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# Industrial Production and Capacity Utilization: The 2008 Annual Revision

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*Kimberly Bayard and Charles Gilbert, of the Board's Division of Research and Statistics, prepared this article. Betsy Wang provided research assistance.*

On March 28, 2008, the Federal Reserve published revisions to its index of industrial production (IP) and the related measures of capacity and capacity utilization. Although the revision affected the data from January 1972 through February 2008, most of the changes were for the period beginning in 2003.<sup>1</sup> Relative to earlier estimates, measured from fourth quarter to fourth quarter, IP is now reported to have increased more slowly in 2006, but changes to output gains in other years since 2003 were more modest. The period from 2003 through 2007 was marked by a steady, moderate rise in industrial output; on average, production increased 2.2 percent per year, and the annual rates of change ranged from 1.5 percent to 3.1 percent (table 1).<sup>2</sup>

The revision shows that the rates of capacity utilization for total industry in the fourth quarters of 2006 and 2007 were lower than previously estimated. The larger revision was for 2006, when utilization was restated to be 80.7 percent, 0.8 percentage point lower than reported earlier. The downward revision for the fourth quarter of 2007 was 0.5 percentage point; at 81.0 percent, utilization was the same as its (long-run) average for 1972 through 2007. The operating rate for manufacturing was revised down about

1 percentage point in 2006 and ½ percentage point in 2007; in both years, downward revisions were widespread across industries. For the fourth quarter of 2007, the factory operating rate stood at 79.3 percent, a little below its long-run average of 79.7 percent. The utilization rate for mines was revised down almost 2 percentage points in the fourth quarter of 2007; still, it then stood at 90.2 percent, 2.7 percentage points above its long-run average. The revised operating rate for utilities is lower, on balance, in recent years than reported earlier.<sup>3</sup> For the fourth quarter of 2007, utilization was 85.9 percent, almost 1 percentage point lower than its long-run average.

Compared with the previous estimates, total industrial capacity is now reported to have risen more slowly in 2006, but the rates of change in other recent years are little different. The smaller increase in 2006 reflected downward revisions to manufacturing and utilities; the capacity index for mining is now reported to have been higher than stated earlier. For high-technology industries, capacity is now estimated to have increased markedly less in 2005 and 2006, but the revisions to the estimates for other recent years were more modest.

Besides including the revised estimates and methods typical of annual revisions, the current revision marks the incorporation of a six-month reporting window. Beginning with the Federal Reserve's G.17 Statistical Release of April 16, 2008, monthly releases are based on a six-month reporting window: One month of new data is reported, and the previous five months of data are revised. For example, the monthly release issued on April 16 included new data for March and revised data for October through February. Previously, the monthly releases were issued with a four-month reporting window, which covered one month of new data and revisions to the previous three months of data. The incorporation of a six-month window will allow for the inclusion of additional data before an annual revision. From March 2007 to March 2008, a six-month window would

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NOTE: Charles Gilbert directed the 2008 revision and, with Kimberly Bayard, David Byrne, Wendy Dunn, Christopher Kurz, Paul Lengermann, Norman Morin, Maria Otoo, and Daniel Vine, prepared the revised estimates of industrial production. David Byrne prepared the improved estimates for communications equipment. Norman Morin and Daniel Vine prepared the revised estimates of capacity and capacity utilization.

1. When necessary to maintain consistency with any revisions to the data for 1972 and subsequent years, the production and capacity indexes for the years before 1972 were multiplied by a constant. However, utilization rates and rates of change in IP for the years before 1972 were not revised.

2. Revised data reported in this article were published in Board of Governors of the Federal Reserve System (2008), Statistical Release G.17, "Industrial Production and Capacity Utilization" (July 16). Data referred to in this article as "previous" appeared in the G.17 release issued on March 17, 2008. That release was the last G.17 published before the annual revision was issued on March 28.

