code	CES Industry Title	Estimated	Revised	Difference	Estimated	Revised	Difference
05-000000	Total private	33.9	33.9	0.0	$27.02	$27.10	$0.08
06-000000	Goods-producing	40.7	40.7	0.0	27.38	27.36	-0.02
08-000000	Private service-providing	32.8	32.8	0.0	26.94	27.04	0.10
10-000000	Mining and logging	47.4	47.4	0.0	32.42	32.29	-0.13
20-000000	Construction	38.8	38.8	0.0	31.48	31.46	-0.02
30-000000	Manufacturing	41.5	41.5	0.0	24.72	24.72	0.00
31-000000	Durable goods	41.9	41.9	0.0	25.88	25.86	-0.02
32-000000	Nondurable goods	40.9	40.9	0.0	22.86	22.85	-0.01
40-000000	Trade, transportation, and utilities	33.7	33.8	0.1	23.47	23.52	0.05
41-420000	Wholesale trade	39.2	39.2	0.0	28.49	28.52	0.03
42-000000	Retail trade	30.2	30.2	0.0	19.26	19.32	0.06
43-000000	Transportation and warehousing	36.9	36.9	0.0	25.70	25.48	-0.22
44-220000	Utilities	41.8	41.8	0.0	41.40	41.50	0.10
50-000000	Information	36.4	36.5	0.1	36.71	36.95	0.24
55-000000	Financial activities	37.2	37.2	0.0	31.54	31.59	0.05
60-000000	Professional and business services	36.1	36.1	0.0	32.05	32.05	0.00
65-000000	Private education and health services	32.5	32.5	0.0	28.34	28.53	0.19
70-000000	Leisure and hospitality	24.8	24.8	0.0	17.53	17.56	0.03
80-000000	Other services	31.1	31.2	0.1	24.42	24.84	0.42

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Net birth-death revisions

The difference between CES estimates and the population employment results from various sources. Disaggregating the difference into its components is complex. Both data sources are subject to nonresponse and reporting error. Additionally, the CES estimates are subject to sampling error and business birth and death modeling error.

The CES sample alone is not sufficient for estimating the total nonfarm employment level because each month new establishments generate employment that cannot be captured through the sample. There is an unavoidable lag between an establishment opening for business and its appearance on the CES sample frame. The sample frame is built from 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 establishments, and verifying the initial data provided. In practice, BLS cannot sample and begin to collect data from new establishments until they are at least a year old.

BLS has researched both sample-based and model-based approaches to measuring employment from business births and deaths 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 BLS 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. 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 Business births and deaths section of the CES Handbook of Methods.

An analysis of error in the birth-death model and the effect of those errors on CES estimation follows.

Net birth-death changes due to the COVID-19 pandemic

Current estimates of not seasonally adjusted employment include both a sample-based component and a model-based component. The model-based portion, called the net birth-death forecast, is intended to account for businesses that have closed or opened since the sample was initially drawn. While this model performs well in times of relative stability, it has not traditionally included a mechanism to account for rapid changes in the most recent months of employment estimates.

In March 2020, the COVID-19 pandemic created a severe economic shock to the global economy, resulting in massive job losses across the United States. This widespread disruption to labor markets and the potential impact to the birth-death model prompted BLS to revisit research conducted after the Great Recession (2007-09) and incorporate new ideas to account for changes in the number of business openings and closings. Two areas of research were implemented to improve the accuracy of the birth-death model in the CES estimates. These adjustments better reflect the net effect of the contribution of business births and deaths to the estimates. These two

methodological changes, one to adjust each of the two steps in the birth-death model, are the following:

- A portion of both reported zero employment and returns from zero in the current month from the sample were used in estimation to better account for the fact that business births and deaths do not offset.
- Current sample growth rates were included in the net birth-death forecasting model to better account for the changing relationships between business openings and closings.

