

## Annual Industry Accounts

### Introducing KLEMS Input Estimates for 1997–2003

By Erich H. Strassner, Gabriel W. Medeiros, and George M. Smith

THE mix of materials and services purchased as inputs to produce the U.S. economy's total output has shifted in recent years, reflecting a broad move toward a more services-oriented economy. A good part of this shift reflects the higher demand for purchased-services inputs and the increased outsourcing of professional and business services by U.S. firms. In each year from 1997 to 2003, every dollar of gross output represented a progressively higher percentage of purchased services and a lower percentage of materials. Materials inputs, however, continue to represent a significant share of inputs used by firms to produce goods and services in the United States. Price changes for these inputs, along with changes in energy prices, strongly affected output prices throughout the economy.

These are the broad findings of a new set of estimates recently introduced by the Bureau of Economic Analysis (BEA). (See the box "New Estimates From the Annual Industry Accounts" on page 32.) These estimates, which BEA will update annually, provide greater detail on the types of inputs that are consumed by industries in the production of goods and services. It aggregates the rich product detail underlying the industry estimates of intermediate inputs into three cost categories—energy, materials, and purchased services.<sup>1</sup> These estimates are prepared by applying a KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) production framework to BEA's estimates of industry production based on the 1997 North American Industry Classification System.<sup>2</sup> The result is a set of industry estimates that are consistent with the published annual industry accounts for 1997–2003. BEA developed this new set of estimates in response to demand from data users. The goal was

to facilitate research into a wide array of economic issues.

The new estimates shed more light at the industry level on the increasingly services-oriented nature of the economy. Purchased-services inputs as a percentage of gross output increased from 22.5 percent in 1997 to 25.1 percent in 2003. That means that every dollar of output in 2003 reflected 25.1 cents worth of purchased services. The strong growth of purchased services as inputs was evident within the goods-producing and services-producing sectors.

In contrast, materials inputs as a percentage of gross output decreased from 20.6 percent to 17.2 percent. Real demand for materials inputs was mixed in this period. During the expansion in the late 1990s, real growth for materials inputs was strong, propelled by strong demand for information and communications technology products. However, weaker demand for the Nation's gross output during the economic slowdown in 2001 and the recovery in 2002–2003 led to a sustained reduction in demand for materials inputs, especially in the goods-producing sector.

The new data also clarify the impact of price changes for energy inputs on overall prices for the Nation's output. Price increases for natural gas consumed in the production of electricity and for fuels consumed by transportation industries contributed strongly to higher economy-wide gross output prices. This effect was most evident in 2000 and 2003 when energy prices spiked.

Other highlights of BEA's new KLEMS estimates include the following:

- Intermediate inputs as a percentage of the Nation's gross output decreased 1.0 percentage point, and value added's share increased 1.0 percentage point in 1997–2003.<sup>3</sup> These trends primarily reflected an increase in the percentage of labor inputs and a decrease in consumption of materials inputs that more than offset gains in purchased-services inputs.

1. BEA first prepared a decomposition of intermediate inputs into cost categories in 2002. See Erich H. Strassner and Brian C. Moyer, "An Analysis of the Composition of Intermediate Inputs by Industry" (paper presented at the 14<sup>th</sup> International Conference on Input-Output Techniques in Montreal, Canada, October 2002); <[www.bea.gov/bea/working\\_paper.htm](http://www.bea.gov/bea/working_paper.htm)>.

2. See Dale W. Jorgenson, Frank M. Gallop, and Barbara M. Fraumeni, *Productivity and U.S. Economic Growth* (Cambridge, MA: Harvard University Press, 1987).

3. Gross output reflects the value of intermediate inputs that are consumed in producing output and the additional value created by labor and capital.

- Real growth in purchased-services inputs demonstrated the highest average annual growth among inputs for 1997–2003. Demand for purchased services by the finance, insurance, real estate, rental, and leasing industry group and the professional and business services industry group contributed 2.25 percentage points, or almost half, of the 4.9-percent average annual growth for real purchased-services inputs.
- Energy inputs as a share of U.S. production dropped slightly in 1997–2003, to 1.9 cents per dollar of U.S. output in 2003. During this period, real demand for energy in the goods-producing sector fell on average 3.2 percent annually, while real demand for energy in the services-producing sector grew 1.3 percent.
- Fluctuations in economy-wide prices for gross output were significantly driven by price changes for energy and materials inputs. Economy-wide gross

output price growth increased 2.8 percent in 2000 and 2.6 percent in 2003. Materials inputs, largely reflecting the impact of petroleum-related prices, and energy inputs accounted for almost 40 percent of the 2.8-percent growth in 2000 and 35 percent of the 2.6-percent growth in 2003.<sup>4</sup>

The remainder of this article includes a discussion of industry trends and developments, a brief summary of the assumptions used to develop a conceptual framework for these new estimates, and a description of the estimation methodology used to prepare the KLEMS estimates. In addition, the full set of KLEMS estimates are presented in tables 1–11 at the end of the article.

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4. Petroleum-derived products are defined mostly as materials when consumed by petroleum and coal products or chemical manufacturing. For more information, see the methodology section in this article.

### New Estimates From the Annual Industry Accounts

Over the past several years, BEA has improved the usefulness of the industry accounts in many ways. Much of this effort has focused on providing more accurate, more timely, and more detailed data. With the release of the new KLEMS estimates, BEA now provides more analytically useful aggregations of intermediate inputs in current dollars and in chain-type quantity and price indexes.

The availability of these new estimates was made possible by the integration of the annual industry accounts, which consist of the gross-domestic-product-by-industry accounts and the annual input-output (I-O) accounts.<sup>1</sup> The integration of these accounts resulted in annual time series of industry data on gross output, intermediate inputs, and value added, estimated within a balanced I-O framework.<sup>2</sup> The balanced I-O “use” table, which shows the commodity composition of intermediate inputs by industry and final demand, provides the necessary commodity detail for aggregating estimates of intermediate inputs into cost categories.

In recent years, industry analyses have explored the relationship among gross output, value added, and intermediate inputs, using BEA’s industry accounts. Such studies have examined the substitution between primary, or value-added, factors of production (labor and capital)

and secondary, or intermediate, factors of production (energy, materials, and purchased services), the sources of economic growth for industries, and the impact of input prices on aggregate price change. These new KLEMS estimates will facilitate additional analyses.

The new estimates also introduce three new measures for analyzing industry gross output. The first measure identifies the percentage-point contributions of an industry’s primary and secondary inputs to the percent change in the industry’s chain-type quantity and price indexes for gross output. The second measure identifies the contribution of each industry to the percent change in the chain-type quantity and price indexes for economy-wide use of energy, materials, and purchased-services inputs. The final measure is a set of estimates on gross output unit costs by industry group, which provides information on the changing cost structure of an industry’s inputs.

BEA will revise these KLEMS estimates, including the estimates of intermediate inputs by industry and the new measures for analyzing industry gross output, as part of its annual revision to the annual industry accounts. This fall, BEA will release revised estimates of the annual industry accounts for 2002–2004, including revised KLEMS estimates for 2002 and 2003 and new KLEMS estimates for 2004.<sup>3</sup>

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1. For more information, see Brian C. Moyer, Mark A. Planting, Mahnaz Fahim-Nader, and Sherlene K. S. Lum, “Preview of the Comprehensive Revision of the Annual Industry Accounts: Integrating the Annual Input-Output and the Gross-Domestic-Product-by-Industry Accounts,” *SURVEY* 84 (March 2004): 38–51.

2. A limitation of BEA’s early work in preparing cost category aggregations of intermediate inputs was the lack of an annual time series of I-O “use” tables. In the earlier GDP-by-industry accounts, the annual I-O “use” tables were incorporated irregularly.

3. The currently published 2004 industry data are the advance GDP-by-industry estimates, which do not include information on the composition of intermediate inputs or gross output. These estimates will be revised using the integrated annual industry accounts methodology, in which the annual I-O accounts for 2004 will be introduced. As a result, the KLEMS estimates will be made available for 2004 as well.

