

Gross Domestic Product by Industry for 2002

By Robert E. Yuskavage and Erich H. Strassner

ON April 17, 2003, the Bureau of Economic Analysis released new estimates of gross domestic product (GDP) for 10 broad industry groups for 2002. These estimates, which incorporate data for 2002 from the national income and product accounts (NIPAs) and other sources, provide the first broad view of how industry groups, such as manufacturing and services, contributed to last year's economic rebound. The GDP-by-industry estimates are value-added measures that are based on the NIPA components of gross domestic income.

The release of these estimates in April—7 months ahead of the regular release of the GDP-by-industry estimates—was one of the goals in BEA's strategic plan to provide more timely data from the industry accounts. In June 2002, BEA reported on the research that led to a prototype methodology for the accelerated estimates and provided illustrative current-dollar estimates for 2001 for industry groups.¹ This year, real (inflation-adjusted) estimates of GDP-by-industry are also provided. Recent budget increases have enabled BEA to provide both the current-dollar and real estimates on an accelerated schedule, and continuation of this funding will sustain the research into expanding and improving the accelerated estimates.

Highlights of the accelerated estimates for 2002 include the following:

- Real GDP growth increased 2.4 percent after an increase of 0.3 percent in 2001. Real GDP in private services-producing industries, which account for about two-thirds of GDP, led the broad-based economic growth, increasing 2.8 percent; real GDP in private goods-producing industries, which account for about one-fifth of GDP, increased 1.3 percent.²
- Real GDP increased in all of the 10 major industry

groups, but the gains were very small for 2 of the private goods-producing industry groups.

- Real GDP growth in retail trade increased 5.9 percent. Electric, gas, and sanitary services (in the transportation and public utilities industry group) and wholesale trade also increased sharply.
- Growth in manufacturing (1.8 percent) was mixed; relatively strong growth in nondurable-goods manufacturing (4.3 percent) offset a slight decline in durable-goods manufacturing (−0.1 percent).

The estimates presented in this article are more limited in scope than the full set of annual GDP-by-industry estimates, which are usually released in November and which present detailed estimates for 66 industries and estimates of the components of current-dollar GDP by industry, gross output, and intermediate inputs.³ BEA prepared these accelerated estimates with limited source data and an abbreviated methodology that differs from the regular, more extensive methodology.

This article is presented in three parts. The first part discusses the relative performance of industry groups. The second part provides a brief description of the methodology, reviews the research that led to the development of the prototype methodology, and describes the extensions of that research to address issues raised in last year's article. The third part discusses future initiatives that could lead to the expansion and improvement of the accelerated estimates.

Industry Performance

The relative performance of industry groups can be assessed by examining their real growth rates, their contributions to real GDP growth, their shares of current-dollar GDP, and their contributions to the change in GDP prices.

1. See Robert E. Yuskavage, "Gross Domestic Product by Industry: A Progress Report on Accelerated Estimates," *SURVEY OF CURRENT BUSINESS* 82 (June 2002): 19–27.

2. Private goods-producing industries consist of agriculture, forestry, and fishing; mining; construction; and manufacturing. Private services-producing industries consist of transportation and public utilities; wholesale trade; retail trade; finance, insurance, and real estate; and services.

3. The revised GDP-by-industry estimates for 2002 on a North American Industry Classification System basis will be released in spring 2004 as part of a comprehensive revision of the GDP-by-industry accounts. This release will also include accelerated estimates for 2003. For the most recently published estimates, see Robert J. McCahill and Brian C. Moyer, "Gross Domestic Product by Industry for 1999–2001," *SURVEY* 82 (November 2002): 23–41.

Real growth rates and contributions

In 2002, growth in real GDP increased to 2.4 percent from 0.3 percent in 2001. Private industries, which account for 87 percent of GDP, increased 2.5 percent, and government increased 1.9 percent. Economic growth in 2002 was led by the private services-producing sector, which increased 2.8 percent; growth in the private goods-producing sector increased 1.3 percent (table A). In the NIPAs, real GDP for "services" increased 2.8 percent, the same increase as that in the services-producing sector of the GDP-by-industry estimates. Real GDP for "goods" increased 3.3 percent, much faster than the goods-producing sector of the GDP-by-industry estimates, which excludes the wholesale trade and retail trade industries.⁴

Real GDP in all five major industry groups in the services-producing sector increased. Retail trade led with an increase of 5.9 percent. Electric, gas, and sanitary services (5.6 percent), within the transportation and public utilities group, and wholesale trade (5.0 percent) also increased sharply. Both finance, insurance, and real estate (FIRE) and services grew relatively slowly (1.6 percent). The growth in services was restrained by weakness in the business and professional services industries, which includes software production.

