News
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USDL 94-327
For Release: 10:00 AM EDT
Monday, July 11, 1994

MULTIFACTOR PRODUCTIVITY MEASURES, 1991 and 1992

Private Business and Private Nonfarm Business

The Bureau of Labor Statistics of the U.S. Department of Labor today reported multifactor productivity measures--output per unit of combined labor and capital inputs--for 1991 and 1992. Multifactor productivity differs from the labor productivity (output per hour) measures, which are published quarterly.

In the most recent years available, multifactor productivity changed at the following percentage rates:

	1990-91	1991-92
Private business	-1.1	1.9
Private nonfarm business	-1.0	1.5

The gains in multifactor productivity were the largest since 1984 and followed 3 years of declines. The 1991 and 1992 annual changes are summarized in table A; further detail and historical measures are shown in tables 1 through 7.

A change in multifactor productivity reflects the difference between the change in output (production of goods and services) and the change in labor and capital inputs engaged in the production of the output. Multifactor productivity does not measure the specific contributions of labor, capital, or any other factor of production. Instead, it reflects the joint effects of many factors, including new technology, economies of scale, managerial skill, and change in the organization of production.

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.

Two major improvements have been incorporated into these multifactor productivity measures. Real output is now measured using a chain weighted "superlative" index number formula. Also, labor inputs now reflect an adjustment for changes in the education and work experience of the work force. These improvements are discussed on page 3.

Table A. Productivity and related measures; percentage changes, 1990-91 and 1991-92

Item	1990-91		1991-92	
	Private business 1/	Private nonfarm business 1/	Private business 1/	Private nonfarm business 1/
Productivity:				
Multifactor productivity 2/	-1.1	-1.0	1.9	1.5
Output per hour of all persons	0.8	1.0	3.3	3.0
Output per unit of capital services	-3.0	-3.1	1.6	1.2
Output	-1.5	-1.5	3.0	2.7
Inputs:				
Labor input	-1.2	-1.4	1.0	1.1
Capital services	1.5	1.7	1.4	1.5
Combined units of labor and capital inputs 3/	-0.4	-0.5	1.1	1.2
Capital services per hour of all persons (capital-labor ratio)	3.9	4.2	1.7	1.8

1/ Excludes government enterprises.
2/ Output per unit of combined labor and capital inputs.
3/ Labor input index combined with capital service input index, weighted by labor's and capital's shares of nominal output.

Changes in 1990-92

A discussion of long term trends begins on page 6, following the section on improvements to the measures.

Private business sector

Multifactor productivity in private business increased 1.9 percent in 1992, following declines in the 3 previous years (tables 1 and 3). The productivity gain in 1992 resulted from comparatively small gains of 3.0 percent in output and 1.1 percent in combined inputs of capital and labor. While output grew faster than in any year since 1988, the gain was less than the average gain of the previous economic expansion (3.9 percent per year). Excluding 1991, input growth in 1992 was the slowest since 1982. The 1.0 percent increase in labor input was due to strong shifts in the composition of labor (1.2 percent) which offset a decline in the hours of all persons (-0.3 percent). The 1.4 percent advance in capital services was the slowest of the entire 1948-92 period. All forms of capital increased slowly in 1992, but the slow growth rates of equipment and structures were unprecedented (table 5).

Labor productivity or output per hour advanced 3.3 percent in 1992, its strongest gain since 1976. Capital productivity (the ratio of output to capital services) increased 1.6 percent.

The trend in multifactor productivity in 1991 reflects the impact of the recession which ended in the first quarter of 1991. The 1.1 percent decline in multifactor productivity was the result of a 1.5 percent decline in output and a 0.4 percent decline in combined capital and labor inputs. The decline in multifactor productivity was the largest since 1982 and the drop in combined inputs was the first since 1975. Labor input fell 1.2 percent reflecting unusually strong gains in labor composition (1.1 percent) and a sharp drop in hours of all persons. The 2.3 percent decline in hours was the largest since 1982. Capital services grew 1.5 percent, slower than in any year except 1992. As in 1992, the services of equipment and structures made comparatively small gains. The sharp decline in the growth rate of hours led to the largest increase in the ratio of capital services to hours at work since 1986.

Unlike multifactor productivity, labor productivity advanced 0.8 percent in 1991. Capital productivity followed the pattern of multifactor productivity; the 3.0 percent decline was the steepest decline since 1982.

Private nonfarm business

Multifactor productivity in private nonfarm business grew 1.5 percent in 1992 (tables 2 and 4). Output increased 2.7 percent in output and combined units of capital and labor inputs rose 1.2 percent. Capital services increased only 1.5 percent, the slowest growth since the series began in 1948; most components of capital services (equipment, structures, and land) grew at historically slow rates (table 5). Labor input posted a sluggish 1.1 percent gain; hours dropped in 1992, falling 0.3 percent, while labor composition jumped 1.3 percent.

In 1992, labor productivity grew faster than in any year since 1983, advancing 3.0 percent. Capital productivity increased for the first time since 1988, posting a gain of 1.2 percent. Growth in capital services per hour slowed in 1992 to a 1.8 percent rate.

