

# News

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## MULTIFACTOR PRODUCTIVITY TRENDS, 2005

### Private Business and Private Nonfarm Business

The Bureau of Labor Statistics (BLS) of the U.S. Department of Labor reported today multifactor productivity data – output per combined units of labor and capital inputs – for 2005. The annual rate of multifactor productivity change from 2004 to 2005 was:

	2004-05
Private business sector	1.7
Private nonfarm business sector	1.8

Multifactor productivity in the private business and private nonfarm business sectors show a lower rate of growth than in the previous two years. The 2004-5 annual changes are summarized in table A, and further detail and historical measures are shown in tables 1 through 6. The 1.7 percent change in multifactor productivity growth for the private business sector is just slightly lower than the preliminary 1.8 percent change reported on August 29, 2006 based on partial information.

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.

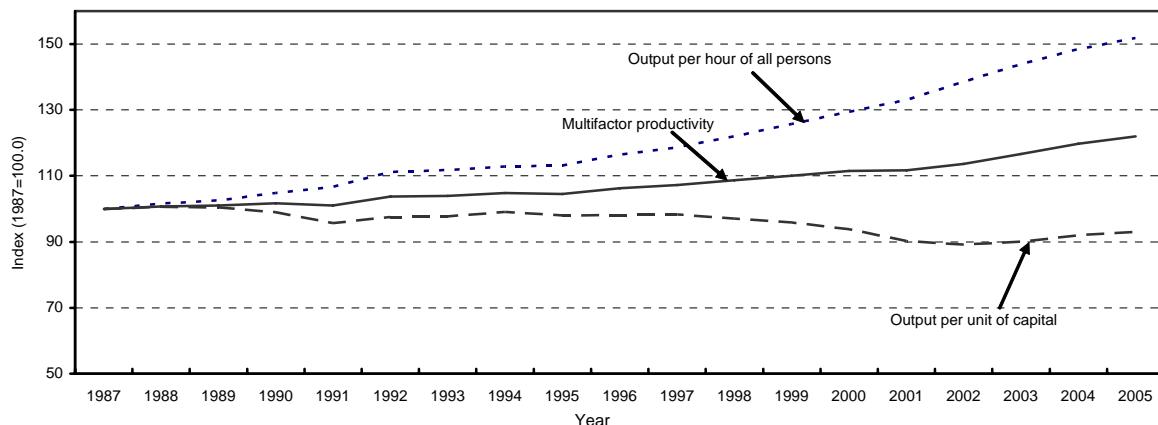
In private business and private nonfarm business, the change in multifactor productivity reflects the difference between the change in real gross domestic product for the sector and the change in labor and capital inputs engaged in the production of this output. The output measures for private business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

### 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 1987-2005 period for private business. Over the last 18 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 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 to 2005**



Multifactor productivity rose 1.7 percent in 2005, a slower rate of growth than in 2003 and 2004. The multifactor productivity gain in 2005 reflected a 3.8 percent increase in output and a 2.1 percent increase in the combined inputs of capital and labor (see table 3).

Continuing the relatively slow growth of the last four years, growth in capital services rose 2.6 percent. However, labor input rose 1.8 percent, slightly higher than the 1.5 percent increase of 2004. Hours rose 1.7 percent. The capital-labor ratio (capital services per hour of all persons) increased by 0.9 percent.

Equipment capital services grew 4.0 percent in 2005, much more rapidly than other broad categories of capital assets (see table 5). Within equipment, services of computers and related equipment grew 13.3 percent, software 6.2 percent, communication equipment 5.1 percent, other information processing equipment 3.7 percent, and all other equipment 2.0 percent. All rates of increase are markedly lower than in the 1995-2000 period except for other information processing equipment. Services of structures grew 0.9 percent in 2005, as compared to a compound average rate of 2.0 percent over the 1995-2000 period. Inventories grew at an annual rate of 2.8 percent in 2005, down from the 4.3 percent compound average annual rate of growth in the 1995-2000 period.

Table A. Productivity and related data, percent changes 2004-05

	Private Business <sup>1</sup>	Private Nonfarm Business <sup>1</sup>
<u>Productivity</u>		
Multifactor Productivity <sup>2</sup>	1.7	1.8
Output per hour of all persons	2.1	2.1
Output per unit of capital services	1.2	1.4
<u>Output</u>	3.8	3.9
<u>Inputs</u>		
Labor input <sup>3</sup>	1.8	1.8
Hours	1.7	1.7
Labor Composition <sup>4</sup>	0.1	0.1
Capital services	2.6	2.4
Combined units of labor and capital inputs <sup>5</sup>	2.1	2.0
<u>Analytic ratio:</u>		
Capital services per hour of all persons	0.9	0.7

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 1.8 percent. This modest increase in labor input was due to an increase in hours at work of 1.7 percent and a modest contribution from labor composition (see table A). Changes in labor composition, as measured by shifts in the educational attainment and work experience of the work force, rose only 0.1 percent (see "Changes in the Composition of Labor for the BLS Multifactor Productivity Measures, 2005", available at <http://www.bls.gov/web/mprlabor.pdf>).