Within the goods-producing sector, real GDP in all four major industry groups increased. Real GDP in manufacturing increased 1.8 percent, as a 0.1-percent decline in durable-goods manufacturing that was

4. Conceptual differences between GDP-by-industry and the NIPA final expenditures categories make such comparisons rough at best. NIPA final expenditures reflect amounts paid by final users, including all wholesale and retail trade margins. The GDP-by-industry estimates reflect only the amounts received by producers. When the GDP-by-industry estimates for goods-producing industries are adjusted to include a measure of trade margins, the growth rates are much closer.

Table A. Percent Changes in Real Gross Domestic Product by Industry Group

	2000	2001	2002	Average annual rate of change 1995-2000
Gross domestic product	3.8	0.3	2.4	4.0
Private industries	3.9	0.4	2.5	4.6
Private goods-producing industries	3.6	-4.2	1.3	4.1
Agriculture, forestry, and fishing.....	7.9	-1.7	0.1	6.2
Mining.....	-11.2	4.8	1.4	-2.0
Construction.....	2.8	-1.6	0.1	4.8
Manufacturing.....	4.7	-6.0	1.8	4.3
Durable goods.....	10.0	-5.2	-0.1	7.9
Nondurable goods.....	-2.2	-7.1	4.3	-0.4
Private services-producing industries	5.4	1.7	2.8	5.3
Transportation and public utilities.....	6.8	-0.2	3.9	4.3
Transportation.....	5.2	-4.3	3.3	4.6
Communications.....	12.3	12.3	3.2	7.2
Electric, gas, and sanitary services.....	2.4	-9.1	5.6	0.6
Wholesale trade.....	5.9	-0.2	5.0	9.2
Retail trade.....	7.5	4.6	5.9	7.2
Finance, insurance, and real estate.....	6.2	2.8	1.6	5.2
Services.....	3.3	0.9	1.6	3.9
Government	2.6	1.7	1.9	1.4

caused by weakness in the industries that produce information and communications technology equipment was offset by a 4.3-percent increase in nondurable-goods manufacturing. Mining increased 1.4 percent.

The acceleration of real GDP growth in 2002 can be examined in terms of the *changes* in each industry group's contribution to real GDP growth.⁵ About two-thirds of the economic rebound in 2002 was accounted for by the goods-producing sector, whose contribution to real GDP growth swung from -1.0 percentage point in 2001 to 0.3 percentage point in 2002 (table B). The upswing primarily reflected an upturn in nondurable-goods manufacturing, whose contribution increased 0.8 percentage point (from -0.5 percentage point to 0.3 percentage point). Durable-goods manufacturing's contribution increased 0.5 percentage point (from -0.5 percentage point to 0.0 percentage point).

The private services-producing sector accounted for about a third of the economic rebound, as its contribution increased 0.7 percentage point (from 1.2 percentage points to 1.9 percentage points). The largest upswings in contributions from 2001 were in wholesale trade and in transportation and public utilities (0.3 percentage point each). These increases were partly offset by FIRE, whose contribution declined 0.3 percentage point.

5. An industry's contribution to real GDP growth depends on both its real growth rate and its relative size. It is the product of its share of current-dollar GDP and its real GDP-by-industry growth rate. See the box "Using Chained-Dollar Estimates for Computing Contributions to Economic Growth: A Cautionary Note" in Sherlene K.S. Lum and Brian C. Moyer, "Gross Product by Industry, 1995-97," SURVEY 78 (November 1998): 24-25.

Table B. Contributions to Percent Change in Real Gross Domestic Product by Industry Group

	2000	2001	2002	Average annual rate of change 1995-2000
Gross domestic product	3.8	0.3	2.4	4.0
	Percentage points			
Private industries	3.4	0.3	2.1	4.0
Private goods-producing industries	0.8	-1.0	0.3	1.0
Agriculture, forestry, and fishing.....	0.1	0.0	0.0	0.1
Mining.....	-0.1	0.1	0.0	-0.0
Construction.....	0.1	-0.1	0.0	0.2
Manufacturing.....	0.8	-0.9	0.3	0.7
Durable goods.....	0.9	-0.5	0.0	0.7
Nondurable goods.....	-0.2	-0.5	0.3	-0.0
Private services-producing industries	3.5	1.2	1.9	3.4
Transportation and public utilities.....	0.6	0.0	0.3	0.4
Transportation.....	0.2	-0.1	0.1	0.1
Communications.....	0.3	0.3	0.1	0.2
Electric, gas, and sanitary services.....	0.1	-0.2	0.1	0.0
Wholesale trade.....	0.4	0.0	0.3	0.6
Retail trade.....	0.7	0.4	0.5	0.6
Finance, insurance, and real estate.....	1.2	0.6	0.3	1.0
Services.....	0.7	0.2	0.3	0.8
Government	0.3	0.2	0.2	0.2

NOTE: For information on the calculation of the contributions to percent change, see footnote 5 in text. Percentage-point contributions do not sum to the percent change in the chain-type quantity index for gross domestic product or to the percentage-point contribution for private industries, because the contributions of the statistical discrepancy and of "not allocated by industry" are excluded (see table 3 for the estimates of real gross domestic product by industry group).