In the recession year of 1991, multifactor productivity dropped 1.0 percent. The decline reflected a 1.5 percent reduction in output and a 0.5 percent loss in combined capital and labor inputs. The decline in output was the largest since 1982. The drop in labor input of 1.4 percent was the sharpest decline since 1982. Hours plunged 2.4 percent, also the largest decline since 1982; this loss was partially offset by rapid shifts in the composition of labor, which posted a 1.2 percent gain. The growth in capital services of 1.7 percent was less than half its average growth rate over the 1948-92 period. Most forms of capital increased slowly while inventories fell 1.0 percent.

Output per hour advanced 1.0 percent in 1991 as the decline in hours was greater than the decline in output. Capital productivity fell 3.1 percent, the largest decline since 1982.

Improvements to Measures

In 1983, the Bureau of Labor Statistics introduced multifactor productivity (MFP) measures dating back to 1948 for private business and private nonfarm business. Since that time, the MFP measures have been useful in identifying the sources of trends in output per hour worked. BLS has made improvements to the measures as better data and methods have become available.

The BLS bases its output measures for private business and private nonfarm business on measures of real product furnished by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. The BEA has recently developed "alternative" measures for various aggregate sectors which use superlative index number formulas rather than the traditional constant dollar formulas. BEA has furnished BLS with superlative index series which the BLS has now adopted as its preferred measures of output for the MFP work. The measures aggregate components of real output based on the product side of the national income and product accounts. As a result, the BLS output measures used in this MFP work have switched from the income to the product side of the national accounts. BLS has long used superlative index formulas for aggregating inputs in its MFP work. This issue has become important in recent years because of rapid and divergent changes in the prices of some goods and services. An important example is computers. Computer prices have declined dramatically while other prices have risen. Because of this, computers receive a significantly different weight in aggregates based on different index number formulas.

BLS has now developed a measure of the effects of changes in the composition of the work force which, when combined with the hours worked by all persons, becomes the new measure of labor input. Analogous to the treatment of capital, the index of labor input was computed from a weighted average of the changes in hours of each type of worker, classified by education, work experience, and gender. Labor composition change, or the difference between the growth rates of labor input and hours of all persons, indicates how changes in the education and experience of the work force have altered the effective amount of labor. The effect of labor composition change on multifactor productivity is measured as the product of the change in labor composition and labor's share of total costs. Details on this work can be found in BLS Bulletin 2426, "Labor Composition and U.S. Productivity Growth, 1948-90," which was published in December 1993. Further improvements to the weighted labor input, especially in the measurement of work experience, are anticipated. Since labor input now includes labor composition, multifactor productivity, which is output per combined units of capital and labor, no longer includes output changes resulting from shifts in labor composition.

For the entire period 1948-92, the net effect of these two improvements was to leave multifactor productivity unchanged in the private business sector and to raise productivity growth by an average annual rate of 0.1 percent in private nonfarm business (table B). The effects of adopting superlative index number formulas for real output were to increase multifactor productivity 0.2 percent annually in private business and 0.3 percent per year in private nonfarm business over the entire period. The superlative chained output index grows faster than constant dollar output early in the period, but more slowly during the 1979-92 period, especially after 1987. The effect of labor composition growth on multifactor productivity is similar in magnitude, but its effect is more consistent throughout the period. The introduction of labor composition reduced multifactor productivity 0.2 percent per year between 1948-92, largely offsetting the revision in the output measure.

The improvements in output and labor indexes do not substantially change the trends in multifactor productivity growth except for the period 1990-92. Multifactor productivity grows rapidly before 1973 and very slowly between 1973-90. For 1990-92, the revisions in both output and labor substantially reduce productivity growth showing a trend of continued slow growth.

BLS is working on several improvements to its multifactor productivity measures in manufacturing. This work is, as yet, incomplete. Data on capital inputs, capital costs, and hours in manufacturing are available upon request.

Table B. Effects of alternative output index and weighted labor input on computed annual rates of growth in multifactor productivity, by major sector, 1948 to 1992

Measure	1948-1992	1948-1973	1973-1979	1979-1990	1990-1992
Private business 1/					
Multifactor productivity 2/	1.3	2.2	0.5	0.1	0.4
Multifactor productivity without improvements 3/	1.3	2.1	-0.1	0.4	1.7
Effect of improvements	0.0	0.1	0.6	-0.3	-1.3
Effect of improvement to:					
Output 4/	0.2	0.3	0.6	0.0	-0.5
Labor Input 5/	-0.2	-0.2	0.0	-0.3	-0.8
Private nonfarm business 1/					
Multifactor productivity 2/	1.1	1.9	0.3	-0.1	0.2
Multifactor productivity without improvements 3/	1.0	1.7	-0.2	0.3	1.5
Effect of Improvements	0.1	0.2	0.5	-0.4	-1.3
Effect of improvement to:					
Output 4/	0.3	0.4	0.5	0.0	-0.5
Labor Input 5/	-0.2	-0.2	0.0	-0.3	-0.8

1/ Excludes government enterprises.
2/ Fisher output index per unit of combined capital and labor.
3/ Constant dollar output (using 1987 price weights in all years) per unit of combined capital and hours inputs.
4/ Growth rate of the Fisher output index less the growth rate of constant dollar output.
5/ The product of labor's share of total costs and the growth rate of hours of all persons less the growth rate of weighted labor input.

Note : The sum of the output and labor input effects may not equal the total effect due to independent rounding.

