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MULTIFACTOR PRODUCTIVITY TRENDS, 2007

Private Business and Private Nonfarm Business

Multifactor productivity, defined as output per combined units of labor and capital inputs, grew at an annual rate of 0.4 percent in the private business sector and 0.2 percent in the private nonfarm business sector for 2007, the Bureau of Labor Statistics (BLS) and the U.S. Department of Labor reported today.

	2006-07
Private business sector	0.4
Private nonfarm business sector	0.2

Growth in multifactor productivity in the private business sector for 2007 was the slowest annual rate of growth since 2001 and for the private nonfarm business sector was the slowest since 1995. The 2006-07 annual changes are summarized in table A, and further detail and historical measures are shown in tables 1 through 6.

Multifactor productivity is designed to measure the joint influences of technological change, efficiency improvements, returns to scale, reallocation of resources, and other factors on economic growth while allowing for the effects of capital and labor. Multifactor productivity, therefore, differs from the 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. Additionally, multifactor productivity measures for the private business and private nonfarm business sectors account for shifts in the composition of labor. Estimates of labor composition are not included in the quarterly labor productivity measures.

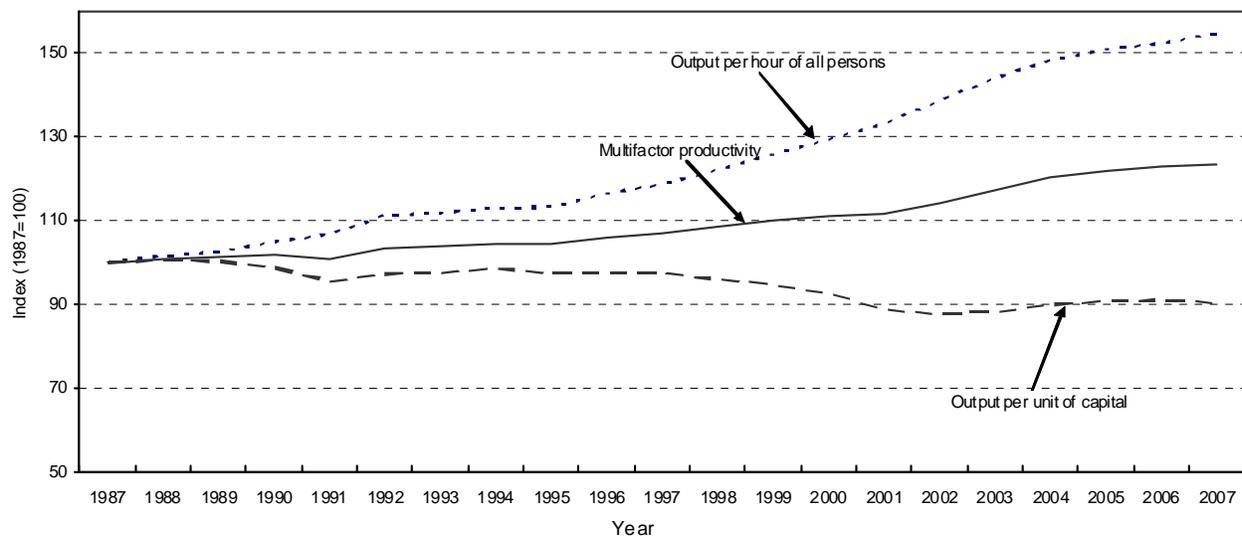
In private business and private nonfarm business, the change in multifactor productivity reflects the difference between the change in real gross domestic product for the sector and the change in labor and capital inputs engaged in the production of this output. The output measures for private business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

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.

Private business sector

Chart 1 shows the annual indexes of multifactor productivity, output per hour worked, and output per unit of capital services during the 1987-2007 period for the private business sector. Over the last 20 years, capital services have grown more rapidly than hours in private business, and the skills of workers -- as measured by their age and education, which implicitly measure their work experience -- also have risen over this period. These shifts toward more capital intensive production and toward workers with more human capital have supplemented labor productivity growth, usually allowing output per hour to grow at a faster rate than multifactor productivity.

