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### PRODUCTIVITY AND COSTS BY INDUSTRY: MANUFACTURING AND MINING INDUSTRIES – 2016

**Labor productivity** rose in 31 of the 90 NAICS 4-digit manufacturing and mining industries in 2016, the U.S. Bureau of Labor Statistics reported today. This was fewer than in 2015 when labor productivity rose in 41 industries. Output and hours worked also increased in fewer industries in 2016 than in the previous year.

**Unit labor costs**, which reflect the total labor costs required to produce a unit of output, rose in 64 of the 86 NAICS 4-digit manufacturing industries and in 1 of the 4 mining industries. Eighteen industries with productivity increases recorded declines in unit labor costs.

**Chart 1. Manufacturing and mining industries with the largest change in productivity, 2016 (NAICS 4-digit industries)**

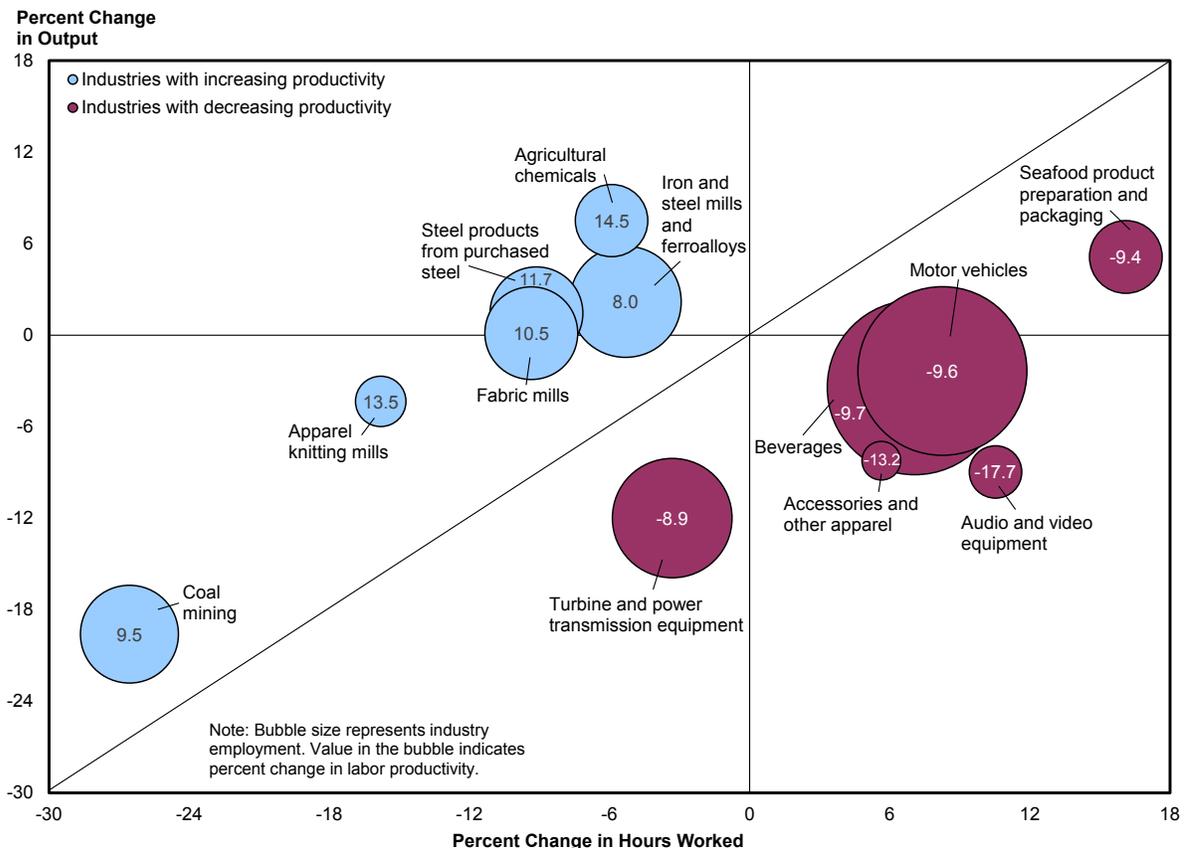


Chart 1 shows the industries with the largest changes in productivity in 2016. The industries with the largest growth in productivity (those above the diagonal line) had declines in hours worked while, in most cases, their output grew. In contrast, industries below the diagonal line exhibited declining productivity as hours worked usually increased and output mostly declined.