Current-dollar levels and shares

Current-dollar GDP and gross domestic income (GDI) both increased 3.6 percent in 2002. In the NIPA estimates, strong increases in corporate profits with inventory valuation and capital consumption adjustments (7.6 percent), net interest (5.3 percent), and proprietors' income with inventory valuation and capital consumption adjustments (3.9 percent) offset slow growth in compensation of employees (1.7 percent). In the GDP-by-industry estimates, which are based on the components of GDI, GDP in private industries increased 3.4 percent, and GDP in government increased 5.0 percent (computed from table 1).

The effects of current-dollar growth in 2002 are reflected in the changes in current-dollar shares of GDP by industry.⁶ The share of GDP accounted for by private industries declined slightly from 87.3 percent in 2001 to 87.1 percent in 2002, while government's share increased slightly from 12.7 percent to 12.9 percent (table C).

The goods-producing sector's share of GDP continued its downtrend, falling from 21.6 percent to 21.1 percent. The decrease was widespread, but it was led by a decline in the share of durable-goods manufacturing from 8.1 percent to 7.8 percent. The services-producing sector's share of GDP continued its uptrend, rising from 66.8 percent to 67.1 percent. The increase was primarily due to FIRE, whose share increased from 20.6 percent to 20.9 percent.

6. An industry's share of current-dollar GDP is a better indicator of the industry's relative size in the economy than its share of real GDP, because the shares of real GDP are affected by the choice of the reference year. See McCahill and Moyer, 27.

Table C. Gross Domestic Product by Industry Group in Current Dollars as a Percentage of Gross Domestic Product

[Percent]

	1999	2000	2001	2002
Gross domestic product	100.0	100.0	100.0	100.0
Private industries	87.6	87.6	87.3	87.1
Private goods-producing industries	23.1	22.9	21.6	21.1
Agriculture, forestry, and fishing.....	1.4	1.4	1.4	1.4
Mining.....	1.1	1.4	1.4	1.2
Construction.....	4.6	4.7	4.8	4.7
Manufacturing.....	16.0	15.5	14.1	13.9
Durable goods.....	9.2	9.0	8.1	7.8
Nondurable goods.....	6.8	6.5	6.1	6.1
Private services-producing industries	64.9	66.0	66.8	67.1
Transportation and public utilities.....	8.3	8.2	8.1	8.0
Transportation.....	3.3	3.2	3.0	3.0
Communications.....	2.8	2.8	2.9	2.9
Electric, gas, and sanitary services.....	2.3	2.2	2.2	2.2
Wholesale trade.....	7.0	7.1	6.8	6.8
Retail trade.....	9.0	9.0	9.2	9.3
Finance, insurance, and real estate.....	19.4	20.1	20.6	20.9
Services.....	21.3	21.5	22.1	22.1
Statistical discrepancy ¹	-0.4	-1.3	-1.2	-1.1
Government	12.4	12.4	12.7	12.9

1. Equals gross domestic product measured as the sum of expenditures less gross domestic income.

Price change and contributions

The growth rate in an industry's GDP-by-industry (value-added) price index indicates the extent to which its prices of labor and capital services are changing relative to economywide price change.⁷ Changes in value-added prices also reflect changes in productivity, which affect an industry's unit labor costs and unit capital costs. Growth in GDP prices decelerated from 2.4 percent in 2001 to 1.1 percent in 2002 (table D). Value-added price growth slowed for both private industries and government.

Value-added prices for the goods-producing sector declined 0.3 percent in 2002. Mining declined the most (-12.6 percent), primarily because of a sharp drop in natural gas wellhead prices. Value-added prices for the manufacturing industry group were unchanged because of offsetting changes within the manufacturing subgroups. Value-added prices for nondurable-goods manufacturing declined 0.4 percent, while value-added prices for durable-goods manufacturing increased 0.3 percent.

Value-added price growth for the services-producing sector slowed to 1.3 percent in 2002. Prices declined sharply for electric, gas, and sanitary services (-3.3 percent), transportation (-1.9 percent), and retail trade (-1.6 percent). Prices for FIRE increased 3.5 percent in 2002, partly reflecting strong increases in the prices for the insurance carriers industry and for nonfarm housing services in real estate.

7. The GDP-by-industry prices for 2002 are computed as implicit price deflators. An industry's current-dollar index of GDP is divided by the industry's chain-type quantity index (base year=1996). Chain-type price indexes for industry groups are Fisher aggregations of the detailed industries.

