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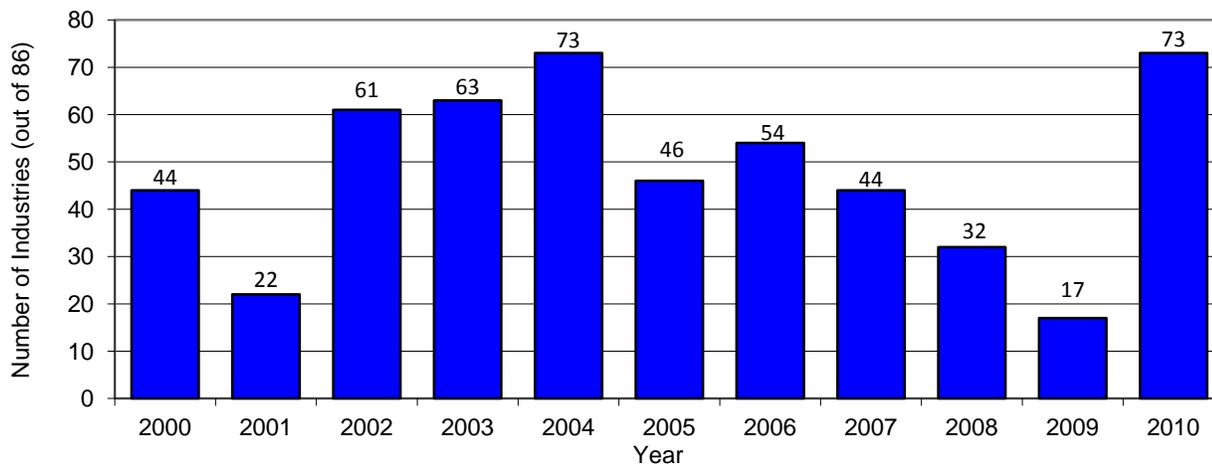
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## MULTIFACTOR PRODUCTIVITY TRENDS FOR DETAILED INDUSTRIES, 2010

Multifactor productivity – defined as output per unit of combined inputs – increased in 73 of the 86 four-digit NAICS manufacturing industries in 2010, the U.S. Bureau of Labor Statistics reported today. (See table 1.) This was up from 2009, when multifactor productivity increased in only 17 of those industries. (See chart 1.) More industries recorded multifactor productivity gains in 2010 than in any year since 2004.

Chart 1. Number of manufacturing industries with increases in multifactor productivity



Seventeen manufacturing industries recorded double-digit percent increases in multifactor productivity. Industries where multifactor productivity rose the most in 2010 were semiconductors and electronic components; motor vehicles; leather and hide tanning and finishing; forging and stamping; and cutlery and hand tools.

Multifactor productivity rose in both of the transportation industries studied in 2010. Multifactor productivity increased 3.8 percent in air transportation and 7.3 percent in line-haul railroads.

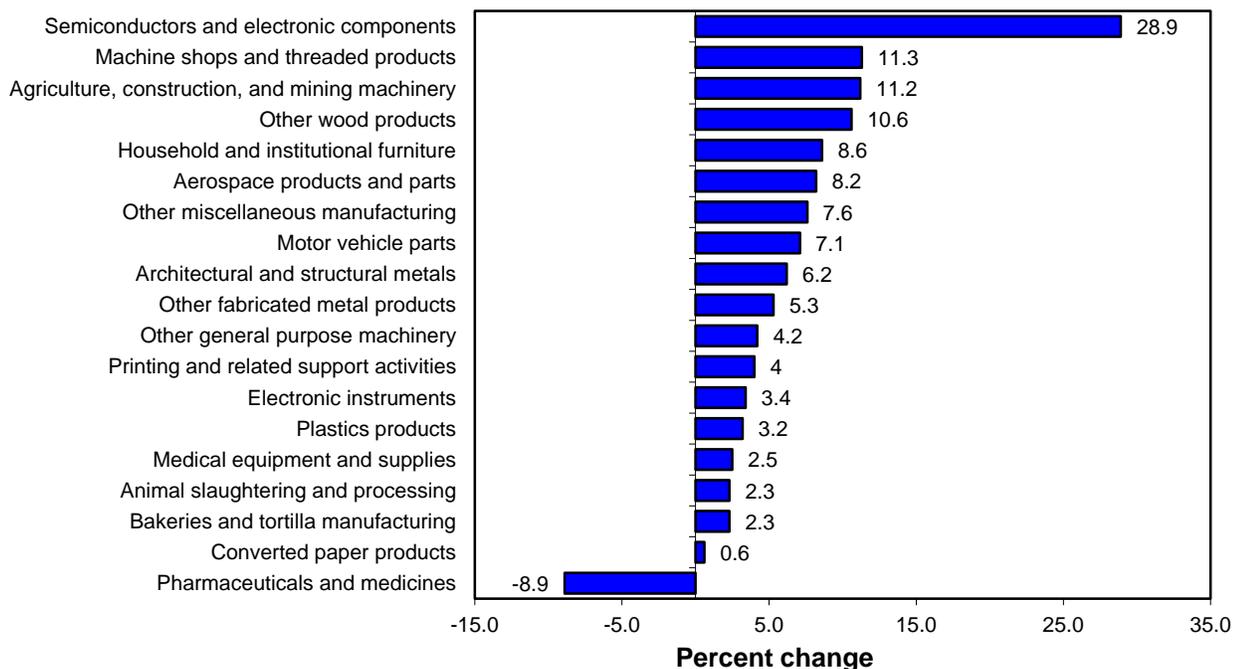
Multifactor productivity indexes relate the change in real output to the change in the combined inputs of labor, capital, and intermediate purchases consumed in producing that output. Multifactor productivity growth measures the extent to which output growth has exceeded the growth in inputs, and reflects the joint influences on economic growth of a variety of factors, including technological change, returns to scale, enhancements in managerial and staff skills, changes in the organization of production, and other efficiency improvements.

Output increased in 65 manufacturing industries in 2010, compared to only 7 in 2009. Double-digit percent increases in output occurred in 27 industries, and multifactor productivity rose in all of those industries except alumina and aluminum production. For some manufacturing industries, multifactor productivity rose despite falling output, as combined inputs fell more rapidly. These industries include printing and related support activities; architectural and structural metals; and railroad rolling stock.

