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MULTIFACTOR PRODUCTIVITY TRENDS, 2002

Private Business and Private Nonfarm Business

From 2001 to 2002, multifactor productivity increased 1.9 percent in the private business sector and 2.0 percent in the private nonfarm business sector, the Bureau of Labor Statistics of the U.S. Department of Labor reported today.

Multifactor productivity is designed to measure the joint influences of economic growth on technological change, efficiency improvements, returns to scale, reallocation of resources, and other factors, allowing for the effects of capital and labor. Multifactor productivity, therefore, differs from labor productivity (output per hour worked) measures that are published quarterly by BLS since it includes information on capital services and other data that are not available on a quarterly basis.

Multifactor productivity in the private business and nonfarm business sectors showed the fastest rate of growth since 1992. The 2002 annual changes are summarized in table A, and further detail and historical measures are shown in tables 1 through 6.

This is the last release of private business and nonfarm business productivity measures based on the Standard Industrial Classification (SIC) system. SIC-based multifactor productivity and related series through 2002 will remain available, but will no longer be updated. In the future, historical and new measures will be based on the North American Industrial Classification System (NAICS).

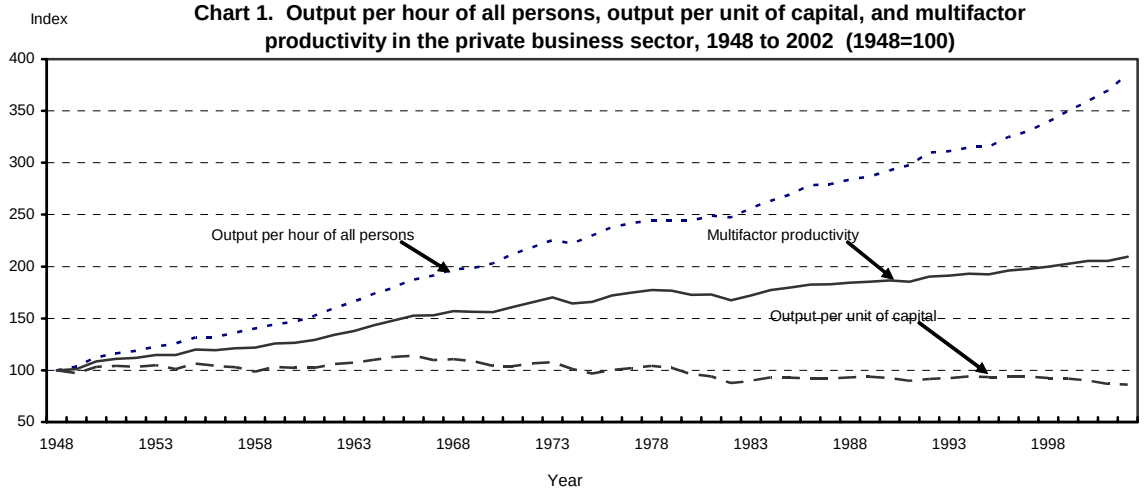

Chart 1 shows the annual indexes of multifactor productivity, output per hour worked, and output per unit of capital services for the 1948-2002 period for private business. Over the last 55 years, capital services have grown more rapidly than hours in the private business sector, and the skills of workers as measured by their education and work experience also have risen over this period. These shifts toward more capital intensive production and workers with more human capital have supplemented multifactor productivity growth, usually allowing output per hour to grow at a faster rate than multifactor productivity.

Private business and private nonfarm business

In private business and private nonfarm business, the change in multifactor productivity reflects the difference between the change in real gross domestic product for the sector and the change in labor and capital inputs engaged in the production of this output. The output measures for private business and private nonfarm business are similar to the indexes of output for business and nonfarm business used in the quarterly labor productivity measures, but the output of government enterprises is omitted.

A change in multifactor productivity reflects the change in output that cannot be accounted for by the change in combined inputs of labor and capital. In contrast, a change in labor productivity reflects the change in output that cannot be accounted for by the change in hours of all persons engaged in production.

Changes in 2001-2002

Private business sector

Multifactor productivity rose 1.9 percent in 2002, the largest rate of increase since 1992. The multifactor productivity gain in 2002 reflected a 1.9 percent increase in output while the combined inputs of capital and labor remained unchanged. In comparison, in 2001, multifactor productivity increased by 0.1 percent as both output and combined inputs increased by 0.4 percent.

In 2002, growth in capital services slowed to 2.7 percent, down from the 4.2 percent increase in 2001. The 1.3 percent drop in labor input in 2002 is about unchanged from the decline of 1.4 percent in 2001. It is the second straight year of declining labor input. The capital-labor ratio (capital services per hour of all persons) typically grows rapidly when hours fall. In 2002, the capital-labor ratio grew more rapidly than any other year since 1982, at an annual rate of 5.3 percent. The exception is 2001, when the capital-labor ratio grew at an annual rate of 6.6 percent.

Among the broad categories of capital assets, equipment grew more rapidly than other assets (see table 5). Within equipment, information processing equipment and software continued to increase sharply in 2002. However, these rates are markedly slower than in the 1995-2000 period. The largest increase in equipment growth continues to be in computers and related equipment, 21.3 percent. Structures and land continued to grow in 2002 at rates similar to recent years. Inventories, however, declined in 2002.