## Industry Trends

The KLEMS estimates for 1997–2003 offer new insights into the sources of input substitution, economic growth, and structural change in the U.S. economy in two distinct periods: The period of strong economic growth in the late 1990s and the period of economic slowdown in 2001 and the recovery in 2002–2003. This section identifies interesting developments during these two periods regarding inputs to production, real economic growth, price growth, and unit costs.

### Inputs to production

The economy's gross output is defined as the value of all goods and services produced in a given year by U.S. industries at producer prices. (See the box "Key Terms.") The production of gross output requires inputs that are classified in two categories: Primary, or value-added, inputs, which consist of labor and capital, and secondary, or intermediate, inputs, which consist of energy, materials, and purchased services. Changes over time in gross output reflect changes in the primary and secondary inputs to production and multifactor productivity growth.

The composition of gross output exhibited two distinct trends in 1997–2003 (chart 1). Overall, intermediate inputs as a percent of U.S. output decreased 1.0 percentage point, and value added increased 1.0 percentage point. However, in 1997–2000, consumption of intermediate inputs as a percent of U.S. output increased 0.8 percentage point to 46 percent of U.S. output, or 46 cents per dollar of U.S. output, reflecting the increased use of purchased-services inputs (table A). The share of value added decreased 0.8 percentage point to 54.0 percent of U.S. output, or 54 cents per

dollar of U.S. output, largely reflecting a 1.7-percentage-point decline in gross operating surplus, which is a combination of capital inputs and net profits in the annual industry accounts. Over 2000–2003, the demand for purchased-services inputs continued its uptrend, but at a more moderate pace. Consequently, these moderate increases were more than offset by the continuing demand-driven downturn in consumption of material inputs (chart 2). Value added recovered

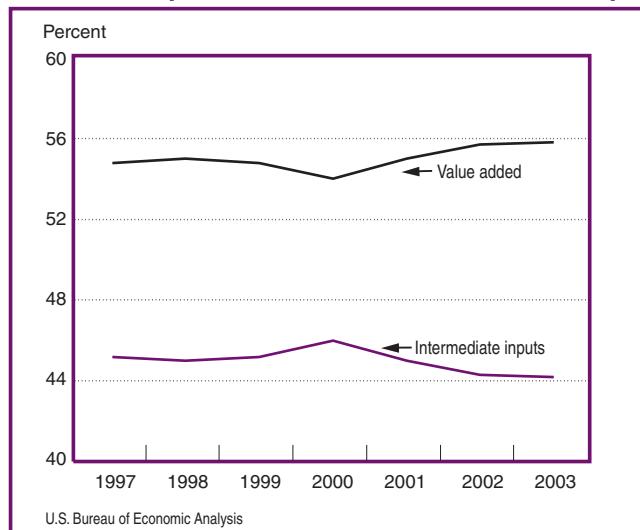
**Table A. Components of Current-Dollar Gross Output by Sector as a Percentage of Gross Output**

Line		1997	1998	1999	2000	2001	2002	2003
1	All industries .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2	Value added.....	54.8	55.0	54.8	54.0	55.0	55.7	55.8
3	Compensation of employees .....	30.8	31.6	31.7	31.8	32.3	32.3	31.9
4	Taxes on production and imports less subsidies .....	3.8	3.8	3.7	3.7	3.7	3.9	3.8
5	Gross operating surplus .....	20.2	19.6	19.4	18.5	19.1	19.6	20.1
6	Intermediate inputs .....	45.2	45.0	45.2	46.0	45.0	44.3	44.2
7	Energy inputs.....	2.0	1.7	1.7	2.0	2.0	1.9	1.9
8	Materials inputs .....	20.6	19.8	19.4	19.2	18.2	17.4	17.2
9	Purchased-services inputs .....	22.5	23.5	24.1	24.8	24.8	25.0	25.1
10	Private goods-producing industries <sup>1</sup> .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
11	Value added.....	37.2	38.1	37.8	38.0	38.4	39.1	39.9
12	Compensation of employees .....	22.0	23.0	23.2	23.7	24.2	24.5	24.2
13	Taxes on production and imports less subsidies .....	1.1	0.9	0.8	0.8	0.9	1.1	1.1
14	Gross operating surplus .....	14.2	14.1	13.8	13.5	13.3	13.4	14.5
15	Intermediate inputs .....	62.8	61.9	62.2	62.0	61.6	60.9	60.1
16	Energy inputs.....	1.9	1.6	1.6	1.7	1.8	1.6	1.7
17	Materials inputs .....	45.8	44.8	44.7	44.6	43.2	42.5	41.8
18	Purchased-services inputs .....	15.1	15.5	15.9	15.7	16.7	16.7	16.6
19	Private services-producing industries <sup>2</sup> .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
20	Value added.....	63.0	62.3	62.0	60.4	61.6	62.1	61.9
21	Compensation of employees .....	31.4	32.1	32.2	32.2	32.4	32.0	31.6
22	Taxes on production and imports less subsidies .....	6.3	6.2	6.0	5.8	5.7	5.9	5.9
23	Gross operating surplus .....	25.3	24.1	23.8	22.4	23.4	24.2	24.5
24	Intermediate inputs .....	37.0	37.7	38.0	39.6	38.4	37.9	38.1
25	Energy inputs.....	1.9	1.6	1.6	1.9	1.8	1.7	1.8
26	Materials inputs .....	8.3	8.1	7.9	8.0	7.7	7.4	7.4
27	Purchased-services inputs .....	26.9	27.9	28.5	29.7	28.9	28.8	28.9

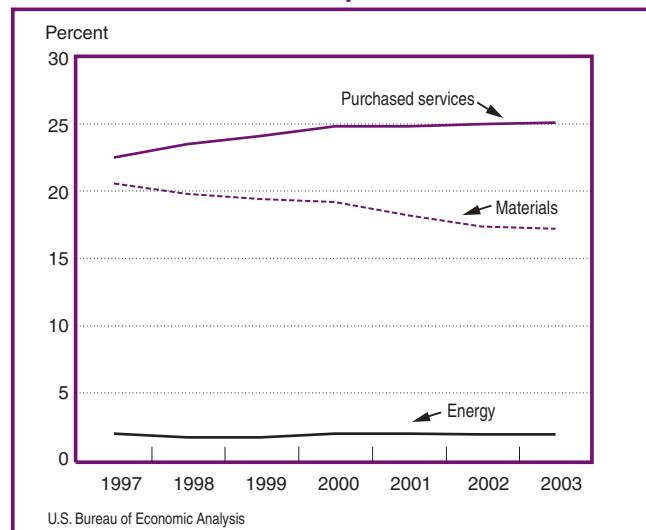
1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

### Chart 1. Composition of All Industries Gross Output



### Chart 2. Intermediate Inputs as a Percentage of All Industries Gross Output



strongly in 2000–2003, reflecting mainly a capital- and productivity-driven 1.6-percentage-point increase in gross operating surplus. That increase helped push value added to 55.8 percent of U.S. output in 2003, or roughly 56 cents per dollar of U.S. output (chart 3).

These broad economy-wide shifts in inputs structure were not uniform across the services-producing and the goods-producing sectors. The services-producing sector increased its consumption of purchased-services inputs sharply in 1997–2000. The boost in consumption reflected strong demand for purchased-services inputs, especially in the information group

(4.5 percentage points) and in the finance, insurance, real estate, rental, and leasing industry group (3.2 percentage points) (see table 2 at the end of the article). These increases led to an overall shift towards intermediate inputs, as the share of value added fell, largely reflecting a 2.9-percent fall in the share of gross operating surplus. In the goods-producing sector, however, the shift towards purchased services was less significant. A 0.6-percentage-point increase was not enough to offset a more significant decrease in consumption of materials inputs. In the goods-producing sector, the share of value added increased 0.8

### Key Terms

The following key terms are used to describe data from the annual industry accounts.