Table D. Percent Changes in Chain-Type Price Indexes for Gross Domestic Product by Industry Group

	2000	2001	2002	Average annual rate of change 1995-2000
Gross domestic product	2.1	2.4	1.1	1.7
Private industries	2.0	1.9	0.9	1.4
Private goods-producing industries	1.5	1.3	-0.3	0.6
Agriculture, forestry, and fishing.....	-2.5	6.6	1.0	-2.0
Mining.....	43.8	-0.3	-12.6	9.1
Construction.....	5.5	5.8	2.0	4.7
Manufacturing.....	-2.0	-0.4	0.0	-0.9
Durable goods.....	-5.6	-3.3	0.3	-3.6
Nondurable goods.....	3.3	3.6	-0.4	3.0
Private services-producing industries	2.1	2.1	1.3	1.7
Transportation and public utilities.....	-1.6	1.4	-1.4	0.4
Transportation.....	-1.2	2.0	-1.9	1.4
Communications.....	-3.4	-7.0	0.5	-0.5
Electric, gas, and sanitary services.....	0.2	12.8	-3.3	0.3
Wholesale trade.....	2.0	-2.1	-1.0	-2.2
Retail trade.....	-0.7	0.4	-1.6	-0.7
Finance, insurance, and real estate.....	3.4	2.2	3.5	2.6
Services.....	3.7	4.2	2.3	3.7
Government	3.1	3.5	3.1	2.8

The deceleration in GDP price growth from 2.4 percent in 2001 to 1.1 percent in 2002 can be examined in terms of changes in the industry contributions to this growth.⁸ The contribution of the goods-producing sector declined 0.4 percentage point, from 0.3 percentage point in 2001 to -0.1 percentage point in 2002 (table E). The decline primarily reflected decreases in the contributions of nondurable-goods manufacturing, mining, and construction (-0.2 percentage point each). The contribution of the services-producing sector declined 0.5 percentage point, from 1.4 percentage points to 0.9 percentage point. The decline primarily reflected 0.4-percentage-point decreases in the contributions of services and of electric, gas, and sanitary services.

In 2002, GDP price growth was primarily fueled by a 0.7-percentage-point contribution by FIRE and a 0.5-percentage-point contribution by services. Within the goods-producing sector, a 0.1-percentage-point contribution by construction was the only positive contribution to GDP price growth.

Methodology and Research

Last June, BEA reported on its research to develop estimates of GDP by industry on an accelerated schedule. Speeding up the release of the input-output, GDP-by-industry, and capital-flow accounts were among the initiatives for the industry accounts in BEA's strategic plan.⁹ Developing a prototype methodology for accel-

8. An industry's contribution to GDP price growth is the product of its share of current-dollar GDP and the growth in its GDP-by-industry price index.

9. See "BEA's Strategic Plan for 2001-2005," SURVEY 82 (May 2002): 23.

Table E. Contributions to Percent Change in the Chain-Type Price Index for Gross Domestic Product by Industry Group

	2000	2001	2002	Average annual rate of change 1995-2000
Gross domestic product.....	2.1	2.4	1.1	1.7
	Percentage points			
Private industries.....	1.7	1.6	0.8	1.2
Private goods-producing industries.....	0.3	0.3	-0.1	0.1
Agriculture, forestry, and fishing.....	0.0	0.1	0.0	-0.0
Mining.....	0.5	0.0	-0.2	0.1
Construction.....	0.3	0.3	0.1	0.2
Manufacturing.....	-0.3	-0.1	0.0	-0.1
Durable goods.....	-0.5	-0.3	0.0	-0.3
Nondurable goods.....	0.2	0.2	0.0	0.2
Private services-producing industries.....	1.4	1.4	0.9	1.1
Transportation and public utilities.....	-0.1	0.1	-0.1	0.0
Transportation.....	0.0	0.1	-0.1	0.0
Communications.....	-0.1	-0.2	0.0	-0.0
Electric, gas, and sanitary services.....	0.0	0.3	-0.1	0.0
Wholesale trade.....	0.1	-0.2	-0.1	-0.1
Retail trade.....	-0.1	0.0	-0.1	-0.1
Finance, insurance, and real estate.....	0.7	0.4	0.7	0.5
Services.....	0.8	0.9	0.5	0.7
Government.....	0.4	0.4	0.4	0.4

NOTE: For information on the calculation of the contributions to percent change, see footnote 8 in text. Percentage-point contributions do not sum to the percent change in the chain-type price index for gross domestic product or to the percentage-point contribution for private industries, because the contributions of the statistical discrepancy and of "not allocated by industry" are excluded (see table 3 for the estimates of real gross domestic product by industry group).

erated estimates of GDP by industry was identified as one of the first major steps in testing the feasibility of these initiatives. This section briefly describes the methodology used to prepare the accelerated estimates for 2002, summarizes and updates the key research findings reported in last year's article, and discusses how the research has been extended in order to better understand the behavior of the real estimates.