Labor input reflects the change in hours at work, adjusted for the effects of changing labor composition. Hours fell 2.5 percent in 2002, the second consecutive year that hours declined. Employment declined 2.2 percent in 2002 after dipping 0.8 percent in 2001. The work week declined slightly for the third year in a row. Changes in labor composition, as measured by shifts in the educational attainment and work experience of the work force, jumped 1.2 percent in 2002 (see "Changes in the Composition of Labor for the BLS Multifactor Productivity Measures, 2002", available at http://www.bls.gov/mfp/mprlab02.pdf) . This was the largest increase since 1992. Labor input fell because the decline in both employment and the work week exceeded the sharp increase in labor composition.

Table A. Productivity and related data, percent changes 2001-02

	Private Business[1]	Private Nonfarm Business[1]
Productivity		
Multifactor Productivity[2]	1.9	2.0
Output per hour of all persons	4.5	4.5
Output per unit of capital services	-0.8	-0.9
Output	1.9	1.8
Inputs		
Labor input[3]	-1.3	-1.5
Hours	-2.5	-2.5
Labor Composition[4]	1.2	1.1
Capital services	2.7	2.8
Combined units of labor and capital inputs[5]	0.0	-0.1
Analytic ratio:		
Capital services per hour of all persons	5.3	5.5

1. Excludes government enterprises.
2. Output per unit of combined labor and capital inputs.
3. Index of hours at work; hours at work by education and experience group are weighted by each group's share of labor compensation.
4. Ratio of labor input to hours.
5. Labor input index combined with capital service input index, weighted by labor's and capital's shares of nominal output.

Labor productivity (output per hour worked) increased 4.5 percent in 2002. This was the largest increase since 1964 and included a 2.5 percent decline in hours at work. Capital productivity (output per unit of capital services) fell 0.8 percent, the smallest decline since 1999.

Private nonfarm business

Multifactor productivity in the private nonfarm business sector rose 2.0 percent in 2002, the largest rate of growth since 1992. Output increased 1.8 percent, and the growth of combined units of capital and labor inputs declined 0.1 percent. In comparison, in 2001, multifactor productivity showed no growth as output and combined inputs both rose 0.5 percent.

Labor input declined 1.5 percent in 2002, the second consecutive drop. As in the private business sector, the slow growth of labor input was due to a decline in hours at work that was partially offset by a strong positive contribution from labor composition (see table A). Capital services increased 2.8 percent, growth slowed for the fourth consecutive year. The fastest growing component of capital services was equipment. The 4.9 percent growth rate, however, was the slowest since 1993. Capital services of information processing equipment and software rose by 10.0 percent in 2002, also the slowest rate of growth since 1993. As in previous years, the fastest increase was in computers and related equipment with a growth rate of 21.3 percent.

Labor productivity grew 4.5 percent in 2002, and capital productivity dipped 0.9 percent. The decline in capital productivity was the smallest since 1999. In 2002, capital services per hour increased at the historically rapid rate of 5.5 percent.

Long-term trends in private business and private nonfarm business

Labor productivity (output per hour worked) differs from multifactor productivity (output per unit of combined capital and labor inputs) in the treatment of both capital and hours. Labor productivity measures do not explicitly account for the effects of capital or of changes in the composition of labor on output growth. As a result, changes in capital intensity (the capital-hours ratio) and labor composition can influence labor productivity growth. In contrast, multifactor productivity treats capital as an explicit factor of production and, therefore, is net of changes in capital intensity. In addition, the labor input measure used to calculate multifactor productivity reflects the combined effects of changes in hours at work and of shifts in the educational attainment and experience of the work force. Therefore, multifactor productivity accounts for changes in labor composition as well. Long-term labor productivity growth can be viewed as the sum of three components: multifactor productivity growth, the contribution of increased capital intensity, and the contribution of shifts in labor composition (see table B).

The contribution of capital intensity equals the change in the capital-hours ratio multiplied by capital's share of total payments to inputs. The contribution of labor composition equals the difference between the growth rate of labor input and the growth rate of hours multiplied by labor's share of total payments. Historically, capital's share has been slightly less than a third of total payments.

Private Business and Nonfarm Business Sectors

The trends of the various measures in the private nonfarm business sector were similar to those in the private business sector in each period. Therefore, the patterns of productivity slowdowns after 1973 and rebounds after 1995 correspond closely in the two sectors. The description that follows focuses exclusively on the private business sector.

Over the entire 1948-2002 period, output per hour worked grew at an annual rate of 2.5 percent in private business (see table B). Of the 2.5 percent growth rate in labor productivity, 1.4 percent can be attributed to increases in multifactor productivity, 0.9 percent to the contribution of capital intensity, and 0.2 percent to changes in labor composition. The contribution of capital intensity is composed of the contribution of information processing equipment and software (0.3 percent) and of the contribution of all other types of capital (0.5 percent). Information processing equipment and software includes computers and related equipment, communications equipment, instruments and photocopying equipment, and software. Investment in these forms of capital was small prior to 1973 but since then has increased its share in total investment.

During the 1948-73 period, labor productivity, or output per hour worked, in private business grew 3.3 percent per year, faster than the average rate for the entire 1948-2002 period. This reflected strong growth in multifactor productivity (2.1 percent), combined with average contributions of capital intensity (0.9 percent) and labor composition (0.2 percent).