### Trends in Labor Productivity in 2016

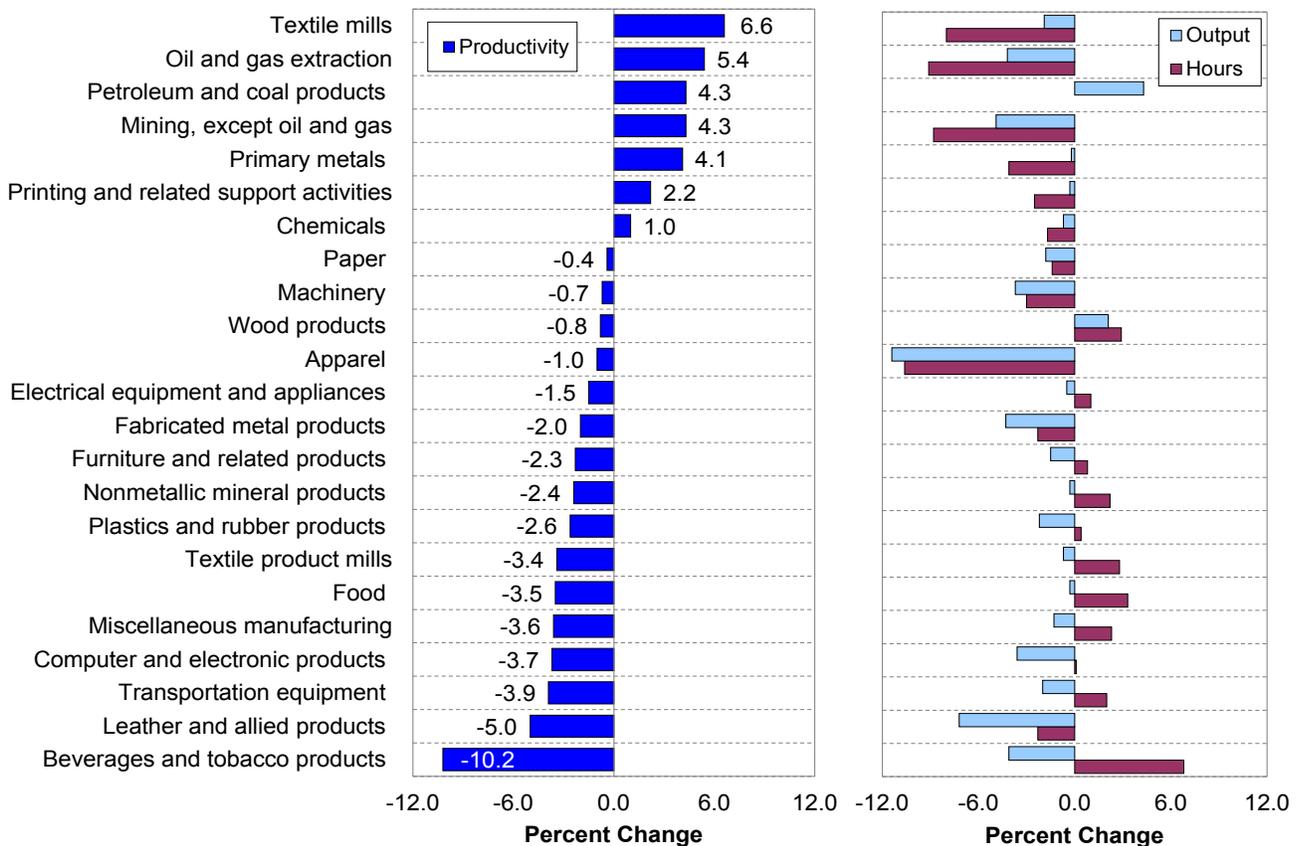
#### Manufacturing

- Labor productivity increased in 5 of the 21 NAICS 3-digit manufacturing industries in 2016, as output increased in only 2 industries, and hours worked rose in 11 industries. (See chart 2.)
- Labor productivity increased in 27 of the 86 NAICS 4-digit manufacturing industries in 2016, as output increased in 31 industries, and hours worked fell in 44 industries.
- Productivity rose fastest in the agricultural chemicals industry, where output increased by 7.7 percent and hours worked declined 5.9 percent.

#### Mining

- Labor productivity increased in both measured NAICS 3-digit mining industries in 2016. Productivity rose 5.4 percent in oil and gas extraction and rose 4.3 percent in mining, except oil and gas. Both industries saw output decline less than hours worked. (See chart 2.)
- Productivity increased in all 4 of the NAICS 4-digit mining industries measured. Output fell in 3 of the industries, but hours worked declined at an even greater rate.