Chart 1. Output per hour of all persons, output per unit of capital, and multifactor productivity in the private business sector, 1987- 2007



Multifactor productivity rose 0.4 percent in 2007 (see table A). The multifactor productivity gain in 2007 reflected a 2.1-percent increase in output and a 1.7-percent increase in the combined inputs of capital and labor (see table 3).

Continuing the relatively slow growth of the last six years, capital services grew by 2.7 percent. Labor input rose 1.1 percent, less than half of the growth of the previous year, 2.4 percent. Hours rose 0.5 percent, a sharp drop from 2.1 percent of the previous year. The capital-labor ratio (capital services per hour of all persons) increased by 2.3 percent, the highest rate of growth since 2003.

Equipment capital services grew 4.6 percent in 2007, much more rapidly than other broad categories of capital assets (see table 5). Within equipment, services of computers and related equipment grew 17.3 percent, software 6.1 percent, communication equipment 5.6 percent, other information processing equipment and software (IPES) 4.4 percent, and all other equipment 2.4 percent. The rates of increase in information processing and software continue to be markedly lower than the huge increases observed in the 1995-2000 period. The lone exception is other information processing equipment and software, which includes office and accounting machinery, medical equipment, and photocopying, electromedical and nonmedical instruments.

Services of structures grew 1.3 percent in 2007, the highest growth rate since they grew 1.4 percent in 2002. Inventories grew at an annual rate of 0.8 percent in 2007, down from 2.7 percent in 2006.

Table A. Productivity and related data, percent changes 2006-07

	Private Business ¹	Private Nonfarm Business ¹
<u>Productivity</u>		
Multifactor productivity ²	0.4	0.2
Output per hour of all persons	1.6	1.4
Output per unit of capital services	-0.7	-0.9
<u>Output</u>	2.1	2.0
<u>Inputs</u>		
Labor input ³	1.1	1.2
Hours	0.5	0.5
Labor composition ⁴	0.7	0.7
Capital services	2.7	2.9
Combined units of labor and capital inputs ⁵	1.7	1.8
<u>Analytic ratio:</u>		
Capital services per hour of all persons	2.3	2.4

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 input reflects the change in hours at work adjusted for the effects of changing labor composition. As mentioned previously, labor input rose 1.1 percent. This increase in labor input was due to an increase in hours at work of 0.5 percent and a contribution from labor composition of 0.7 percent (see table A). Changes in labor composition, as measured by shifts in the age and educational attainment of the workforce, showed the largest rate of growth since 1992. See "Changes in the Composition of Labor for BLS Multifactor Productivity Measures, 2007", available at <http://www.bls.gov/mfp/mprlabor.pdf>.

Labor productivity (output per hour worked) increased 1.6 percent in 2007, speeding up after four consecutive years in which the growth rate of labor productivity decelerated. Capital productivity (output per unit of capital services) decreased at a rate of -0.7 percent, the first decline since 2002.

Private nonfarm business sector

Multifactor productivity in the private nonfarm business sector rose 0.2 percent in 2007 (see table A), the slowest rate of growth since 1995. Output increased 2.0 percent and the combined inputs of capital and labor increased 1.8 percent.

Labor input in 2007 grew less than half of the previous year, 1.2 percent, compared to 2.6 percent recorded in 2006. Capital services grew 2.9 percent, the same as in 2006. Within capital services, equipment was the fastest growing component (see table 6). The increase in equipment in 2007 was largely due to capital services of information processing equipment and software, which rose by 7.4 percent. As in previous years, the fastest growth in equipment was in computers and related equipment, which grew 17.3 percent.

Labor productivity grew at a 1.4-percent annual rate and capital productivity fell at a 0.9-percent annual rate. Capital services per hour increased at the rate of 2.4 percent.

Historical trends in the private business and private nonfarm business sectors

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 nor do they account for 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 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 composition of the workforce. Therefore, multifactor productivity accounts for changes in labor composition as well. Historical trends in 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.