After 1973, productivity growth slowed (see table B). From 1973 to 1990, labor productivity increased at an annual average rate of 1.5 percent, much slower than the growth rate of 3.3 percent during the previous period. Gains in multifactor productivity dropped to only 0.5 percent, much lower than the 2.1 percent rate during the 1948-73 period. The contribution of capital intensity remained nearly stable at 0.8 percent in the 1973-90 period, as information processing equipment and software began to play an increasingly important role. As a result, labor productivity growth from 1973-90 was nearly half that of the 1948-73 period, reflecting the much slower growth in multifactor productivity.

From 1990 to 1995, labor productivity advanced at an annual rate of 1.5 percent, the same rate as during the 1973-90 period. Small increases in the rates of growth in multifactor productivity and in the contribution of labor composition were offset by a decline in the contribution of capital intensity, from 0.8 percent in 1973-90 to 0.4 percent in 1990-95. Information processing capital continued growing in importance, contributing all the increase in capital intensity in the latter period.

Table B. Compound average annual rates of growth in output per hour of all persons and the contributions of capital intensity, labor composition, and multifactor productivity, by major sector, 1948 to 2002

(percent per year)

	1948-02	1948-73	1973-90	1990-95	1995-00	2000-02	2001-02
Private business[1]							
Output per hour of all persons	2.5	3.3	1.5	1.5	2.7	3.6	4.5
Contribution of capital intensity[2]	0.9	0.9	0.8	0.4	1.1	1.8	1.7
Contribution of information processing equipment and software[3]	0.3	0.1	0.4	0.4	0.9	0.9	0.8
Contribution of all other capital services	0.5	0.8	0.3	0.0	0.2	0.9	0.8
Contribution of labor composition[4]	0.2	0.2	0.2	0.4	0.3	0.7	0.8
Multifactor productivity[5]	1.4	2.1	0.5	0.7	1.3	1.0	1.9
Private nonfarm business[1]							
Output per hour of all persons	2.3	2.9	1.4	1.6	2.5	3.6	4.5
Contribution of capital intensity[2]	0.9	0.8	0.8	0.5	1.1	1.8	1.7
Contribution of information processing equipment and software[3]	0.3	0.1	0.4	0.4	0.9	0.9	0.8
Contribution of all other capital services	0.5	0.7	0.4	0.0	0.2	0.9	0.9
Contribution of labor composition[4]	0.2	0.2	0.2	0.4	0.3	0.7	0.8
Multifactor productivity[5]	1.2	1.9	0.4	0.7	1.1	1.0	2.0
Contribution of R&D to multifactor productivity	0.2	0.2	0.2	0.2	0.2	0.3	0.3

1. Excludes government enterprises.
2. Growth rate in capital services per hour multiplied by capital's share of current dollar costs.
3. Growth rate of information processing equipment and software per hour multiplied by its share of total costs.
4. Growth rate of labor composition (the growth rate of labor input less the growth rate of the hours of all persons) multiplied by labor's share of current dollar costs.
5. Output per unit of combined labor and capital inputs.

Note: Multifactor productivity plus contribution of capital intensity and labor composition may not sum to output per hour due to independent rounding. Contribution of information processing equipment and all other capital may not sum to the contribution of capital intensity due to independent rounding.

From 1995 to 2000, output per hour worked rebounded to a 2.7 percent growth rate per year, 1.2 percentage points more than during the 1990-95 period. Half of this acceleration can be attributed to faster multifactor productivity growth, which almost doubled from 0.7 percent to 1.3 percent per year. The remainder of the increase was due to a rise in the contribution of capital intensity, from 0.4 percent to 1.1 percent with information processing capital accounting for a predominant part of this increase. This continued the trend in the substitution of information processing equipment and software for other forms of capital seen in earlier periods.

From 2000 to 2002, output per hour worked rose rapidly at an annual rate of 3.6 percent. The contribution of capital intensity accounted for most of this faster growth, although labor composition added to output per hour growth. Capital intensity grew 1.8 percent, up from the 1.1 percent rate during the 1995-2000 period. Information processing equipment and software contributed about half of the growth of capital services. All other capital services contributed the other half, posting a substantial increase from 0.2 percent in 1995-2000 to 0.9 percent in 2000-02. The contribution of labor composition increased from 0.3 percent in 1995-2000 to 0.7 percent in 2000-02. Only multifactor productivity reduced its contribution to output per hour worked, slowing from an annual growth rate of 1.3 percent in 1995-2000 to an annual growth rate of 1.0 percent in 2000-02.

Contribution of research and development to multifactor productivity in private nonfarm business

While multifactor productivity reflects many influences, technological change is one of the primary contributors. For private nonfarm business, BLS also reports estimates of the impact on multifactor productivity growth of firms' spending for research and development (R&D) on all firms within the same industries. Because many people associate research and development spending and the resulting technological improvements with productivity, multifactor productivity has not been adjusted to exclude the effects of research and development. The contribution of research and development averaged 0.2 percent per year for the entire 1948-2002 period, or about 17 percent of total multifactor productivity growth (see table B). The contribution of research and development varied little over time, contributing 0.2 percent per year during the 1948-73 period, 0.2 percent during the 1973-90 period, 0.2 percent for the 1990-95 and 1995-2000 periods, and 0.3 percent in the 2000-02 period.