**Chart 2. Productivity growth in NAICS 3-digit manufacturing and mining industries, 2016**



## Trends in Unit Labor Costs in 2016

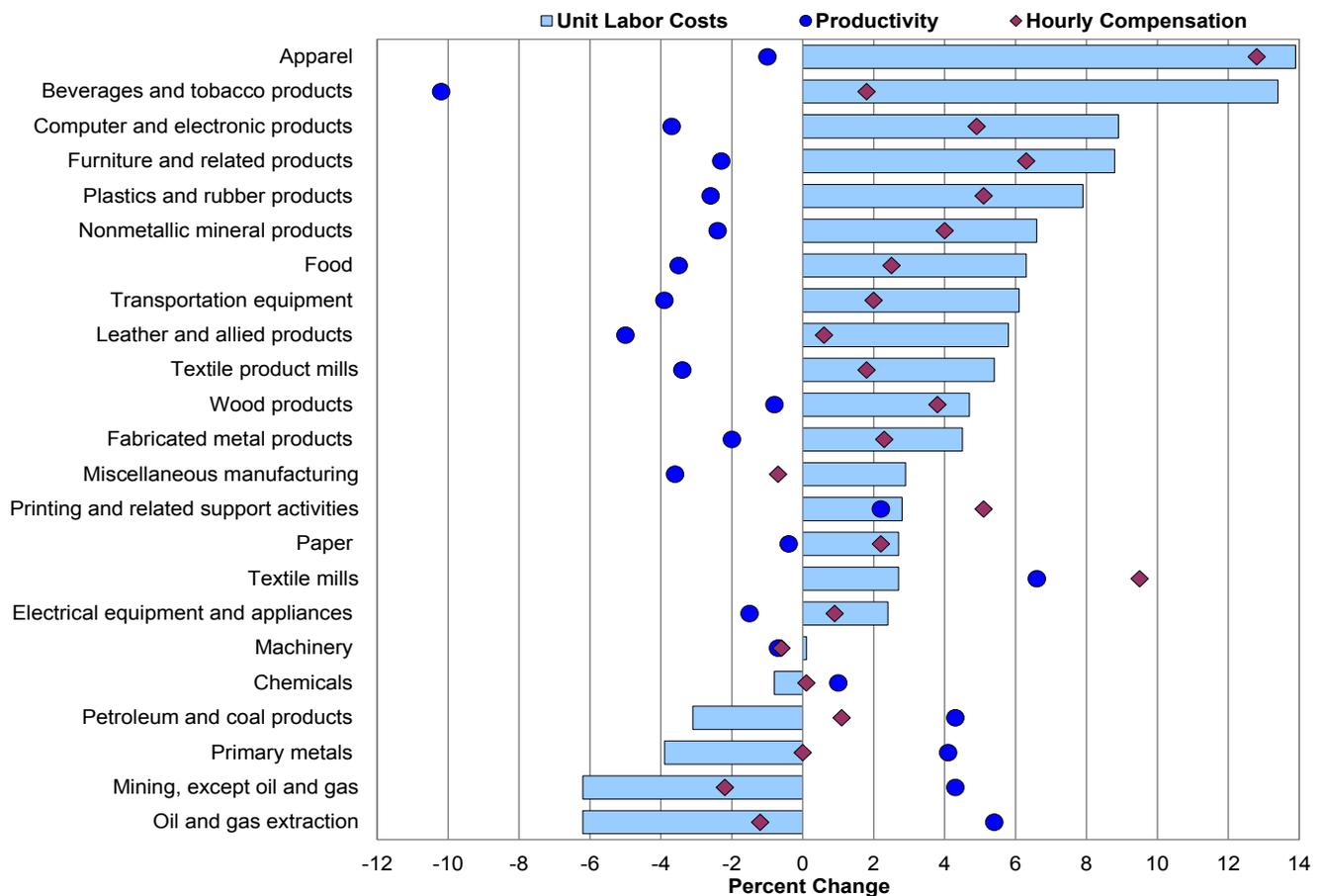
### Manufacturing

- Employers face increased unit labor costs when hourly compensation gains outpace productivity. For NAICS 3-digit industries, unit labor costs increased in 18 of the 21 manufacturing industries. Chart 3 shows the relationship between changes in hourly compensation, productivity, and unit labor costs.
- Of the 64 NAICS 4-digit manufacturing industries that had increases in unit labor costs, productivity growth was negative in almost four-fifths of them.

### Mining

- Unit labor costs declined in both measured NAICS 3-digit mining industries as productivity growth outpaced hourly compensation growth. (See Chart 3.)
- Unit labor costs fell in 3 of the 4 NAICS 4-digit mining industries measured, all 3 of which posted declining hourly compensation and increasing labor productivity. The only industry with an increase in unit labor costs was nonmetallic mineral mining and quarrying, which had more growth in hourly compensation than in productivity.

**Chart 3. Unit labor costs, productivity, and hourly compensation in NAICS 3-digit manufacturing and mining industries, 2016**



## Long-term trends in Labor Productivity and Unit Labor Costs

Chart 4 displays the number of NAICS 4-digit manufacturing and mining industries with increases in productivity, output, and hours worked for selected time periods through 2016.

Over the entire 1987-2016 period, **labor productivity** rose in 85 of the 90 manufacturing and mining industries measured.

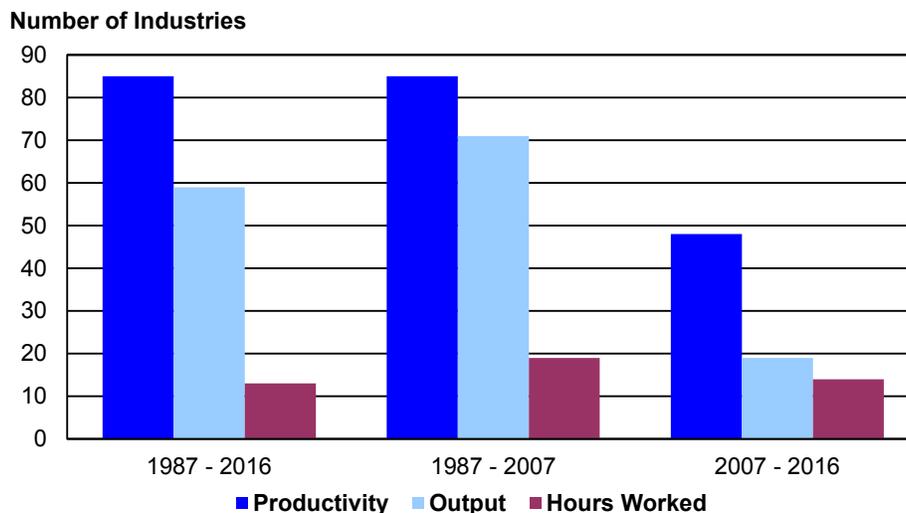
- Productivity growth in the 1987-2016 period was associated with output rising in 59 manufacturing and mining industries, while hours worked increased in only 13.
- Productivity increased in 48 industries in the more recent 2007-2016 period that included a severe recession.
- The 2007-2016 productivity increases are predominantly the result of a decline in hours worked, rather than an increase in output, as 72 industries experienced decreasing hours worked in this period compared to 19 industries that documented increasing output.

From 1987 to 2016, **unit labor costs** increased in 79 of the 90 manufacturing and mining industries.

- Among the NAICS 4-digit industries, unit labor costs fell in 11 of the 86 manufacturing industries from 1987 to 2016. None of the 4 mining industries saw declines in unit labor costs.
- From 2007 to 2016, unit labor costs decreased in 10 of the 86 manufacturing industries. Computer and peripheral equipment was the only industry with declines in both labor productivity and unit labor costs, as hourly compensation fell faster than productivity. In mining, oil and gas extraction saw a decline in unit labor costs while the other 3 industries had gains.

Computer and peripheral equipment had the largest productivity gains and the largest unit labor cost declines during the 1987 to 2007 period, as well as for the whole 1987 to 2016 interval. However, between 2007 and 2016, magnetic media manufacturing and reproducing posted the greatest productivity growth, while leather and hide tanning and finishing saw the sharpest drop in unit labor costs.