Long-term trends

Labor productivity growth (output per hour) differs from multifactor productivity (output per unit of combined capital and labor inputs) in its treatment of capital and hours. Since labor productivity measures do not explicitly account for the effects of capital or shifts in the composition of labor on output growth, changes in capital intensity (the capital-hours ratio) and labor composition influence labor productivity growth. However, multifactor productivity (MFP) treats capital as an explicit factor of production and shifts in the composition of labor are included in the measures of labor input. Therefore, changes in capital intensity and labor composition do not affect measures of MFP. 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 the composition of the work force.

From 1948 to 1992, output per hour grew at an annual rate of 2.5 percent in private business and 2.1 percent in private nonfarm business (table C). Of the 2.1 percent growth rate in labor productivity in private nonfarm business, 1.1 percent can be attributed to increases in multifactor productivity, 0.8 percent to the contribution of capital intensity, and 0.2 percent to increases in labor composition. The contribution of capital intensity equals the change in the capital-hours ratio multiplied by capital's share of total costs. 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 costs; historically, capital's share has been less than one-third of total costs.

The widely discussed post-1973 productivity slowdown is apparent from the data in table C. From 1948 to 1973, multifactor productivity grew at an annual rate of 2.2 percent in private business and 1.9 percent in private nonfarm business. These rates, combined with the growth rates in the contributions of capital intensity and labor composition, resulted in labor productivity growth rates of 3.4 percent and 2.9 percent, respectively, in private business and private nonfarm business.

During the period 1973 to 1979, gains in multifactor productivity slowed to only 0.5 percent per year in private business. At the same time, the average annual contribution of capital intensity decreased to 0.7 percent and the contribution of labor composition change was zero. Labor productivity, therefore, increased only 1.2 percent per year from 1973 to 1979. A similar slowdown occurred in private nonfarm business during the 1973-79 period.

Between 1979 and 1990, multifactor productivity was almost unchanged in private business and private nonfarm business. Output per hour nevertheless continued to advance at the same rates as in the 1973-79 period. The contribution of labor composition increased to 0.3 percent per year in both sectors essentially offsetting further declines in multifactor productivity growth.

Labor productivity had relatively rapid gains of 2.0 percent per year during 1990-92 in both sectors. The increase in labor productivity in private business was the result of a 0.4 percent per year growth rate in multifactor productivity, a 0.9 percent contribution of capital intensity, and an unsually large 0.8 percent contribution of labor composition. Trends in private nonfarm business were virtually identical. However, since productivity measures are strongly cyclical, figures for this short period cannot be interpreted as indicative of new underlying trends.

Table C. Compound average annual rates of growth in output per hour of all persons, the contributions of capital intensity, labor composition, and multifactor productivity, by major sector, 1948 to 1992

Measure	1948-1992	1948-1973	1973-1979	1979-1990	1990-1992
Private business 1/					
Output per hour of all persons	2.5	3.4	1.2	1.2	2.0
Contribution of capital intensity 2/	0.9	1.0	0.7	0.7	0.9
Contribution of labor composition 3/	0.2	0.2	0.0	0.3	0.8
Multifactor productivity 4/	1.3	2.2	0.5	0.1	0.4
Private nonfarm business 1/					
Output per hour of all persons	2.1	2.9	1.0	1.0	2.0
Contribution of capital intensity 2/	0.8	0.9	0.7	0.7	0.9
Contribution of labor composition 3/	0.2	0.2	0.0	0.3	0.8
Multifactor productivity 4/	1.1	1.9	0.3	-0.1	0.2
Contribution of R&D to multifactor productivity	0.2	0.2	0.1	0.2	0.2

1/ Excludes government enterprises.
2/ Growth rate in capital services per hour times capital's share of current dollar costs.
3/ Growth rate of labor input less the growth rate of hours of all persons times labor's share of current dollar costs.
4/ Output per unit of combined labor and capital inputs.

Note: The sum of multifactor productivity and the contributions of capital intensity and labor composition may not equal labor productivity due to independent rounding.

Source: Tables 1-2.

While MFP reflects many influences, it is generally believed that technological change is one of the primary contributors. For private nonfarm business, BLS has now estimated the direct effects of firms' spending on research and development (R&D) on MFP growth within their own industries. Because many people associate R&D spending and the resulting technology improvements with productivity, BLS has not adjusted MFP to exclude the effects of R&D. Instead, the estimated effects are shown separately (table C). The contribution of R&D averaged 0.2 percent per year for the entire 1948-92 period. Its contribution slowed to 0.1 percent per year during the 1973-79 period, but it has since returned to the 0.2 annual growth rate of the pre-1973 period.

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, "Trends in Multifactor Productivity, 1948-81."

The multifactor productivity indexes 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 1959-92, the output indexes are supplied by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. BLS adjusts these to eliminate the output of government enterprises. For the years 1948-58, BLS calculated output indexes by applying the Fisher index formula to data on categories of final expenditures in published tables from the National Income and Product Accounts (NIPA) produced by BEA. BLS linked these two indexes at 1959. Since 1983, BLS has used chained superlative indexes (Tornqvist indexes) to aggregate inputs. BLS has used several data sets to verify that Tornqvist and Fisher indexes yield results that are empirically quite similar.

The capital input series measures the services derived from the stock of physical assets. The assets included are fixed business equipment, structures, inventories, and land. Structures include nonresidential structures and residential capital which is rented out by profit-making firms or persons. Financial assets are excluded as are owner-occupied residential structures. The aggregate capital measures are obtained by (Tornqvist) weighting the capital stocks for each asset type within each of 53 industries using the 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 and gross product originating by industry used in measuring the rental prices are obtained from BEA.