Revisions

Private business and private nonfarm business output series reflect the annual revisions to the National Income and Product Accounts (NIPA), announced by the Bureau of Economic Analysis (BEA) in October 2004.

Hours at work measures for production and nonsupervisory workers in nonagricultural establishments were revised to reflect new measures of hours at work to hours paid ratios. Average weekly paid hours prior to 2001 were adjusted to hours at work using the ratio of hours at work to hours paid derived from the Hours at Work Survey. After the discontinuation of the Hours at Work Survey following the collection of data for 2000, new ratios of hours at work to hours paid based on data collected from the National Compensation Survey (NCS) now extend the series beyond 2000. A description of the hours at work to hours paid ratio derived from the National Compensation Survey titled "A Note on the Incorporation of Hours-Worked Hours-Paid Ratios from the Employment Index into Hours at Work Measures" can be found at http://www.bls.gov/lpc/lprhws/lprhwhp.pdf.

New estimates of average weekly hours at work for nonproduction and supervisory workers developed using information from the Current Population Survey (CPS) together with information from the Current Employment Statistics (CES) program, and the NCS have been incorporated. A description of the methodology used in calculating these average weekly hours titled "Construction of Average Weekly Hours for Supervisory and Nonproduction Wage and Salary Workers in Private Nonfarm Establishments" can be located at http://www.bls.gov/lpc/lprswawhtech.pdf.

Labor composition measures have been updated through 2002. A brief description, "Changes in the Composition of Labor for the BLS Multifactor Productivity Measures, 2002" is available at http://www.bls.gov/mfp/mprlab02.pdf.

Comprehensive tables containing additional data beyond the scope of this press release are available at http://www.bls.gov/mfp/mprdload.htm or in print upon request.

Summary of Methods

The following note describes the major data sources and the procedures used in deriving BLS multifactor productivity indexes. More detailed information on methods, limitations, and data sources is provided in BLS Bulletin 2178 (September 1983), "Trends in Multifactor Productivity, 1948-81." Additional data not contained in the release can be obtained in print or at http://www.bls.gov/mfp.

This release presents data for the private business and private nonfarm business sectors. The private business sector, which accounted for approximately 78 percent of gross domestic product in 2000, includes all of gross domestic product except the output of general government, government enterprises, non-profit institutions, the rental value of owner-occupied real estate, and the output of paid employees of private households. Additionally, the private nonfarm business sector excludes farms from the private business sector, but includes agricultural services. Multifactor measures exclude government enterprises, while the BLS quarterly Productivity and Cost series includes them.

Multifactor productivity measures describe the relationship between output in real terms and the inputs involved in its production. They do not measure the specific contributions of labor, capital, or any other factor of production. Rather, multifactor productivity is designed to measure the joint influences of output, capital, and labor on economic growth of technological change, efficiency improvements, returns to scale, reallocation of resources due to shifts in factor inputs across industries, and other factors.

The multifactor productivity indexes for private business and private nonfarm business are derived by dividing an output index by an index of labor input and capital services. The output indexes are computed as chained superlative indexes (Fisher Ideal indexes) of components of real output. For the years 1948 to 2002, BEA supplies the output indexes. BLS adjusts these to eliminate the output of government enterprises.

Capital input measures the services derived from the stock of physical assets and software. The assets included are fixed business equipment, structures, inventories, and land. Among equipment, BLS provides additional detail for information processing equipment and software (IPES). IPES is composed of four broad classes of assets: computers and related equipment, software, communications equipment, and other IPES equipment. Computers and related equipment includes mainframe computers, personal computers, printers, video displays, and other related equipment. Software is comprised of pre-packaged, custom, and own-account software. Communications equipment is not further differentiated. Other IPES includes scientific and related equipment, photocopying and related equipment, and office and accounting equipment. Structures include nonresidential structures and residential capital that is rented out by profit-making firms or persons.

Financial assets are excluded from capital input measures, as are owner-occupied residential structures. The aggregate capital input measures are obtained by Tornqvist aggregation of the capital stocks for each asset type within each of 53 SIC industries using estimated rental prices for each asset type. Each rental price reflects the nominal rate of return to all assets within the industry and rates of economic depreciation and revaluation for the specific asset; rental prices are adjusted for the effects of taxes. Data on investments in physical assets are obtained from BEA. Current-dollar gross product originating (GPO) data, obtained from BEA, are used in estimating capital rental prices.

Labor input in private business and private nonfarm business is obtained by Tornqvist-aggregation of the hours at work by all persons, classified by education, work experience, and gender with weights determined by their shares of labor compensation. Hours paid of employees are largely obtained from CES. These hours of employees are then converted to an at-work basis by using information from the Employment Cost Index (ECI) of the National Compensation Survey and the Hours at Work Survey. The hours at work of proprietors, unpaid family workers, and farm employees are derived from the Current Population Survey. Hours at work for nonproduction and supervisory workers are derived using data from the CPS, the CES, and the NCS. The growth rate of labor composition is defined as the difference between the growth rate of weighted labor input and the growth rate of the hours of all persons. Additional information concerning data sources and methods of measuring labor composition can be found in BLS Bulletin 2426 (December 1993), "Labor Composition and U.S. Productivity Growth, 1948-90."