**Chart 4. Manufacturing and mining industries with increases in labor productivity, output, and hours worked**



### **Want to know more?**

**Find data** at [www.bls.gov/lpc](http://www.bls.gov/lpc) for:

- Additional industries and sectors
- Detailed data series: indexes of productivity and related measures; rates of change; and levels of industry employment, hours worked, nominal value of production, and labor compensation
- Additional years and long-term data

### **Questions?**

Additional information can be obtained by calling the BLS productivity program at (202) 691-5618 or by sending an email to [productivity@bls.gov](mailto:productivity@bls.gov). Information in this release will be made available to sensory impaired individuals upon request. Voice phone: (202) 691-5200; Federal Relay Service: (800) 877-8339.

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## Technical Note

**Labor Productivity:** Labor productivity describes the relationship between real output and the labor hours involved in its production. These measures show the changes from period to period in the amount of goods and services produced per hour worked. Although the labor productivity measures relate output in an industry to hours worked of all persons in that industry, they do not measure the specific contribution of labor to growth in output. Rather, they reflect the joint effects of many influences, including: changes in technology; capital investment; utilization of capacity, energy, and materials; the use of purchased services inputs, including contract employment services; the organization of production; the characteristics and effort of the workforce; and managerial skill.

**Unit Labor Costs:** Unit labor costs represent the cost of labor required to produce one unit of output. The unit labor cost indexes are computed by dividing an index of nominal industry labor compensation by an index of real industry output. Unit labor costs also describe the relationship between compensation per hour worked (hourly compensation) and real output per hour worked (labor productivity). When hourly compensation growth outpaces productivity, unit labor costs increase. Alternatively, when productivity growth exceeds hourly compensation, unit labor costs decrease.

**Output:** Industry output is measured as an annual-weighted index of the changes in the various products (in real terms) provided for sale outside the industry. Real industry output is usually derived by deflating nominal sales or values of production using BLS price indexes, but for some industries it is measured by physical quantities of output. Industry output reflects sectoral value of production, derived by adjusting shipments for changes in inventories and removing intra-industry transactions. Industry output measures are constructed primarily using data from the economic censuses and annual surveys of the Census Bureau, U.S. Department of Commerce, together with data on price changes primarily from BLS. Data from the Bureau of Economic Analysis at the U.S. Department of Commerce is used in part to construct intra-industry transactions. Other data sources include the Energy Information Administration at the U.S. Department of Energy and the U.S. Geological Survey at the U.S. Department of the Interior. Manufacturing industry output for 2016 is constructed with data on industrial production from the Federal Reserve and BLS price indexes.

**Labor Hours:** Labor hours are measured as annual hours worked by all employed persons in an industry. Data on industry employment and hours come primarily from the BLS Current Employment Statistics (CES) survey and Current Population Survey (CPS). CES data on the number of total and production worker jobs held by wage and salary workers in nonfarm establishments are supplemented with CPS data on self-employed and unpaid family workers to estimate industry employment. Hours worked estimates are derived using CES and CPS employment, CES data on the average weekly hours paid of production workers, CPS data on hours of nonproduction, self-employed, and unpaid family workers, and ratios of hours worked to hours paid based on data from the National Compensation Survey (NCS). For some industries, employment and hours data are supplemented or further disaggregated using data from the BLS Quarterly Census of Employment and Wages (QCEW), the Census Bureau, or other sources. Hours worked are estimated separately for different types of workers and then are directly aggregated; no adjustments for labor composition are made.

**Labor Compensation:** Labor compensation, defined as payroll plus supplemental payments, is a measure of the cost to the employer of securing the services of labor. Payroll includes salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind. Supplemental payments include both legally required expenditures and payments for voluntary programs. The legally required portion consists primarily of federal old age and survivors' insurance, unemployment compensation, and workers' compensation. Payments for voluntary programs include all programs not specifically required by legislation, such as the employer portion of private health insurance and pension plans. Industry compensation measures are constructed primarily using data from the BLS QCEW and the economic censuses of the Census Bureau at the U.S. Department of Commerce.