Methodology

The methodology that was used to prepare the accelerated estimates of GDP by industry for 2002 is the same as that described in the June 2002 SURVEY.¹⁰ The current-dollar estimates were primarily prepared by extrapolating the major published components of industry income for 2001 by largely unpublished industry source data from the NIPAs. The chain-type quantity indexes and chained-dollar estimates were primarily prepared by using the single-deflation method: An index of current-dollar GDP by industry was divided by the industry's gross output price index. The chain-type quantity indexes for industry groups and for "all industries" are Fisher aggregations of the detailed industries. The real growth rate for "all industries" using the single-deflation method was 2.4 percent, the same as that for real GDP in the NIPAs.

Updating the research

The research that BEA described last June had been designed primarily to assess the feasibility of providing industry estimates shortly after the release of the final fourth-quarter GDP estimate in late March, because users expressed a need for more timely information on the direction and scale of industry growth. The research findings suggested that reasonably reliable current-dollar estimates could be prepared for industry groups and for major aggregates but not for detailed industries and that the reliability of the real estimates appeared to be sensitive to economic developments, such as business-cycle fluctuations and changes in relative prices.

The statistical criteria for evaluating the methods proposed for the accelerated estimates were the mean absolute revision (MAR) in annual percent changes for industries and the simple average MAR for all industries. Other statistics were also computed to test the reliability of the direction of change, of the acceleration or deceleration in growth rates, and of the ranking of growth rates. Experimental accelerated estimates of GDP by industry were computed for 1998-2000, and they were compared with actual changes obtained from several vintages of the published GDP-by-indus-

10. Yuskavage, 20-21.

try accounts. MAR measures were computed for current-dollar estimates and for real estimates. The measures for the real estimates were computed using two different methods—the single-deflation method and the gross-output-extrapolation method.

The research results reported last year have been updated to include experimental accelerated estimates for 2001 and the published GDP-by-industry estimates for 1999–2001 that were released in November 2002. The MAR measures are slightly higher than those reported last June, partly reflecting the revisions to current-dollar and real GDP growth rates for 2001. However, these updated results do not change the interpretations of the reliability of the accelerated estimates: The accelerated current-dollar estimates for broad industry groups successfully indicated

- The direction of change 98 percent of the time (down from last year's 100 percent)
- Whether an industry group's GDP was accelerating or decelerating more than 80 percent of the time (up from about 75 percent)
- Whether an industry group's GDP growth was high, medium, or low in comparison with that of other industry groups about 70 percent of the time (about the same as last year)

Last year's research results also showed that the range of revisions to the growth rates for the major industry groups did not significantly differ from that for the major expenditure components of GDP and that many of the revisions to the growth rates for detailed industries were offsetting at the industry-group level. These findings continue to hold using the up-

dated estimates.

For each measure, the percent change in the accelerated estimate is compared with that in both the first regular estimate and the "latest" regular estimate; for perspective, the percent change in the first estimate is also compared with that in the latest estimate. For updated current-dollar estimates, the average MAR for the 13 industry groups relative to the first estimate increased to 1.75 percentage points from 1.61 percentage points, and it increased to 2.20 points from 2.04 points relative to the latest estimate (table F). For the updated real estimates using the single-deflation method, the average MAR for 13 industry groups relative to the first estimate increased to 2.40 points from 2.25 points. The average MAR for all of the other real estimate measures were about the same as before.

Extending the research

Experimental accelerated estimates of real GDP by industry for 2001 were not presented last June, primarily because of a relatively large unexplained difference between the growth rate of real GDP by industry for "all industries" using the single-deflation method and the growth rate of overall real GDP from the NIPA's. These aggregate real output measures are conceptually equivalent, but they often differ in practice—even in comparisons of the regular GDP-by-industry estimates with the NIPA estimates—because of differences in methodology, source data, and aggregation procedures. For 1988–2001, the mean difference (industry less NIPA) was 0.03 percentage point, and the mean absolute difference was 0.16 percentage point. The

Table F. Mean Absolute Revisions to Annual Percent Changes in GDP by Industry for Industry Groups, 1998–2001

[Percentage points]