The labor and capital components of the input indexes are combined with Tornqvist weights that represent each component's share of total costs. Total costs are defined as the value of output (Gross Product Originating) less a portion of indirect business taxes. Most indirect taxes, such as excise taxes, are excluded from costs; however, property and motor vehicle taxes remain in total costs. The index uses changing weights: The share in each year is averaged with the preceding year's share.

GPO data by SIC industry are not available for 2002. These data are needed to calculate rental prices for each asset in every industry. Rental prices for 2001 are used to calculate 2002 capital income shares for each asset. In addition, while aggregate hours are available for 2002 and used in the measurement of labor input by major sector, hours at work are unavailable by SIC industry for 2002. These data are needed to apportion proprietor’s income into capital and labor costs so that aggregate capital and labor shares can be calculated. Proprietor’s compensation for 2002 is extrapolated by assuming that the growth in proprietor’s compensation is the same as the growth in employee’s compensation per hour.

Research and development

The stock of research and development in private nonfarm business is derived by cumulating constant dollar measures of research and development expenditures and allowing for depreciation. Current dollar expenditures for privately financed research and development for the years 1953-2002 are obtained from annual issues of Research and Development in Industry published by the National Science Foundation. BLS develops price deflators and estimates of the rate of depreciation. Further description of these data and methods can be found in BLS Bulletin 2331 (September 1989), "The Impact of Research and Development on Productivity Growth."

Table 1. Private business sector: Productivity and related measures, 1948-2002[1]

Indexes 2000=100

Year	Productivity			Output[3]	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity[2]		Labor Input[4]	Capital Services[5]	Combined units of labor and capital[6]	
1948	27.8	110.9	48.7	15.2	45.9	13.7	31.2	25.1
1949	28.8	107.7	49.3	15.2	44.4	14.1	30.8	26.7
1950	31.3	114.5	52.9	16.7	45.2	14.6	31.6	27.4
1955	36.6	117.9	58.5	20.3	48.2	17.3	34.8	31.0
1960	40.8	113.6	61.6	22.5	48.5	19.8	36.5	35.9
1965	50.0	125.1	72.1	29.1	52.1	23.3	40.4	40.0
1966	52.1	126.5	74.3	31.1	53.5	24.6	41.8	41.2
1967	53.2	121.8	74.5	31.7	53.4	26.0	42.5	43.7
1968	54.9	122.7	76.4	33.3	54.2	27.1	43.6	44.8
1969	55.2	120.8	76.1	34.3	55.8	28.4	45.1	45.7
1970	56.4	115.6	76.0	34.3	54.8	29.7	45.1	48.8
1971	58.9	115.4	78.4	35.6	54.4	30.9	45.4	51.0
1972	60.7	118.3	80.6	37.9	56.2	32.1	47.0	51.3
1973	62.7	119.9	82.9	40.6	58.2	33.9	49.0	52.3
1974	61.7	112.3	80.0	40.0	58.6	35.6	50.0	55.0
1975	63.9	107.5	80.8	39.6	56.0	36.9	49.0	59.5
1976	66.1	111.3	83.8	42.3	57.7	38.0	50.4	59.4
1977	67.2	113.4	85.2	44.6	60.0	39.4	52.4	59.2
1978	67.9	115.6	86.3	47.4	63.1	41.1	55.0	58.8
1979	67.9	113.5	86.0	49.0	65.0	43.2	57.0	59.9
1980	67.8	106.6	84.1	48.5	64.6	45.5	57.7	63.6
1981	69.2	104.4	84.3	49.8	65.6	47.8	59.1	66.3
1982	68.8	97.2	81.5	48.4	64.7	49.8	59.4	70.7
1983	71.2	99.5	83.8	51.0	66.1	51.2	60.8	71.6
1984	73.2	103.2	86.4	55.5	70.1	53.8	64.3	71.0
1985	74.9	102.9	87.5	58.1	71.8	56.5	66.4	72.8
1986	77.3	102.4	88.9	60.3	72.7	58.9	67.9	75.5
1987	77.7	102.4	89.1	62.5	75.0	61.0	70.1	75.9
1988	78.9	103.4	89.8	65.2	77.7	63.0	72.6	76.3
1989	79.7	103.9	90.3	67.6	80.2	65.0	74.9	76.7
1990	81.4	102.6	90.9	68.6	80.1	66.9	75.5	79.3
1991	82.7	99.7	90.3	68.1	79.1	68.4	75.4	83.0
1992	86.2	101.7	92.7	70.9	80.0	69.7	76.5	84.8
1993	86.5	102.6	93.1	73.2	82.4	71.3	78.6	84.4
1994	87.5	104.5	94.1	76.9	86.1	73.5	81.7	83.7
1995	87.7	103.6	93.8	79.1	88.5	76.4	84.3	84.6
1996	90.3	103.9	95.5	82.8	90.4	79.7	86.7	86.9
1997	91.9	104.1	96.3	87.2	94.0	83.8	90.5	88.3
1998	94.4	102.6	97.4	91.5	96.2	89.2	93.9	92.0
1999	97.2	101.8	98.7	96.2	99.0	94.5	97.5	95.4
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	102.7	96.3	100.1	100.4	98.6	104.2	100.4	106.6
2002	107.2	95.5	102.0	102.3	97.4	107.1	100.3	112.2

See footnotes following table 4. Source: Bureau of Labor Statistics

Table 2. Private nonfarm business sector: Productivity and related measures, 1948-2002[1]