Combined inputs of capital, labor, and intermediate purchases rose in 43 manufacturing industries in 2010, compared to 12 industries in 2009. Purchases of intermediate inputs rose in 56 percent of the industries, labor hours rose in 47 percent, and capital services rose in 16 percent.

Chart 2 shows the percent change in multifactor productivity in 2010 in the largest manufacturing industries (those with employment over 200,000). Of those industries, multifactor productivity increased the most in semiconductors and electronic components, as output surged despite a much smaller increase in inputs. Pharmaceuticals and medicines was the only industry where multifactor productivity declined among these industries, reflecting a large drop in output with no corresponding decline in inputs.

**Chart 2. Percent change in multifactor productivity in the largest manufacturing industries, 2009-2010**



Multifactor productivity in air transportation increased more in 2010 than in any of the previous 4 years, and in line haul railroads it increased more in 2010 than in any other year since 1987. Air transportation output increased 4.4 percent and combined inputs grew 0.6 percent. Line-haul railroads output rose 12.8 percent and combined inputs increased 5.2 percent.

Year-to-year movements in industry multifactor productivity measures may be erratic, particularly in smaller industries. The annual measure based on sample data may differ from measures generated by a census of establishments in the industry. Annual changes in an industry's output, labor, capital, and intermediate purchases may reflect cyclical changes in the economy as well as long-term trends. As a result, long-term multifactor productivity changes tend to be more reliable indicators of industry performance than year-to-year changes.

## Historical Trends

Between 1987 and 2010, multifactor productivity increased in 46 of 86 manufacturing industries, fewer than in 2010. (See table 2.) Output increased in 43 industries over the period while purchases of combined inputs rose in 44 industries. Average rates of change in multifactor productivity for most manufacturing industries ranged between -1.9 and 2.0 percent over the long term. (See chart 3.) In contrast, more industries recorded large productivity increases in 2010 than over the long-term; 33 industries posted multifactor productivity gains of 6.1 percent or more in 2010, the most since the measures began in 1987.

**Chart 3. Distribution of percent change in multifactor productivity for manufacturing industries, 2009-2010 and 1987-2010**

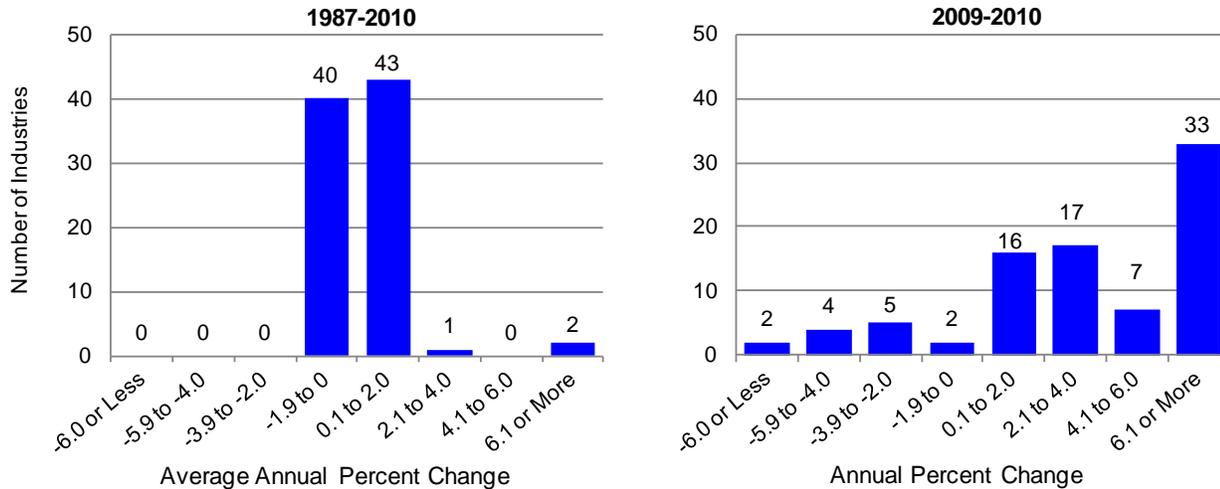
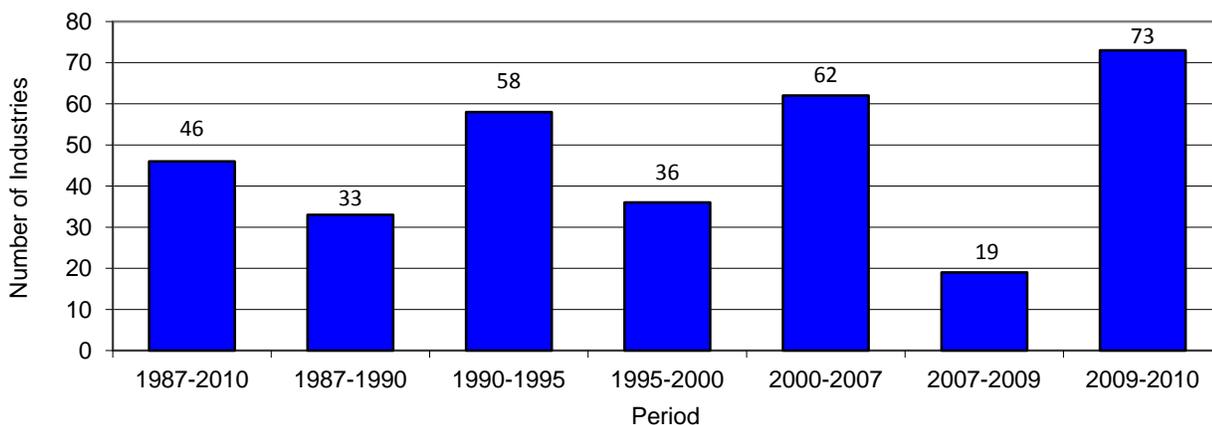


Table 3 presents the average annual compound rate of change in multifactor productivity by industry from 1987 to 2010 and for various subperiods. Multifactor productivity increased in more industries in 2010 than over any of the previous subperiods shown; the number in 2010 contrasts sharply with the number during the 2007-2009 period. (See chart 4.)