Labor input is obtained by (Tornqvist) weighting the hours worked by all persons, classified by education, work experience, and gender, by their shares of labor compensation. Hours paid of employees are obtained from the Current Employment Statistics program. The hours at work of proprietors, unpaid family workers, and farm employees are derived from the Current Population Survey. The hours of employees are converted to an at-work basis by using the Hours At Work survey. 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, "Labor Composition and U.S. Productivity Growth, 1948-90".

The labor and capital components of the input indexes are combined with (Tornqvist) weights which 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 where the share in each year is averaged with the preceding year's share.

Data are presented for the private business and private nonfarm business sectors. The private business sector, which accounts for about 80 percent of gross domestic product, 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.

These multifactor productivity measures describe the relationship between output in real terms and the labor time and capital services involved in its production. They do not measure the specific contributions of labor, capital, or any other factor of production. Rather, they reflect the joint effects of many factors, including new technology, economies of scale, managerial skill, and change in the organization of production.

Notes:

Data on output, hours, and capital investment have been revised to conform with the 1987 Standard Industrial Classification system.

BLS uses current dollar Gross Product Originating (GPO) data to estimate capital rental prices. Revised current dollar GPO data by industry, and its components by industry, are now available from BEA for the period 1959-91. For years prior to 1959, unrevised current dollar GPO data were used. GPO data for 1992 are not yet available. In the absence of 1992 GPO data, the BLS extrapolated capital asset cost shares so that relative rental prices were unchanged between 1991 and 1992.

Measures of hours of all persons at the major sector level have been revised to reflect the BLS June 1994 benchmarking of the Current Employment Statistics data to the March 1993 unemployment insurance data.

Information in this release will be made available to sensory-impaired individuals upon request. Voice phone: 202-606-STAT; TDD phone: 202-606-5897; TDD message referral phone number: 1-800-326-2577.

Table 1. Private business sector: Productivity and related measures, 1948-92 [1]

Indexes 1987=100

Year	Productivity			Output	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor productivity [2]	[3]	Labor input [4]	Capital services [5]	Combined units of labor and capital inputs [6]	
1948	36.3	116.9	56.1	25.6	63.4	21.9	45.6	31.1
1949	37.6	114.1	56.8	25.5	61.3	22.4	45.0	32.9
1950	41.0	120.0	60.9	28.1	62.4	23.4	46.2	34.1
1951	42.4	121.0	62.3	29.9	64.3	24.7	48.0	35.0
1952	43.3	118.8	62.8	30.6	64.4	25.7	48.6	36.5
1953	44.9	120.0	64.3	32.0	65.5	26.6	49.7	37.4
1954	46.0	116.1	64.3	31.6	63.7	27.2	49.1	39.6
1955	48.1	121.4	67.2	34.3	66.1	28.2	51.0	39.7
1956	48.3	118.9	66.9	34.9	67.2	29.4	52.2	40.6
1957	49.9	117.2	67.9	35.4	66.4	30.2	52.2	42.5
1958	51.3	112.5	68.2	34.7	63.5	30.9	50.9	45.6
1959	52.9	117.7	70.6	37.2	66.0	31.6	52.7	45.0
1960	53.8	116.3	70.9	37.8	66.3	32.5	53.4	46.3
1961	55.9	116.0	72.4	38.6	65.5	33.3	53.3	48.2
1962	58.6	119.8	75.1	41.1	67.2	34.3	54.7	48.9
1963	61.0	121.0	77.3	43.0	67.7	35.5	55.6	50.4
1964	63.9	124.1	80.5	45.8	68.8	36.9	56.9	51.5
1965	66.3	126.4	83.0	48.9	70.9	38.7	59.0	52.4
1966	69.0	127.1	85.5	52.2	72.5	41.1	61.1	54.3
1967	70.7	122.6	85.8	53.2	72.3	43.4	62.0	57.7
1968	73.1	122.9	88.0	55.8	73.2	45.4	63.4	59.5
1969	73.6	120.8	87.7	57.5	75.2	47.6	65.6	61.0
1970	74.9	115.4	87.4	57.4	74.1	49.7	65.7	64.9
1971	78.1	115.4	90.2	59.6	73.5	51.6	66.1	67.7
1972	80.6	118.2	92.8	63.5	75.9	53.7	68.4	68.2
1973	83.3	120.3	95.6	68.0	78.5	56.5	71.1	69.2
1974	82.0	112.7	92.3	66.9	79.0	59.4	72.5	72.7
1975	84.5	107.3	92.8	66.0	75.7	61.5	71.1	78.7
1976	87.6	111.2	96.4	70.3	77.6	63.3	73.0	78.8
1977	89.3	114.1	98.5	74.5	80.7	65.4	75.7	78.3
1978	90.0	115.1	99.2	78.8	84.7	68.4	79.4	78.1
1979	89.5	113.1	98.5	80.9	87.2	71.5	82.1	79.1
1980	89.2	105.9	96.2	79.9	86.6	75.4	83.1	84.2
1981	91.1	103.5	96.4	82.1	87.9	79.4	85.2	88.0
1982	90.5	96.4	93.3	79.6	86.6	82.6	85.3	93.9
1983	93.2	98.0	95.4	83.3	88.4	85.0	87.3	95.0
1984	95.7	102.3	98.4	90.4	93.6	88.4	91.9	93.6
1985	97.1	101.2	98.9	93.7	95.7	92.5	94.7	95.9
1986	99.6	99.8	99.9	96.7	96.8	96.9	96.8	99.8
1987	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988	101.0	101.4	100.6	104.3	104.1	102.8	103.7	99.6
1989	101.1	101.4	100.3	107.0	107.2	105.6	106.7	99.7
1990	101.9	99.8	100.0	107.9	107.7	108.1	107.8	102.1
1991	102.8	96.9	98.9	106.3	106.4	109.8	107.5	106.1
1992	106.1	98.4	100.8	109.5	107.5	111.3	108.6	107.9

