



Internet address: <http://www.bls.gov/mfp>
Historical, technical
information: (202) 691-5606
Media contact: (202) 691-5902

USDL 09-0480
For Release: 10:00 AM EDT
Wednesday, May 6, 2009

PRELIMINARY MULTIFACTOR PRODUCTIVITY TRENDS, 2008

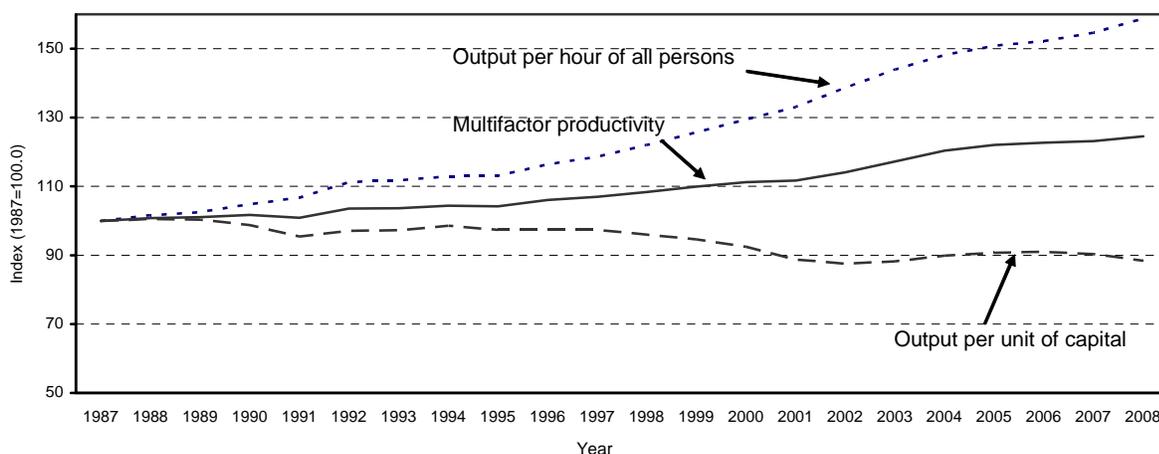
Private Business Sector and Private Nonfarm Business Sector

Multifactor productivity, defined as output per combined units of labor and capital inputs, grew at an annual rate of 1.2 percent in the private business sector and 1.1 percent in the private nonfarm business sector for 2008, the Bureau of Labor Statistics (BLS) and the U.S. Department of Labor reported today.

	2007-08
Private business sector	1.2
Private nonfarm business sector	1.1

The estimates of multifactor productivity in the private business and in the private nonfarm business sectors for 2008 both show the largest annual rates of growth since 2005. The 2007-08 annual changes are summarized in tables A and B. Table B also presents data showing historical trends.

Chart 1. Output per hour of all persons, output per unit of capital, and multifactor productivity in the private business sector, 1987-2008



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 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 a single factor--the change in hours of all persons engaged in production.

Table A. Productivity and related data, percent changes 2007-08

	Private Business ¹	Private Nonfarm Business ¹
<u>Productivity</u>		
Multifactor productivity ²	1.2	1.1
Output per hour of all persons	2.7	2.8
Output per unit of capital services	-2.1	-2.0
<u>Output</u>	0.8	0.8
<u>Inputs</u>		
Labor input ³	-1.9	-1.8
Hours	-1.9	-2.0
Labor composition ⁴	-0.1	0.1
Capital services	2.9	3.0
Combined units of labor and capital inputs ⁵	-0.3	-0.3
<u>Analytic ratio:</u>		
Capital services per hour of all persons	4.9	5.0

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.

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 1987-2008 period for the private business sector. Over the last 21 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.

Multifactor productivity rose 1.2 percent for the private business sector in 2008 (see table A). The multifactor productivity gain in 2008 reflected a 0.8-percent increase in output and a 0.3-percent decrease in the combined inputs of capital and labor.

Capital services grew 2.9 percent. Labor input posted a decrease of 1.9 percent, as both hours worked and labor composition fell. Labor input reflects the change in hours at work adjusted for the effects of changing labor composition. The decrease of labor input was due mostly to a decrease in hours at work of 1.9 percent and a decrease in labor composition of 0.1 percent. The capital-labor ratio (capital services per hour of all persons) increased by 4.9 percent.

Labor productivity (output per hour worked) increased 2.7 percent. Capital productivity (output per unit of capital services) fell 2.1 percent. As shown in table B, the contribution of labor composition was unchanged from 2007 to 2008, while the contribution of capital intensity growth gained 1.6 percent over the same period.

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. 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 and for 2007-2008.

Private nonfarm business sector

Multifactor productivity rose 1.1 percent for the private nonfarm business sector in 2008 (see table A). The multifactor productivity gain in 2008 reflected a 0.8-percent increase in output and a 0.3-percent decrease in the combined inputs of capital and labor.

Capital services grew 3.0 percent. Labor input posted a decrease of 1.8 percent, as hours worked declined and labor composition rose slightly. The decrease of labor input was due to a decrease of 2.0 percent in hours at work and an increase of 0.1 percent in labor composition. The capital-labor ratio (capital services per hour of all persons) increased by 5.0 percent.

Labor productivity (output per hour worked) increased 2.8 percent. Capital productivity (output per unit of capital services) fell 2.0 percent. The contribution of labor composition rose 0.1 percent, while the contribution of capital intensity growth gained 1.6 percentage points from the previous period (see table B).