The relationship between labor productivity growth and these three components can be seen in table B and chart 2. Chart 2 clearly shows the major changes in the relative contributions of multifactor productivity and of capital intensity in the latter half of the 1990s. These contributions have continued to be relatively high for the 2000-2007 period.

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.

The description that follows focuses exclusively on the private business sector. Trends in the private nonfarm business sector were similar to those in the private business sector in each period.

Over the 1987-2007 period, output per hour worked grew at an annual rate of 2.2 percent in private business (see table B). Of the 2.2 percent growth rate in labor productivity, 1.0 percent can be attributed to increases in multifactor productivity, 0.8 percent to the contribution of capital intensity, and 0.3 percent to changes in labor composition. Output per hour worked accelerated from a 1.5 percent annual growth rate in the 1990-95 period to 2.7 percent in the 1995-2000 period. For the 2000-07 period, output per hour grew at nearly the same rate as the previous period, 2.6 percent.

Over the 1987-90 and 1990-95 periods, all productivity measures showed similar rates of growth. Multifactor productivity increased at an average annual rate of 0.6 percent in the 1987-90 period while rising 0.5 percent in the 1990-95 period. Labor productivity grew at an average annual rate of 1.6 percent during the 1987-90 period while rising 1.5 percent in the 1990-1995 period. In both periods, increasing capital intensity contributed 0.6 percent to output per hour worked. Information processing equipment contributed 0.5 percent in the 1987-90 period and 0.4 percent in the 1990-95 period. The contribution of labor composition rose at an average annual rate of 0.4 percent in the 1987-90 period and 0.5 percent in the 1990-95 period.

In the latter half of the 1990s, productivity growth accelerated. Multifactor productivity growth increased 1.3 percent and output per hour growth increased 2.7 percent, a sharp increase from the previous period. The contribution of capital intensity doubled from the 1990-95 period, rising an average of 1.2 percent per year from 1995 to 2000. The contribution of information processing equipment rose to 0.9 percent, while the contribution of other capital services grew 0.2 percent. The contribution of labor composition dropped 0.3 percentage points from the previous period to 0.2 percent.

In the 2000-07 period, multifactor productivity growth increased to 1.5 percent, an additional 0.2 percentage points from the 1995-2000 period. Labor productivity rose an average of 2.6 percent per year. The contribution of capital intensity dropped 0.3 percentage points from the previous period to 0.9 percent. The contribution of information processing equipment dropped to 0.5 percent from 0.9 percent in the 1995-2000 period. At the same time, the contribution of other capital services rose to 0.3 percent. The contribution of labor composition growth increased at the same rate as the previous period, 0.2 percent.

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, selected periods, 1987-2007

(Percent per year)

	1987-07	1987-90	1990-95	1995-00	2000-07	2006-07
<u>Private business</u> ¹						
Output per hour of all persons	2.2	1.6	1.5	2.7	2.6	1.6
Contribution of capital intensity ²	0.8	0.6	0.6	1.2	0.9	0.7
Contribution of information processing equipment and software ³	0.6	0.5	0.4	0.9	0.5	0.5
Contribution of all other capital services	0.2	0.2	0.1	0.2	0.3	0.3
Contribution of labor composition ⁴	0.3	0.4	0.5	0.2	0.2	0.5
Multifactor productivity ⁵	1.0	0.6	0.5	1.3	1.5	0.4
<u>Private nonfarm business</u> ¹						
Output per hour of all persons	2.1	1.5	1.6	2.5	2.5	1.4
Contribution of capital intensity ²	0.8	0.6	0.6	1.2	0.9	0.8
Contribution of information processing equipment and software ³	0.6	0.5	0.5	0.9	0.5	0.5
Contribution of all other capital services	0.2	0.1	0.1	0.2	0.3	0.3
Contribution of labor composition ⁴	0.3	0.4	0.5	0.2	0.2	0.5
Multifactor productivity ⁵	1.0	0.5	0.5	1.1	1.4	0.2
Contribution of R&D to multifactor productivity	0.2	0.2	0.2	0.2	0.2	0.2

¹ Excludes government enterprises.