	Current-dollar estimates			Real estimates				Latest less first
				Single-deflation method		Gross-output-extrapolation method		
	First less accelerated	Latest less accelerated	Latest less first	First less accelerated	Latest less accelerated	First less accelerated	Latest less accelerated	
Agriculture, forestry, and fishing.....	1.83	2.21	1.54	3.63	3.53	3.92	3.82	1.12
Mining.....	4.90	4.02	3.31	3.74	3.44	7.80	5.76	2.72
Construction.....	0.80	2.28	1.98	2.50	2.34	1.24	1.21	1.53
Manufacturing.....	1.33	1.76	1.11	1.97	1.80	0.45	0.66	0.67
Durable goods.....	1.47	1.76	1.13	3.12	3.05	1.86	2.38	2.00
Nondurable goods.....	1.30	2.17	1.83	2.66	3.05	2.38	3.08	1.16
Transportation and public utilities.....	1.92	2.65	1.05	2.13	1.72	2.01	1.98	1.57
Transportation.....	2.19	2.63	1.09	2.06	1.29	1.94	1.33	1.37
Communications.....	2.70	2.50	1.72	2.74	1.57	4.46	4.11	1.97
Electric, gas, and sanitary services.....	2.75	5.35	3.66	4.08	5.22	4.56	5.39	2.78
Wholesale trade.....	1.93	1.33	0.81	1.79	2.12	2.47	2.40	1.37
Retail trade.....	0.36	0.84	0.95	1.14	1.09	1.51	1.31	0.33
Finance, insurance, and real estate.....	1.00	2.34	1.79	1.58	1.53	0.88	1.17	0.73
Services.....	0.97	0.52	0.98	1.93	1.88	2.02	2.57	0.78
Government.....	0.61	0.69	0.26	0.19	0.40	0.32	0.33	0.33
Average for 13 industry groups¹.....	1.75	2.20	1.62	2.40	2.35	2.72	2.68	1.40

1. Includes all industry groups listed above except for the aggregates "manufacturing" and "transportation and public utilities."

NOTE: The mean revision is defined as the average of all revisions. Each revision is calculated as the percentage change in the later annual estimate less the percentage change in the earlier annual estimate. Revisions are summed and divided by the number of observations in the sample period over which the sum-

tion is calculated. The mean absolute revision is calculated using the absolute value of each revision. The "first" annual estimate refers to the first time for which the regular estimate of a particular year was released, and the "latest" refers to the most recently revised estimate of the particular year. For example, the first estimate for 1998 was released in June 2000, and the latest estimate for 1998 was released in November 2001.

difference has ranged from -0.42 point in 1992 to 0.35 point in 1997.

For the accelerated estimates, the previous research had suggested that in the absence of data needed for the preferred double-deflation method, single deflation by the industry's gross output price index would yield more reliable results than the method of extrapolation using the industry's gross output quantity index. The assumptions underlying the single-deflation method were judged more likely to hold under a wider variety of macroeconomic conditions than those underlying the extrapolation method. Because of data limitations, however, those conclusions were based on only 3 years of testing with experimental accelerated estimates. In addition, the previous research focused on comparisons of revisions for the industry groups within the industry accounts, not on the comparison of "all industries" with GDP.

BEA solicited comments on the proposed methodology for the accelerated estimates, particularly about the methodology for the real estimates. The results of the previous research suggested that the errors due to using methods other than the conceptually preferred double-deflation method were likely to be larger during unstable economic periods, such as periods around business-cycle turning points or periods with sharp changes in relative prices. Several respondents to BEA's request for comments strongly encouraged BEA to conduct further research aimed at improving the methodology for the real estimates and extending the time period for evaluation. It was also noted that an analysis based on estimates for 1998–2000 may be misleading because of the economic boom during this period. In addition, energy prices in this period were quite volatile, declining sharply in 1998 and increasing sharply in 2000. The current-dollar estimates for industry groups were considered to be significantly better than a "naive" estimate based on assuming no

change in the industry shares of GDP, but the real estimates were considered to be only marginally better.

The previous research was extended by examining more closely the differences in aggregate real output measures for the 3 earlier years of experimental accelerated estimates using updated results for 2001. The extended research focused on differences in growth rates between "all industries" and the initial estimates of GDP, and it evaluated the results for "all industries" relative to several vintages of the *regular* GDP-by-industry estimates. It also provided further perspective on the reliability of alternatives to the double-deflation method by computing aggregate estimates from the historical published GDP-by-industry estimates using the alternative methods.

The extended research produced the following results:

- For the 4 years of accelerated GDP-by-industry estimates (1998–2001), the extrapolation method performed better than the single-deflation method relative to the initial NIPA GDP estimate for each year, and it performed better relative to the latest regular GDP-by-industry estimate for 3 of the 4 years;
- For 1987–2001, based on the historical published GDP-by-industry estimates, the single-deflation method performed slightly better for "all industries," but this advantage was greater in the earlier years (1988–1994) than in the later years (1995–2001);
- For 1987–2001, based on the historical published GDP-by-industry estimates, the single-deflation method performed significantly better for most of the industry groups; and
- Use of some form of the double-deflation method improves the performance of the accelerated real GDP-by-industry estimates for industry groups and for "all industries," especially in years with volatile energy prices.