Labor productivity (output per hour worked) increased 2.1 percent, the fourth consecutive year in which the growth rate of labor productivity decelerated. Capital productivity (output per unit of capital services) grew 1.2 percent, the third consecutive annual increase.

### **Private nonfarm business sector**

Multifactor productivity in the private nonfarm business sector rose 1.8 percent in 2005, lower than the 2.6 percent increase in 2004. Output increased 3.9 percent, and the combined inputs of capital and labor increased 2.0 percent.

Labor input and capital services grew slightly higher in 2005 than the previous year. Labor input grew 1.8 percent, compared to 1.6 percent in 2004. Capital services grew 2.4 percent, compared to 2.2 percent in 2004. Within capital services, equipment was the fastest growing component(see table 6). The increase in equipment in 2005 was largely due to capital services of information processing equipment and software rising by 6.7 percent. As in previous years, the fastest growth in equipment was in computers and related equipment, which grew 13.3 percent.

Labor productivity grew 2.1 percent and capital productivity rose 1.4 percent. Capital services per hour increased at the rate of 0.7 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 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. 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.

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.

Because trends in the private nonfarm business sector were similar to those in the private business sector in each period, the description that follows focuses exclusively on the private business sector.

Over the 1987-2005 period, output per hour worked grew at an annual rate of 2.3 percent in private business. Of the 2.3 percent growth rate in labor productivity, 1.1 percent can be attributed to increases in multifactor productivity, 0.9 percent to the contribution of capital intensity, and 0.4 percent to changes in labor composition. Since 1987, output per hour worked has accelerated, growing 1.5 percent in the 1990-95 period, 2.7 percent in the 1995-2000 period, and 3.2 percent in the 2000-2005 period.

In the period 1987-1990, all of the productivity measures (see table B) grew to varying degrees. Multifactor productivity increased at annual average rate of 0.6 percent. Labor productivity grew at annual average rate of 1.6 percent. The contribution of capital intensity averaged a growth rate of 0.6 percent, with information processing equipment exhibiting a growth rate of 0.4 percent and other capital services growing 0.2 percent. The contribution of labor composition increased 0.4 percent.

Over the 1990-1995 period, increases in the productivity measures were similar to those in the 1987-1990 period. Multifactor productivity rose 0.5 percent. Labor productivity grew at 1.5 percent. The contribution of capital intensity grew 0.6 percent, with information processing equipment contributing two-thirds of this growth. The contribution of labor composition rose 0.4 percent, the same as in the previous period.

In the latter half of the 1990s, productivity growth accelerated. Multifactor productivity growth increased 1.3 percent, and output per hour growth nearly doubled compared to the 1990-95 period, rising 2.7 percent. The contribution of capital intensity almost doubled from the 1990-95 period, rising an average of 1.1 percent. The growth in each of the two components of the contribution of capital intensity, information processing equipment and other capital services, doubled from the previous period, with information processing equipment commanding an even more predominant share of the total contribution of capital services. The growth of 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 0.1 percentage point from the previous period, to 0.3 percent.

In the 2000-2005 period, multifactor productivity growth increased an additional 0.5 percentage points from the 1995-2000 period, to 1.8 percent. Labor productivity continued its upward trend, rising an average of 3.2 percent per year. The contribution of capital intensity growth dropped 0.1 percentage points from the previous period to 1.0 percent. Growth in the composition of capital intensity came in equal parts from both of the major components. The contribution of information processing equipment dropped to a growth rate of 0.6 percent from 0.9 percent in the 1995-2000 period. At the same time, the contribution of other capital services rose to 0.4 percent. The contribution of labor composition growth increased to 0.4 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, 1987 to 2005

(percent per year)