² Growth rate in capital services per hour multiplied by capital's share of current dollar costs.

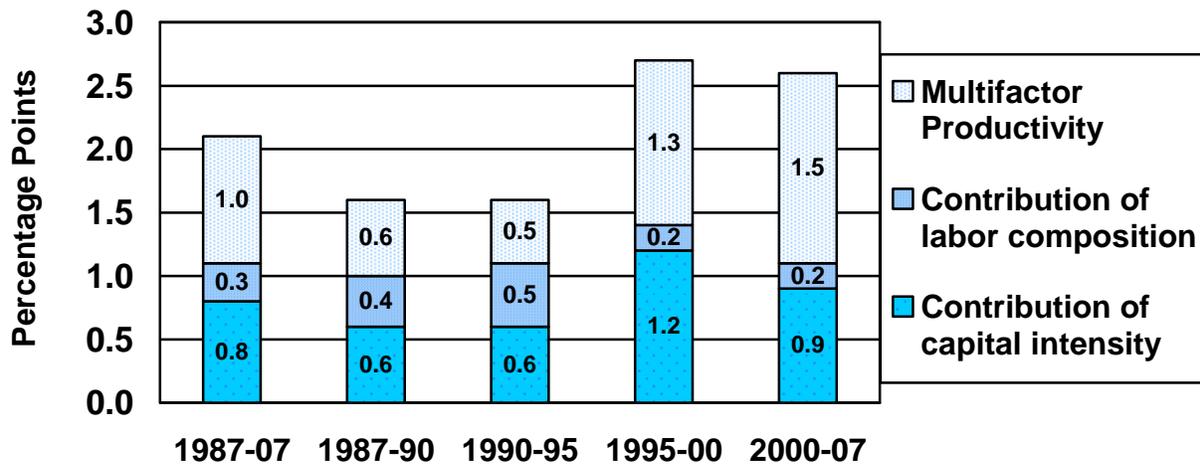
³ Growth rate of information processing equipment and software per hour multiplied by its share of total costs.

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.

**Chart 2. Contributors to growth in output per hour
in the private business sector, selected periods,
1987-2007**



Note: Multifactor productivity plus contribution of capital intensity and labor composition may not sum to output per hour due to independent rounding.

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

While multifactor productivity reflects many influences, technological change is one of the primary contributors. For the private nonfarm business sector, 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 1987-2007 period, or around 20 percent of total multifactor productivity growth (see table B). The contribution of research and development did not vary measurably over time, contributing 0.2 percent per year during each time period. Tables of contributions of research and development to multifactor productivity in the private nonfarm business sector can be found at <http://www.bls.gov/mfp/rhtable.pdf>.

Table C. Annual rates of growth of the previous and revised multifactor productivity measures in the private business sector for the 1988-2007 period

(Percent per year)

Year	Multifactor Productivity	
	Previous	Revised
1988	0.7	0.8
1989	0.3	0.2
1990	0.6	0.6
1991	-0.7	-0.8
1992	2.6	2.6
1993	0.2	0.1
1994	0.8	0.8
1995	-0.3	-0.2
1996	1.7	1.7
1997	0.9	0.9
1998	1.3	1.3
1999	1.3	1.4
2000	1.3	1.2
2001	0.1	0.4
2002	1.7	2.1
2003	2.6	2.8
2004	2.5	2.7
2005	1.6	1.3
2006	0.5	0.6
2007	0.7	0.4

Revised Measures

Previous and revised multifactor productivity data for 1988-2007 for the private business and private nonfarm business sectors are displayed in table C. The differences in 2007 are largely due to the fact that previous results were based on preliminary information. The 0.4-percent change in multifactor productivity growth for the private business sector was somewhat lower than the 0.7-percent change reported on May 6, 2008, based on preliminary information. This was due to a downward revision of output to 2.1 from 2.3 percent and a slight upward revision of combined inputs to 1.7 from 1.6 percent.