First, a proportion of reports that fell to zero employment and reports that returned from zero employment in each month were used to adjust the weighted contribution of each report used in the calculation of the over-the-month change of the sample-based estimates. Typically, reports with zero employment in either the previous or current month are not included in estimation. To account for an excess amount of reports going to zero employment and reports returning from zero employment, BLS calculated the likelihood that either a reported zero or a return from zero exceeded what would be expected for the month. These "excess declines to zero" and "excess returns from zero" (collectively called excess reported zeroes) partially account for drops in employment (when more business deaths than are usually observed in historical population data occur) and for increases in employment (when there are more business births than normal). More specifically, "excess declines to zero" were used in March 2020 and subsequent months' first preliminary, second preliminary, and final estimates through September 2021. "Excess returns from zero" were used in first, second, and final estimates from May 2020 to September 2021.

Second, BLS adjusted the portion of business births and deaths that cannot be accounted for using sample data by including more recent information. Net birth-death forecasts are normally modeled using an ARIMA based on over-the-month changes of 5 years of historical birth-death residual values that end 9 months before the forecast of the current month. Instead of using only historical data—data that would not accurately account for how the labor market has changed due to COVID-19—a regression variable that includes data up to the current month was included in the model. The regression variable is the CES sample-based ratio of over-the-month change, known as the sample link, for each of the major industry sectors. Each major industry sector sample link was used as a regressor for the basic-level industry forecasts only within that sector from April 2020 to September 2021.

BLS did research on a monthly basis to determine when to return to normal estimation. BLS monitored responses to the CES survey for a reduction in rates of newly reported zeroes and returns from zero in the current month and the resumption of previous patterns in the net birth-death forecasts. Effective with the release of October 2021 preliminary estimates, BLS determined that adjustments to its birth-death methodology were no longer necessary.

The use of sample links as regression variables in the model accounted for a difference of 47,000 in the net birth-death forecasts from April 2021 to September 2021, with a range from -21,000 to 39,000. Exhibit 1 below outlines monthly differences due to the inclusion of the sample link regressor.

Exhibit 1. Preliminary and revised net birth-death forecasts for total private with and without regressor adjustments, not seasonally adjusted (in thousands)

Month	Preliminary Forecast			Revised Forecast		
	With Adjustment	Without Adjustment	Difference	With Adjustment	Without Adjustment	Difference
April 2020	-553	246	-799	-470	282	-752
May	345	207	138	319	203	116
June	295	73	222	235	68	167
July	241	193	48	254	211	43
August	154	104	50	142	95	47
September	-62	-99	37	-64	-96	32
October	344	293	51	363	313	50
November	6	2	4	-1	0	-1
December	19	-56	75	18	-48	66
Total 2020	789	963	-174	796	1,028	-232
January 2021	-143	-143	0	(1)	(1)	(1)
February	131	135	-4	(1)	(1)	(1)
March	38	-1	39	(1)	(1)	(1)
April	298	277	21	309	270	39
May	218	242	-24	239	260	-21
June	76	95	-19	106	118	-12
July	224	225	-1	264	244	20
August	142	135	7	146	134	12
September	-89	-103	14	-87	-96	9
Total 2021	895	862	33	977	930	47

Footnotes
(1) Net birth-death forecasts are only revised in the post-benchmark period for months April to December.

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The effect of these adjustments to CES estimates of employment reflect the pronounced impact of the COVID-19 pandemic. Exhibit 2 illustrates the difference at the total private level between the published CES estimates that use these two adjustments and a simulated CES series calculated without using either adjustment. The total private benchmark revision amount applied to March 2022 was 506,000. Without these adjustments to the birth-death model, the total private employment would have been 141,000 less, and the benchmark revision amount would have been 647,000.

Exhibit 2. Effects of adjusted net birth-death and use of reported zeroes on total private employment before benchmarking, not seasonally adjusted (in thousands)

Month	Total Private Employment with Adjustments	Total Private Employment without Adjustments	Difference
Apr-21	122,117	122,052	65
May	123,111	123,069	42
June	124,593	124,504	89
July	125,471	125,317	154
August	125,653	125,488	165
September	125,444	125,285	159
October	126,847	126,686	161
November	127,659	127,497	162
December	127,922	127,763	159
Jan-22	125,482	125,342	140
February	126,784	126,641	143
March	127,478	127,337	141

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Forecasted vs. actual net birth-death

Only error from the model-based component of CES estimation is directly measurable. Error from this component is measured by comparing the actual net of births and deaths with the model-based forecast that was used in the CES sample-based estimates during the previous benchmark year. Most recently, the data from April 2021 to March 2022 can be measured. As table 8 shows, the actual net birth-death from April 2021 to March 2022 was approximately 289,000 above the forecast used in the CES monthly estimates for the same period.