**Gross output.** The goods and services produced by an industry in a given year and valued at producers prices (prices received by the industry, including excise and sales taxes). Gross output is measured by summing the value of an industry's sales or receipts, other operating income, commodity taxes, and inventory change. Gross output reflects (1) the value of intermediate inputs (energy, materials, and purchased services) that the industry consumes in producing its gross output and (2) the additional value created by the industry's labor and capital in this production. Labor and capital are an industry's primary inputs to production; intermediate inputs are an industry's secondary inputs. Gross output is purchased by final consumers and by industries. Because gross output may be produced and consumed as an intermediate input in the same year, aggregations of gross output across industries reflect double-counting.

**Intermediate inputs.** The energy, raw materials, semi-finished goods, and services that an industry consumes in producing its gross output, including inputs produced by and purchased from domestic industries and foreign sources. In the KLEMS production framework, intermediate inputs are grouped into three categories: Energy (E), materials (M), and purchased services (S).

**Value added.** The additional value created by an industry's capital and labor in the production process. Value added is measured as the value of the industry's gross output, less the value of intermediate inputs that industry consumes producing this gross output. Value added can also be measured as the sum of the industry's return to labor (compensation of employees), net return to government (taxes on production and imports less subsidies), and return to capital (gross operating surplus). The value added of all industries equals gross domestic product (GDP). Therefore, the value added of an industry measures the contribution of its capital and labor, including changes in productivity, to GDP. Measures of

current-dollar value added are valued at current-year prices; measures of real (or price-adjusted) value added are valued at the prices of a base year. In the annual industry accounts, real value added is computed using the double-deflation technique, in which an industry's real intermediate inputs are subtracted from its real gross output. In the KLEMS production framework, value-added inputs are grouped into two categories: Capital (K) and labor (L).

**Compensation of employees.** The income accrued to employees as remuneration for their work for domestic production. Compensation of employees is the sum of wage and salary accruals and of supplements to wages and salaries. It reflects the compensation per hour worked that accrues to employees and the total hours worked by employees.

**Taxes on production and imports less subsidies.** Taxes on production and imports consist of Federal excise taxes and customs duties and of state and local sales taxes, property taxes (including residential real estate taxes), motor vehicle licenses, severance taxes, other taxes, and special assessments. Subsidies are monetary grants paid by government agencies to private business and to government enterprises.

**Gross operating surplus.** The profits-like measure of business income estimated in the annual industry accounts by subtracting the costs of compensation of employees and of "taxes on production and imports less subsidies" from value added. Alternatively, gross operating surplus consists of private domestic enterprises' business income (corporate profits before tax with inventory valuation adjustment (IVA) and without capital consumption adjustment (CCAdj), proprietors' income with IVA and without CCAdj, and rental income of persons without CCAdj), net interest and miscellaneous payments, business current transfer payments (net), private capital consumption allowances, current surplus of government enterprises, and consumption of fixed capital for owner-occupied housing, nonprofit institutions primarily serving households, and government.

percentage point, partly reflecting an increase in demand for labor, which is accounted for in the 1.7-percentage-point increase in compensation of employees.

In 2000–2003, the economy-wide shift back towards value added reflected capital and productivity gains in both the services-producing and the goods-producing sectors. During this time, the share of gross operating surplus as a percent of U.S. output increased 2.1 percentage points in the services-producing sector and 1.0 percentage point in the goods-producing sector. These increases, along with the continuing downtrend in demand for materials inputs within both sectors, contributed to increases in value-added's share within each sector.

Over 1997–2003, value added as a percent of gross output for the services-producing sector fell 1.1 percentage points; in contrast, value added as a percent of

gross output in the goods-producing sector increased 2.7 percentage points. Within intermediate inputs, each sector shifted away from materials inputs with relatively weaker demand for materials inputs within the goods-producing sector, specifically during the late 1990s. Increased demand for intermediate inputs in the services-producing sector reflected gains of 2.0 percentage points for purchased-services inputs, and gains for value added in the goods-producing sector primarily reflect gains of 2.2 percentage points for compensation of employees.

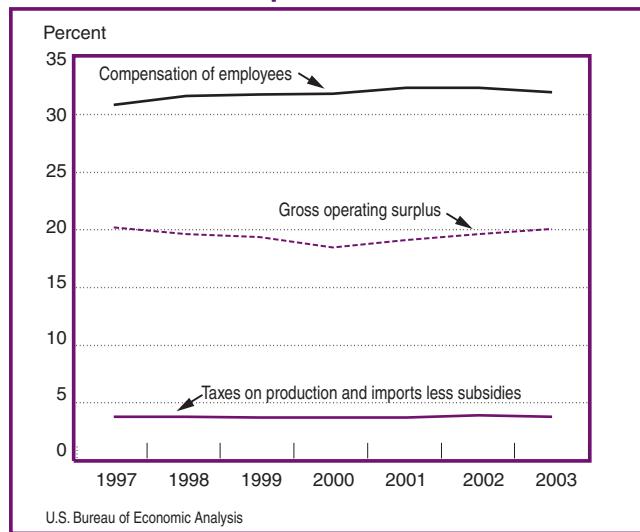
### Real economic growth

Growth rates in the chain-type quantity indexes for gross output, value added, and intermediate inputs by cost category indicate whether the quantities of an industry's value added and its energy, materials, and purchased-services inputs are growing faster or slower than its output. The impact of the use of these inputs on growth in real gross output for the industry can be identified by examining the inputs' percentage-point contribution to the percent change in the industry's real gross output.<sup>5</sup> In addition, the extent to which an industry's real demand for an input is contributing to the economy-wide real demand for the input can be identified.

In 1997–2003, real demand for purchased-services inputs averaged the highest annual growth of all inputs used in the production of U.S. output, at 4.9 percent (table B). Real demand for these inputs far outpaced real growth for value added (3.0-percent average annual growth), energy inputs (0.7 percent) and materials inputs (1.1 percent), partly reflecting the increased

5. Contributions to growth estimates depend on both the relative size and the growth rate of the contributing component. See the methodology section for more information.

**Chart 3. Value Added as a Percentage of All Industries Gross Output**



**Table B. Percent Changes in the Chain-Type Quantity Indexes for Gross Output, Value Added, and Intermediate Inputs by Sector**

Line		1998	1999	2000	2001	2002	2003	Average annual rate of change 1997–2000	Average annual rate of change 2000–2003	Average annual rate of change 1997–2003
1	All industries .....	5.3	5.1	4.6	-0.1	1.2	2.2	5.0	1.1	3.1
2	Value added .....	4.2	4.5	3.7	0.8	1.9	3.0	4.1	1.9	3.0
3	Intermediate inputs .....	6.5	6.0	5.7	-1.2	0.6	1.5	6.0	0.3	3.1
4	Energy inputs .....	0.0	2.8	4.2	-1.4	2.8	-4.1	2.3	-0.9	0.7
5	Materials inputs .....	5.1	4.1	2.3	-3.1	-1.0	-0.5	3.8	-1.5	1.1
6	Purchased-services inputs.....	8.2	7.8	8.5	0.3	1.6	3.3	8.2	1.7	4.9
7	Private goods-producing industries <sup>1</sup> .....	4.4	4.0	2.3	-3.6	-1.1	0.3	3.5	-1.5	1.0
8	Value added .....	5.3	3.8	4.8	-4.3	1.1	2.8	4.7	-0.2	2.2
9	Intermediate inputs .....	3.9	4.1	0.7	-3.2	-2.4	-1.2	2.9	-2.3	0.3
10	Energy inputs .....	-5.3	1.3	-3.0	-6.1	-1.1	-5.0	-2.4	-4.1	-3.2
11	Materials inputs .....	4.4	4.2	0.7	-4.7	-2.5	-1.7	3.1	-3.0	0.0
12	Purchased-services inputs.....	3.1	4.1	1.0	1.3	-2.6	0.5	2.7	-0.2	1.2
13	Private services-producing industries <sup>2</sup> .....	6.5	6.1	6.2	1.2	1.9	3.0	6.3	2.0	4.1
14	Value added .....	4.8	5.3	3.7	2.6	2.0	3.2	4.6	2.6	3.6
15	Intermediate inputs .....	9.4	7.5	10.4	-1.0	1.7	2.6	9.1	1.1	5.0
16	Energy inputs .....	0.7	1.1	9.4	-4.0	4.7	-3.5	3.6	-1.0	1.3
17	Materials inputs .....	7.8	4.4	7.3	-1.5	1.0	0.9	6.5	0.1	3.3
18	Purchased-services inputs.....	10.4	8.8	11.4	-0.7	1.7	3.5	10.2	1.5	5.8