**Chart 4. Number of manufacturing industries with increases in multifactor productivity**



From 1987 to 2010 multifactor productivity rose for both transportation industries, although at a more moderate rate than in 2010. Multifactor productivity in air transportation grew at an average annual rate of 1.1 percent during this period, as output increased more than combined inputs. In line-haul railroads, multifactor productivity increased at an average of 2.1 percent per year as output rose and combined inputs declined slightly.

## Technical Note

**Multifactor Productivity:** Multifactor productivity measures for detailed industries are derived by dividing an index of real industry output by an index of the combined inputs of labor, capital, and intermediate purchases. The multifactor productivity indexes do not measure the specific contributions of capital, labor, and intermediate inputs. Rather, they are designed to reflect the joint influences on economic growth of a number of factors, including technological change, returns to scale, improved skills of the workforce, better management techniques, or other efficiency improvements.

**Output:** Manufacturing industry output is measured as annual sectoral output, the total value, in real terms, of goods and services produced for sale outside the industry. Industry value of production is derived by adjusting industry shipments for changes in inventories and subtracting intra-industry transfers and resales. For most manufacturing industries, real output is measured by deflating nominal value of production, but for some industries physical quantities of output are measured. For air transportation and line-haul railroads, output is measured by aggregating passenger-miles and freight ton-miles with weights based on revenues or operating expenses.

Output measures for manufacturing industries are constructed using data primarily from the economic censuses and annual surveys of the Bureau of the Census, U.S. Department of Commerce, together with information on price changes chiefly from the Bureau of Labor Statistics (BLS). Output measures for air transportation and line-haul railroads are constructed using data primarily from the Bureau of Transportation Statistics (BTS) and the Surface Transportation Board (STB), both in the U.S. Department of Transportation (DOT), together with information from the Association of American Railroads (AAR), AMTRAK, and several other sources.

**Combined Inputs:** The index of combined inputs is a Törnqvist index of separate quantity indexes of capital, labor, and intermediate purchases (including fuels, electricity, materials, and purchased services). The annual growth rates of the various inputs are aggregated using their relative cost shares in total industry value of production as weights. The labor weight is based on labor compensation including fringe benefits. The weight for intermediate purchases is based on the total cost of materials, fuels, electricity, and purchased services. The capital weight is calculated as the value of sectoral production minus the costs of labor compensation and intermediate purchases.

**Capital Input:** Capital input reflects the flow of services derived from the stock of physical assets. Capital services are estimated by calculating productive capital stocks and are assumed to be proportional to changes in these capital stocks for each asset. The capital index is a Törnqvist index of separate quantity indexes of equipment, structures, inventories, and land.

For manufacturing industries, physical capital is comprised of 26 categories of equipment, 2 categories of structures, 3 categories of inventories, and land. Measures of total capital services for each industry are estimated by aggregating the capital stocks of individual asset types. Estimates of investment by asset type for each industry are derived using annual capital expenditures for detailed industries from the economic censuses and annual surveys of the Bureau of the Census, in combination with benchmark capital flow tables and annual detailed asset investment by industry from the Bureau of Economic Analysis (BEA). Price changes are removed from the annual investment data before calculating stocks. Price deflators for each asset category are constructed by combining detailed price indexes (mostly BLS Producer Price Indexes) with weights that reflect each industry's use of individual asset commodities.

The capital stocks for the different assets are combined using weights based on estimated annual rental prices for each asset type, averaged between two time periods. Each rental price reflects the nominal rate of return to all assets within the industry and the rates of economic depreciation and revaluation of the specific asset. Rental prices are adjusted for the effects of taxes.

For air transportation, a weighted index of 44 types of airframes and 34 types of engines is derived from quantities and purchase prices from BTS. For assets other than airframes and engines, capital stocks are calculated as is done for manufacturing industries. Inventories of parts and supplies are also included; the current dollar series is deflated with a weighted cost index based on data from Airlines for America (A4A) and BTS. Indexes for aircraft and engines, non-aircraft assets, and parts and supplies inventories are aggregated using cost share weights to derive an overall measure of capital input.

For line-haul railroads, current dollar investment for 10 categories of equipment and 13 categories of structures, obtained from STB and AMTRAK, are deflated with BLS PPIs and deflators based on BEA data. The capital stocks for each of the items are calculated as is done for manufacturing industries. Inventories of materials and supplies are also included. Estimates of investments in land from STB and AMTRAK were deflated with price indexes from BEA.

**Labor Input:** For manufacturing industries, the primary source of industry employment and hours data is the BLS Current Employment Statistics (CES) survey. The CES provides monthly data on the number of total and production worker jobs held by wage and salary workers in nonfarm establishments, as well as data on the average weekly hours of production workers in those establishments. CES data are supplemented with data from the Current Population Survey (CPS) to estimate employment and hours of self-employed and unpaid family workers in each industry. Data from the CPS, together with the CES data, are also used to estimate the historical average weekly hours of nonproduction workers for each industry. CES and CPS data are supplemented or further disaggregated for some industries using data from the BLS Quarterly Census of Employment and Wages (QCEW), the Bureau of the Census, or other sources. Hours of all persons in an industry are treated as homogeneous and are directly aggregated.

For air transportation and line-haul railroads, labor input measures are derived primarily from DOT data. For air transportation, annual estimates are based on monthly data from BTS. For line-haul railroads, total labor hours for supervisory and nonsupervisory workers are derived from STB data and supplemented with data from AAR. For the railroad industry, the labor input measure includes an adjustment to remove capitalized labor hours in order to avoid double-counting because some capitalized labor costs are embedded in the railroad investment data.

**Intermediate Purchases Input:** The index of intermediate purchases is a Törnqvist index of separate quantities of materials, purchased services, fuels, and electricity consumed by each industry. Except for electricity consumed by manufacturing industries, for which direct quantity data are available, quantities are derived by deflating current-dollar values with appropriate price deflators.

For manufacturing industries, nominal values of materials, fuels and electricity, along with quantities of electricity consumed by each industry are obtained from economic censuses and annual surveys of the Bureau of the Census. To avoid double counting, an adjustment is made to the materials estimates to exclude the value of intra-industry commodity transfers. Purchased business services are estimated using annual industry data and benchmark input-output tables from BEA.