Table 8. Differences between forecasted and actual net birth-death, total private employment, April 2021 to March 2022 (in thousands)

Benchmark 2022	2021									2022			
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Actual Net Birth-Death	499	212	13	465	102	-217	653	30	-20	-160	169	-61	1,685
Forecast Net Birth-Death	309	239	106	264	146	-87	379	17	-42	-114	156	23	1,396
Difference	190	-27	-93	201	-44	-130	274	13	22	-46	13	-84	289
Cumulative Difference	190	163	70	271	227	97	371	384	406	360	373	289	

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Net birth-death adjustments to the post-benchmark period

From April 2022 to December 2022, also called the post-benchmark period, CES estimates were recalculated for each month based primarily on new benchmark levels and new net birth-death forecasts. Net birth-death forecasts were revised to incorporate information from the most recent year of universe employment counts. Table 9 shows the net birth-death values for the supersectors over the post-benchmark period. From April 2022 to December 2022, the net birth-death model cumulatively added 1,459,000 jobs, compared with 1,276,000 in the previously published April 2022 to December 2022 employment estimates.

Table 9. Net birth-death forecasts by industry supersector, April to December 2022 (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	0	0	1	0	1	0	0	2
20-000000	Construction	33	41	22	17	10	-4	31	-9	-17	124
30-000000	Manufacturing	-2	11	7	3	5	-1	11	4	1	39
40-000000	Trade, transportation, and utilities	4	32	19	39	23	-3	112	23	14	263
41-420000[1]	Wholesale trade	-4	6	-3	6	2	-11	21	2	0	19
42-000000[1]	Retail trade	5	19	13	17	11	0	31	0	-3	93
43-000000[1]	Transportation and warehousing	3	7	9	16	10	8	59	21	17	150
44-220000[1]	Utilities	0	0	0	0	0	0	1	0	0	1
50-000000	Information	9	6	3	10	4	0	14	6	2	54
55-000000	Financial activities	8	8	-5	18	4	-16	45	1	8	71
60-000000	Professional and business services	111	37	-8	85	26	-33	142	10	-21	349
65-000000	Private education and health services	45	18	-31	57	19	-35	102	12	-14	173
70-000000	Leisure and hospitality	99	90	82	88	22	-52	31	-24	-6	330
80-000000	Other services	17	10	4	10	6	-9	22	-2	-4	54
Total private net birth-death forecast		323	254	93	327	120	-153	511	21	-37	1,459

Footnotes

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

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Reconstructions

In addition to the regular benchmark revisions, CES employment, hours, and earnings estimates are sometimes reconstructed to avoid series breaks and to provide users with continuous, comparable employment time series suitable for economic analysis. Reconstructions may be necessary to correct processing errors, reporting errors, changes in scope, updates to the North American Industry Classification System (NAICS), or to address other issues that may cause breaks in CES time series that are not economic in nature. The reconstructions that were incorporated with this year's annual benchmark are described below.

Retail trade recoding

During processing for the 2022 benchmark, QCEW's Annual Refiling Survey identified incorrectly coded establishments for the first quarter of 2022, moving a significant amount of employment out of Electronic Shopping and Mail-Order Houses (NAICS 454110) into Corporate, Subsidiary, and Regional Managing Offices (NAICS 551114). For CES purposes, this resulted in about 68,000 in employment in electronic shopping and mail-order houses (42-454100) moving into corporate, subsidiary, and regional managing offices (60-551114) for March 2022. This amounted to approximately 14.6 percent of the previously published March 2022 employment level of electronic shopping and mail-order houses. Both industries were reconstructed for AE, PE, WE, PE AWH, and PE AHE back to January 1990. AE AWH and AE AHE were reconstructed for both industries back to the start of those data types, March 2006. All reconstructions were applied to not seasonally adjusted CES data.