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

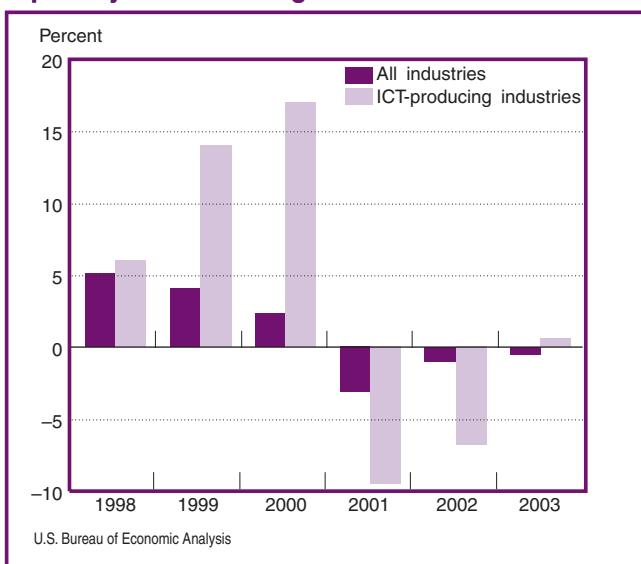
2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health

care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

outsourcing of professional and business services.<sup>6</sup> Within the services-producing sector, real demand for purchased-services inputs was especially strong, averaging 5.8 percent growth annually. Demand for purchased services by the finance, insurance, real estate, rental, and leasing industry group contributed 1.24 percentage points, or about a fourth, of the average annual growth of 4.9 percent in real purchased services. Demand by professional and business services contributed just over a fifth of the average annual growth in real purchased services.

6. In the annual industry accounts, real value added is computed using the double-deflation technique, by subtracting an industry's real intermediate inputs from its real gross output. As a result, real growth in value added reflects a combination of growth in primary inputs and in multifactor productivity. Real estimates of value added for 1997–2003 are from the annual industry accounts. The industry estimates of value added differ from the estimates of real growth in GDP in the national income and product accounts (NIPAs), which were revised as part of the 2005 NIPA annual revision. In the late fall of 2005, the annual industry accounts for 2002–2004 will be revised to be consistent with the NIPA estimates.

#### Chart 4. Real Growth in Demand for Materials Inputs by ICT-Producing Industries



Real demand for materials inputs experienced two distinct periods of growth: A period of expansion in the late 1990s and a period of declining demand in 2000–2003. In 1997–2000, real demand for materials averaged 3.8-percent growth and was led by durable-goods manufacturing, which accounted for 38 percent of real materials growth, and by construction, which accounted for 15 percent of real materials growth. In 2000–2003, real demand for materials fell on average 1.5 percent each year, with the sharpest declines in the information and communications technology (ICT) producing industries (5.3 percent) (chart 4).<sup>7</sup> Higher real demand for materials inputs by government partly offset a 2.1-percent decrease in materials inputs demanded by private industries.

Real growth in U.S. gross output averaged 3.1 percent in 1997–2003; growth averaged 5.0 percent over the late 1990s and 1.1 percent in 2001–2003. Demand for intermediate inputs accounted for a slightly larger contribution than value added to economy-wide gross output growth in 1997–2000. In 2000–2003, real gross output growth was largely accounted for by growth in value added. The differences in growth accounted for by intermediate inputs partly reflects the negative contributions of materials inputs and the reduced contributions of purchased services in 2000–2003 (table C).

7. These industries consist of one goods-producing industry—computer and electronic products in durable-goods manufacturing—and three services-producing industries—publishing industries (includes software) and “information and data processing services” in the information industry group and “computer systems design and related services” in the professional, scientific, and technical industry group.

**Table C. Contributions to Percent Change in the Chain-Type Quantity Index for All Industries Gross Output**

Line	1998	1999	2000	2001	2002	2003
1 All industries .....	5.3	5.1	4.6	-0.1	1.2	2.2
2 Value added .....	2.5	2.5	2.0	0.5	1.0	1.6
3 Intermediate inputs .....	2.9	2.7	2.6	-0.5	0.3	0.6
4 Energy inputs .....	0.0	0.0	0.1	0.0	0.1	-0.1
5 Materials inputs .....	1.0	0.8	0.5	-0.6	-0.2	-0.1
6 Purchased-services inputs .....	1.8	1.8	2.0	0.1	0.4	0.8

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Staff members of CIAD contributed to the development of the estimates. Staff members of the Office of the Chief Information Officer, particularly Stephen P. Holliday and Douglas J. Klear, helped reengineer the data-processing application that was used to prepare the estimates.

## Price growth

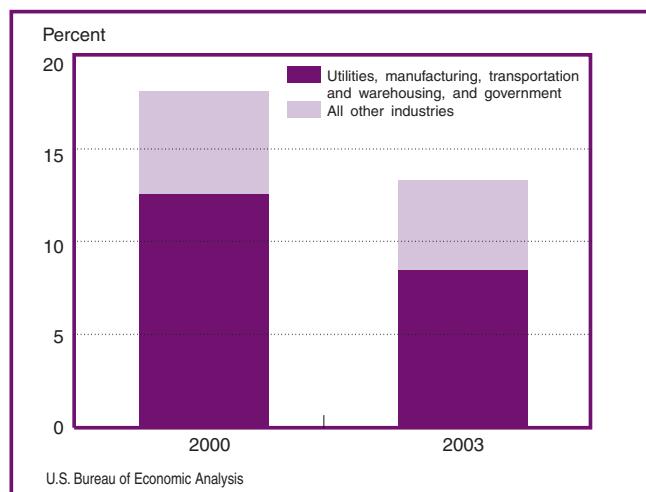
The price indexes for gross output, value added, and intermediate inputs by cost category represent the prices received by an industry for its output and the prices paid for its inputs. Growth rates for these indexes indicate whether prices for these inputs are growing faster or slower than output prices. The impact of the input prices on growth in the prices for gross output can be identified by examining the inputs' percentage-point contribution to the percent change in the industry's gross output price index. In addition, the extent to which the prices paid by the industry for various inputs contributes to the aggregate price growth for those inputs can be identified by examining the industry's contribution to economy-wide price growth for the inputs.

Price growth for the Nation's output averaged 1.4 percent in 1997–2003 and was relatively evenly distributed between value added and intermediate inputs (table D). Price growth for value added averaged 1.8 percent, and price growth for intermediate inputs averaged 1.0 percent. Within intermediate inputs, energy prices increased, on average, 3.5 percent, materials prices remained relatively stable (0.2 percent), and purchased-services prices increased modestly (1.5 percent).

The 3.5-percent average annual growth rate for energy inputs prices was uneven in 1997–2003; prices spiked 18.1-percent in 2000 and 13.2 percent in 2003. These spikes largely reflected rapid price growth for petroleum-related products. The impact of these price increases was widespread; the use of energy inputs within transportation and warehousing, government,

utilities, and manufacturing accounted for almost 70 percent of the 18.1-percent price growth in 2000 and 65 percent of the 13.2-percent price growth in 2003 (chart 5).

## Chart 5. Contributions to Percent Change in the Chain-Type Price Index for All Industries Energy Inputs



In addition, price changes for energy and materials inputs contributed strongly to fluctuations in output prices. Materials inputs, primarily reflecting rapid price increases for petroleum-related inputs, and energy inputs accounted for almost 40 percent of the 2.8-percent economy-wide price growth in 2000 and roughly 35 percent of the 2.6-percent price growth in 2003.