Constant-dollar materials consumed are derived by dividing annual current-dollar industry purchases by a weighted price deflator for each industry. Aggregate materials deflators are constructed for each industry by combining producer price indexes and import price indexes from BLS for detailed commodities. The

deflators are combined using weights based on detailed commodity data from the BEA benchmark input-output tables. Aggregate price indexes to deflate purchased business services are constructed in a similar manner using consumer price indexes (CPIs), PPIs, and deflators developed by BEA. The value of fuels consumed by each industry is deflated with a weighted price deflator based on PPIs for individual fuel categories; the weights reflect fuel expenditures by industry from the Energy Information Administration (EIA), U.S. Department of Energy.

For air transportation, detailed cost of materials, services, fuels, and electricity from the BTS were deflated using cost indexes from A4A. For line-haul railroads, intermediate purchases data from STB were supplemented with data from other sources including AAR, AMTRAK, EIA, and the Edison Electric Institute. The nominal values were deflated with producer price indexes from BLS and implicit price deflators calculated from BEA investment data.

**Revisions:** This news release incorporates 2010 data and revisions to 2009 data from Annual Survey of Manufactures published by the Census Bureau. This news release also incorporates the annual benchmark revisions of the BLS Current Employment Statistics (CES) survey published in February, 2012. All of the measures for 2010 in this release are preliminary and subject to revision.

**Additional Information:** The industries included in this release are classified according to the 2007 NAICS. While the rates of change reported by BLS in this news release are rounded to one decimal place, all industry productivity percent changes are calculated using index numbers rounded to three decimal places.

Industry multifactor productivity and related indexes and rates can be accessed by visiting the Multifactor Productivity and Costs website at <http://www.bls.gov/mfp>. Additional data are available upon request by calling the Division of Industry Productivity Studies at 202-691-5618 or by sending a request by e-mail to [dipsweb@bls.gov](mailto:dipsweb@bls.gov). Information in this report will be made available to sensory-impaired individuals upon request. Voice phone: 202-691-5618; TDD message referral phone number: 1-800-877-8339.

To subscribe to the industry productivity program's electronic notification service, send an e-mail to [dipsnews@bls.gov](mailto:dipsnews@bls.gov) with the word "subscribe" in the subject line.

**Table 1. Industry multifactor productivity and related data, percent change, 2009-2010**

NAICS code	Industry	2010 Employment (thousands)	Percent change					Intermediate purchases
			Multifactor productivity	Output	Combined inputs	Labor Hours	Capital	
<b>Manufacturing</b>								
3111	Animal food	51	0.4	-5.8	-6.2	-0.3	0.4	-9.4
3112	Grain and oilseed milling	59	1.3	-1.6	-2.9	0.1	-0.2	-4.3
3113	Sugar and confectionery products	70	1.5	1.8	0.3	-5.4	-0.4	2.5
3114	Fruit and vegetable preserving and specialty	173	2.0	-0.4	-2.3	4.8	0.1	-4.7
3115	Dairy products	133	1.9	1.1	-0.7	0.1	0.3	-1.1
3116	Animal slaughtering and processing	492	2.3	-0.6	-2.9	-0.6	-0.7	-3.6
3117	Seafood product preparation and packaging	38	0.6	-2.6	-3.1	7.4	-2.6	-5.1
3118	Bakeries and tortilla manufacturing	295	2.3	0.9	-1.4	0.5	-0.3	-2.3
3119	Other food products	166	0.9	1.8	0.9	3.8	2.0	-0.4
3121	Beverages	171	0.3	-0.1	-0.3	3.6	0.1	-1.3
3122	Tobacco and tobacco products	17	1.7	0.4	-1.3	-6.8	-0.6	-4.3
3131	Fiber, yarn, and thread mills	29	-3.7	7.4	11.6	8.6	-5.5	15.3
3132	Fabric mills	60	-0.4	7.6	8.0	9.2	-3.9	12.1
3133	Textile and fabric finishing mills	39	7.7	13.7	5.6	-8.1	-4.9	11.8
3141	Textile furnishings mills	61	3.9	0.8	-2.9	-6.7	-3.4	-1.5
3149	Other textile product mills	67	4.6	8.5	3.7	-4.5	-2.1	9.4
3151	Apparel knitting mills	24	1.2	7.4	6.0	6.8	-6.0	12.3
3152	Cut and sew apparel	142	-1.1	-1.6	-0.5	-4.7	-5.4	4.8
3159	Accessories and other apparel	13	6.7	1.0	-5.3	-9.3	-5.2	-2.1
3161	Leather and hide tanning and finishing	4	17.6	52.2	29.4	10.4	-2.5	51.2
3162	Footwear	12	6.8	5.1	-1.6	-9.1	-3.4	3.8
3169	Other leather products	15	-4.0	1.8	6.0	13.9	-4.3	5.4
3211	Sawmills and wood preservation	85	11.1	10.7	-0.4	7.3	-5.1	-1.9
3212	Plywood and engineered wood products	64	7.6	5.5	-1.9	-5.2	-5.8	-0.3
3219	Other wood products	216	10.6	3.7	-6.2	-5.8	-4.1	-6.6
3221	Pulp, paper, and paperboard mills	112	1.4	2.9	1.5	-3.6	-4.3	6.4
3222	Converted paper products	284	0.6	2.1	1.5	1.3	-2.5	2.5
3231	Printing and related support activities	525	4.0	-0.3	-4.1	-4.4	-4.5	-3.9
3241	Petroleum and coal products	114	1.8	4.0	2.2	-1.1	1.3	2.4
3251	Basic chemicals	143	8.1	19.3	10.4	-0.1	-1.5	16.6
3252	Resin, rubber, and artificial fibers	90	4.8	18.9	13.4	0.2	-3.8	19.2
3253	Agricultural chemicals	37	-2.4	-1.2	1.2	-4.4	-0.5	3.1
3254	Pharmaceuticals and medicines	278	-8.9	-8.3	0.7	-0.1	-0.8	2.8
3255	Paints, coatings, and adhesives	57	6.8	9.2	2.2	-0.2	-2.2	3.3
3256	Soaps, cleaning compounds, and toiletries	105	3.4	2.3	-1.0	2.5	-1.0	-1.5
3259	Other chemical products and preparations	86	6.2	15.5	8.8	2.2	0.3	10.6
3261	Plastics products	504	3.2	8.6	5.2	3.5	-2.2	8.2
3262	Rubber products	123	3.6	12.0	8.1	3.7	-2.0	12.6
3271	Clay products and refractories	51	10.9	14.1	2.9	8.1	-4.5	2.0
3272	Glass and glass products	83	7.2	3.2	-3.7	-3.6	-3.5	-3.8
3273	Cement and concrete products	172	0.6	-0.4	-1.0	-4.2	-3.3	0.9
3274	Lime and gypsum products	14	4.4	0.1	-4.1	-8.6	-3.5	-3.1
3279	Other nonmetallic mineral products	67	9.1	8.3	-0.7	-4.8	-2.4	2.0
3311	Iron and steel mills and ferroalloy production	87	3.8	28.9	24.2	7.2	-3.1	31.7
3312	Steel products from purchased steel	53	4.2	42.6	36.8	10.3	-3.9	52.0
3313	Alumina and aluminum production	55	-4.7	16.3	22.0	8.2	-4.0	27.0
3314	Other nonferrous metal production	59	10.2	17.2	6.4	7.3	2.4	9.7
3315	Foundries	112	2.5	16.9	14.1	3.4	-4.2	19.9