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 2. Private nonfarm business sector: Productivity and related measures, 1948-92 [1]

Indexes 1987=100

Year	Productivity			Output	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor productivity [2]	[3]	Labor input [4]	Capital services [5]	Combined units of labor and capital inputs [6]	
1948	41.9	123.3	61.9	24.7	53.7	20.1	40.0	34.0
1949	43.7	120.7	63.2	24.7	51.6	20.5	39.1	36.2
1950	46.7	126.8	66.9	27.2	53.4	21.5	40.7	36.8
1951	48.1	129.2	68.7	29.3	55.9	22.7	42.7	37.2
1952	48.8	126.7	68.6	30.0	56.7	23.7	43.7	38.5
1953	49.7	127.7	69.3	31.4	58.6	24.6	45.2	39.0
1954	50.8	123.1	69.3	30.9	56.9	25.1	44.6	41.3
1955	53.2	128.9	72.4	33.7	59.3	26.1	46.5	41.3
1956	53.0	126.2	71.7	34.4	60.9	27.2	47.9	42.0
1957	54.3	124.5	72.3	35.0	60.8	28.1	48.4	43.7
1958	55.7	119.3	72.5	34.3	58.2	28.7	47.2	46.7
1959	57.4	125.2	75.1	36.9	60.8	29.4	49.1	45.8
1960	57.9	123.0	75.2	37.4	61.1	30.4	49.7	47.1
1961	59.9	122.6	76.4	38.2	60.9	31.1	50.0	48.8
1962	62.7	126.8	79.1	40.8	62.9	32.2	51.6	49.5
1963	64.9	128.0	81.2	42.7	63.6	33.4	52.6	50.7
1964	67.8	131.5	84.4	45.6	65.1	34.7	54.1	51.6
1965	69.9	133.6	86.6	48.8	67.4	36.5	56.3	52.3
1966	72.3	134.4	89.0	52.2	69.6	38.9	58.7	53.8
1967	73.7	129.0	89.0	53.2	69.5	41.2	59.7	57.1
1968	76.2	129.5	91.4	56.0	70.5	43.2	61.2	58.9
1969	76.3	126.9	90.7	57.7	72.9	45.4	63.6	60.1
1970	77.3	120.9	90.0	57.4	71.9	47.5	63.8	64.0
1971	80.5	120.5	92.7	59.6	71.5	49.4	64.3	66.8
1972	83.1	123.4	95.6	63.6	73.9	51.5	66.6	67.3
1973	85.8	125.6	98.4	68.3	76.7	54.4	69.4	68.3
1974	84.4	117.1	94.9	67.2	77.3	57.4	70.9	72.1
1975	86.4	110.5	94.9	65.9	73.9	59.6	69.4	78.2
1976	89.5	114.6	98.5	70.4	76.1	61.5	71.5	78.1
1977	91.0	117.2	100.3	74.6	79.3	63.7	74.4	77.7
1978	91.9	118.5	101.3	79.1	83.4	66.8	78.1	77.5
1979	91.1	115.6	100.1	81.2	86.0	70.2	81.1	78.7
1980	90.8	108.4	97.9	80.3	85.6	74.1	82.0	83.8
1981	92.0	104.9	97.4	82.0	86.9	78.1	84.2	87.7
1982	91.4	97.4	94.1	79.4	85.6	81.5	84.4	93.8
1983	94.5	99.6	96.8	83.6	87.5	84.0	86.5	94.9
1984	96.6	103.4	99.3	90.6	92.9	87.6	91.2	93.4
1985	97.3	101.8	99.2	93.6	95.4	91.9	94.3	95.6
1986	99.8	100.1	100.1	96.7	96.6	96.6	96.6	99.8
1987	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988	100.9	101.3	100.5	104.5	104.3	103.1	103.9	99.6
1989	100.8	100.9	100.0	107.1	107.5	106.1	107.1	99.9
1990	101.4	99.1	99.4	107.8	108.2	108.7	108.4	102.3
1991	102.4	96.0	98.4	106.2	106.7	110.6	107.9	106.6
1992	105.4	97.2	99.9	109.1	107.9	112.3	109.2	108.5

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 3. Private business sector: Productivity and related measures, 1949-92 [1]