Revisions to earlier years were due to updated and revised data sources, improved measures of rates of return on capital stock, and, to a larger extent, improved methodology in labor composition, described in “Changes in the Composition of Labor for BLS Multifactor Productivity Measures, 2007”, available at <http://www.bls.gov/mfp/mprlabor.pdf>.

Notes

Private business and private nonfarm business output series through 2007 reflect the annual revisions to the National Income and Product Accounts (NIPA), announced by the Bureau of Economic Analysis (BEA) in August 2008.

Multifactor productivity measures for the private business and private nonfarm business sectors are developed from data based on the 1997 North American Industry Classification System (NAICS). These measures are not comparable with the measures for the private business and private nonfarm business sectors previously developed using data on a 1987 Standard Industrial Classification (SIC) basis. This is because major sector multifactor productivity measures are aggregated from industry detail data that are largely unavailable on a NAICS basis before 1987. In addition, the hours of employees, proprietors and unpaid family workers, which are collected on a 2007 NAICS basis, are converted to a 1997 NAICS basis for this report.

BLS prepared multifactor productivity measures from three-digit NAICS detail. Most critical data were not reported on a NAICS basis for years prior to 1998. Detailed GDP by industry data are available from 1998 forward, but for 1987-97, many of the income components needed to construct capital rental prices were obtained by applying 1997 SIC-to-NAICS conversion factors to SIC data and adjusting to the resulting NAICS totals. A similar procedure was applied to manufacturing inventories. Detailed nonmanufacturing inventories were constructed using total inventory for the private business sector and nonmanufacturing industry shares of total inventory derived from the IRS book value of inventories reported for NAICS industries. Land data were only available from 1998 to 2005 on a NAICS basis. As a consequence, land estimates from 1987 to 1997 were calculated using a combination of SIC to NAICS conversion factors and more detailed IRS data. Data for 2006 and 2007 were extrapolated using detailed IRS data for 2005.

The Bureau of Labor Statistics uses Current Population Survey (CPS) data to measure the hours of nonfarm proprietors, unpaid family workers, and all persons working in the farm sector. The CPS features measures of employment that count each person only once and classify each person according to his or her primary job. However, the CPS also collects more detailed information on employment and hours worked at primary jobs and all other jobs, separately. The BLS productivity measures use the more detailed information on employment and hours to assign all hours worked to the correct industrial sector.

Labor composition measures have been updated through 2007. A new, simplified procedure to calculate labor composition is being implemented this year to replace the previous methodology. BLS has removed the experience coefficient from its labor composition estimates and uses actual wage averages rather than imputed wage averages in its estimates. A brief description, "Changes in the Composition of Labor for BLS Multifactor Productivity Measures, 2007", is available at <http://www.bls.gov/mfp/mprlabor.pdf>.

Comprehensive tables containing additional data not included in this news release are available at <http://www.bls.gov/mfp/mprdownload.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.", and on the BLS Multifactor Productivity website under the title "Technical Information About the BLS Multifactor Productivity Measures" for Major Sectors and 18 NAICS 3-digit Manufacturing Industries at <http://www.bls.gov/mfp/mprtech.pdf>. General information is available on the BLS Multifactor Productivity website at <http://www.bls.gov/mfp/mprover.htm>. Additional data not contained in the release can be obtained in print or at <http://www.bls.gov/mfp>. A number of comprehensive tables set up as zip files can be obtained at <http://www.bls.gov/mfp/mprdownload.htm>. Included in the additional data available in the home page is a zip file containing selected multifactor productivity data that links 1948-87 SIC data to NAICS data from 1987 forward. This file includes data for the private business and private nonfarm business sectors.