Basic-level reconstruction methods

A part of the CES industry electronic shopping and mail-order houses (42-454100) in the retail trade major industry sector was redistributed into corporate, subsidiary, and regional managing offices (60-551114) in the professional and business services major industry sector.

A ratio of employment moving out of electronic shopping and mail-order houses amounting to 14.6 percent was calculated from QCEW data for March 2022. That ratio was applied to the March 2022 CES AE, PE, and WE estimates for electronic shopping and mail-order houses to determine the amount of employment to wedge back from March 2022 for the history of the series back to 1990, or 387 months. The amount of employment moving out of electronic shopping and mail-order houses in March 2022 was spread back across those 387 months linearly; 1/387 of the March difference is subtracted from the January 1990 estimate, 2/387 from the February 1990 estimate, and so on, until the full amount is subtracted from the March 2022 estimate. These employment amounts were then added to the employment of corporate, subsidiary, and regional managing offices to get the new totals.

Average weekly hours (AWH) and average hourly earnings (AHE) did not change for electronic shopping and mail-order houses, although the total hours and total earnings did. The amount of total hours to move into corporate, subsidiary, and regional managing offices was calculated by multiplying the amount of employment moving out of electronic shopping and mail-order houses by the AWH for that industry. Total earnings to move out of electronic shopping and mail-order houses was calculated by multiplying the AWH moving to corporate, subsidiary, and regional managing offices by AHE for electronic shopping and mail-order houses. These formulas apply to both AE and PE hours and earnings. These moving amounts of total hours and total earnings

were summed with the original total hours and total earnings for corporate, subsidiary, and regional managing offices. Those new total hours and total earnings were then averaged using the new employment levels for corporate, subsidiary, and regional managing offices. The AWH and AHE for corporate, subsidiary, and regional managing offices, therefore, did change due to the reconstruction. More information about the calculation of CES employment, hours, and earnings estimates is available in the Handbook of Methods under Monthly Estimation.

The resulting reconstructed series for electronic shopping and mail-order houses was distributed in its entirety to other industries due to the NAICS 2022 update. The NAICS 2022 update is briefly described below. More information about NAICS changes in the CES program is available on the CES NAICS page.

Conversion to the 2022 North American Industry Classification System

With the release of January 2023 data on February 3, 2023, the CES program updated the national nonfarm payroll series to the NAICS 2022 basis from the NAICS 2017 basis. The conversion to NAICS 2022 resulted in minor revisions reflecting content and coding changes within the mining and logging, manufacturing, wholesale trade, financial activities, and other services sectors, as well as major revisions reflecting content and coding changes in the retail trade and information sectors. Many industry titles and descriptions were also updated to better reflect official NAICS titles. Approximately 10 percent of CES employment was reclassified into different industries as a result of the update. For more information on the CES program conversion to NAICS 2022, see the CES NAICS 2022 page.

Aggregate-level reconstruction effects
Reconstructed basic series from both the corporate, subsidiary, and regional managing offices reconstruction and the NAICS update were summed to aggregate levels using the normal CES aggregation methods (see the Aggregation procedures section in the CES Handbook of Methods), and, consequently, unadjusted aggregate employment series are subject to change from the detailed aggregate series to summary level aggregates within each the major industry sector. Additionally, the reconstruction to corporate, subsidiary, and regional managing offices affected major industry sector level employment for trade, transportation, and utilities and professional and business services. Hours and earnings series are subject to change from summary levels to major industry sector levels for private service-providing, service-providing, total private, and total nonfarm. Differences for not seasonally adjusted employment for private service-providing, service-providing, total private, and total nonfarm are minor, ranging from -2,000 to 3,000.

Reconstruction methods for series that go back further than 1990
For industries that have series with earlier data than January 1990, ratios at the major industry level were created from summed reconstructed data and the originally published estimates. These pre-1990 ratios were calculated for employment and total earnings using January 1990 data for all series in exhibit 3 and applied to the pre-1990 histories for these series. Pre-1990 PE AWH did not change, but the historical PE AWH data were used to calculate PE AHE changes for pre-1990 data, which had minor changes between -1 and 1 cent for some months.