**Table 1. Industry multifactor productivity and related data, percent change, 2009-2010-Continued**

NAICS code	Industry	2010 Employment (thousands)	Percent change					Intermediate purchases
			Multifactor productivity	Output	Combined inputs	Labor Hours	Capital	
3321	Forging and stamping	90	14.8	15.1	0.2	5.5	-3.3	-1.1
3322	Cutlery and hand tools	42	14.2	10.6	-3.2	-4.2	-3.3	-2.5
3323	Architectural and structural metals	327	6.2	-3.8	-9.4	-5.9	-2.9	-11.6
3324	Boilers, tanks, and shipping containers	86	11.3	5.0	-5.7	-3.0	-2.1	-7.3
3325	Hardware	24	10.5	10.3	-0.2	0.6	-4.5	0.0
3326	Spring and wire products	42	10.3	9.3	-0.8	1.0	-3.2	-1.3
3327	Machine shops and threaded products	329	11.3	14.7	3.0	6.7	-0.6	1.5
3328	Coating, engraving, and heat treating metals	123	10.7	15.1	4.0	6.7	-2.7	4.6
3329	Other fabricated metal products	255	5.3	5.1	-0.2	4.0	-1.9	-1.5
3331	Agriculture, construction, and mining machinery	209	11.2	15.6	4.0	3.9	0.8	5.2
3332	Industrial machinery	102	9.0	26.9	16.4	5.3	-3.0	23.6
3333	Commercial and service industry machinery	92	2.5	1.9	-0.6	-2.4	-1.2	0.3
3334	HVAC and commercial refrigeration equipment	126	7.9	5.4	-2.3	-0.2	-0.1	-3.6
3335	Metalworking machinery	158	4.0	15.8	11.3	6.6	-3.5	16.3
3336	Turbine and power transmission equipment	92	12.4	10.0	-2.1	-1.3	-1.4	-2.5
3339	Other general purpose machinery	230	4.2	7.9	3.5	1.4	-2.1	5.9
3341	Computer and peripheral equipment	158	-8.4	-22.5	-15.4	-5.1	-4.3	-21.8
3342	Communications equipment	118	-2.2	2.3	4.6	-5.9	1.1	10.6
3343	Audio and video equipment	20	-2.2	-7.7	-5.6	-13.8	-9.4	-2.7
3344	Semiconductors and electronic components	374	28.9	32.1	2.5	-0.5	-1.3	9.9
3345	Electronic instruments	409	3.4	6.4	2.9	-2.7	-0.7	8.5
3346	Magnetic media manufacturing and reproduction	26	3.8	3.5	-0.3	-10.8	-6.6	6.6
3351	Electric lighting equipment	46	-4.9	-0.1	5.1	-1.7	-0.9	9.2
3352	Household appliances	60	-4.3	0.1	4.6	0.1	-3.4	8.0
3353	Electrical equipment	137	-2.6	-2.7	-0.1	1.2	-3.4	0.5
3359	Other electrical equipment and components	119	5.9	15.6	9.1	-1.9	-2.8	16.8
3361	Motor vehicles	153	18.7	39.9	17.9	11.0	4.2	21.3
3362	Motor vehicle bodies and trailers	109	0.7	17.3	16.5	11.2	-4.8	18.7
3363	Motor vehicle parts	425	7.1	27.4	18.9	8.8	-6.8	23.7
3364	Aerospace products and parts	481	8.2	2.6	-5.1	-4.5	1.7	-6.7
3365	Railroad rolling stock	19	10.2	-7.1	-15.7	-16.3	-0.1	-16.1
3366	Ship and boat building	127	1.5	-0.6	-2.1	-4.4	1.1	-1.0
3369	Other transportation equipment	34	2.3	-12.1	-14.0	-14.3	-5.9	-14.9
3371	Household and institutional furniture	247	8.6	0.1	-7.8	-9.4	-4.1	-7.3
3372	Office furniture and fixtures	102	3.6	-4.4	-7.8	-5.3	-3.4	-10.7
3379	Other furniture-related products	37	3.5	-1.9	-5.2	-4.6	-3.6	-6.0
3391	Medical equipment and supplies	313	2.5	2.6	0.1	-3.6	2.3	0.6
3399	Other miscellaneous manufacturing	308	7.6	5.9	-1.6	-4.4	-2.0	-0.1
	<b>Transportation</b>							
481	Air Transportation	391	3.8	4.4	0.6	-2.1	-0.5	3.4
482111	Line-Haul Railroads	172	7.3	12.8	5.2	4.4	2.0	8.4