Percent Change

Year	Productivity			Output	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor productivity [2]	[3]	Labor input [4]	Capital services [5]	Combined units of labor and capital inputs [6]	
1949	3.4	-2.4	1.3	-0.2	-3.3	2.3	-1.5	6.0
1950	9.0	5.2	7.2	10.1	1.7	4.6	2.7	3.6
1951	3.5	0.8	2.4	6.4	3.1	5.5	3.9	2.6
1952	2.3	-1.8	0.8	2.2	0.1	4.0	1.4	4.2
1953	3.6	1.0	2.3	4.6	1.7	3.5	2.2	2.6
1954	2.3	-3.3	0.1	-1.2	-2.7	2.1	-1.3	5.8
1955	4.7	4.5	4.5	8.5	3.8	3.8	3.8	0.2
1956	0.3	-2.1	-0.5	1.8	1.6	4.0	2.4	2.5
1957	3.2	-1.4	1.5	1.6	-1.2	3.0	0.1	4.7
1958	2.9	-4.0	0.5	-2.0	-4.4	2.1	-2.5	7.2
1959	3.1	4.6	3.5	7.1	4.0	2.4	3.5	-1.4
1960	1.7	-1.2	0.4	1.7	0.5	3.0	1.3	2.9
1961	3.8	-0.2	2.2	2.0	-1.2	2.3	-0.2	4.1
1962	4.9	3.2	3.7	6.5	2.5	3.2	2.7	1.6
1963	4.1	1.1	2.9	4.6	0.7	3.5	1.6	3.0
1964	4.8	2.5	4.1	6.5	1.6	3.9	2.3	2.3
1965	3.6	1.8	3.1	6.9	3.1	5.0	3.7	1.8
1966	4.2	0.6	3.0	6.6	2.3	6.0	3.5	3.6
1967	2.4	-3.6	0.3	2.0	-0.2	5.7	1.6	6.2
1968	3.5	0.3	2.6	4.9	1.2	4.7	2.3	3.2
1969	0.7	-1.7	-0.3	3.1	2.7	4.9	3.4	2.4
1970	1.7	-4.4	-0.4	-0.2	-1.5	4.4	0.2	6.4
1971	4.3	0.0	3.2	3.8	-0.8	3.8	0.5	4.3
1972	3.2	2.4	3.0	6.6	3.3	4.0	3.5	0.8
1973	3.3	1.8	3.0	7.0	3.4	5.1	3.9	1.5
1974	-1.6	-6.4	-3.5	-1.6	0.7	5.1	2.0	5.1
1975	3.1	-4.8	0.6	-1.3	-4.2	3.6	-2.0	8.2
1976	3.6	3.6	3.8	6.6	2.6	2.9	2.7	0.0
1977	2.0	2.6	2.2	6.0	3.9	3.3	3.7	-0.6
1978	0.7	1.0	0.7	5.7	5.0	4.7	4.9	-0.2
1979	-0.5	-1.8	-0.7	2.7	2.9	4.5	3.4	1.3
1980	-0.3	-6.4	-2.3	-1.2	-0.6	5.5	1.2	6.5
1981	2.0	-2.3	0.2	2.8	1.5	5.2	2.6	4.5
1982	-0.6	-6.9	-3.2	-3.1	-1.5	4.1	0.1	6.7
1983	2.9	1.7	2.2	4.7	2.1	2.9	2.4	1.2
1984	2.7	4.3	3.2	8.6	5.8	4.0	5.2	-1.5
1985	1.4	-1.0	0.5	3.6	2.3	4.6	3.1	2.5
1986	2.6	-1.4	1.0	3.2	1.1	4.7	2.2	4.1
1987	0.4	0.2	0.1	3.4	3.3	3.2	3.3	0.2
1988	1.0	1.4	0.6	4.3	4.1	2.8	3.7	-0.4
1989	0.1	0.0	-0.2	2.6	2.9	2.6	2.8	0.1
1990	0.8	-1.5	-0.3	0.8	0.5	2.4	1.1	2.4
1991	0.8	-3.0	-1.1	-1.5	-1.2	1.5	-0.4	3.9
1992	3.3	1.6	1.9	3.0	1.0	1.4	1.1	1.7

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 4. Private nonfarm business sector: Productivity and related measures, 1949-92 [1]