Questions raised. These results raise several important questions. One question concerns which estimate—the April NIPA GDP or the most recent regular GDP by industry—is the more appropriate standard for evaluating the alternative methods for preparing the accelerated real estimates. Both standards are important, but in different ways. On the one hand, estimates that closely track the NIPA real GDP estimate released in April raise the level of confidence in the use of the accelerated industry real growth rates to compute contributions to real GDP growth. On the other hand, estimates that closely track subsequent annual revisions of GDP by industry raise the level of confidence in the use of the accelerated estimates as early indicators of industry real growth. On balance, the April

Acknowledgments

The methodology for the accelerated GDP-by-industry estimates was developed by Robert E. Yuskavage, senior economist in the Office of the Associate Director for Industry Accounts, under the guidance of Sumiye Okubo, Associate Director for Industry Accounts. The estimates for 2002 and the tables for this article were prepared by Erich H. Strassner of the Industry Economics Division (IED). Kali A. Kong of the National Income and Wealth Division provided valuable assistance in the preparation of the estimates. Ann M. Lawson, Chief of IED, and Brian C. Moyer, Chief of the Annual Industry Branch of IED, reviewed the estimates.

NIPA GDP estimate appears to be a slightly more important standard because of the proximity of its release with that of the accelerated GDP-by-industry estimates.

Another important question concerns which alternative to the double-deflation method—the single-deflation method or the gross-output-extrapolation method—should be used when double deflation is not feasible. The answer should be determined by the results of research using both the accelerated estimates and the published estimates. The extended research using published data is based on a longer period (13 years rather than 4 years) and avoids the complications associated with using preliminary and incomplete “accelerated” source data, allowing the analysis to focus on the effects of the methods themselves. The weight of the evidence over the longer period comes down slightly in favor of the single-deflation method; the performance for most of the industry groups is consistently better with this method. The poorer performance of this method for “all industries” for 1995–2001 is primarily due to the results for 1998 and for 2000, when energy prices were volatile.

The large difference for 2001 between the April real GDP estimate from the NIPA’s and the accelerated estimate for “all industries” was similar to the differences in the published estimates for other years with unusual economic conditions. However, the single-deflation method can be improved by accounting for changes in the intermediate input prices for selected industries. BEA will continue to investigate ways to implement a modified double-deflation method, and it will continue to monitor the relative performance of the alternative methods because they may be sensitive to trends and cycles in the economy. BEA will also investigate the

feasibility of tailoring methods to particular industries, especially if one method consistently performs better for certain industries or industry groups.

Future Initiatives

The accelerated GDP-by-industry estimates for 2002 represent the achievement of a key milestone for the new initiatives described in BEA’s strategic plan. Preparation of these estimates was made possible by recent budget increases in support of this project, and continuation of this funding will sustain the research into expanding and improving the estimates.

BEA welcomes your feedback on the value of this initiative and the other initiatives in the strategic plan to speed up the availability of estimates from the industry accounts. BEA is interested in learning more about your interests and priorities regarding the accelerated estimates, especially whether additional industry detail for the April estimates would be useful despite the prospect of substantial revisions in November.

As a result of the increased funding, BEA could investigate the feasibility of increasing the level of industry detail to include many of the industries that are included in the regular November release. BEA could also consider providing additional estimates, such as gross output and the shares of labor and capital income. BEA could also develop more extensive estimating methodologies and expedite the conversion of the estimates to the new North American Industry Classification System.

Please e-mail your comments on these issues to Sumiye Okubo, BEA’s Associate Director for Industry Accounts, at industryacct@bea.gov.

Tables 1–4 follow.

**Table 1. Gross Domestic Product by Industry Group
in Current Dollars, 1999–2002**

[Billions of dollars]

	1999	2000	2001	2002
Gross domestic product	9,274.3	9,824.6	10,082.2	10,446.2
Private industries	8,123.0	8,606.9	8,800.8	9,101.1
Private goods-producing industries	2,138.6	2,248.9	2,182.7	2,204.0
Agriculture, forestry, and fishing.....	127.7	134.3	140.6	142.1
Mining.....	104.1	133.1	139.0	123.2
Construction.....	425.4	461.3	480.0	490.3
Manufacturing.....	1,481.3	1,520.3	1,423.0	1,448.4
Durable goods.....	853.8	886.4	812.8	814.4
Nondurable goods.....	627.5	633.9	610.2	634.0
Private services-producing industries	6,023.1	6,486.5	6,735.4	7,013.7
Transportation and public utilities.....	770.1	809.3	819.5	839.3
Transportation.....	301.9	313.7	306.1	310.4
Communications.....	257.2	279.1	291.5	302.4
Electric, gas, and sanitary services.....	211.0	216.5	221.9	226.6
Wholesale trade.....	645.3	696.8	680.7	707.7
Retail trade.....	831.7	887.3	931.8	970.8
Finance, insurance, and real estate.....	1,798.8	1,976.7	2,076.9	2,183.8
Services.....	1,977.2	2,116.4	2,226.6	2,312.2
Statistical discrepancy ¹	-38.8	-128.5	-117.3	-116.7
Government	1,151.3	1,217.7	1,281.3	1,345.2