**Table 1. Recent labor productivity, unit labor costs, and related data**

Industry	2012 NAICS code	2016 Employment (thousands)	Percent change, 2015-2016				
			Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation
<b>Mining</b>							
Mining.....	21	644.5	17.5	-15.2	-4.4	-18.6	-18.9
Oil and gas extraction.....	211	180.5	5.4	-6.2	-4.2	-9.1	-10.1
Oil and gas extraction.....	2111	180.5	5.4	-6.2	-4.2	-9.1	-10.1
Mining, except oil and gas.....	212	186.3	4.3	-6.2	-4.9	-8.8	-10.8
Coal mining.....	2121	50.5	9.5	-10.3	-19.6	-26.6	-27.9
Metal ore mining.....	2122	39.9	4.7	-7.0	-0.9	-5.4	-7.9
Nonmetallic mineral mining and quarrying.....	2123	95.9	2.0	0.3	4.4	2.3	4.7
<b>Manufacturing</b>							
Food.....	311	1,589.1	-3.5	6.3	-0.3	3.3	5.9
Animal food.....	3111	58.4	-2.7	8.3	-5.7	-3.0	2.1
Grain and oilseed milling.....	3112	59.8	0.4	-0.2	2.4	2.0	2.3
Sugar and confectionery products.....	3113	78.0	-3.1	13.2	-6.0	-2.9	6.4
Fruit and vegetable preserving and specialty.....	3114	175.2	-8.0	4.9	-1.5	7.1	3.3
Dairy products.....	3115	141.6	-1.2	7.0	-1.9	-0.7	5.0
Animal slaughtering and processing.....	3116	499.7	-2.6	5.1	1.0	3.7	6.2
Seafood product preparation and packaging.....	3117	39.9	-9.4	-4.0	5.2	16.1	1.0
Bakeries and tortilla products.....	3118	327.4	-0.9	9.7	-2.9	-2.0	6.5
Other food products.....	3119	209.1	-8.5	7.3	3.5	13.2	11.1
Beverages and tobacco products.....	312	249.6	-10.2	13.4	-4.1	6.8	8.7
Beverages.....	3121	235.6	-9.7	14.6	-3.3	7.1	10.8
Tobacco.....	3122	14.0	-7.8	-4.4	-6.3	1.6	-10.5
Textile mills.....	313	119.3	6.6	2.7	-1.9	-8.0	0.7
Fiber, yarn, and thread mills.....	3131	29.6	6.7	0.4	0.5	-5.8	0.9
Fabric mills.....	3132	55.9	10.5	2.1	0.2	-9.4	2.3
Textile and fabric finishing mills.....	3133	33.8	0.4	5.5	-7.0	-7.4	-1.9
Textile product mills.....	314	133.2	-3.4	5.4	-0.7	2.8	4.7
Textile furnishings mills.....	3141	58.4	-2.0	6.9	-1.1	0.9	5.8
Other textile product mills.....	3149	74.8	-4.4	3.9	-0.2	4.4	3.7
Apparel.....	315	148.9	-1.0	13.9	-11.4	-10.6	0.9
Apparel knitting mills.....	3151	12.7	13.5	1.5	-4.4	-15.8	-2.9
Cut and sew apparel.....	3152	122.7	-1.4	15.9	-12.8	-11.5	1.1
Accessories and other apparel.....	3159	13.5	-13.2	11.9	-8.3	5.6	2.6
Leather and allied products.....	316	33.1	-5.0	5.8	-7.2	-2.3	-1.8
Leather and hide tanning and finishing.....	3161	5.2	-3.5	-22.8	-9.1	-5.8	-29.8
Footwear.....	3162	13.8	-3.3	9.6	-4.8	-1.6	4.3
Other leather products.....	3169	14.1	-6.3	20.6	-8.0	-1.9	10.9
Wood products.....	321	414.4	-0.8	4.7	2.1	2.9	6.8
Sawmills and wood preservation.....	3211	93.7	3.4	-0.6	3.2	-0.3	2.5
Plywood and engineered wood products.....	3212	78.7	-0.9	7.4	2.1	3.0	9.6
Other wood products.....	3219	242.0	-2.8	6.4	1.3	4.3	7.8
Paper.....	322	371.7	-0.4	2.7	-1.8	-1.4	0.8
Pulp, paper, and paperboard mills.....	3221	100.7	4.5	-0.2	-1.2	-5.5	-1.3
Converted paper products.....	3222	271.0	-2.4	4.2	-2.1	0.3	2.0
Printing and related support activities.....	323	466.3	2.2	2.8	-0.3	-2.5	2.5
Printing and related support activities.....	3231	466.3	2.2	2.8	-0.3	-2.5	2.5
Petroleum and coal products.....	324	112.9	4.3	-3.1	4.3	0.0	1.1
Petroleum and coal products.....	3241	112.9	4.3	-3.1	4.3	0.0	1.1
Chemicals.....	325	822.7	1.0	-0.8	-0.7	-1.7	-1.6
Basic chemicals.....	3251	148.8	2.0	-0.2	0.7	-1.3	0.5
Resin, rubber, and artificial fibers.....	3252	92.5	7.2	2.4	1.0	-5.8	3.4
Agricultural chemicals.....	3253	35.9	14.5	-11.0	7.7	-5.9	-4.1
Pharmaceuticals and medicines.....	3254	287.1	-4.0	-2.1	-3.3	0.8	-5.3