Percent Change

Year	Productivity			Output	Inputs			Capital per hour of all persons
	Output per hour of all persons	Output per unit of capital	Multifactor productivity [2]	[3]	Labor input [4]	Capital services [5]	Combined units of labor and capital inputs [6]	
1949	4.2	-2.1	2.0	0.0	-4.0	2.1	-2.1	6.5
1950	6.8	5.1	5.9	10.0	3.5	4.7	3.9	1.7
1951	3.1	1.9	2.7	7.8	4.6	5.8	5.0	1.2
1952	1.4	-1.9	-0.2	2.2	1.6	4.2	2.4	3.4
1953	2.0	0.8	1.1	4.5	3.3	3.7	3.4	1.2
1954	2.2	-3.5	-0.1	-1.4	-2.9	2.2	-1.4	6.0
1955	4.7	4.7	4.6	8.9	4.2	4.0	4.1	0.1
1956	-0.4	-2.1	-1.0	2.1	2.7	4.3	3.2	1.7
1957	2.5	-1.4	0.9	1.8	-0.1	3.2	0.9	3.9
1958	2.4	-4.2	0.3	-2.1	-4.3	2.2	-2.4	6.9
1959	3.1	5.0	3.6	7.6	4.5	2.5	3.9	-1.8
1960	0.9	-1.7	0.1	1.4	0.5	3.2	1.3	2.7
1961	3.4	-0.3	1.6	2.1	-0.3	2.4	0.5	3.8
1962	4.7	3.4	3.6	7.0	3.2	3.4	3.3	1.2
1963	3.5	0.9	2.6	4.6	1.2	3.6	1.9	2.6
1964	4.4	2.7	3.9	6.9	2.3	4.1	2.8	1.7
1965	3.1	1.6	2.7	6.9	3.6	5.2	4.1	1.4
1966	3.4	0.6	2.7	7.0	3.3	6.3	4.2	2.8
1967	1.9	-4.0	0.1	1.8	-0.2	6.0	1.7	6.2
1968	3.5	0.4	2.7	5.3	1.4	4.9	2.5	3.1
1969	0.1	-2.0	-0.8	3.0	3.4	5.2	3.9	2.2
1970	1.3	-4.7	-0.7	-0.4	-1.3	4.6	0.4	6.4
1971	4.0	-0.3	3.0	3.7	-0.6	4.0	0.7	4.3
1972	3.3	2.4	3.1	6.8	3.3	4.3	3.6	0.8
1973	3.2	1.7	2.9	7.4	3.8	5.5	4.3	1.5
1974	-1.6	-6.7	-3.5	-1.6	0.7	5.5	2.0	5.4
1975	2.4	-5.7	0.0	-2.0	-4.4	3.8	-2.1	8.5
1976	3.5	3.7	3.8	6.9	3.0	3.1	3.0	-0.2
1977	1.7	2.3	1.8	6.0	4.3	3.6	4.1	-0.5
1978	0.9	1.2	1.0	6.0	5.1	4.8	5.0	-0.2
1979	-0.9	-2.4	-1.2	2.6	3.2	5.2	3.8	1.6
1980	-0.3	-6.3	-2.3	-1.1	-0.5	5.5	1.2	6.4
1981	1.4	-3.2	-0.5	2.2	1.5	5.5	2.7	4.7
1982	-0.7	-7.2	-3.4	-3.2	-1.4	4.3	0.2	7.0
1983	3.5	2.2	2.8	5.4	2.2	3.1	2.5	1.2
1984	2.2	3.8	2.6	8.3	6.1	4.3	5.5	-1.6
1985	0.8	-1.6	-0.1	3.3	2.7	4.9	3.4	2.4
1986	2.6	-1.7	0.9	3.3	1.3	5.1	2.4	4.4
1987	0.2	-0.1	-0.1	3.4	3.5	3.5	3.5	0.2
1988	0.9	1.3	0.5	4.5	4.3	3.1	3.9	-0.4
1989	-0.1	-0.4	-0.5	2.5	3.1	2.9	3.0	0.3
1990	0.5	-1.8	-0.6	0.7	0.7	2.5	1.2	2.4
1991	1.0	-3.1	-1.0	-1.5	-1.4	1.7	-0.5	4.2
1992	3.0	1.2	1.5	2.7	1.1	1.5	1.2	1.8

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 modified by the Bureau of Labor Statistics (BLS), U.S. Department of Labor. Compensation and hours data are from the BLS. Capital measures are based on data supplied by BEA and the U.S. Department of Agriculture.

(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 the hours at work of all persons including employees, proprietors, and unpaid family workers classified by education, work experience and gender. Index is computed by combining changes in the hours of each education, experience and gender group by its 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.

Table 5. Real capital inputs by asset types, 1948-92

Average annual growth rates (percent)

Private business

Period	All Assets	Equip-ment	Structures	Rental Residential Capital	Inventories	Land
1948-92	3.7	5.2	3.3	2.6	3.3	2.5
1948-73	3.9	5.5	3.5	2.5	4.0	2.3
1973-79	4.0	6.2	3.0	2.7	3.6	2.0
1979-90	3.8	4.6	3.4	3.1	2.1	3.6
1990-92	1.5	2.0	1.5	0.7	0.2	1.2
1991	1.5	2.0	1.8	0.7	-0.9	1.4
1992	1.4	1.9	1.2	0.7	1.2	1.0

Private nonfarm business

Period	All Assets	Equip-ment	Structures	Rental Residential Capital	Inventories	Land
1948-92	4.0	5.4	3.4	2.6	3.4	3.4
1948-73	4.1	5.6	3.5	2.5	4.2	3.2
1973-79	4.3	6.3	3.0	2.7	3.8	3.8
1979-90	4.1	5.0	3.6	3.1	2.2	4.0
1990-92	1.6	2.2	1.6	0.6	0.1	1.5
1991	1.7	2.2	1.9	0.6	-1.0	1.7
1992	1.5	2.1	1.3	0.7	1.2	1.2