Capital Input: 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, terminals, tape drives, storage devices, and integrated systems. Software is comprised of pre-packaged, custom, and own-account software. Communications equipment is not further differentiated. Other IPES includes medical equipment and related instruments, electromedical instruments, nonmedical instruments, photocopying and related equipment, and office and accounting machinery. 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 60 NAICS industry groupings 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. Current-dollar capital costs can be defined as each asset's rental price multiplied by its constant-dollar stock, adjusting for capital composition effects. Data on investments in physical assets are obtained from BEA. Data on inventories are obtained from BEA using additional information from IRS Corporation Income Returns. Estimates for land in the farm sector are obtained from USDA. Nonfarm industry detail is based on IRS book value data. Current-dollar gross product originating (GPO) data, obtained from BEA, are used in estimating capital rental prices.

Labor Input: Labor input in private business and private nonfarm business is obtained by chained superlative (Tornqvist) aggregation of the hours at work by all persons, classified by age, education, and gender with weights determined by their shares of labor compensation. Hours paid of employees are largely obtained from the Current Employment Statistics program (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 (NCS) and the Hours at Work Survey. Hours at work for nonproduction and supervisory workers are derived using data from the CPS, the CES, and the NCS. The hours at work of proprietors, unpaid family workers, and farm employees are derived from the Current Population Survey. Hours at work data reflect Productivity and Costs data as of the March 5, 2009 news release. Therefore it reflects the benchmark revisions to the CES and other revisions to hours released on February 6, 2009. 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."

Combined Inputs: Labor and capital input are combined using 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 taxes on production and imports. Most taxes on production and imports, 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.

Output: This release presents data for the private business and private nonfarm business sectors. The private business sector, which accounted for approximately 77 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 include them.

Multifactor Productivity: 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 1987 to 2007, BEA supplies the output indexes. BLS adjusts these to remove the output of government enterprises.

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 1987-2007 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." BLS measures of year-to-year contributions of research and development to the private nonfarm business sector and measures of the stock of research and development are available at <http://www.bls.gov/mfp/rddtable.pdf> .

Table 1. Private business sector: Indexes of productivity and related measures, 1987-2007¹

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	
1987	77.3	108.1	89.9	62.4	75.5	57.8	69.5	71.5
1988	78.5	108.7	90.6	65.2	78.1	60.0	71.9	72.2
1989	79.3	108.5	90.8	67.6	80.6	62.3	74.4	73.1
1990	81.0	106.8	91.4	68.6	80.5	64.3	75.1	75.9
1991	82.4	103.2	90.7	68.1	79.7	66.0	75.1	79.9
1992	86.0	105.0	93.1	70.9	80.5	67.5	76.2	81.8
1993	86.4	105.2	93.2	73.2	83.0	69.6	78.6	82.1
1994	87.2	106.6	93.9	76.8	86.7	72.1	81.9	81.8
1995	87.4	105.3	93.7	79.2	89.0	75.2	84.5	83.1
1996	90.0	105.3	95.3	82.8	90.8	78.7	86.9	85.5
1997	91.7	105.3	96.2	87.2	94.4	82.9	90.7	87.1
1998	94.3	103.8	97.4	91.5	96.5	88.2	93.9	90.9
1999	97.2	102.3	98.8	96.2	98.8	94.1	97.4	95.0
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	102.8	96.0	100.4	100.5	98.2	104.6	100.0	107.0
2002	107.1	94.7	102.5	102.0	96.2	107.7	99.5	113.1
2003	111.2	95.5	105.4	105.2	95.8	110.2	99.9	116.5
2004	114.5	97.2	108.2	109.7	96.9	112.9	101.4	117.8
2005	116.6	98.1	109.7	113.6	98.8	115.8	103.6	118.9
2006	117.6	98.4	110.3	117.1	101.2	119.1	106.2	119.6
2007	119.5	97.7	110.7	119.5	102.3	122.3	108.0	122.3

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 2. Private nonfarm business sector: Indexes of productivity and related measures, 1987-2007¹