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, 1987-2008

(Percent per year)

	1987-2008	1987-1990	1990-1995	1995-2000	2000-2007	2007-2008
<u>Private business</u> ¹						
Output per hour of all persons	2.2	1.6	1.5	2.7	2.6	2.7
Contribution of capital intensity ²	0.9	0.6	0.6	1.2	0.9	1.6
Contribution of labor composition ³	0.3	0.4	0.5	0.2	0.2	0.0
Multifactor productivity ⁴	1.1	0.6	0.5	1.3	1.5	1.2
<u>Private nonfarm business</u> ¹						
Output per hour of all persons	2.2	1.5	1.6	2.5	2.5	2.8
Contribution of capital intensity ²	0.9	0.6	0.6	1.2	0.9	1.6
Contribution of labor composition ³	0.3	0.4	0.5	0.2	0.2	0.1
Multifactor productivity ⁴	1.0	0.5	0.5	1.1	1.4	1.1

¹ Excludes government enterprises.

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

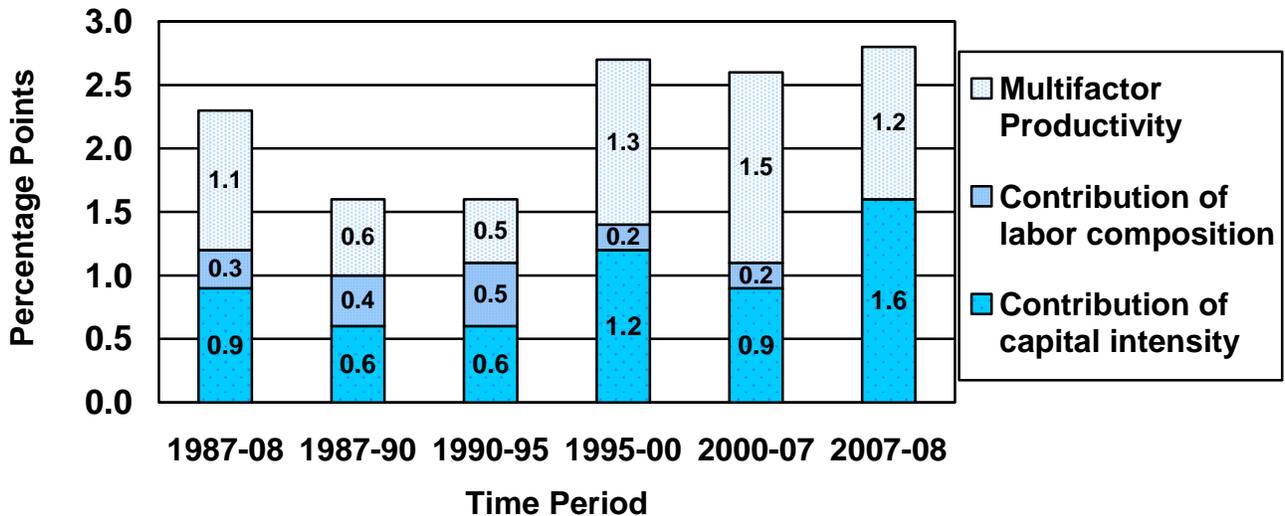
³ Growth rate of labor composition (the growth rate of labor input less the growth rate of the hours of all persons) multiplied by labor's share of current dollar costs.

⁴ 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.

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.

Chart 2. Contributors to growth in output per hour, private business sector, selected time periods



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

Notes

While capital services by major sector are estimated for 2008, these preliminary estimates do not include an update of capital services by asset type. Measures of capital services through 2007 can be found in tables 5 and 6 of “Multifactor Productivity Trends, 2007” located at http://www.bls.gov/news.release/archives/prod3_03252009.pdf.

The data in this press release reflect updated methodology that was introduced in the March 25th, 2009 press release, “Multifactor Productivity Trends, 2007” located at http://www.bls.gov/news.release/archives/prod3_03252009.pdf. These data reflect 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>.

Summary of Methods

The methodology for preliminary estimates is discussed in “Preliminary estimates of multifactor productivity growth” located at <http://www.bls.gov/opub/mlr/2005/06/art3abs.htm>. This release uses a methodology for preliminary estimates that uses data that are available shortly after the end of the calendar year. The methodology is a simplified version of the full methodology that BLS uses when more detailed information is available. Preliminary estimates for the private nonfarm business sector are produced using the same methodology as that used for the production of estimates for the private business sector; the only difference is that the farm sector is excluded.

Capital Input: Capital input measures the services derived from the stock of physical assets and software. The assets included are computers, software, communications and other information processing equipment, other fixed business equipment, structures, inventories, rental residences, and land. Investments, depreciation, capital income, and rental prices are estimated for each of these eight aggregates. Rental prices reflect the nominal rates of return and the rates of economic depreciation and revaluation for the specific asset. Rental prices are adjusted for the effects of taxes. Data on investments in physical assets are obtained from the Bureau of Economic Analysis (BEA). Capital input measures constructed for the preliminary MFP measures are based on less detail than those for the full MFP measures.

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 Current Population Survey (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 preliminary estimate of the 2008 labor composition index assumes that relative wages across groups remained constant between 2007 and 2008. 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. BLS adjusts BEA output measures to remove the output of government enterprises.

Table 1. Private business sector: Indexes of productivity and related measures, 1987-2008¹

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
2008	122.7	95.6	112.0	120.4	100.3	125.9	107.6	128.3

See footnotes following table 4.

Source: Bureau of Labor Statistics

Table 2. Private nonfarm business sector: Indexes of productivity and related measures, 1987-2008¹

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
2008	122.3	95.1	111.4	120.4	100.9	126.7	108.1	128.8

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, 1988-2008¹

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
2008	2.7	-2.1	1.2	0.8	-1.9	2.9	-0.3	4.9

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, 1988-2008¹

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	1.0	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
2008	2.8	-2.0	1.1	0.8	-1.8	3.0	-0.3	5.0

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.