**Table 2. Industry multifactor productivity and related data, average annual compound rates of change, 1987-2010**

NAICS code	Industry	Percent change					
		Multifactor productivity	Output	Combined inputs	Labor Hours	Capital	Intermediate purchases
<b>Manufacturing</b>							
3111	Animal food	0.4	1.8	1.4	-0.7	1.8	1.6
3112	Grain and oilseed milling	0.3	1.3	1.0	-0.8	0.7	1.2
3113	Sugar and confectionery products	-0.1	-0.4	-0.3	-1.4	0.8	-0.7
3114	Fruit and vegetable preserving and specialty	0.1	1.1	1.0	0.0	1.3	1.1
3115	Dairy products	-0.1	1.1	1.2	-0.7	1.6	1.3
3116	Animal slaughtering and processing	0.7	2.1	1.4	1.1	2.2	1.3
3117	Seafood product preparation and packaging	-0.3	0.2	0.5	-0.9	1.2	0.6
3118	Bakeries and tortilla manufacturing	-1.0	0.2	1.2	-0.3	1.3	2.0
3119	Other food products	0.5	1.9	1.4	1.4	1.2	1.6
3121	Beverages	0.6	1.4	0.8	-0.7	0.6	1.1
3122	Tobacco and tobacco products	-1.0	-3.2	-2.2	-4.6	-2.2	-3.5
3131	Fiber, yarn, and thread mills	0.2	-2.4	-2.6	-5.4	-1.6	-1.9
3132	Fabric mills	1.0	-2.7	-3.6	-6.9	-1.9	-2.7
3133	Textile and fabric finishing mills	0.1	-3.6	-3.7	-5.0	-1.9	-3.6
3141	Textile furnishings mills	-0.5	-2.6	-2.1	-3.0	-0.8	-2.5
3149	Other textile product mills	0.2	-0.6	-0.7	-2.6	1.2	-0.3
3151	Apparel knitting mills	-0.4	-7.2	-6.8	-7.1	-2.5	-7.9
3152	Cut and sew apparel	-1.9	-8.4	-6.6	-7.2	-2.4	-8.0
3159	Accessories and other apparel	-1.1	-7.2	-6.1	-5.2	-1.7	-7.0
3161	Leather and hide tanning and finishing	0.4	-3.7	-4.1	-5.1	-2.0	-4.2
3162	Footwear	0.6	-5.8	-6.4	-8.3	-3.2	-6.0
3169	Other leather products	-0.3	-4.0	-3.8	-4.3	-1.4	-4.8
3211	Sawmills and wood preservation	0.6	-0.1	-0.8	-2.7	-0.8	0.3
3212	Plywood and engineered wood products	0.0	-1.3	-1.2	-2.3	0.8	-0.8
3219	Other wood products	-0.4	-1.1	-0.7	-2.1	1.1	-0.1
3221	Pulp, paper, and paperboard mills	-0.2	-0.4	-0.2	-3.3	-0.8	1.2
3222	Converted paper products	-0.1	0.0	0.1	-1.3	0.9	0.3
3231	Printing and related support activities	-0.2	-0.6	-0.5	-1.9	1.6	-0.1
3241	Petroleum and coal products	0.3	1.2	0.9	-1.5	1.2	1.0
3251	Basic chemicals	-0.8	0.3	1.1	-2.2	0.5	2.1
3252	Resin, rubber, and artificial fibers	0.4	0.5	0.1	-2.0	0.4	0.4
3253	Agricultural chemicals	0.8	0.5	-0.2	-2.1	-0.9	0.5
3254	Pharmaceuticals and medicines	-1.9	2.0	4.0	2.1	4.6	4.1
3255	Paints, coatings, and adhesives	-1.3	-0.8	0.5	-1.8	0.3	1.1
3256	Soaps, cleaning compounds, and toiletries	0.0	1.7	1.7	-0.9	1.9	2.2
3259	Other chemical products and preparations	-0.7	0.2	0.9	-2.3	0.3	2.2
3261	Plastics products	0.2	1.4	1.2	-0.5	2.7	1.5
3262	Rubber products	0.7	0.1	-0.5	-2.2	0.1	0.3
3271	Clay products and refractories	-0.2	-1.9	-1.7	-2.6	-1.0	-1.1
3272	Glass and glass products	0.8	-0.1	-0.9	-2.3	-0.1	-0.4
3273	Cement and concrete products	-0.7	-0.5	0.2	-0.5	0.7	0.5
3274	Lime and gypsum products	-0.6	-1.1	-0.6	-2.1	0.6	-0.6
3279	Other nonmetallic mineral products	0.8	0.7	-0.1	-1.0	-0.1	0.4
3311	Iron and steel mills and ferroalloy production	0.8	1.5	0.7	-2.8	-2.0	2.7
3312	Steel products from purchased steel	-0.7	-1.7	-0.9	-1.1	-2.0	-0.6
3313	Alumina and aluminum production	-0.2	-0.3	-0.1	-2.8	-0.8	0.8
3314	Other nonferrous metal production	-0.3	-1.4	-1.1	-2.4	-0.3	-1.2
3315	Foundries	-0.2	-0.6	-0.4	-2.9	-0.5	1.4

**Table 2. Industry multifactor productivity and related data, average annual compound rates of change, 1987-2010-Continued**