**Table 1. Recent labor productivity, unit labor costs, and related data — Continued**

Industry	2012 NAICS code	2016 Employment (thousands)	Percent change, 2015-2016				
			Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation
Paints, coatings, and adhesives.....	3255	64.2	0.6	0.8	0.8	0.1	1.6
Soaps, cleaning compounds, and toiletries.....	3256	110.8	1.6	6.4	-2.3	-3.9	4.0
Other chemical products and preparations.....	3259	83.4	-0.8	5.1	-3.1	-2.3	1.8
Plastics and rubber products.....	326	702.4	-2.6	7.9	-2.2	0.4	5.5
Plastics products.....	3261	568.4	-2.9	8.8	-2.3	0.7	6.4
Rubber products.....	3262	134.0	-1.1	4.3	-1.9	-0.8	2.3
Nonmetallic mineral products.....	327	426.4	-2.4	6.6	-0.3	2.2	6.3
Clay products and refractories.....	3271	46.4	7.1	2.5	-1.5	-8.0	0.9
Glass and glass products.....	3272	92.2	-0.6	8.7	-2.7	-2.0	5.8
Cement and concrete products.....	3273	194.5	-6.4	7.0	0.3	7.2	7.3
Lime and gypsum products.....	3274	14.6	5.6	2.9	4.3	-1.2	7.3
Other nonmetallic mineral products.....	3279	78.7	-1.6	7.0	-0.1	1.5	6.9
Primary metals.....	331	379.1	4.1	-3.9	-0.2	-4.1	-4.2
Iron and steel mills and ferroalloys.....	3311	84.0	8.0	-11.1	2.3	-5.3	-9.1
Steel products from purchased steel.....	3312	56.5	11.7	-6.3	1.5	-9.1	-4.9
Alumina and aluminum production.....	3313	59.4	-6.8	5.7	-6.1	0.8	-0.7
Other nonferrous metal production.....	3314	61.5	4.1	-3.8	3.5	-0.5	-0.4
Foundries.....	3315	117.7	-1.9	4.7	-7.1	-5.2	-2.6
Fabricated metal products.....	332	1,456.4	-2.0	4.5	-4.3	-2.3	-0.1
Forging and stamping.....	3321	98.5	-0.1	0.8	-1.9	-1.8	-1.2
Cutlery and handtools.....	3322	40.1	-6.2	3.1	-3.5	2.9	-0.5
Architectural and structural metals.....	3323	373.5	-5.8	9.9	-6.2	-0.4	3.1
Boilers, tanks, and shipping containers.....	3324	92.7	6.5	3.9	-5.0	-10.8	-1.3
Hardware.....	3325	25.6	-6.6	4.3	-2.8	4.1	1.4
Spring and wire products.....	3326	43.3	-2.9	4.3	-2.9	0.0	1.3
Machine shops and threaded products.....	3327	369.8	-2.1	4.0	-6.3	-4.3	-2.6
Coating, engraving, and heat treating metals.....	3328	138.1	2.6	-2.7	3.0	0.4	0.2
Other fabricated metal products.....	3329	274.8	-2.4	4.4	-4.4	-2.0	-0.2
Machinery.....	333	1,091.5	-0.7	0.1	-3.7	-3.0	-3.6
Agriculture, construction, and mining machinery.....	3331	209.9	5.0	-5.1	-9.0	-13.4	-13.7
Industrial machinery.....	3332	115.6	-1.4	1.3	1.9	3.4	3.3
Commercial and service industry machinery.....	3333	90.6	1.7	-4.9	4.1	2.4	-1.0
HVAC and commercial refrigeration equipment.....	3334	129.3	-0.6	1.0	2.5	3.1	3.5
Metalworking machinery.....	3335	183.8	-3.0	5.6	-5.6	-2.6	-0.3
Turbine and power transmission equipment.....	3336	99.1	-8.9	10.8	-12.0	-3.3	-2.5
Other general purpose machinery.....	3339	263.2	0.6	-2.7	-0.5	-1.1	-3.1
Computer and electronic products.....	334	1,058.5	-3.7	8.9	-3.6	0.1	5.0
Computer and peripheral equipment.....	3341	164.2	2.8	3.3	5.1	2.3	8.6
Communications equipment.....	3342	87.7	1.0	-1.1	-0.3	-1.2	-1.4
Audio and video equipment.....	3343	21.1	-17.7	9.6	-9.0	10.5	-0.4
Semiconductors and electronic components.....	3344	371.0	-4.9	13.3	-5.4	-0.6	7.2
Electronic instruments.....	3345	397.8	-4.3	7.9	-4.8	-0.5	2.8
Magnetic media manufacturing and reproducing.....	3346	16.7	-7.7	-5.9	-2.1	6.1	-7.9
Electrical equipment and appliances.....	335	387.0	-1.5	2.4	-0.5	1.0	1.9
Electric lighting equipment.....	3351	49.0	-1.7	0.7	6.9	8.8	7.7
Household appliances.....	3352	64.1	-5.7	-1.6	2.0	8.2	0.4
Electrical equipment.....	3353	140.7	-2.2	7.6	-7.3	-5.2	-0.2
Other electrical equipment and components.....	3359	133.2	-0.9	1.6	1.4	2.3	3.1
Transportation equipment.....	336	1,632.8	-3.9	6.1	-2.0	2.0	4.1
Motor vehicles.....	3361	209.1	-9.6	14.4	-2.1	8.3	11.9
Motor vehicle bodies and trailers.....	3362	152.3	0.0	6.7	0.7	0.7	7.5
Motor vehicle parts.....	3363	583.5	-1.0	3.4	2.5	3.5	6.0
Aerospace products and parts.....	3364	490.1	-5.0	6.3	-4.6	0.4	1.4
Railroad rolling stock.....	3365	27.0	3.2	-9.8	-2.1	-5.1	-11.6
Ship and boat building.....	3366	136.0	-0.8	5.2	-6.0	-5.2	-1.1
Other transportation equipment.....	3369	34.8	-5.2	2.3	-1.2	4.2	1.0

**Table 1. Recent labor productivity, unit labor costs, and related data — Continued**

Industry	2012 NAICS code	2016 Employment (thousands)	Percent change, 2015-2016				
			Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation
Furniture and related products.....	337	408.6	-2.3	8.8	-1.5	0.8	7.2
Household and institutional furniture.....	3371	261.0	-1.0	6.7	0.2	1.2	6.9
Office furniture and fixtures.....	3372	109.7	-2.8	11.9	-3.3	-0.4	8.3
Other furniture related products.....	3379	37.9	-5.4	9.0	-3.6	1.9	5.1
Miscellaneous manufacturing.....	339	647.7	-3.6	2.9	-1.3	2.3	1.6
Medical equipment and supplies.....	3391	317.1	-2.5	-0.5	0.8	3.4	0.3
Other miscellaneous manufacturing.....	3399	330.6	-5.2	8.1	-4.1	1.2	3.7