Indexes 2000=100

Year	Productivity			Output[3]	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity[2]		Labor Input[4]	Capital Services[5]	Combined units of labor and capital[6]	
1948	31.5	124.1	53.7	14.7	39.6	11.8	27.3	25.4
1949	32.9	120.5	54.8	14.7	38.0	12.2	26.8	27.3
1950	35.1	127.4	58.1	16.1	39.3	12.7	27.8	27.5
1955	40.0	131.7	63.2	20.0	43.7	15.2	31.6	30.4
1960	43.6	126.0	65.8	22.2	45.1	17.7	33.8	34.6
1965	52.5	137.1	75.7	29.0	49.8	21.2	38.3	38.3
1966	54.4	138.5	77.9	31.1	51.4	22.5	39.9	39.3
1967	55.4	132.9	77.9	31.6	51.4	23.8	40.6	41.6
1968	57.1	133.8	79.8	33.3	52.3	24.9	41.7	42.7
1969	57.2	131.1	79.2	34.3	54.0	26.2	43.3	43.6
1970	58.1	124.9	78.8	34.3	53.3	27.5	43.5	46.5
1971	60.6	124.4	81.2	35.6	53.0	28.6	43.8	48.7
1972	62.5	127.2	83.6	38.0	54.8	29.9	45.5	49.1
1973	64.5	129.3	86.0	40.8	56.9	31.6	47.5	49.9
1974	63.6	120.8	83.1	40.2	57.3	33.3	48.4	52.6
1975	65.4	114.3	83.3	39.5	54.7	34.6	47.4	57.2
1976	67.7	118.6	86.5	42.3	56.4	35.7	48.9	57.1
1977	68.7	120.6	87.8	44.7	58.8	37.1	50.9	56.9
1978	69.6	122.9	89.1	47.7	61.9	38.8	53.5	56.6
1979	69.4	120.2	88.5	49.2	63.9	40.9	55.6	57.7
1980	69.2	112.7	86.5	48.7	63.5	43.2	56.3	61.4
1981	70.2	109.2	86.1	49.7	64.5	45.5	57.7	64.3
1982	69.6	101.2	83.0	48.1	63.7	47.6	58.0	68.8
1983	72.8	103.9	86.1	51.3	65.1	49.4	59.6	70.0
1984	74.3	107.2	88.2	55.6	69.1	51.9	63.1	69.3
1985	75.5	106.1	88.7	58.0	71.1	54.7	65.4	71.2
1986	77.9	105.2	90.0	60.3	72.1	57.3	66.9	74.0
1987	78.2	104.7	90.0	62.4	74.5	59.6	69.3	74.7
1988	79.6	105.7	90.9	65.3	77.3	61.8	71.9	75.2
1989	80.1	105.9	91.1	67.6	79.8	63.9	74.3	75.7
1990	81.7	104.2	91.5	68.6	79.8	65.8	75.0	78.4
1991	83.1	101.1	91.0	68.1	78.7	67.4	74.8	82.3
1992	86.5	102.8	93.2	70.8	79.6	68.8	75.9	84.1
1993	86.9	103.8	93.6	73.2	82.2	70.6	78.2	83.7
1994	87.9	105.4	94.5	76.7	85.6	72.8	81.2	83.3
1995	88.4	104.7	94.6	79.3	88.0	75.7	83.8	84.4
1996	90.8	104.7	96.0	82.9	90.0	79.2	86.3	86.7
1997	92.2	104.6	96.6	87.2	93.7	83.3	90.2	88.2
1998	94.7	103.0	97.7	91.5	96.0	88.8	93.7	91.9
1999	97.3	102.1	98.8	96.3	99.0	94.3	97.5	95.3
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	102.6	96.3	100.0	100.5	98.8	104.4	100.5	106.6
2002	107.2	95.4	102.0	102.4	97.3	107.3	100.3	112.4