	1987-05	1987-90	1990-95	1995-00	2000-05	2004-05
<u>Private business<sup>1</sup></u>						
Output per hour of all persons	2.3	1.6	1.5	2.7	3.2	2.1
Contribution of capital intensity <sup>2</sup>	0.9	0.6	0.6	1.1	1.0	0.3
Contribution of information processing equipment and software <sup>3</sup>	0.6	0.4	0.4	0.9	0.6	0.3
Contribution of all other capital services	0.2	0.2	0.1	0.2	0.4	0.0
Contribution of labor composition <sup>4</sup>	0.4	0.4	0.4	0.3	0.4	0.1
Multifactor productivity <sup>5</sup>	1.1	0.6	0.5	1.3	1.8	1.7
<u>Private nonfarm business<sup>1</sup></u>						
Output per hour of all persons	2.3	1.5	1.6	2.5	3.2	2.1
Contribution of capital intensity <sup>2</sup>	0.8	0.6	0.6	1.1	1.0	0.2
Contribution of information processing equipment and software <sup>3</sup>	0.6	0.5	0.5	0.9	0.6	0.3
Contribution of all other capital services	0.2	0.1	0.1	0.2	0.4	-0.1
Contribution of labor composition <sup>4</sup>	0.4	0.4	0.4	0.3	0.4	0.1
Multifactor productivity <sup>5</sup>	1.0	0.5	0.6	1.1	1.8	1.8
Contribution of R&D to multifactor productivity	0.2	0.2	0.2	0.2	0.3	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.

### **Contribution of research and development to multifactor productivity in 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 1987-2005 period, or about 20 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 following periods: 1987-90, 1990-95, and 1995-2000. The contribution of research and development to multifactor productivity increased to 0.3 percent in the 2000-05 period.

### **Notes**

Private business and private nonfarm business output series through 2005 reflect the annual revisions to the National Income and Product Accounts (NIPA), announced by the Bureau of Economic Analysis (BEA) in July 2006.

Multifactor productivity measures for the private business and private nonfarm business sectors are now 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 proprietors and unpaid family workers, compensation, and measures of labor composition, which are collected on a 2002 NAICS basis, are converted to a 1997 NAICS basis for this report.

BLS built 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 from 1987-1997, 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 2003 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 2004 and 2005 were extrapolated using detailed IRS data for 2003.

The Bureau of Labor Statistics has used Current Population Survey (CPS) data to measure the hours of nonfarm proprietors and unpaid family workers, and all persons working in the farm sector using the hours worked by people whose main job falls into these categories. Since the Productivity and Costs news release of June 2005, hours for primary and secondary jobs held by persons working more than one job were processed separately and assigned to the appropriate class of worker for each job, rather than assigning all hours to the primary job. Hours worked in a second job as a nonfarm employee by a proprietor (or other selected category of worker for whom our source is the CPS) were deducted to avoid double-counting. Conversely, hours worked as a proprietor in a secondary job by a person who is primarily an employee were included. This multiple-jobholder adjustment yielded an improved measure of hours at work by sector and industry and the employment series approximated a count of jobs rather than persons. This adjustment has not yet been implemented within the manufacturing sector, where there are very few proprietors.

Labor composition measures have been updated through 2005. A brief description, "Changes in the Composition of Labor for the BLS Multifactor Productivity Measures, 2005" is available at <http://www.bls.gov/web/mprlabor.pdf>.

Comprehensive tables containing additional data not included in this news 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.", the BLS Handbook of Methods, Chapter 10 at <http://www.bls.gov/opub/hom/pdf/homch10.pdf>, and on the BLS Multifactor Productivity website at <http://www.bls.gov/mfp/mfpover.htm>. Additional data not contained in the release can be obtained in print or at <http://www.bls.gov/mfp>.

**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 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. 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 6, 2007 news release. Therefore it does reflect the benchmark revisions to the CES survey and other revisions to hours released on February 2, 2007. 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 2005, BEA supplies the output indexes. BLS adjusts these to eliminate 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 1987-2005 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 the stock of research and development are available upon request.

Table 1. Private business sector: Indexes of productivity and related measures, 1987-2005<sup>1</sup>