**Table D. Percent Changes in the Chain-Type Price Indexes for Gross Output, Value Added, and Intermediate Inputs by Sector**

Line		1998	1999	2000	2001	2002	2003	Average annual rate of change 1997–2000	Average annual rate of change 2000–2003	Average annual rate of change 1997–2003
1	All industries .....	-0.3	1.1	2.8	1.2	1.0	2.6	1.2	1.6	1.4
2	Value added .....	1.1	1.4	2.2	2.4	1.7	1.8	1.6	2.0	1.8
3	Intermediate inputs .....	-1.6	0.7	3.7	0.1	0.0	3.4	0.9	1.1	1.0
4	Energy inputs .....	-7.8	3.1	18.1	2.5	-5.5	13.2	3.9	3.1	3.5
5	Materials inputs.....	-4.0	-0.2	4.3	-1.3	-1.1	4.0	0.0	0.5	0.2
6	Purchased-services inputs.....	1.0	1.3	2.2	0.8	1.2	2.1	1.5	1.4	1.5
7	Private goods-producing industries <sup>1</sup> .....	-2.6	0.0	3.4	0.1	-0.7	3.6	0.2	1.0	0.6
8	Value added .....	-1.2	-0.5	1.4	1.8	-1.1	3.1	-0.1	1.3	0.6
9	Intermediate inputs .....	-3.5	0.3	4.7	-1.0	-0.5	4.0	0.5	0.8	0.6
10	Energy inputs .....	-5.8	2.0	16.0	5.3	-7.3	14.1	3.7	3.7	3.7
11	Materials inputs.....	-4.9	-0.4	4.7	-2.0	-0.8	4.1	-0.3	0.4	0.1
12	Purchased-services inputs.....	1.3	2.3	3.5	0.9	1.0	2.6	2.4	1.5	1.9
13	Private services-producing industries <sup>2</sup> .....	0.7	1.4	2.3	1.5	1.4	1.9	1.5	1.6	1.5
14	Value added .....	1.2	1.8	2.1	2.1	2.1	1.4	1.7	1.9	1.8
15	Intermediate inputs .....	-0.2	0.8	2.6	0.6	0.3	2.8	1.1	1.2	1.1
16	Energy inputs .....	-7.6	2.7	17.6	2.6	-5.5	12.6	3.7	3.0	3.3
17	Materials inputs.....	-2.0	-0.1	3.1	0.3	-2.1	4.1	0.3	0.7	0.5
18	Purchased-services inputs.....	0.9	1.0	1.6	0.6	1.3	1.9	1.1	1.2	1.2

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

## Unit costs

An industry's gross output price index represents the prices of its value added and its intermediate inputs, so the industry's price index and the current-dollar components of its gross output can be used to assess the contribution of each component to the gross output price index.<sup>8</sup> When a component of gross output unit costs grows faster than the gross output price index, then the component's contribution to the growth in unit costs has increased.

The cost per unit of real gross output for the Nation increased at an annual average rate of 1.4 percent each year in 1997–2003 (table E). Unit costs for value added increased 1.7 percent, and unit costs for intermediate inputs increased 1.1 percent. Within value added, compensation of employees increased 2.0 percent (unit labor costs), and gross operating surplus increased 1.2 percent (unit capital costs). Within intermediate inputs, purchased-services inputs increased 3.3 percent, materials inputs decreased 1.7 percent, and energy inputs increased 0.9 percent. The larger increases in the unit costs for compensation of employees and in purchased-services inputs indicate that labor costs and costs for purchased services became a larger part of the gross output price index for all industries during the period.

8. See the methodology for more information on the computation of unit costs for gross output.

**Table E. Current-Dollar Cost per Unit of Real Gross Output by Sector**  
[Percent]

Line		Average annual rate of change 1997–2000	Average annual rate of change 2000–2003	Average annual rate of change 1997–2003
1	All industries .....	1.2	1.6	1.4
2	Value added .....	0.7	2.7	1.7
3	Compensation of employees.....	2.3	1.8	2.0
4	Taxes on production and imports less subsidies .....	0.0	2.6	1.3
5	Gross operating surplus.....	-1.7	4.3	1.2
6	Intermediate inputs .....	1.9	0.3	1.1
7	Energy inputs .....	1.7	0.0	0.9
8	Materials inputs.....	-1.2	-2.1	-1.7
9	Purchased-services inputs.....	4.6	2.0	3.3
10	Private goods-producing industries <sup>1</sup> .....	0.2	1.0	0.6
11	Value added .....	1.0	2.6	1.8
12	Compensation of employees.....	2.8	1.7	2.2
13	Taxes on production and imports less subsidies .....	-7.2	11.2	1.6
14	Gross operating surplus.....	-1.4	3.6	1.0
15	Intermediate inputs .....	-0.2	-0.1	-0.1
16	Energy inputs .....	-1.9	1.9	0.0
17	Materials inputs.....	-0.7	-1.2	-0.9
18	Purchased-services inputs.....	1.5	2.9	2.2
19	Private services-producing industries <sup>2</sup> .....	1.5	1.6	1.5
20	Value added .....	0.1	2.5	1.3
21	Compensation of employees.....	2.3	0.9	1.6
22	Taxes on production and imports less subsidies .....	-1.1	2.2	0.5
23	Gross operating surplus.....	-2.5	4.7	1.0
24	Intermediate inputs .....	3.8	0.3	2.0
25	Energy inputs .....	1.8	0.0	0.9
26	Materials inputs.....	0.4	-0.8	-0.2
27	Purchased-services inputs.....	4.9	0.7	2.8

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, and food services; and other services, except government.

## Methodology

The new estimates of intermediate inputs in the cost categories of energy, materials, and purchased services for 1997–2003 were prepared by applying the KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) production framework. These new estimates by industry are based on the 1997 North American Industry Classification System (NAICS), and they are presented at the three-digit NAICS level. (See the box “Data Availability.”)

## Conceptual framework

In order to develop the estimates of intermediate inputs by industry, the standard accounting concept for gross output was used to describe the development of current-dollar intermediate inputs by industry and by cost category, and a production-based framework was used to derive chain-type price and quantity indexes of inputs that are based on an economic approach to the theory of index numbers.<sup>9</sup>

In addition, the development of the estimates requires several assumptions about industry production technology. The following is assumed:

- An industry frontier production function that includes the value-added inputs of capital and labor and the intermediate inputs of energy, materials, and purchased services,
- Weak separability of the industry production function in value-added inputs, energy inputs, materials inputs, and purchased-services inputs, which implies that the marginal rates of technical substitution for an input group are independent of the quantities of other input groups,
- Linear homogeneity of the industry production function, which implies a production technology of constant returns to scale, and
- Cost-minimizing behavior by industries as they consume inputs.

9. For the details about the conceptual framework used, see Strassner and Moyer, 4–12.

## Data Availability

This article presents the full set of KLEMS estimates for 1997–2003. The full set of annual industry accounts, including the integrated GDP-by-industry accounts and annual I-O accounts, the advance estimates of GDP by industry for 2004, and the new KLEMS estimates are available interactively on BEA's Web site; go to <[www.bea.gov](http://www.bea.gov)> and under “Industry,” click on “Annual Industry Accounts.”

## Estimation methodology

The estimates are prepared in three broad steps. First, current-dollar estimates of intermediate inputs by industry and by cost category are prepared. Second, chain-type price and quantity indexes are computed. Third, the contributions to growth and the gross output unit cost measures are estimated.

**Current-dollar estimates.** First, the current-dollar estimates of intermediate inputs by industry and by cost category are prepared by assigning each detailed product that is consumed as an intermediate input to one of the three categories of inputs: Energy, materials, or purchased services.