Exhibit 3. Start years of pre-1990 industries affected by NAICS 2022 conversion

CES Industry Code	CES Industry Title	AE	PE	PE AWH	PE AHE	PE AOT	WE
31-333200	**Industrial machinery manufacturing**	1972	1972	1972	1972	1972	1972
31-333248	**All other industrial machinery manufacturing**	1972	1972	1972	1972	1972	1972
31-335910	**Battery manufacturing**	1972					
32-325300	**Pesticide, fertilizer, and other agricultural chemical manufacturing**	1972					
42-445132	**Vending machine operators**	1982	1982	1982	1982		1982
50-516110	**Radio broadcasting stations**	1982					
50-516120	**Television broadcasting stations**	1982					

Seasonal adjustment in reconstructed series

For all series affected by the redistribution of employment, hours, and earnings due to either the corporate, subsidiary, and regional managing offices reconstruction or the NAICS update, the corresponding seasonally adjusted series were also subject to change for the entirety of their histories. Aggregate industries as well as component series used in indirect seasonal adjustment are also subject to change, up to and including total private and total nonfarm. More information about seasonal adjustment of CES series is available on the CES Seasonal Adjustment page.

Changes to the CES published series

With the release of the January 2023 first preliminary estimates on February 3, 2023, BLS incorporated series changes related to annual sample adequacy and disclosure review and updated the national nonfarm payroll series to the 2022 North American Industry Classification System (NAICS) from the NAICS 2017 basis.

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 NAICS 2022. Some industries no longer have sufficient sample to be estimated and published separately and were discontinued or combined with other similar industries for estimation and publication purposes. This information is also available on the Notice of Publication Changes with the Release of Data on February 3, 2023 page.

A list of currently published CES series is available at the CES published series page.

Table 10. Series with CES industry code or title changes

NAICS Code	Previous		New	
	CES Industry Code	CES Industry Title	CES Industry Code	CES Industry Title
3322,9	31-332900	Other fabricated metal products	31-332900	Cutlery, handtool, and other fabricated metal product manufacturing
33220,99	31-332990	All other fabricated metal products	31-332990	Cutlery, handtool, and all other fabricated metal product manufacturing
332200;991,6,9	31-332200	Cutlery and hand tools	31-332999	Cutlery, handtool, ball and roller bearing, fabricated pipe, pipe fitting, and all other fabricated metal product manufacturing
332200;991,6,9	31-332999	Miscellaneous fabricated metal products and balls and roll bearings		
333511,5,9	31-333511	Industrial molds	31-333519	Industrial mold, cutting tool and machine tool accessory, rolling mill, and other metalworking machinery manufacturing
333511,5,9	31-333519	Miscellaneous metalworking machinery		
337122,6,7	31-337122	Nonupholstered wood household furniture	31-337127	Nonupholstered household furniture and institutional furniture manufacturing
337122,6,7	31-337127	Miscellaneous household and institutional furniture		
3372,9	31-337200	Office furniture and fixtures	31-337200	Office furniture (including fixtures) and other furniture related product manufacturing
337215,900	31-337215	Showcases, partitions, shelving, and lockers	31-337215	Showcase, partition, shelving, locker, and other furniture related product manufacturing
337215,900	31-337900	Other furniture-related products		
44411,2,8	42-444110	Home centers	42-444180	Home centers, paint, wallpaper, and other building material dealers
44411,2,8	42-444120	Pain and wallpaper stores		
44411,2,8	42-444190	Other building material dealers		
6112,3	65-611200	Junior colleges	65-611300	Private junior colleges, colleges, universities, and professional schools
6112,3	65-611300	Colleges and universities		
6112,3	65-611300	Colleges and universities		

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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 separately for AE and non-AE data types. The first two tables in this section reference discontinued and collapsed series for AE only. The third table references discontinued series for all non-AE data types. Discontinued series tables (table 11 and table 13) display series for which the data types noted are no longer published. The collapsed series tables (table 12 and table 14) display series for which the data types noted are published at a more aggregate level because the more detailed 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. Industries that are no longer published for AE will also no longer be published for other directly estimated data types or derivative series. Table 15 shows non-AE series that have sufficient sample to be broken into more detail.