See footnotes following table 4. Source: Bureau of Labor Statistics

Table 3. Private business sector: Productivity and related measures, 1949-2002

Percent Change

Year	Productivity			Output[3]	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity[2]		Labor Input[4]	Capital Services[5]	Combined units of labor and capital[6]	
1949	3.5	-2.9	1.2	-0.2	-3.3	2.8	-1.4	6.5
1950	8.8	6.3	7.4	10.1	2.0	3.6	2.5	2.3
1955	4.6	5.0	4.6	8.5	3.9	3.4	3.7	-0.3
1960	1.9	-0.9	0.6	1.9	0.5	2.8	1.2	2.8
1965	3.6	2.3	3.3	7.1	3.2	4.6	3.7	1.2
1966	4.1	1.1	3.1	6.8	2.6	5.6	3.6	2.9
1967	2.3	-3.7	0.2	1.9	-0.2	5.8	1.7	6.2
1968	3.2	0.8	2.5	5.1	1.6	4.2	2.4	2.4
1969	0.5	-1.6	-0.4	3.1	2.9	4.7	3.5	2.1
1970	2.2	-4.3	-0.2	0.0	-1.7	4.5	0.1	6.8
1971	4.4	-0.2	3.2	3.9	-0.8	4.1	0.7	4.6
1972	3.1	2.5	2.9	6.5	3.4	3.9	3.6	0.6
1973	3.2	1.4	2.8	7.1	3.5	5.6	4.2	1.9
1974	-1.5	-6.3	-3.4	-1.5	0.7	5.2	2.0	5.2
1975	3.6	-4.3	1.0	-1.0	-4.4	3.4	-2.0	8.2
1976	3.4	3.5	3.6	6.7	2.9	3.0	2.9	-0.1
1977	1.6	1.9	1.7	5.6	4.0	3.7	3.9	-0.3
1978	1.2	1.9	1.3	6.3	5.2	4.3	4.9	-0.8
1979	0.0	-1.8	-0.4	3.4	3.0	5.3	3.7	1.9
1980	-0.2	-6.0	-2.3	-1.2	-0.6	5.2	1.1	6.2
1981	2.1	-2.1	0.3	2.8	1.5	5.1	2.6	4.3
1982	-0.6	-6.8	-3.3	-2.9	-1.4	4.2	0.4	6.7
1983	3.6	2.4	2.9	5.4	2.2	2.9	2.4	1.2
1984	2.8	3.6	3.0	8.8	6.0	5.0	5.7	-0.8
1985	2.3	-0.3	1.3	4.7	2.6	5.0	3.3	2.6
1986	3.1	-0.5	1.6	3.8	1.2	4.3	2.2	3.6
1987	0.6	0.0	0.2	3.6	3.2	3.6	3.3	0.6
1988	1.6	1.0	0.9	4.4	3.6	3.3	3.5	0.5
1989	0.9	0.4	0.5	3.7	3.1	3.2	3.2	0.5
1990	2.1	-1.3	0.6	1.5	0.0	2.9	0.9	3.4
1991	1.7	-2.8	-0.6	-0.7	-1.2	2.2	-0.2	4.6
1992	4.2	2.0	2.6	4.1	1.1	2.0	1.4	2.1
1993	0.4	0.9	0.4	3.2	3.0	2.3	2.8	-0.5
1994	1.1	1.9	1.0	5.0	4.4	3.1	4.0	-0.7
1995	0.2	-0.9	-0.2	3.0	2.8	3.9	3.2	1.1
1996	2.9	0.3	1.7	4.7	2.1	4.4	2.9	2.7
1997	1.8	0.2	0.9	5.3	4.0	5.1	4.4	1.6
1998	2.7	-1.4	1.1	4.9	2.4	6.4	3.7	4.2
1999	2.9	-0.8	1.3	5.2	2.9	6.0	3.9	3.7
2000	2.9	-1.8	1.4	3.9	1.0	5.8	2.5	4.8
2001	2.7	-3.7	0.1	0.4	-1.4	4.2	0.4	6.6
2002	4.5	-0.8	1.9	1.9	-1.3	2.7	0.0	5.3

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 4. Private nonfarm business sector: Productivity and related measures, 1949-2002

Percent Change

Year	Productivity			Output[3]	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity[2]		Labor Input[4]	Capital Services[5]	Combined units of labor and capital[6]	
1949	4.5	-2.9	1.9	0.0	-4.2	2.9	-2.0	7.6
1950	6.7	5.7	6.1	10.0	3.6	4.1	3.7	0.9
1955	4.7	5.0	4.6	8.9	4.2	3.7	4.1	-0.3
1960	1.3	-1.4	0.5	1.7	0.4	3.1	1.2	2.7
1965	3.1	2.0	2.8	7.1	3.7	5.0	4.1	1.1
1966	3.5	1.0	2.8	7.1	3.3	6.1	4.2	2.4
1967	1.8	-4.0	0.0	1.7	-0.2	5.9	1.7	6.1
1968	3.1	0.7	2.6	5.3	1.8	4.6	2.7	2.5
1969	0.2	-2.0	-0.8	3.0	3.3	5.2	3.9	2.2
1970	1.6	-4.8	-0.6	-0.1	-1.3	4.9	0.5	6.7
1971	4.2	-0.3	3.1	3.8	-0.7	4.2	0.7	4.6
1972	3.2	2.2	2.9	6.8	3.4	4.5	3.7	0.9
1973	3.2	1.6	2.9	7.4	3.9	5.7	4.4	1.6
1974	-1.4	-6.6	-3.4	-1.4	0.6	5.5	2.0	5.5
1975	2.8	-5.4	0.3	-1.7	-4.4	3.9	-2.0	8.6
1976	3.5	3.8	3.8	7.1	3.1	3.2	3.1	-0.2
1977	1.5	1.7	1.5	5.7	4.2	3.9	4.1	-0.2
1978	1.3	1.9	1.5	6.6	5.2	4.6	5.0	-0.5
1979	-0.3	-2.2	-0.7	3.2	3.2	5.5	3.9	1.9
1980	-0.2	-6.2	-2.3	-1.1	-0.5	5.5	1.2	6.4
1981	1.4	-3.1	-0.5	2.2	1.5	5.4	2.6	4.7
1982	-0.9	-7.4	-3.6	-3.1	-1.3	4.6	0.5	7.0
1983	4.6	2.7	3.7	6.6	2.3	3.8	2.7	1.8
1984	2.1	3.2	2.4	8.3	6.2	5.0	5.8	-1.0
1985	1.6	-1.0	0.6	4.3	2.9	5.4	3.7	2.7
1986	3.1	-0.8	1.5	3.9	1.3	4.8	2.4	4.0
1987	0.5	-0.5	0.0	3.6	3.3	4.1	3.6	1.0
1988	1.7	1.0	0.9	4.6	3.7	3.6	3.7	0.7
1989	0.7	0.1	0.2	3.5	3.2	3.4	3.3	0.6
1990	2.0	-1.6	0.5	1.5	0.0	3.1	1.0	3.6
1991	1.8	-3.0	-0.5	-0.8	-1.4	2.3	-0.3	5.0
1992	4.0	1.7	2.4	3.9	1.2	2.1	1.5	2.2
1993	0.5	0.9	0.4	3.5	3.3	2.5	3.0	-0.5
1994	1.1	1.6	0.9	4.8	4.1	3.2	3.8	-0.4
1995	0.6	-0.7	0.1	3.3	2.8	4.0	3.2	1.3
1996	2.7	0.0	1.5	4.5	2.2	4.5	3.0	2.7
1997	1.6	-0.1	0.7	5.2	4.1	5.3	4.5	1.7
1998	2.7	-1.5	1.1	5.0	2.5	6.6	3.8	4.2
1999	2.8	-0.9	1.1	5.2	3.1	6.2	4.1	3.7
2000	2.8	-2.1	1.2	3.8	1.1	6.0	2.6	4.9
2001	2.6	-3.7	0.0	0.5	-1.2	4.4	0.5	6.6
2002	4.5	-0.9	2.0	1.8	-1.5	2.8	-0.1	5.5