The assignments are generally based on the consuming industry's production process.<sup>10</sup> For most industries, a detailed product is consumed as an energy input, a material input, or a purchased-services input. However, in a few cases, detailed products may be assigned to different cost categories, depending on the industry. For example, the assignment of petroleum-derived inputs depends on the consuming industry: When a petroleum-derived product is consumed by most industries, it is categorized as an energy input, but when it is consumed by the petroleum refining industry and the chemical manufacturing industry, it is categorized as a material input.

Second, the detailed products in each cost category are summed to produce the current-dollar estimates of energy, materials, and purchased services for each industry. These estimates sum to the current-dollar estimates of total intermediate inputs by industry.

**Real estimates and prices.** The computation of the chain-type price and quantity indexes uses the same procedures that are used to prepare the integrated annual industry accounts: Current-dollar cost category products are allocated to domestic inputs or to imported inputs, and then each detailed product is deflated by its corresponding price indexes from the annual industry accounts.

The deflated domestic and imported cost category products are aggregated by product, cost category, and industry using the Fisher index number formula. By construction, a Fisher aggregation of energy, materials,

and purchased services for an industry yields the industry's chain-type price and quantity indexes for intermediate inputs.

**Contributions to growth.** The formulas used to compute the percentage-point contribution of an industry's inputs to the industry's real gross output growth and gross output price growth were adapted from the formulas that are used to compute the contributions to real GDP growth and the contributions to GDP price growth in the annual industry accounts.<sup>11</sup> Specifically, the contribution to the percent change ( $C\% \Delta_{i,t}$ ) in real gross output for industry  $i$  in period  $t$  that is attributable to the quantity change in input  $j$  is

$$C\% \Delta_{i,t} = 100 * \frac{((p_{j,t}/P^F_{i,t}) + p_{j,t-1}) * (q_{j,t} - q_{j,t-1})}{\sum_j ((p_{j,t}/P^F_{i,t}) + p_{j,t-1}) * q_{j,t-1}}$$

where  $P^F_{i,t}$  is the Fisher price index for gross output of industry  $i$  in period  $t$  relative to period  $t-1$ ,  $p_{j,t}$  is the price index of input  $j$  to industry  $i$  in period  $t$ , and  $q_{j,t}$  is the quantity index of input  $j$  to industry  $i$  in period  $t$ . The summation with subscript  $j$  in the denominator includes all the inputs consumed in the production of the aggregate.<sup>12</sup>

**Gross output unit costs.** Gross output unit costs are computed by dividing current-dollar gross output and its components by real (chained-dollar) gross output. The resulting quotients provide the gross output chain-type price indexes and the part of the price indexes associated with each component.<sup>13</sup>

11. These formulas were also adapted to compute the contributions to percent change by industry group in the chain-type quantity and price indexes for "all industries" inputs by cost category. In these formulas, the Fisher index is for the particular input for which contributions are being measured and the price and quantity indexes for an industry's value added is replaced by the price and quantity indexes for the industry's input. For more information on the formula used to compute the contributions to real GDP growth, see Brian C. Moyer, Mark A. Planting, Paul V. Kern, and Abigail M. Kish, "Improved Annual Industry Estimates," SURVEY OF CURRENT BUSINESS, 84 (June 2004): 34.

12. A symmetric formula is used to compute the percentage-point contribution of the input to the percent change in the industry's chain-type price index for gross output.

13. Gross output unit cost measures attribute changes in the gross output unit prices to the components of gross output in proportion to each component's share of current-dollar gross output. Therefore, year-to-year changes in component shares of current-dollar gross output result in changes in the contributions of the cost components to gross output prices even if the prices do not change.

10. The assignment of cost categories also uses information on input cost category controls that underlie the benchmark and annual input-output accounts.











**Table 3.A. Percent Changes in Current-Dollar Cost per Unit of Real Gross Output by Industry Group, 1998–2003**  
 [Percent]

Line		1998	1999	2000	2001	2002	2003	Line		1998	1999	2000	2001	2002	2003
165	Compensation of employees.....	1.8	1.2	3.3	2.1	2.6	1.8	182	Value added .....	-0.5	1.0	-0.3	3.5	2.2	1.7
166	Taxes on production and imports less subsidies	14.3	0.0	0.0	0.0	0.0	-16.7	183	Compensation of employees.....	2.7	1.9	2.2	2.2	0.0	0.6
167	Gross operating surplus.....	-0.9	1.0	0.9	-2.8	1.0	3.8	184	Taxes on production and imports less subsidies .....	-1.7	0.0	-1.7	0.0	5.2	1.6
168	Intermediate inputs.....	1.5	5.5	6.1	5.7	4.4	6.7	185	Gross operating surplus .....	-4.1	0.0	-3.4	6.3	4.6	3.2
169	Energy inputs.....	-4.2	13.0	23.1	9.4	-5.7	6.1	186	Intermediate inputs.....	2.5	2.2	6.7	-1.5	0.0	2.3
170	Materials inputs.....	0.0	0.0	2.1	8.2	2.8	7.3	187	Energy inputs .....	-11.1	0.0	18.8	-5.3	0.0	5.6
171	Purchased-services inputs.....	3.4	6.7	5.8	4.2	6.5	6.5	188	Materials inputs .....	0.0	-2.5	3.9	-2.5	-2.6	2.6
<b>Addenda:</b>															
172	<b>Private goods-producing industries<sup>1</sup>.....</b>	<b>-2.6</b>	<b>0.0</b>	<b>3.4</b>	<b>0.1</b>	<b>-0.8</b>	<b>3.6</b>	190	<b>Information-communications-technology-producing industries<sup>3</sup> .....</b>	<b>-8.8</b>	<b>-6.3</b>	<b>-4.9</b>	<b>-5.2</b>	<b>-2.4</b>	<b>-2.9</b>
173	Value added .....	-0.3	-0.5	3.8	1.1	1.3	5.4	191	Value added .....	5.0	-6.2	-6.6	-6.7	-0.2	0.2
174	Compensation of employees.....	1.8	1.4	5.3	2.1	0.8	2.0	192	Compensation of employees.....	-0.3	-1.6	4.0	-4.1	-7.5	-8.1
175	Taxes on production and imports less subsidies .....	-10.0	-11.1	0.0	12.5	22.2	0.0	193	Taxes on production and imports less subsidies .....	-10.0	-11.1	0.0	0.0	12.5	-11.1
176	Gross operating surplus.....	-3.5	-2.2	1.5	-1.5	0.0	12.8	194	Gross operating surplus .....	-15.4	-19.6	-40.0	-23.2	49.1	38.0
177	Intermediate inputs.....	-4.0	0.3	3.2	-0.6	-1.8	2.3	195	Intermediate inputs.....	-11.9	-6.4	-3.3	-3.9	-4.3	-5.5
178	Energy inputs.....	-11.1	0.0	6.3	5.9	-11.1	12.5	196	Energy inputs .....	-25.0	-16.7	0.0	0.0	-20.0	0.0
179	Materials inputs.....	-4.8	-0.2	3.2	-3.1	-2.3	1.9	197	Materials inputs .....	-17.4	-9.3	-4.6	-12.7	-6.8	-7.8
180	Purchased-services inputs.....	0.0	2.7	1.9	6.4	-0.6	3.0	198	Purchased-services inputs .....	-5.4	-3.4	-2.1	3.9	-2.4	-3.9
181	<b>Private services-producing industries<sup>2</sup>.....</b>	<b>0.7</b>	<b>1.3</b>	<b>2.4</b>	<b>1.5</b>	<b>1.4</b>	<b>1.9</b>								

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assis-

tance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.