**Table 2. Long run labor productivity, unit labor costs, and related data**

Industry	2012 NAICS code	2016 Employment (thousands)	Average annual percent change, 1987-2016				
			Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation
<b>Mining</b>							
Mining.....	21	644.5	1.1	2.8	1.0	-0.1	3.8
Oil and gas extraction.....	211	180.5	1.4	3.6	1.1	-0.3	4.7
Oil and gas extraction.....	2111	180.5	1.4	3.6	1.1	-0.3	4.7
Mining, except oil and gas.....	212	186.3	1.5	1.3	0.0	-1.5	1.4
Coal mining.....	2121	50.5	1.9	0.8	-1.7	-3.5	-0.9
Metal ore mining.....	2122	39.9	0.6	3.0	0.9	0.2	3.8
Nonmetallic mineral mining and quarrying.....	2123	95.9	1.4	1.8	1.0	-0.4	2.9
Support activities for mining <sup>1</sup> .....	213	383.7	1.4	3.3	4.0	2.5	7.3
Support activities for mining <sup>1</sup> .....	2131	383.7	1.4	3.3	4.0	2.5	7.3
<b>Manufacturing</b>							
Food.....	311	1,589.1	1.0	1.6	1.4	0.4	3.0
Animal food.....	3111	58.4	1.8	1.4	1.7	-0.2	3.1
Grain and oilseed milling.....	3112	59.8	2.1	0.8	1.4	-0.7	2.2
Sugar and confectionery products.....	3113	78.0	1.2	1.9	0.4	-0.7	2.4
Fruit and vegetable preserving and specialty.....	3114	175.2	1.3	1.6	1.1	-0.2	2.7
Dairy products.....	3115	141.6	1.7	1.7	1.4	-0.3	3.1
Animal slaughtering and processing.....	3116	499.7	0.6	1.6	1.7	1.1	3.4
Seafood product preparation and packaging.....	3117	39.9	0.9	2.2	0.4	-0.5	2.6
Bakeries and tortilla products.....	3118	327.4	0.2	1.8	0.3	0.1	2.1
Other food products.....	3119	209.1	0.1	2.2	2.1	2.0	4.4
Beverages and tobacco products.....	312	249.6	-0.1	2.3	-0.1	0.0	2.1
Beverages.....	3121	235.6	0.8	1.5	1.4	0.6	2.9
Tobacco.....	3122	14.0	1.6	1.3	-3.0	-4.5	-1.8
Textile mills.....	313	119.3	3.1	-0.2	-2.2	-5.1	-2.3
Fiber, yarn, and thread mills.....	3131	29.6	3.2	-0.7	-1.5	-4.6	-2.3
Fabric mills.....	3132	55.9	3.2	0.2	-2.5	-5.6	-2.3
Textile and fabric finishing mills.....	3133	33.8	1.7	0.7	-2.9	-4.6	-2.3
Textile product mills.....	314	133.2	0.8	2.2	-1.4	-2.2	0.8
Textile furnishings mills.....	3141	58.4	0.7	2.2	-2.1	-2.7	0.0
Other textile product mills.....	3149	74.8	1.5	1.9	-0.3	-1.7	1.7
Apparel.....	315	148.9	-0.7	1.9	-6.8	-6.2	-5.0
Apparel knitting mills.....	3151	12.7	0.2	1.1	-6.9	-7.1	-5.9
Cut and sew apparel.....	3152	122.7	-0.6	2.0	-6.8	-6.2	-5.0
Accessories and other apparel.....	3159	13.5	-3.1	2.7	-6.5	-3.6	-4.1
Leather and allied products.....	316	33.1	0.8	1.8	-4.2	-5.0	-2.5
Leather and hide tanning and finishing.....	3161	5.2	0.9	-0.5	-3.0	-3.8	-3.5
Footwear.....	3162	13.8	0.8	2.5	-5.2	-6.0	-2.9
Other leather products.....	3169	14.1	-0.1	2.9	-4.0	-3.9	-1.2
Wood products.....	321	414.4	1.4	1.6	0.2	-1.2	1.8
Sawmills and wood preservation.....	3211	93.7	2.2	0.9	0.3	-1.8	1.2
Plywood and engineered wood products.....	3212	78.7	1.0	1.6	0.2	-0.8	1.7
Other wood products.....	3219	242.0	1.0	2.2	-0.1	-1.1	2.1
Paper.....	322	371.7	2.0	1.1	0.0	-1.9	1.2
Pulp, paper, and paperboard mills.....	3221	100.7	2.7	0.8	-0.4	-3.1	0.3
Converted paper products.....	3222	271.0	1.4	1.7	0.1	-1.3	1.8
Printing and related support activities.....	323	466.3	1.3	1.2	-0.6	-1.8	0.5
Printing and related support activities.....	3231	466.3	1.3	1.2	-0.6	-1.8	0.5
Petroleum and coal products.....	324	112.9	2.4	2.3	1.3	-1.1	3.6
Petroleum and coal products.....	3241	112.9	2.4	2.3	1.3	-1.1	3.6
Chemicals.....	325	822.7	1.6	1.8	1.0	-0.6	2.7
Basic chemicals.....	3251	148.8	2.3	1.3	0.7	-1.5	2.0

See footnotes at end of table.