NAICS code	Industry	Percent change					
		Multifactor productivity	Output	Combined inputs	Labor Hours	Capital	Intermediate purchases
3321	Forging and stamping	0.7	0.9	0.2	-1.8	1.2	1.0
3322	Cutlery and hand tools	0.5	-0.6	-1.0	-2.7	-0.2	-0.1
3323	Architectural and structural metals	-0.4	0.3	0.7	-0.4	1.0	1.4
3324	Boilers, tanks, and shipping containers	0.1	-0.3	-0.4	-1.2	-0.4	-0.2
3325	Hardware	-1.0	-3.3	-2.4	-4.2	-0.7	-1.7
3326	Spring and wire products	0.6	-0.1	-0.7	-2.7	0.6	0.1
3327	Machine shops and threaded products	0.9	2.3	1.4	0.3	2.1	2.2
3328	Coating, engraving, and heat treating metals	1.0	2.3	1.3	-0.4	1.7	2.2
3329	Other fabricated metal products	-0.3	0.0	0.2	-1.2	0.4	1.1
3331	Agriculture, construction, and mining machinery	0.8	2.8	2.0	0.0	0.4	2.9
3332	Industrial machinery	0.4	0.9	0.5	-1.6	1.7	1.5
3333	Commercial and service industry machinery	-0.6	-0.7	-0.1	-2.1	0.1	1.0
3334	HVAC and commercial refrigeration equipment	0.6	1.0	0.4	-1.3	1.3	0.8
3335	Metalworking machinery	0.7	-0.4	-1.0	-2.2	0.4	-0.1
3336	Turbine and power transmission equipment	-0.2	0.8	1.0	-0.9	0.9	2.0
3339	Other general purpose machinery	0.3	1.1	0.8	-1.5	0.5	2.1
3341	Computer and peripheral equipment	15.4	15.9	0.4	-4.2	1.0	1.0
3342	Communications equipment	1.4	2.3	0.9	-2.9	3.3	2.4
3343	Audio and video equipment	1.2	-2.7	-3.9	-4.7	0.0	-4.2
3344	Semiconductors and electronic components	13.7	14.2	0.5	-1.9	6.2	-1.8
3345	Electronic instruments	0.5	1.8	1.3	-2.1	1.2	3.8
3346	Magnetic media manufacturing and reproduction	3.3	0.5	-2.7	-1.8	1.1	-3.5
3351	Electric lighting equipment	-0.2	-0.8	-0.6	-2.6	0.3	0.0
3352	Household appliances	1.2	-0.1	-1.3	-3.5	-0.6	-0.8
3353	Electrical equipment	-0.3	-0.6	-0.3	-2.5	-0.7	1.2
3359	Other electrical equipment and components	0.0	-0.2	-0.2	-2.4	0.2	0.5
3361	Motor vehicles	0.7	0.9	0.2	-2.9	0.6	0.5
3362	Motor vehicle bodies and trailers	-0.5	0.2	0.7	-0.8	1.0	1.1
3363	Motor vehicle parts	1.0	1.7	0.6	-1.6	0.1	1.6
3364	Aerospace products and parts	-0.9	-0.3	0.5	-2.3	0.2	2.3
3365	Railroad rolling stock	0.9	3.7	2.7	-1.5	0.0	4.6
3366	Ship and boat building	-0.2	0.6	0.8	-1.8	0.2	2.4
3369	Other transportation equipment	1.4	5.5	4.1	-0.5	3.6	5.4
3371	Household and institutional furniture	-0.1	-1.2	-1.1	-2.8	0.6	-0.4
3372	Office furniture and fixtures	-0.2	-0.9	-0.7	-1.9	1.0	-0.5
3379	Other furniture-related products	0.8	1.0	0.2	-1.0	0.0	0.6
3391	Medical equipment and supplies	1.7	4.6	2.9	1.0	4.8	3.0
3399	Other miscellaneous manufacturing	0.5	0.6	0.1	-1.8	1.1	0.8
	<b>Transportation</b>						
481	Air Transportation	1.1	2.7	1.6	-0.2	3.9	2.3
482111	Line-Haul Railroads	2.1	1.9	-0.2	-2.2	-0.1	1.8

**Table 3. Industry multifactor productivity, average annual compound rates of change, 1987-2010 and selected subperiods**

NAICS code	Industry	Percent change						
		1987-2010	1987-1990	1990-1995	1995-2000	2000-2007	2007-2009	2009-2010
<b>Manufacturing</b>								
3111	Animal food	0.4	0.6	0.3	-0.7	1.8	-1.9	0.4
3112	Grain and oilseed milling	0.3	0.0	0.5	0.4	0.1	0.8	1.3
3113	Sugar and confectionery products	-0.1	-0.4	0.4	2.0	0.2	-7.3	1.5
3114	Fruit and vegetable preserving and specialty	0.1	-2.6	1.3	1.0	1.1	-5.4	2.0
3115	Dairy products	-0.1	-0.3	-0.6	-0.7	0.4	0.1	1.9
3116	Animal slaughtering and processing	0.7	-0.9	0.9	1.3	1.2	-2.1	2.3
3117	Seafood product preparation and packaging	-0.3	-1.2	0.0	-0.4	1.6	-6.4	0.6
3118	Bakeries and tortilla manufacturing	-1.0	-4.4	0.3	-0.7	0.0	-4.7	2.3
3119	Other food products	0.5	-0.1	0.7	-0.1	1.5	-1.4	0.9
3121	Beverages	0.6	0.3	1.0	-1.0	2.6	-2.4	0.3
3122	Tobacco and tobacco products	-1.0	-1.1	-0.7	0.6	-1.2	-6.5	1.7
3131	Fiber, yarn, and thread mills	0.2	0.1	0.3	0.0	2.1	-3.7	-3.7
3132	Fabric mills	1.0	-0.1	1.3	-0.1	2.8	-1.0	-0.4
3133	Textile and fabric finishing mills	0.1	-0.2	-0.1	1.1	0.6	-6.8	7.7
3141	Textile furnishings mills	-0.5	-0.6	1.2	-1.0	0.3	-7.9	3.9
3149	Other textile product mills	0.2	-0.1	-0.2	0.4	1.4	-5.5	4.6
3151	Apparel knitting mills	-0.4	0.8	2.0	-2.6	-2.3	3.1	1.2
3152	Cut and sew apparel	-1.9	-1.4	0.5	-1.7	-2.4	-7.8	-1.1
3159	Accessories and other apparel	-1.1	0.9	0.5	-4.7	-2.6	3.0	6.7
3161	Leather and hide tanning and finishing	0.4	-3.2	-2.1	3.6	-2.4	6.4	17.6
3162	Footwear	0.6	-1.9	0.2	-0.8	1.4	3.2	6.8
3169	Other leather products	-0.3	0.0	-2.3	1.7	2.7	-8.8	-4.0
3211	Sawmills and wood preservation	0.6	1.6	-1.4	-2.0	1.0	4.8	11.1
3212	Plywood and engineered wood products	0.0	-0.6	-0.4	-0.8	0.5	-2.1	7.6
3219	Other wood products	-0.4	-0.8	-1.0	-0.7	0.2	-5.3	10.6
3221	Pulp, paper, and paperboard mills	-0.2	-1.6	-1.1	-0.3	1.5	-2.1	1.4
3222	Converted paper products	-0.1	-0.5	-0.2	-0.3	0.8	-2.2	0.6
3231	Printing and related support activities	-0.2	-0.3	-0.3	-1.3	0.7	-2.0	4.0
3241	Petroleum and coal products	0.3	-1.9	2.2	2.0	-0.9	-1.4	1.8
3251	Basic chemicals	-0.8	-1.0	-3.3	-1.1	2.3	-7.8	8.1
3252	Resin, rubber, and artificial fibers	0.4	-0.9	1.0	-0.8	1.0	-0.8	4.8
3253	Agricultural chemicals	0.8	2.1	1.0	-1.1	2.6	-1.5	-2.4
3254	Pharmaceuticals and medicines	-1.9	-1.9	-2.5	-2.1	0.5	-4.4	-8.9
3255	Paints, coatings, and adhesives	-1.3	-2.1	-0.8	-2.1	-0.3	-5.9	6.8
3256	Soaps, cleaning compounds, and toiletries	0.0	-1.5	0.1	-1.9	3.7	-7.4	3.4
3259	Other chemical products and preparations	-0.7	-1.7	0.0	-1.0	-1.3	-2.0	6.2
3261	Plastics products	0.2	-0.8	1.0	0.5	0.4	-3.7	3.2
3262	Rubber products	0.7	1.3	1.2	1.0	0.0	-1.5	3.6
3271	Clay products and refractories	-0.2	0.7	1.1	0.9	-1.9	-6.5	10.9
3272	Glass and glass products	0.8	-0.2	1.7	1.9	-0.9	0.6	7.2
3273	Cement and concrete products	-0.7	0.6	0.3	0.2	-0.6	-8.1	0.6
3274	Lime and gypsum products	-0.6	-1.4	-2.5	0.8	0.2	-3.1	4.4
3279	Other nonmetallic mineral products	0.8	-1.4	2.0	-0.4	2.0	-3.4	9.1
3311	Iron and steel mills and ferroalloy production	0.8	1.3	2.0	1.9	-0.8	-1.2	3.8
3312	Steel products from purchased steel	-0.7	1.1	2.3	-0.1	-3.2	-6.0	4.2
3313	Alumina and aluminum production	-0.2	-0.2	-0.7	-0.2	-0.5	4.6	-4.7
3314	Other nonferrous metal production	-0.3	-1.6	1.5	0.1	-5.4	9.3	10.2
3315	Foundries	-0.2	-0.2	1.5	0.1	-1.4	-2.5	2.5