**Table 6.B. Contributions to Percent Change by Industry Group in the Chain-Type Price Index for All Industries Energy Inputs, 1998–2003**

Line		1998	1999	2000	2001	2002	2003
	<b>Percent change:</b>						
1	All industries .....	-7.77	3.07	18.10	2.46	-5.49	13.20
	<b>Percentage points:</b>						
2	Private industries .....	-5.93	2.09	14.26	2.81	-4.92	10.55
3	Agriculture, forestry, fishing, and hunting .....	-0.37	0.24	0.75	-0.01	-0.15	0.33
4	Mining .....	-0.24	0.09	0.54	-0.01	-0.17	0.57
5	Utilities .....	-0.68	0.09	1.78	0.45	-0.72	1.94
6	Construction .....	-0.41	0.23	0.75	-0.02	-0.18	0.46
7	Manufacturing .....	-0.70	0.02	2.41	1.40	-1.35	2.06
8	Durable goods .....	-0.24	-0.02	0.76	0.54	-0.43	0.66
9	Nondurable goods .....	-0.47	0.03	1.64	0.86	-0.92	1.40
10	Wholesale trade .....	-0.16	0.05	0.37	0.09	-0.13	0.26
11	Retail trade .....	-0.27	0.08	0.59	0.17	-0.18	0.43
12	Transportation and warehousing .....	-2.16	1.08	4.55	-0.89	-0.60	1.80
13	Information .....	-0.03	0.00	0.07	0.05	-0.03	0.07
14	Finance, insurance, real estate, rental, and leasing .....	-0.20	-0.01	0.61	0.78	-0.56	0.99
15	Professional and business services .....	-0.37	0.16	0.92	0.22	-0.33	0.71
16	Educational services, health care, and social assistance .....	-0.15	0.03	0.36	0.17	-0.19	0.34
17	Arts, entertainment, recreation, accommodation, and food services .....	-0.12	0.00	0.33	0.28	-0.21	0.39
18	Other services, except government .....	-0.07	0.02	0.22	0.12	-0.12	0.20
19	<b>Government .....</b>	<b>-1.85</b>	<b>0.98</b>	<b>3.85</b>	<b>-0.34</b>	<b>-0.58</b>	<b>2.65</b>
	<b>Addenda:</b>						
20	Private goods-producing industries <sup>1</sup> .....	-1.72	0.58	4.45	1.37	-1.84	3.42
21	Private services-producing industries <sup>2</sup> .....	-4.20	1.51	9.81	1.44	-3.08	7.13
22	Information-communications-technology-producing industries <sup>3</sup> .....	-0.03	0.00	0.10	0.10	-0.06	0.09

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other

services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.





**Table 7.B. Contributions to Percent Change by Industry Group in the Chain-Type Quantity Index for All Industries Energy Inputs, 1998–2003**

Line		1998	1999	2000	2001	2002	2003
	<b>Percent change:</b>						
1	All industries .....	<b>-0.02</b>	<b>2.77</b>	<b>4.16</b>	<b>-1.40</b>	<b>2.79</b>	<b>-4.11</b>
	<b>Percentage points:</b>						
2	Private industries .....	<b>-1.24</b>	<b>0.97</b>	<b>4.24</b>	<b>-3.93</b>	<b>2.34</b>	<b>-3.19</b>
3	Agriculture, forestry, fishing, and hunting .....	-0.16	0.33	-0.43	0.05	0.12	-0.36
4	Mining .....	-0.52	-0.18	0.64	0.10	-0.30	0.61
5	Utilities .....	0.42	-0.52	0.25	-0.23	0.56	-1.08
6	Construction .....	-0.38	0.21	0.05	-0.04	0.09	0.02
7	Manufacturing .....	-0.58	0.00	-1.10	-1.73	-0.18	-1.50
8	Durable goods .....	-0.20	-0.12	-0.70	-0.92	-0.01	-0.53
9	Nondurable goods .....	-0.38	0.12	-0.40	-0.81	-0.17	-0.97
10	Wholesale trade .....	-0.24	-0.01	0.19	-0.08	-0.06	-0.16
11	Retail trade .....	0.31	0.31	0.18	-0.33	0.01	-0.39
12	Transportation and warehousing .....	-0.62	0.85	-0.29	-1.30	-0.11	-0.53
13	Information .....	0.10	0.03	0.07	0.01	0.01	-0.09
14	Finance, insurance, real estate, rental, and leasing .....	-0.65	-0.26	3.95	-0.30	1.32	0.72
15	Professional and business services .....	0.47	0.26	0.42	-0.03	0.24	-0.19
16	Educational services, health care, and social assistance .....	0.11	0.01	0.04	0.17	0.50	-0.16
17	Arts, entertainment, recreation, accommodation, and food services .....	0.32	-0.13	0.26	-0.16	0.06	0.10
18	Other services, except government .....	0.17	0.07	0.04	-0.06	0.08	-0.18
19	<b>Government .....</b>	<b>1.22</b>	<b>1.80</b>	<b>-0.08</b>	<b>2.53</b>	<b>0.45</b>	<b>-0.92</b>
	<b>Addenda:</b>						
20	Private goods-producing industries <sup>1</sup> .....	-1.63	0.37	-0.84	-1.63	-0.28	-1.22
21	Private services-producing industries <sup>2</sup> .....	0.39	0.60	5.09	-2.30	2.62	-1.97
22	Information-communications-technology-producing industries <sup>3</sup> .....	-0.09	0.09	0.02	-0.14	-0.09	-0.12

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other

services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.





**Table 8.B. Contributions to Percent Change by Industry Group in the Chain-Type Price Index for All Industries Materials Inputs, 1998–2003**

Line		1998	1999	2000	2001	2002	2003
	<b>Percent change:</b>						
1	All industries .....	<b>-4.00</b>	<b>-0.23</b>	<b>4.29</b>	<b>-1.26</b>	<b>-1.10</b>	<b>4.04</b>
	<b>Percentage points:</b>						
2	Private industries .....	<b>-3.98</b>	<b>-0.30</b>	<b>4.07</b>	<b>-1.33</b>	<b>-1.09</b>	<b>3.79</b>
3	Agriculture, forestry, fishing, and hunting .....	-0.22	-0.08	0.12	0.02	-0.04	0.18
4	Mining .....	-0.09	0.04	0.21	0.00	-0.08	0.24
5	Utilities .....	-0.16	0.08	0.55	0.11	-0.38	0.72
6	Construction .....	-0.01	0.10	0.11	0.00	0.00	0.12
7	Manufacturing .....	-3.21	-0.34	2.86	-1.42	-0.43	2.20
8	Durable goods .....	-1.26	-0.80	0.01	-0.72	-0.17	0.19
9	Nondurable goods .....	-1.95	0.46	2.85	-0.69	-0.25	2.01
10	Wholesale trade .....	-0.08	-0.05	-0.03	-0.03	-0.03	0.02
11	Retail trade .....	-0.03	-0.01	0.01	-0.01	-0.01	0.01
12	Transportation and warehousing .....	-0.01	0.01	0.04	0.01	-0.02	0.05
13	Information .....	-0.06	-0.06	-0.01	-0.06	-0.05	-0.01
14	Finance, insurance, real estate, rental, and leasing .....	-0.01	0.03	0.04	0.00	0.00	0.05
15	Professional and business services .....	-0.07	-0.05	0.00	-0.03	-0.02	0.01
16	Educational services, health care, and social assistance .....	0.00	0.02	0.08	0.03	0.00	0.09
17	Arts, entertainment, recreation, accommodation, and food services .....	-0.01	0.01	0.08	0.05	-0.03	0.12
18	Other services, except government .....	-0.03	-0.01	0.01	-0.01	-0.01	0.00
19	<b>Government .....</b>	<b>-0.02</b>	<b>0.07</b>	<b>0.22</b>	<b>0.07</b>	<b>-0.02</b>	<b>0.25</b>
	<b>Addenda:</b>						
20	Private goods-producing industries <sup>1</sup> .....	-3.53	-0.28	3.31	-1.39	-0.54	2.73
21	Private services-producing industries <sup>2</sup> .....	-0.46	-0.02	0.77	0.07	-0.55	1.06
22	Information-communications-technology-producing industries <sup>3</sup> .....	-0.64	-0.44	-0.35	-0.38	-0.14	-0.12

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other

services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.