Source: Bureau of Labor Statistics

Table 6. Private business sector: Real capital inputs by asset types, 1948-92

Index 1987 = 100

Period	All Assets	Equip-ment	Structures	Rental Residential Capital	Inventories	Land
1948	21.9	12.2	26.2	35.1	26.3	36.2
1949	22.4	13.4	26.6	35.5	25.6	36.8
1950	23.4	14.6	27.0	35.9	27.8	37.4
1951	24.7	15.6	27.6	36.3	31.6	37.9
1952	25.7	17.0	28.3	36.6	32.8	38.6
1953	26.6	18.2	29.2	36.9	33.4	39.4
1954	27.2	19.1	30.1	37.3	32.6	40.3
1955	28.2	20.1	31.1	37.7	34.7	41.0
1956	29.4	21.1	32.4	38.1	36.4	42.0
1957	30.2	22.2	33.8	38.5	36.4	43.1
1958	30.9	22.8	35.0	39.0	36.0	44.1
1959	31.6	23.2	36.1	39.8	37.0	45.1
1960	32.5	23.8	37.3	40.6	38.7	45.8
1961	33.3	24.4	38.5	41.5	38.6	46.7
1962	34.3	25.1	39.8	42.7	40.6	47.7
1963	35.5	26.0	41.1	44.3	42.3	48.8
1964	36.9	27.2	42.6	46.0	44.1	50.2
1965	38.7	28.8	44.4	47.8	47.0	51.7
1966	41.1	31.0	46.7	49.4	51.0	53.5
1967	43.4	33.3	48.9	50.8	55.3	55.2
1968	45.4	35.3	51.1	52.4	58.1	56.7
1969	47.6	37.5	53.3	54.6	60.9	58.2
1970	49.7	39.7	55.5	56.8	62.7	59.6
1971	51.6	41.6	57.5	59.0	64.2	60.8
1972	53.7	43.9	59.3	61.8	66.1	62.1
1973	56.5	46.9	61.4	64.7	69.7	63.9
1974	59.4	50.5	63.4	66.7	73.6	65.7
1975	61.5	53.4	65.3	67.8	74.2	67.4
1976	63.3	55.8	66.9	68.9	75.6	68.7
1977	65.4	58.7	68.6	70.2	78.1	70.1
1978	68.4	63.1	70.7	72.1	82.6	71.5
1979	71.5	67.3	73.4	75.9	86.0	71.8
1980	75.4	71.4	76.7	81.2	86.0	77.1
1981	79.4	75.3	80.7	85.9	87.1	81.6
1982	82.6	78.5	84.8	88.6	87.1	84.8
1983	85.0	81.2	88.0	90.0	86.0	87.7
1984	88.4	84.8	91.0	92.1	91.9	91.2
1985	92.5	90.1	94.4	94.9	96.1	94.4
1986	96.9	95.5	97.5	97.6	99.3	96.9
1987	100.0	100.0	100.0	100.0	100.0	100.0
1988	102.8	103.9	102.1	102.5	103.1	101.7
1989	105.6	107.6	104.3	104.6	106.2	103.1
1990	108.1	110.8	106.5	106.0	107.8	105.5
1991	109.8	113.0	108.5	106.6	106.9	107.0
1992	111.3	115.2	109.7	107.4	108.2	108.0

Source: Bureau of Labor Statistics

Table 7. Private nonfarm business sector: Real capital inputs by asset types, 1948-92

Index 1987 = 100

Period	All Assets	Equip-ment	Structures	Rental Residential Capital	Inventories	Land
1948	20.1	11.6	25.9	34.8	24.6	25.1
1949	20.5	12.6	26.3	35.2	23.8	25.6
1950	21.5	13.6	26.7	35.6	26.1	26.2
1951	22.7	14.5	27.2	36.1	30.0	26.7
1952	23.7	15.9	28.0	36.4	31.1	27.4
1953	24.6	17.1	28.8	36.7	31.7	28.1
1954	25.1	18.0	29.7	37.0	30.9	29.0
1955	26.1	18.9	30.8	37.4	33.0	29.7
1956	27.2	20.0	32.1	37.8	34.8	30.5
1957	28.1	21.0	33.5	38.2	34.8	31.6
1958	28.7	21.6	34.7	38.8	34.3	32.5
1959	29.4	22.0	35.7	39.5	35.3	33.4
1960	30.4	22.7	36.9	40.4	37.1	34.4
1961	31.1	23.3	38.2	41.3	36.9	35.3
1962	32.2	24.0	39.4	42.5	38.8	36.3
1963	33.4	24.9	40.7	44.0	40.6	37.5
1964	34.7	26.0	42.1	45.8	42.4	38.8
1965	36.5	27.6	44.0	47.6	45.2	40.4
1966	38.9	29.8	46.2	49.2	49.3	42.3
1967	41.2	32.0	48.4	50.6	53.6	44.1
1968	43.2	33.9	50.6	52.2	56.4	45.8
1969	45.4	36.1	52.8	54.4	59.2	47.6
1970	47.5	38.3	55.0	56.5	61.0	49.2
1971	49.4	40.2	57.0	58.8	62.6	50.8
1972	51.5	42.3	58.9	61.6	64.3	52.4
1973	54.4	45.3	60.9	64.5	68.2	55.1
1974	57.4	48.8	63.0	66.5	72.4	57.6
1975	59.6	51.7	64.8	67.7	73.1	60.0
1976	61.5	54.0	66.4	68.7	74.6	62.0
1977	63.7	56.9	68.0	70.1	78.0	64.1
1978	66.8	61.3	70.1	72.0	82.0	66.0
1979	70.2	65.5	72.8	75.8	85.5	68.7
1980	74.1	69.6	76.1	81.2	85.5	73.4
1981	78.1	73.6	80.2	85.8	86.5	78.7
1982	81.5	76.9	84.4	88.5	86.4	82.4
1983	84.0	79.8	87.7	90.0	85.3	85.6
1984	87.6	83.6	90.7	92.0	91.5	89.6
1985	91.9	89.3	94.2	94.9	95.8	93.1
1986	96.6	95.1	97.4	97.6	99.0	96.6
1987	100.0	100.0	100.0	100.0	100.0	100.0
1988	103.1	104.3	102.2	102.5	103.5	101.8
1989	106.1	108.3	104.5	104.6	106.9	103.4
1990	108.7	111.8	107.0	106.1	108.6	105.8
1991	110.6	114.3	109.0	106.7	107.5	107.6
1992	112.3	116.7	110.4	107.4	108.8	108.9

Source: Bureau of Labor Statistics

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