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	
1987	78.0	110.1	90.7	62.4	74.9	56.7	68.8	70.8
1988	79.3	111.0	91.7	65.3	77.5	58.8	71.3	71.4
1989	79.9	110.6	91.7	67.6	80.1	61.2	73.8	72.3
1990	81.4	108.6	92.0	68.6	80.2	63.2	74.6	75.0
1991	82.9	104.7	91.3	68.1	79.2	65.0	74.6	79.1
1992	86.3	106.2	93.5	70.8	80.1	66.6	75.7	81.2
1993	86.7	106.5	93.7	73.2	82.7	68.7	78.2	81.4
1994	87.7	107.7	94.4	76.7	86.1	71.3	81.3	81.5
1995	88.2	106.5	94.5	79.3	88.4	74.5	83.9	82.8
1996	90.5	106.1	95.8	82.8	90.4	78.1	86.5	85.3
1997	92.0	105.8	96.5	87.2	94.0	82.4	90.4	86.9
1998	94.5	104.2	97.7	91.5	96.3	87.8	93.7	90.7
1999	97.3	102.6	99.0	96.3	98.8	93.9	97.3	94.8
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	102.7	96.0	100.4	100.5	98.4	104.7	100.2	107.0
2002	107.1	94.5	102.5	102.1	96.4	107.9	99.6	113.2
2003	111.1	95.2	105.2	105.2	96.0	110.5	100.0	116.7
2004	114.2	96.9	108.0	109.6	97.1	113.1	101.5	117.8
2005	116.1	97.7	109.3	113.5	99.1	116.1	103.8	118.9
2006	117.2	97.9	109.9	117.1	101.6	119.6	106.6	119.7
2007	118.9	97.0	110.1	119.4	102.8	123.1	108.4	122.6

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 3. Private business sector: Compound average annual rates of growth in productivity and related measures, 1988-2007¹

Percent per year

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	
1988	1.6	0.5	0.8	4.4	3.4	3.9	3.5	1.1
1989	1.0	-0.2	0.2	3.7	3.2	3.9	3.4	1.2
1990	2.2	-1.6	0.6	1.5	-0.1	3.2	0.9	3.8
1991	1.7	-3.3	-0.8	-0.7	-1.0	2.7	0.1	5.2
1992	4.3	1.8	2.6	4.1	1.0	2.3	1.4	2.5
1993	0.5	0.2	0.1	3.2	3.1	3.1	3.1	0.3
1994	1.0	1.3	0.8	5.0	4.5	3.6	4.2	-0.4
1995	0.2	-1.3	-0.2	3.0	2.7	4.3	3.2	1.5
1996	2.9	0.0	1.7	4.6	2.0	4.6	2.8	2.9
1997	1.9	0.0	0.9	5.3	3.9	5.3	4.4	1.9
1998	2.8	-1.4	1.3	4.9	2.3	6.4	3.6	4.3
1999	3.1	-1.4	1.4	5.2	2.4	6.7	3.7	4.5
2000	2.9	-2.2	1.2	3.9	1.2	6.3	2.7	5.3
2001	2.8	-4.0	0.4	0.5	-1.8	4.6	0.0	7.0
2002	4.2	-1.4	2.1	1.5	-2.0	2.9	-0.5	5.6
2003	3.9	0.8	2.8	3.1	-0.5	2.3	0.4	3.1
2004	3.0	1.8	2.7	4.2	1.1	2.4	1.5	1.1
2005	1.8	0.9	1.3	3.6	2.0	2.6	2.2	0.9
2006	0.9	0.3	0.6	3.1	2.4	2.8	2.5	0.6
2007	1.6	-0.7	0.4	2.1	1.1	2.7	1.7	2.3

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 4. Private nonfarm business sector: Compound average annual rates of growth in productivity and related measures, 1988-2007¹