**Table 2. Long run labor productivity, unit labor costs, and related data — Continued**

Industry	2012 NAICS code	2016 Employment (thousands)	Average annual percent change, 1987-2016				
			Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation
Resin, rubber, and artificial fibers.....	3252	92.5	2.0	1.8	0.3	-1.6	2.2
Agricultural chemicals.....	3253	35.9	2.8	0.8	1.3	-1.5	2.0
Pharmaceuticals and medicines.....	3254	287.1	0.0	3.3	1.6	1.6	4.9
Paints, coatings, and adhesives.....	3255	64.2	0.7	2.2	-0.1	-0.9	2.1
Soaps, cleaning compounds, and toiletries.....	3256	110.8	1.6	0.9	1.3	-0.3	2.3
Other chemical products and preparations.....	3259	83.4	2.1	1.0	0.0	-2.0	1.1
Plastics and rubber products.....	326	702.4	1.6	1.4	1.3	-0.3	2.7
Plastics products.....	3261	568.4	1.5	1.5	1.5	0.0	3.1
Rubber products.....	3262	134.0	1.8	0.9	0.4	-1.4	1.3
Nonmetallic mineral products.....	327	426.4	1.0	1.6	0.2	-0.8	1.8
Clay products and refractories.....	3271	46.4	1.1	1.5	-1.5	-2.5	-0.1
Glass and glass products.....	3272	92.2	2.1	0.8	0.4	-1.6	1.2
Cement and concrete products.....	3273	194.5	0.0	2.1	0.2	0.2	2.4
Lime and gypsum products.....	3274	14.6	1.6	2.8	-0.4	-1.9	2.4
Other nonmetallic mineral products.....	3279	78.7	1.2	1.8	0.9	-0.3	2.7
Primary metals.....	331	379.1	2.6	0.2	0.6	-1.9	0.9
Iron and steel mills and ferroalloys.....	3311	84.0	3.8	-1.0	1.2	-2.5	0.2
Steel products from purchased steel.....	3312	56.5	0.6	1.8	-0.1	-0.7	1.8
Alumina and aluminum production.....	3313	59.4	2.3	0.9	0.3	-1.9	1.2
Other nonferrous metal production.....	3314	61.5	2.2	1.5	0.4	-1.8	1.9
Foundries.....	3315	117.7	1.7	1.0	-0.3	-2.0	0.7
Fabricated metal products.....	332	1,456.4	1.0	1.7	0.7	-0.2	2.4
Forging and stamping.....	3321	98.5	2.2	0.7	1.2	-0.9	1.9
Cutlery and handtools.....	3322	40.1	1.3	1.4	-1.0	-2.3	0.4
Architectural and structural metals.....	3323	373.5	0.4	2.4	0.7	0.3	3.0
Boilers, tanks, and shipping containers.....	3324	92.7	0.7	1.6	0.4	-0.4	2.0
Hardware.....	3325	25.6	0.7	1.2	-2.3	-3.0	-1.1
Spring and wire products.....	3326	43.3	1.7	1.4	-0.3	-1.9	1.1
Machine shops and threaded products.....	3327	369.8	1.4	1.4	2.1	0.6	3.5
Coating, engraving, and heat treating metals.....	3328	138.1	2.2	0.7	2.3	0.1	3.0
Other fabricated metal products.....	3329	274.8	0.5	2.0	-0.1	-0.5	1.9
Machinery.....	333	1,091.5	1.9	0.8	1.1	-0.8	2.0
Agriculture, construction, and mining machinery.....	3331	209.9	2.0	0.6	1.9	-0.2	2.5
Industrial machinery.....	3332	115.6	1.4	1.1	0.7	-0.7	1.8
Commercial and service industry machinery.....	3333	90.6	1.9	0.6	0.1	-1.8	0.7
HVAC and commercial refrigeration equipment.....	3334	129.3	1.8	1.1	1.1	-0.7	2.2
Metalworking machinery.....	3335	183.8	1.7	0.9	0.4	-1.3	1.3
Turbine and power transmission equipment.....	3336	99.1	1.5	0.5	1.2	-0.3	1.7
Other general purpose machinery.....	3339	263.2	2.0	1.3	1.3	-0.6	2.7
Computer and electronic products.....	334	1,058.5	9.0	-5.3	6.7	-2.1	1.0
Computer and peripheral equipment.....	3341	164.2	15.6	-14.0	12.0	-3.1	-3.7
Communications equipment.....	3342	87.7	5.4	-1.4	2.0	-3.3	0.5
Audio and video equipment.....	3343	21.1	2.0	1.4	-1.6	-3.6	-0.2
Semiconductors and electronic components.....	3344	371.0	12.6	-8.4	11.0	-1.5	1.6
Electronic instruments.....	3345	397.8	3.0	0.6	1.2	-1.7	1.8
Magnetic media manufacturing and reproducing.....	3346	16.7	1.3	0.5	-1.8	-3.0	-1.3
Electrical equipment and appliances.....	335	387.0	1.9	1.2	0.1	-1.8	1.2
Electric lighting equipment.....	3351	49.0	1.7	1.2	-0.1	-1.8	1.2
Household appliances.....	3352	64.1	3.0	-0.5	0.4	-2.5	-0.2
Electrical equipment.....	3353	140.7	1.3	1.7	-0.7	-2.0	1.0
Other electrical equipment and components.....	3359	133.2	1.7	1.7	0.4	-1.3	2.1
Transportation equipment.....	336	1,632.8	2.8	-0.3	2.0	-0.8	1.7
Motor vehicles.....	3361	209.1	3.1	-0.3	2.1	-1.0	1.7
Motor vehicle bodies and trailers.....	3362	152.3	1.4	2.1	1.9	0.5	4.0
Motor vehicle parts.....	3363	583.5	3.0	-1.5	2.9	-0.1	1.4
Aerospace products and parts.....	3364	490.1	2.5	0.6	0.7	-1.7	1.4

See footnotes at end of table.

**Table 2. Long run labor productivity, unit labor costs, and related data — Continued**

Industry	2012 NAICS code	2016 Employment (thousands)	Average annual percent change, 1987-2016				
			Labor productivity	Unit labor costs	Output	Hours worked	Labor compensation
Railroad rolling stock.....	3365	27.0	4.6	-2.0	5.2	0.6	3.2
Ship and boat building.....	3366	136.0	1.7	1.9	0.6	-1.1	2.5
Other transportation equipment.....	3369	34.8	3.7	-0.9	3.4	-0.2	2.5
Furniture and related products.....	337	408.6	1.4	1.6	-0.1	-1.5	1.5
Household and institutional furniture.....	3371	261.0	1.2	1.8	-0.5	-1.8	1.2
Office furniture and fixtures.....	3372	109.7	1.3	1.8	0.1	-1.2	1.9
Other furniture related products.....	3379	37.9	2.1	0.4	1.2	-0.8	1.7
Miscellaneous manufacturing.....	339	647.7	1.8	1.4	1.7	-0.1	3.2
Medical equipment and supplies.....	3391	317.1	2.2	0.9	3.4	1.2	4.3
Other miscellaneous manufacturing.....	3399	330.6	1.3	2.0	0.2	-1.1	2.2

<sup>1</sup> For NAICS industry 2131 average annual percent changes are for 1987-2015. Employment is for 2015.