Indexes 2000=100.0

Year	Productivity			Output <sup>3</sup>	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity <sup>2</sup>		Labor Input <sup>4</sup>	Capital Services <sup>5</sup>	Combined units of labor and capital <sup>6</sup>	
1987	77.3	106.5	89.7	62.4	75.4	58.6	69.6	72.5
1988	78.5	107.2	90.3	65.2	78.1	60.8	72.2	73.2
1989	79.3	107.0	90.6	67.6	80.6	63.1	74.6	74.1
1990	81.0	105.5	91.2	68.6	80.5	65.1	75.2	76.8
1991	82.4	102.0	90.6	68.1	79.4	66.8	75.2	80.8
1992	86.0	103.9	93.0	70.9	80.2	68.3	76.2	82.7
1993	86.4	104.0	93.2	73.2	82.6	70.3	78.5	83.0
1994	87.2	105.6	93.9	76.8	86.3	72.8	81.8	82.6
1995	87.4	104.4	93.7	79.2	88.8	75.8	84.5	83.8
1996	90.0	104.5	95.3	82.8	90.6	79.2	86.9	86.1
1997	91.7	104.7	96.2	87.2	94.2	83.3	90.7	87.6
1998	94.3	103.3	97.4	91.5	96.4	88.5	93.9	91.2
1999	97.2	102.2	98.7	96.2	99.0	94.2	97.5	95.1
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	102.8	96.1	100.2	100.5	98.6	104.5	100.3	106.9
2002	107.1	95.0	101.9	102.0	97.2	107.4	100.2	112.7
2003	111.2	95.9	104.6	105.2	96.9	109.7	100.6	116.0
2004	114.7	98.0	107.3	109.9	98.4	112.2	102.4	117.1
2005	117.1	99.1	109.2	114.1	100.2	115.1	104.5	118.1

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 2. Private nonfarm business sector: Indexes of productivity and related measures, 1987-2005<sup>1</sup>

Indexes 2000=100.0

Year	Productivity			Output <sup>3</sup>	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity <sup>2</sup>		Labor Input <sup>4</sup>	Capital Services <sup>5</sup>	Combined units of labor and capital <sup>6</sup>	
1987	78.0	108.3	90.6	62.4	74.7	57.7	68.9	72.0
1988	79.3	109.4	91.4	65.3	77.5	59.7	71.5	72.5
1989	79.9	108.9	91.5	67.6	80.0	62.1	73.9	73.3
1990	81.4	107.1	91.9	68.6	80.0	64.1	74.7	76.1
1991	82.9	103.3	91.3	68.1	78.9	65.9	74.6	80.2
1992	86.3	104.9	93.4	70.8	79.8	67.5	75.7	82.2
1993	86.7	105.2	93.7	73.2	82.3	69.6	78.1	82.4
1994	87.7	106.5	94.5	76.7	85.7	72.1	81.2	82.4
1995	88.2	105.5	94.5	79.3	88.2	75.2	83.9	83.6
1996	90.5	105.3	95.8	82.8	90.2	78.7	86.5	86.0
1997	92.0	105.1	96.4	87.2	93.9	82.9	90.4	87.5
1998	94.5	103.7	97.7	91.5	96.2	88.2	93.7	91.1
1999	97.3	102.4	98.8	96.3	99.0	94.0	97.5	95.0
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	102.7	96.1	100.1	100.5	98.7	104.6	100.4	106.9
2002	107.1	94.9	101.9	102.1	97.2	107.6	100.2	112.8
2003	111.0	95.7	104.4	105.2	97.1	110.0	100.7	116.1
2004	114.4	97.7	107.1	109.9	98.6	112.4	102.5	117.0
2005	116.8	99.1	109.1	114.1	100.4	115.1	104.6	117.9

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, 1988-2005

Percent per year

Year	Productivity			Output <sup>3</sup>	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity <sup>2</sup>		Labor Input <sup>4</sup>	Capital Services <sup>5</sup>	Combined units of labor and capital <sup>6</sup>	
1988	1.6	0.6	0.7	4.4	3.6	3.7	3.6	0.9
1989	1.0	-0.2	0.3	3.7	3.1	3.8	3.3	1.1
1990	2.2	-1.5	0.7	1.5	-0.1	3.0	0.9	3.7
1991	1.7	-3.3	-0.7	-0.7	-1.3	2.7	0.0	5.3
1992	4.3	1.9	2.7	4.1	1.0	2.2	1.4	2.4
1993	0.5	0.2	0.2	3.2	3.0	3.0	3.0	0.3
1994	1.0	1.5	0.8	5.0	4.5	3.5	4.2	-0.5
1995	0.2	-1.1	-0.3	3.0	2.9	4.2	3.3	1.4
1996	2.9	0.1	1.7	4.6	2.1	4.5	2.9	2.8
1997	1.9	0.2	0.9	5.3	4.0	5.2	4.4	1.7
1998	2.8	-1.3	1.3	4.9	2.3	6.3	3.5	4.2
1999	3.1	-1.1	1.3	5.2	2.7	6.4	3.8	4.3
2000	2.9	-2.1	1.3	3.9	1.0	6.2	2.6	5.1
2001	2.8	-3.9	0.2	0.5	-1.4	4.5	0.3	6.9
2002	4.2	-1.2	1.7	1.5	-1.4	2.7	-0.1	5.4
2003	3.9	0.9	2.7	3.1	-0.3	2.2	0.5	2.9
2004	3.1	2.1	2.7	4.5	1.5	2.3	1.7	1.0
2005	2.1	1.2	1.7	3.8	1.8	2.6	2.1	0.9