Percent per year

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	
1988	1.7	0.9	1.1	4.6	3.5	3.8	3.6	0.9
1989	0.7	-0.4	0.0	3.5	3.3	3.9	3.5	1.2
1990	1.9	-1.8	0.4	1.5	0.1	3.4	1.1	3.8
1991	1.8	-3.5	-0.8	-0.8	-1.1	2.9	0.0	5.5
1992	4.1	1.4	2.4	3.9	1.0	2.5	1.5	2.6
1993	0.5	0.3	0.2	3.5	3.3	3.2	3.3	0.2
1994	1.1	1.1	0.8	4.8	4.1	3.7	4.0	0.1
1995	0.6	-1.1	0.1	3.3	2.7	4.5	3.2	1.7
1996	2.6	-0.3	1.4	4.5	2.2	4.8	3.0	3.0
1997	1.6	-0.3	0.7	5.2	4.0	5.5	4.5	1.9
1998	2.8	-1.5	1.3	5.0	2.4	6.6	3.7	4.4
1999	2.9	-1.6	1.3	5.2	2.6	6.9	3.9	4.5
2000	2.8	-2.5	1.1	3.8	1.2	6.5	2.7	5.5
2001	2.7	-4.0	0.4	0.5	-1.6	4.7	0.2	7.0
2002	4.2	-1.5	2.1	1.5	-2.0	3.1	-0.6	5.8
2003	3.7	0.7	2.6	3.1	-0.4	2.4	0.4	3.0
2004	2.8	1.9	2.6	4.2	1.2	2.3	1.5	1.0
2005	1.7	0.8	1.3	3.5	2.0	2.7	2.2	0.9
2006	0.9	0.2	0.5	3.2	2.6	2.9	2.7	0.7
2007	1.4	-0.9	0.2	2.0	1.2	2.9	1.8	2.4

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 age, education, and gender. This superlative chain index is computed by combining changes in the hours of each age, education, 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. Compound average annual rates of growth in real capital services by asset type, private business sector, 1987-2007

Percent per year

	1987 to 2007	1987 to 1990	1990 to 1995	1995 to 2000	2000 to 2007	2006 to 2007
All Assets	3.8	3.6	3.2	5.9	2.9	2.7
Equipment	5.9	4.7	4.8	9.6	4.7	4.6
All Information Processing Equipment & Software (IPES)	11.2	11.0	9.4	17.5	8.1	7.4
Computers & related equipment	22.7	19.1	16.1	41.3	16.8	17.3
Software	12.5	17.8	13.4	16.4	7.2	6.1
Communication equipment	7.2	6.2	5.4	10.6	6.4	5.6
Other IPES	3.4	3.0	3.5	3.2	3.5	4.4
All other equipment	2.4	1.2	1.9	4.4	1.9	2.4
Structures	1.8	2.7	1.9	2.1	1.2	1.3
Residential rental capital	1.5	2.1	1.2	1.7	1.4	0.9
Inventories	2.6	2.7	2.3	4.3	1.5	0.8
Land	1.6	3.2	1.3	1.6	1.1	0.5

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. Compound average annual rates of growth in real capital services by asset type, private nonfarm business sector, 1987-2007

Percent per year

	1987 to 2007	1987 to 1990	1990 to 1995	1995 to 2000	2000 to 2007	2006 to 2007
All Assets	4.0	3.7	3.3	6.1	3.0	2.9
Equipment	6.0	4.9	5.0	9.7	4.7	4.6
All Information Processing Equipment & Software (IPES)	11.2	11.0	9.4	17.5	8.1	7.4
Computers & related equipment	22.7	19.1	16.1	41.3	16.8	17.3
Software	12.5	17.8	13.4	16.4	7.2	6.1
Communication equipment	7.2	6.2	5.4	10.6	6.4	5.6
Other IPES	3.3	3.0	3.5	3.2	3.4	4.3
All other equipment	2.5	1.4	2.0	4.4	1.9	2.4
Structures	1.9	2.8	2.0	2.1	1.3	1.4
Residential rental capital	1.5	2.1	1.2	1.7	1.4	0.9
Inventories	2.7	3.1	2.3	4.5	1.6	0.9
Land	1.7	2.0	1.4	2.0	1.5	1.7

Source: Bureau of Labor Statistics

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