1. Equals gross domestic product measured as the sum of expenditures less gross domestic income.

**Table 2. Chain-Type Quantity Indexes for Gross Domestic Product
by Industry Group, 1999–2002**

[1996=100]

	1999	2000	2001	2002
Gross domestic product	113.39	117.64	117.94	120.82
Private industries	115.58	120.10	120.56	123.53
Private goods-producing industries	114.77	118.89	113.92	115.38
Agriculture, forestry, and fishing.....	118.50	127.82	125.64	125.76
Mining.....	101.45	90.14	94.44	95.79
Construction.....	116.23	119.45	117.53	117.68
Manufacturing.....	115.03	120.47	113.24	115.26
Durable goods.....	126.84	139.52	132.29	132.20
Nondurable goods.....	100.57	98.32	91.32	95.21
Private services-producing industries	117.41	123.80	125.96	129.46
Transportation and public utilities.....	109.89	117.34	117.13	121.68
Transportation.....	110.35	116.06	111.06	114.78
Communications.....	118.94	133.55	149.97	154.76
Electric, gas, and sanitary services.....	100.28	102.70	93.31	98.50
Wholesale trade.....	133.80	141.65	141.37	148.44
Retail trade.....	123.15	132.33	138.45	146.57
Finance, insurance, and real estate.....	117.50	124.83	128.31	130.33
Services.....	113.05	116.74	117.84	119.67
Government	103.99	106.71	108.54	110.56

Table 3. Real Gross Domestic Product by Industry Group, 1999–2002

[Billions of chained (1996) dollars]

	1999	2000	2001	2002
Gross domestic product	8,859.0	9,191.4	9,214.5	9,439.9
Private industries	7,851.0	8,157.8	8,189.4	8,390.8
Private goods-producing industries	2,153.0	2,230.3	2,137.0	2,164.5
Agriculture, forestry, and fishing.....	154.6	166.7	163.9	164.0
Mining.....	114.7	101.9	106.8	108.3
Construction.....	367.8	378.0	371.9	372.4
Manufacturing.....	1,513.9	1,585.4	1,490.3	1,516.9
Durable goods.....	949.3	1,044.3	990.1	989.4
Nondurable goods.....	570.8	558.0	518.3	540.4
Private services-producing industries	5,734.3	6,046.4	6,152.1	6,322.6
Transportation and public utilities.....	732.2	781.9	780.5	810.8
Transportation.....	268.6	282.5	270.3	279.4
Communications.....	255.3	286.7	321.9	332.2
Electric, gas, and sanitary services.....	208.8	213.9	194.3	205.1
Wholesale trade.....	708.6	750.2	748.7	786.1
Retail trade.....	846.2	909.2	951.2	1,007.1
Finance, insurance, and real estate.....	1,688.3	1,793.5	1,843.5	1,872.5
Services.....	1,768.4	1,826.0	1,843.3	1,871.9
Statistical discrepancy ¹	-37.3	-121.3	-108.3	-107.0
Government	1,061.1	1,088.8	1,107.5	1,128.2
Not allocated by industry ²	-66.1	-87.0	-108.9	-110.2

1. Equals the current-dollar statistical discrepancy deflated by the implicit price deflator for gross domestic business product.

2. Equals gross domestic product (GDP) less the statistical discrepancy and the sum of GDP by industry of the industry groups. The value of not allocated by industry reflects the nonadditivity of chained-dollar estimates and the differences in source data used to estimate real GDP by industry and the expenditures measure of real GDP.

**Table 4. Chain-Type Price Indexes for Gross Domestic Product
by Industry Group, 1999–2002**

[1996=100]

	1999	2000	2001	2002
Gross domestic product	104.69	106.89	109.42	110.66
Private industries	103.46	105.51	107.47	108.47
Private goods-producing industries	99.33	100.83	102.14	101.83
Agriculture, forestry, and fishing.....	82.62	80.54	85.82	86.65
Mining.....	90.82	130.62	130.24	113.78
Construction.....	115.68	122.05	129.07	131.68
Manufacturing.....	97.85	95.89	95.49	95.48
Durable goods.....	89.94	84.88	82.09	82.31
Nondurable goods.....	109.94	113.59	117.73	117.31
Private services-producing industries	105.04	107.28	109.48	110.93
Transportation and public utilities.....	105.18	103.50	105.00	103.52
Transportation.....	112.40	111.03	113.23	111.10
Communications.....	100.74	97.36	90.53	91.02
Electric, gas, and sanitary services.....	101.04	101.21	114.21	110.46
Wholesale trade.....	91.08	92.89	90.92	90.02
Retail trade.....	98.29	97.59	97.95	96.40
Finance, insurance, and real estate.....	106.55	110.22	112.66	116.62
Services.....	111.81	115.90	120.80	123.52
Government	108.51	111.83	115.69	119.23