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, 1988-2005  
 Percent per year

Year	Productivity			Output <sup>3</sup>	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor Productivity <sup>2</sup>		Labor Input <sup>4</sup>	Capital Services <sup>5</sup>	Combined units of labor and capital <sup>6</sup>	
1988	1.7	1.0	0.9	4.6	3.7	3.6	3.7	0.7
1989	0.7	-0.4	0.1	3.5	3.2	3.9	3.4	1.1
1990	1.9	-1.7	0.4	1.5	0.1	3.2	1.1	3.7
1991	1.8	-3.5	-0.7	-0.8	-1.4	2.9	-0.1	5.5
1992	4.1	1.6	2.4	3.9	1.1	2.3	1.5	2.5
1993	0.5	0.3	0.3	3.5	3.2	3.2	3.2	0.2
1994	1.1	1.2	0.8	4.8	4.1	3.6	3.9	-0.1
1995	0.6	-1.0	0.0	3.3	2.9	4.3	3.3	1.5
1996	2.6	-0.2	1.4	4.5	2.3	4.7	3.0	2.8
1997	1.6	-0.1	0.7	5.2	4.1	5.3	4.5	1.7
1998	2.8	-1.3	1.3	5.0	2.4	6.4	3.7	4.2
1999	2.9	-1.3	1.1	5.2	2.9	6.6	4.0	4.2
2000	2.8	-2.4	1.2	3.8	1.0	6.3	2.6	5.3
2001	2.7	-3.9	0.1	0.5	-1.3	4.6	0.4	6.9
2002	4.2	-1.3	1.8	1.5	-1.5	2.8	-0.3	5.6
2003	3.7	0.8	2.5	3.1	-0.2	2.3	0.6	2.9
2004	3.0	2.2	2.6	4.4	1.6	2.2	1.8	0.8
2005	2.1	1.4	1.8	3.9	1.8	2.4	2.0	0.7

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. Compound average annual rates of growth in real capital services by asset type, private business sector, 1987-2005

Percent per year

	1987 to 2005	1987 to 1990	1990 to 1995	1995 to 2000	2000 to 2005	2004 to 2005
All Assets	3.8	3.5	3.1	5.7	2.9	2.6
Equipment	5.9	4.5	4.7	9.4	4.6	4.0
All Information Processing Equipment & Software (IPES)	11.5	10.8	9.4	17.4	8.4	6.7
Computers & related equipment	23.4	18.8	16.4	40.9	17.4	13.3
Software	13.8	18.6	13.9	17.5	7.3	6.2
Communication equipment	7.5	6.3	5.4	10.8	7.0	5.1
Other IPES	3.4	3.4	3.8	3.2	3.0	3.7
All other equipment	2.3	1.2	1.8	4.2	1.8	2.0
Structures	1.9	2.8	1.9	2.0	1.1	0.9
Residential rental capital	1.6	2.0	1.1	1.7	1.5	1.7
Inventories	2.6	2.6	2.2	4.3	1.3	2.8
Land	1.6	2.9	1.4	1.7	1.0	2.1

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. Compound average annual rates of growth in real capital services by asset type, private nonfarm business sector, 1987-2005

Percent per year

	1987 to 2005	1987 to 1990	1990 to 1995	1995 to 2000	2000 to 2005	2004 to 2005
All Assets	3.9	3.6	3.2	5.9	2.9	2.4
Equipment	6.1	4.8	4.9	9.5	4.7	4.0
All Information Processing Equipment & Software (IPES)	11.5	10.7	9.4	17.4	8.4	6.7
Computers & related equipment	23.4	18.8	16.3	40.9	17.4	13.3
Software	13.8	18.6	13.9	17.5	7.3	6.2
Communication equipment	7.5	6.3	5.4	10.8	7.0	5.1
Other IPES	3.3	3.3	3.8	3.2	3.0	3.7
All other equipment	2.5	1.5	2.0	4.3	1.7	1.9
Structures	1.9	2.9	2.0	2.1	1.2	0.9
Residential rental capital	1.6	2.0	1.1	1.7	1.5	1.7
Inventories	2.7	3.0	2.2	4.5	1.4	2.9
Land	1.5	1.8	1.5	2.1	0.6	0.4

Source: Bureau of Labor Statistics

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