Table 11. Discontinued AE series

NAICS Code	CES Industry Code	CES Industry Title	Next Highest Published Industry
32211,2	32-322120	Pulp mills and paper mills	Pulp, paper, and paperboard mills (32-322100)
32213	32-322130	Paperboard mills	Pulp, paper, and paperboard mills (32-322100)
336111	32-336111	Automobiles	Motor vehicle manufacturing (32-336100)

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Table 12. Collapsed AE series

Previous			New		
NAICS Code	**CES Industry Code**	**CES Industry Title**	**NAICS Code**	**CES Industry Code**	**CES Industry Title**
3322	31-332200	Cutlery and hand tools	332200; 991,6,9	31-332999	Cutlery, handtool, ball and roller bearing, fabricated pipe, pipe fitting, and all other fabricated metal product manufacturing
332999	31-332999	Miscellaneous fabricated metal products and ball and roller bearings			
333511	31-333511	Industrial molds	333511, 5,9	31-333519	Industrial mold, cutting tool and machine tool accessory, rolling mill, and other metalworking machinery manufacturing

Previous			New		
NAICS Code	CES Industry Code	CES Industry Title	NAICS Code	CES Industry Code	CES Industry Title
333515,9	31-333519	Miscellaneous metalworking machinery	337122, 6,7	31-337127	Nonupholstered household furniture and institutional furniture manufacturing
337122	31-337122	Nonupholstered wood household furniture			
337124,5,7	31-337127	Miscellaneous household and institutional furniture			
337215	31-337215	Showcases, partitions, shelving, and lockers	337215, 900	31-337215	Showcase, partition, shelving, locker, and other furniture related product manufacturing
3379	31-337900	Other furniture-related products			
44411	42-444110	Home centers	4411,2, 8	42-444180	Home centers, paint, wallpaper, and other building material dealers
44412	42-444120	Paint and wallpaper stores			
44419	42-444190	Other building material dealers			
6112	65-611200	Junior colleges	6112,3	65-611300	Private junior colleges, colleges, universities, and professional schools
6113	65-611300	Colleges and universities			

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Table 13. Discontinued non-AE series

NAICS Code	CES Industry Code	CES Industry Title	Discontinued From Publication	Next Highest Published Industry
21239	10-212390	Other nonmetallic mineral mining	PE, PE AWH, PE AHE	Nonmetallic mineral mining and quarrying (10-212300)
23817	20-238170	Siding contractors	PE, PE AWH, PE AHE	Foundation, structure, and building exterior contractors (20-238100)

NAICS Code	CES Industry Code	CES Industry Title	Discontinued From Publication	Next Highest Published Industry
23819	20-238190	Other building exterior contractors	PE, PE AWH, PE AHE	Foundation, structure, and building exterior contractors (20-238100)
3211	31-321100	Sawmills and wood preservation	AE AWOH, PE AWOH	Wood product manufacturing (31-321000)
3212	31-321200	Plywood and engineered wood products	AE AWOH, PE AWOH	Wood product manufacturing (31-321000)
3324	31-332400	Boilers, tanks, and shipping containers	PE, PE AWH, PE AHE	Fabricated metal product manufacturing (31-332000)
333514	31-333514	Special tools, dies, jigs, and fixtures	PE AWOH	Metalworking machinery manufacturing (31-333500)
334513	31-334513	Industrial process variable instruments	AE AWH, AE AHE, WE	Navigational, measuring, electromedical, and control instruments manufacturing (31-334500)
33631	31-336310	Motor vehicle gasoline engine and parts	AE AWH, AE AHE, PE, PE AWH, PE AHE, WE, PE AWOH	Motor vehicle parts manufacturing (31-336300)
33635	31-336350	Motor vehicle power train components	PE, PE AWH, PE AHE, WE, PE AWOH	Motor vehicle parts manufacturing (31-336300)
337121	31-337121	Upholstered household furniture	AE AWH, AE AHE, WE, AE AWOH	Household and institutional furniture manufacturing (31-3371200)
311611	32-311611	Animal, except poultry, slaughtering	WE	Animal slaughtering and processing (32-311600)
311612, 3	32-311613	Meat processed from carcasses, and rendering and meat byproduct processing	WE	Animal slaughtering and processing (32-311600)
3117	32-311700	Seafood product preparation and packaging	AE AWOH	Food manufacturing (32-311000)
313	32-313000	Textile mills	PE AWOH	Nondurable goods (32-000000)
32221	32-322210	Paperboard containers	PE AWOH	Paper manufacturing (32-322000)
324	32-324000	Petroleum and coal products	AE AWH, AE AHE	Nondurable goods (32-000000)
3259	32-325900	Other chemical products and preparations	AE AWOH	Chemical manufacturing (32-325000)
32611	32-326110	Plastics packaging materials, film, and sheet	AE AWH, AE AHE, WE	Plastics product manufacturing (32-326100)