**Table 3. Industry multifactor productivity, average annual compound rates of change, 1987-2010 and selected subperiods -Continued**

NAICS code	Industry	Percent change						
		1987-2010	1987-1990	1990-1995	1995-2000	2000-2007	2007-2009	2009-2010
3321	Forging and stamping	0.7	-0.6	0.9	0.9	1.9	-8.5	14.8
3322	Cutlery and hand tools	0.5	-1.4	0.9	-0.3	-0.8	2.0	14.2
3323	Architectural and structural metals	-0.4	-1.2	0.8	-0.6	0.2	-6.6	6.2
3324	Boilers, tanks, and shipping containers	0.1	0.7	1.2	0.2	0.2	-8.8	11.3
3325	Hardware	-1.0	-2.2	0.6	-0.1	-2.2	-6.3	10.5
3326	Spring and wire products	0.6	0.4	1.5	0.5	0.8	-6.1	10.3
3327	Machine shops and threaded products	0.9	1.0	3.2	0.2	0.6	-6.9	11.3
3328	Coating, engraving, and heat treating metals	1.0	0.8	2.0	-0.6	2.4	-6.4	10.7
3329	Other fabricated metal products	-0.3	-1.8	0.2	-0.8	1.0	-4.9	5.3
3331	Agriculture, construction, and mining machinery	0.8	2.6	-0.2	-1.0	2.1	-4.1	11.2
3332	Industrial machinery	0.4	0.2	1.5	-0.5	0.6	-4.3	9.0
3333	Commercial and service industry machinery	-0.6	0.9	-0.9	-1.7	-0.9	-0.1	2.5
3334	HVAC and commercial refrigeration equipment	0.6	-0.2	0.6	0.6	1.0	-2.8	7.9
3335	Metalworking machinery	0.7	0.1	1.2	-0.7	1.9	-2.3	4.0
3336	Turbine and power transmission equipment	-0.2	-0.5	-0.2	0.8	-0.7	-6.3	12.4
3339	Other general purpose machinery	0.3	0.5	-0.1	-0.1	1.5	-4.3	4.2
3341	Computer and peripheral equipment	15.4	5.4	11.8	21.7	20.9	19.7	-8.4
3342	Communications equipment	1.4	3.7	3.6	1.3	2.1	-7.1	-2.2
3343	Audio and video equipment	1.2	3.7	1.8	0.2	3.3	-6.3	-2.2
3344	Semiconductors and electronic components	13.7	7.2	18.1	22.7	9.0	1.2	28.9
3345	Electronic instruments	0.5	1.6	-0.3	-4.3	2.9	3.8	3.4
3346	Magnetic media manufacturing and reproduction	3.3	1.2	5.8	-1.1	4.7	6.4	3.8
3351	Electric lighting equipment	-0.2	-1.8	0.1	0.3	1.3	-2.5	-4.9
3352	Household appliances	1.2	-0.1	2.4	0.9	2.6	-1.4	-4.3
3353	Electrical equipment	-0.3	0.4	1.6	-2.4	0.9	-3.7	-2.6
3359	Other electrical equipment and components	0.0	-1.8	0.9	0.4	-0.5	-1.5	5.9
3361	Motor vehicles	0.7	0.2	-1.5	0.3	2.8	-7.0	18.7
3362	Motor vehicle bodies and trailers	-0.5	-3.0	2.0	-1.9	0.3	-2.6	0.7
3363	Motor vehicle parts	1.0	-0.8	1.9	-0.3	1.5	0.5	7.1
3364	Aerospace products and parts	-0.9	-2.8	-1.8	-1.7	0.7	-3.2	8.2
3365	Railroad rolling stock	0.9	2.2	-1.4	4.0	-1.6	1.3	10.2
3366	Ship and boat building	-0.2	-0.2	-2.1	-0.4	0.1	2.8	1.5
3369	Other transportation equipment	1.4	-1.8	4.1	-1.0	4.1	-4.5	2.3
3371	Household and institutional furniture	-0.1	-0.5	0.7	-0.5	0.4	-6.4	8.6
3372	Office furniture and fixtures	-0.2	-2.6	0.2	1.9	0.8	-8.0	3.6
3379	Other furniture-related products	0.8	0.1	0.6	-0.2	2.2	-2.0	3.5
3391	Medical equipment and supplies	1.7	2.8	0.2	2.3	2.1	0.4	2.5
3399	Other miscellaneous manufacturing	0.5	1.3	0.6	-0.1	1.1	-4.8	7.6
	<b>Transportation</b>							
481	Air Transportation	1.1	-1.3	0.6	0.7	2.9	-0.6	3.8
482111	Line-Haul Railroads	2.1	4.4	4.2	1.1	1.1	-2.8	7.3