See footnotes following table 4.

Source: Bureau of Labor Statistics

Footnotes, Tables 1-4

Source: Output data are from the Bureau of Economic Analysis (BEA), U.S. Department of Commerce, and are modified by the Bureau of Labor Statistics (BLS), U.S. Department of Labor. Compensation and hours data are from BLS. Capital measures are based on data supplied by BEA and the U.S. Department of Agriculture. Also see Summary of Methods in this release.

(1) The private business sector includes all of gross domestic product except the output of general government, government enterprises, non-profit institutions, the rental value of owner-occupied real estate, and the output of paid employees of private households. The private nonfarm business sector also excludes farms but includes agricultural services.

(2) Output per unit of combined labor and capital inputs.

(3) Gross domestic product originating in the sector, superlative chained index.

(4) Index of hours at work of all persons including employees, proprietors, and unpaid family workers, classified by education, work experience, and gender. This superlative chain index is computed by combining changes in the hours of each education, experience, and gender group weighted by each group’s share of labor compensation.

(5) A measure of the flow of capital services used in the sector.

(6) Labor input combined with capital input, using labor's and capital's shares of costs as weights to form a superlative chained index.

Table 5. Real capital services by asset type, private business, 1948-2002

Average annual growth rates (percent)

	1948-2002	1948-1973	1973-1990	1990-95	1995-00	2000-02	2001-02
All Assets	3.9	3.7	4.1	2.7	5.5	3.5	2.7
Equipment	6.0	5.4	6.3	4.4	9.5	6.2	4.9
All Information Processing Equipment & Software (IPES)	11.8	8.9	15.1	9.4	18.1	12.1	10.0
Computers & related equipment	25.6	14.4	41.9	16.6	42.6	24.8	21.3
Software	17.9	19.9	17.0	14.8	17.3	8.9	6.1
Communication equipment	8.5	9.1	8.1	4.9	9.8	10.1	8.4
Other IPES	6.4	6.8	8.1	3.2	3.9	3.3	3.5
All other equipment	3.7	4.8	2.9	1.2	4.0	1.8	0.8
Structures	3.0	3.2	3.5	1.8	2.1	1.7	1.5
Residential rental capital	2.2	2.8	2.1	0.9	1.5	1.4	1.3
Inventories	3.4	4.2	2.6	2.6	4.8	-1.7	-3.5
Land	1.6	1.8	1.7	0.3	1.2	0.9	1.1

Source: Bureau of Labor Statistics

Note: For a brief discussion of methods used in preparing these data, see Summary of Methods in this release.

Table 6. Real capital services by asset type, private nonfarm business, 1948-2002

Average annual growth rates (percent)

	1948-2002	1948-1973	1973-90	1990-95	1995-00	2000-02	2001-02
All Assets	4.2	4.0	4.4	2.8	5.7	3.6	2.8
Equipment	6.1	5.5	6.6	4.6	9.7	6.2	4.9
All Information Processing Equipment & Software (IPES)	11.8	8.9	15.1	9.4	18.1	12.1	10.0
Computers & related equipment	25.6	14.4	41.9	16.5	42.6	24.8	21.3
Software	17.9	19.9	17.0	14.8	17.3	8.9	6.1
Communication equipment	8.5	9.1	8.1	4.9	9.8	10.1	8.4
Other IPES	6.4	6.8	8.1	3.2	3.9	3.3	3.5
All other equipment	3.8	4.9	3.1	1.4	4.1	1.8	0.8
Structures	3.1	3.3	3.5	1.9	2.2	1.7	1.5
Residential rental capital	2.2	2.8	2.1	0.9	1.5	1.4	1.3
Inventories	3.6	4.5	2.8	2.6	4.9	-1.7	-3.6
Land	2.4	2.8	2.7	0.4	1.4	1.1	1.4

Source: Bureau of Labor Statistics

Note: For a brief discussion of methods used in preparing these data, see Summary of Methods in this release.