NAICS Code	CES Industry Code	CES Industry Title	Discontinued From Publication	Next Highest Published Industry
312,6	32-329000	Miscellaneous nondurable goods manufacturing	AE AWH, AE AHE	Nondurable goods (32-000000)
42342	41-423420	Office equipment	PE, PE AWH, PE AHE	Professional and commercial equipment and supplies merchant wholesalers (41-423400)
42341,4,6,9	41-423490	Miscellaneous professional and commercial equipment	PE, PE AWH, PE AHE	Professional and commercial equipment and supplies merchant wholesalers (41-423400)
44512	42-445120	Convenience stores	AE AWH, AE AHE, PE, PE AWH, PE AHE	Convenience retailers and vending machine operators (42-445130)
44613	42-446130	Optical goods stores	PE, PE AWH, PE AHE	Health and personal care retailers (42-456100)
44619	42-446190	Other health and personal care stores	PE, PE AWH, PE AHE	Health and personal care retailers (42-456100)
484121	43-484121	General freight trucking, long-distance TL	PE, PE AWH, PE AHE	General freight trucking, long-distance (43-484120)
484122	43-484122	General freight trucking, long-distance LTL	PE, PE AWH, PE AHE	General freight trucking, long-distance (43-484120)
4883	43-488300	Support activities for water transportation	PE, PE AWH, PE AHE	Support activities for transportation (43-488000)
4882,9	43-488900	Support activities for other transportation, including rail	PE, PE AWH, PE AHE	Support activities for transportation (43-488000)
51511	50-515110	Radio broadcasting	AE AWH, AE AHE, PE, PE AWH, PE AHE, WE	Radio and television broadcasting stations (50-516100)
56191	60-561910	Packaging and labeling services	PE, PE AWH, PE AHE	Other support services (60-561900)
56192	60-561920	Convention and trade show organizers	PE, PE AWH, PE AHE	Other support services (60-561900)
81221	80-812210	Funeral homes and funeral services	AE AWH, AE AHE	Death care services (80-812200)
81222	80-812220	Cemeteries and crematories	AE AWH, AE AHE	Death care services (80-812200)

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Table 14. Collapsed non-AE series

Previous			New		
NAICS Code	**CES Industry Code**	**CES Industry Title**	**NAICS Code**	**CES Industry Code**	**CES Industry Title**
3322	31-332200	Cutlery and hand tools	33220,99	31-332990	Cutlery, handtool, and all other fabricated metal product manufacturing
33299	31-332990	All other fabricated metal products			
3372	31-337200	Office furniture and fixtures	3372,9	31-337200	Office furniture (including fixtures) and other furniture related product manufacturing
3379	31-337900	Other furniture-related products			

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Table 15. New non-AE series

NAICS Code	CES Industry Code	CES Industry Title	New Publication
2123	10-212300	Nonmetallic mineral mining and quarrying	PE, PE AWH, PE AHE

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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 the CES-National Database page.

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. CES vintage data are typically updated in early March following the annual benchmark revision.

Benchmarks for detailed industries can be found at the CES detailed industry tables page.

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