**Table 9.B. Contributions to Percent Change by Industry Group in the Chain-Type Quantity Index for All Industries Materials Inputs, 1998–2003**

Line		1998	1999	2000	2001	2002	2003
	<b>Percent change:</b>						
1	All industries .....	<b>5.09</b>	<b>4.10</b>	<b>2.32</b>	<b>-3.09</b>	<b>-1.03</b>	<b>-0.45</b>
	<b>Percentage points:</b>						
2	Private industries .....	<b>4.97</b>	<b>4.00</b>	<b>2.26</b>	<b>-3.64</b>	<b>-1.43</b>	<b>-0.95</b>
3	Agriculture, forestry, fishing, and hunting .....	0.15	0.09	-0.14	0.04	-0.10	0.00
4	Mining .....	-0.11	-0.06	0.19	0.10	-0.15	0.15
5	Utilities .....	0.10	-0.18	0.10	0.13	-0.18	-0.15
6	Construction .....	0.50	0.72	0.50	0.15	-0.30	0.16
7	Manufacturing .....	2.64	2.21	-0.03	-3.56	-1.14	-1.49
8	Durable goods .....	2.09	2.27	-0.02	-2.41	-0.68	-1.04
9	Nondurable goods .....	0.55	-0.06	-0.01	-1.15	-0.45	-0.45
10	Wholesale trade .....	-0.02	0.12	0.21	-0.26	0.00	0.09
11	Retail trade .....	0.09	0.32	0.19	-0.17	0.18	0.04
12	Transportation and warehousing .....	0.13	-0.04	0.03	-0.09	-0.01	-0.06
13	Information .....	0.30	0.26	0.41	0.05	-0.08	-0.10
14	Finance, insurance, real estate, rental, and leasing .....	0.15	-0.11	0.13	-0.15	0.20	0.24
15	Professional and business services .....	0.46	0.31	0.35	0.03	-0.03	0.09
16	Educational services, health care, and social assistance .....	0.21	0.14	0.08	0.12	0.17	0.06
17	Arts, entertainment, recreation, accommodation, and food services .....	0.14	0.10	0.05	-0.10	0.04	-0.01
18	Other services, except government .....	0.25	0.13	0.19	0.05	-0.04	0.05
19	Government .....	<b>0.12</b>	<b>0.09</b>	<b>0.06</b>	<b>0.55</b>	<b>0.40</b>	<b>0.49</b>
	<b>Addenda:</b>						
20	Private goods-producing industries <sup>1</sup> .....	3.18	2.95	0.52	-3.26	-1.68	-1.18
21	Private services-producing industries <sup>2</sup> .....	1.80	1.05	1.74	-0.37	0.25	0.23
22	Information-communications-technology-producing industries <sup>3</sup> .....	0.41	0.91	1.12	-0.67	-0.43	0.04

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other

services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.





**Table 10.B. Contributions to Percent Change by Industry Group in the Chain-Type Price Index for All Industries Purchased-Services Inputs, 1998–2003**

Line		1998	1999	2000	2001	2002	2003
	<b>Percent change:</b>						
1	All industries.....	1.00	1.33	2.18	0.85	1.24	2.15
	<b>Percentage points:</b>						
2	Private industries.....	0.86	1.13	1.80	0.60	1.06	1.77
3	Agriculture, forestry, fishing, and hunting .....	-0.01	0.02	0.04	0.02	0.00	0.02
4	Mining.....	-0.06	0.07	0.17	0.00	-0.06	0.13
5	Utilities.....	0.01	0.01	0.01	0.01	0.02	0.01
6	Construction.....	0.06	0.06	0.07	0.05	0.06	0.06
7	Manufacturing.....	0.27	0.31	0.38	0.11	0.17	0.26
8	Durable goods.....	0.10	0.12	0.16	0.07	0.08	0.11
9	Nondurable goods.....	0.18	0.19	0.22	0.04	0.10	0.15
10	Wholesale trade.....	0.08	0.07	0.11	0.03	0.05	0.07
11	Retail trade.....	0.15	0.14	0.18	0.04	0.07	0.11
12	Transportation and warehousing .....	0.02	0.07	0.16	0.05	0.01	0.07
13	Information .....	0.02	0.05	0.14	0.07	0.08	0.13
14	Finance, insurance, real estate, rental, and leasing.....	-0.02	-0.04	0.03	-0.13	0.34	0.48
15	Professional and business services .....	0.15	0.17	0.23	0.17	0.16	0.21
16	Educational services, health care, and social assistance .....	0.08	0.09	0.13	0.07	0.08	0.14
17	Arts, entertainment, recreation, accommodation, and food services.....	0.06	0.08	0.10	0.07	0.06	0.07
18	Other services, except government.....	0.04	0.04	0.06	0.04	0.04	0.04
19	<b>Government</b> .....	0.14	0.20	0.38	0.25	0.18	0.38
	<b>Addenda:</b>						
20	Private goods-producing industries <sup>1</sup> .....	0.26	0.46	0.66	0.18	0.17	0.47
21	Private services-producing industries <sup>2</sup> .....	0.60	0.67	1.14	0.42	0.89	1.30
22	Information-communications-technology-producing industries <sup>3</sup> .....	-0.01	0.03	0.09	0.04	0.02	0.04

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assis-

tance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.





**Table 11.B. Contributions to Percent Change by Industry Group in the Chain-Type Quantity Index for All Industries Purchased-Services Inputs, 1998–2003**

Line		1998	1999	2000	2001	2002	2003
	<b>Percent change:</b>						
1	All industries .....	<b>8.20</b>	<b>7.77</b>	<b>8.52</b>	<b>0.31</b>	<b>1.58</b>	<b>3.27</b>
	<b>Percentage points:</b>						
2	Private industries .....	<b>7.76</b>	<b>6.95</b>	<b>8.10</b>	<b>-0.23</b>	<b>0.68</b>	<b>2.54</b>
3	Agriculture, forestry, fishing, and hunting .....	0.01	-0.04	-0.06	0.03	-0.07	0.03
4	Mining .....	0.05	-0.10	0.09	0.16	-0.11	0.03
5	Utilities .....	0.09	-0.22	0.07	0.02	-0.08	-0.15
6	Construction .....	0.09	0.17	0.19	-0.06	0.15	0.22
7	Manufacturing .....	0.53	0.84	-0.03	0.12	-0.46	-0.18
8	Durable goods .....	0.21	0.65	-0.28	-0.13	-0.23	0.04
9	Nondurable goods .....	0.32	0.19	0.25	0.26	-0.23	-0.22
10	Wholesale trade .....	-0.20	0.29	0.52	-0.50	0.04	0.22
11	Retail trade .....	0.37	0.62	0.41	-0.32	0.21	0.18
12	Transportation and warehousing .....	0.39	0.14	-0.09	-0.19	-0.09	-0.04
13	Information .....	1.38	1.00	1.41	0.44	0.28	0.12
14	Finance, insurance, real estate, rental, and leasing .....	2.15	2.57	2.87	-1.16	-0.11	1.11
15	Professional and business services .....	1.89	1.13	1.72	0.67	0.24	0.43
16	Educational services, health care, and social assistance .....	0.56	0.34	0.38	0.48	0.53	0.26
17	Arts, entertainment, recreation, accommodation, and food services .....	0.18	0.08	0.33	0.04	0.10	0.31
18	Other services, except government .....	0.27	0.15	0.25	0.05	0.03	-0.01
19	<b>Government .....</b>	<b>0.44</b>	<b>0.82</b>	<b>0.43</b>	<b>0.54</b>	<b>0.91</b>	<b>0.73</b>
	<b>Addenda:</b>						
20	Private goods-producing industries <sup>1</sup> .....	0.68	0.86	0.20	0.25	-0.49	0.10
21	Private services-producing industries <sup>2</sup> .....	7.08	6.10	7.90	-0.48	1.17	2.45
22	Information-communications-technology-producing industries <sup>3</sup> .....	0.58	0.78	0.76	0.04	-0.30	0.12

1. Consists of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing.

2. Consists of utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assis-

tance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

3. Consists of computer and electronic products; publishing industries (includes software); information and data processing services; and computer systems design and related services.