3. In this article, "recent years" generally refers to years in the period from 2003 through 2007.

1. Revised rates of change in industrial production and capacity, revised rates of capacity utilization, and the difference between revised and previously reported rates, 2003–07

Item	MEMO: 2006 pro- portion	Revised rate (percent)						Difference between rates (revised minus previous, percentage points)					
		2003–07 avg.	2003	2004	2005	2006	2007	2003–07 avg.	2003	2004	2005	2006	2007
<i>Production</i>													
Total index .....	100.0	2.2	1.5	3.1	2.6	1.7	2.1	–3	.4	.1	–6	–1.8	.4
Manufacturing .....	79.2	2.5	1.7	3.7	3.7	1.1	2.3	–3	.4	.2	–7	–2.2	.6
Excluding selected high-tech industries <sup>1</sup> .....	74.7	1.4	.2	3.3	2.5	.1	1.1	–3	.0	.3	–4	–1.9	.3
Selected high-tech industries ..	4.6	19.1	23.8	9.4	22.4	17.3	22.3	–4	6.7	–1.0	–5.7	–7.3	5.5
Mining and utilities .....	20.8	1.0	.7	.6	–1.6	3.9	1.6	–1	.2	–1	.0	–1	–5
<i>Capacity</i>													
Total index .....	100.0	.7	–.6	.2	.8	1.3	1.8	–2	.3	.0	–2	–1.1	.0
Manufacturing .....	80.9	.9	–.6	.2	1.4	1.4	2.0	–3	.3	.1	–3	–1.3	–2
Excluding selected high-tech industries <sup>1</sup> .....	75.7	.3	–.7	–.2	.7	.8	.8	–1	.1	.0	.1	–.6	–.2
Selected high-tech industries ..	5.1	10.9	4.2	5.5	13.1	10.3	21.4	–1.7	2.8	1.2	–5.2	–9.3	1.9
Mining and utilities .....	19.1	.9	1.4	.8	–.4	1.1	1.5	.1	.4	–.4	.5	–.3	.4
<i>Capacity utilization</i>													
Total index .....	100.0	79.6	76.8	79.1	80.4	80.7	81.0	–3	.0	.0	–2	–.8	–.5
Manufacturing .....	80.9	78.0	74.8	77.5	79.2	79.0	79.3	–4	–2	–1	–3	–1.1	–.5
Excluding selected high-tech industries <sup>1</sup> .....	75.7	78.2	75.5	78.1	79.5	79.0	79.2	–6	–2	.0	–3	–1.4	–1.0
Selected high-tech industries ..	5.1	74.3	67.1	69.5	75.2	80.0	79.9	.0	.3	–1.2	–1.3	.3	2.0
Mining and utilities .....	19.1	87.0	86.9	86.7	85.6	87.9	88.1	–1	.0	.3	–2	.0	–.6

NOTE: For production and capacity, the revised rates of change are from the fourth quarter of the previous year to the fourth quarter of the year indicated; the differences between revised and previously reported production are also calculated from Q4-to-Q4 rates.

Capacity utilization rates are for the fourth quarter of the year indicated; differences between revised and previously reported capacity utilization are also calculated from Q4 rates.

1. Manufacturing excluding semiconductors and related electronic components, computers and peripheral equipment, and communications equipment.

have allowed an additional 3 percent to 4 percent of IP to reflect primary source data that otherwise would have been incorporated only at the time of an annual revision.<sup>4</sup> The longer reporting window will cause the latest month of data shown for a few indexes in the supplement to the G.17 release to be as many as five months earlier than the latest value for aggregate IP; the monthly values for detailed production indexes are not shown until the underlying data are available or the reporting window is closed. For the 12 months preceding the publication of the 2008 annual revision, the data issued for only one or two of the published indexes would have been affected by this change.

The updated measures of production incorporate several newly available sources of data. The primary source is the U.S. Census Bureau's 2006 Annual Survey of Manufactures (ASM), which shows a lower annual level of output than previously estimated. The revision also incorporates other new source data from the Census Bureau, including manufacturing data from selected 2006 Current Industrial Reports and annual data on the publishing industry from the

4. Some IP indexes are estimated from secondary source data until primary source data become available.

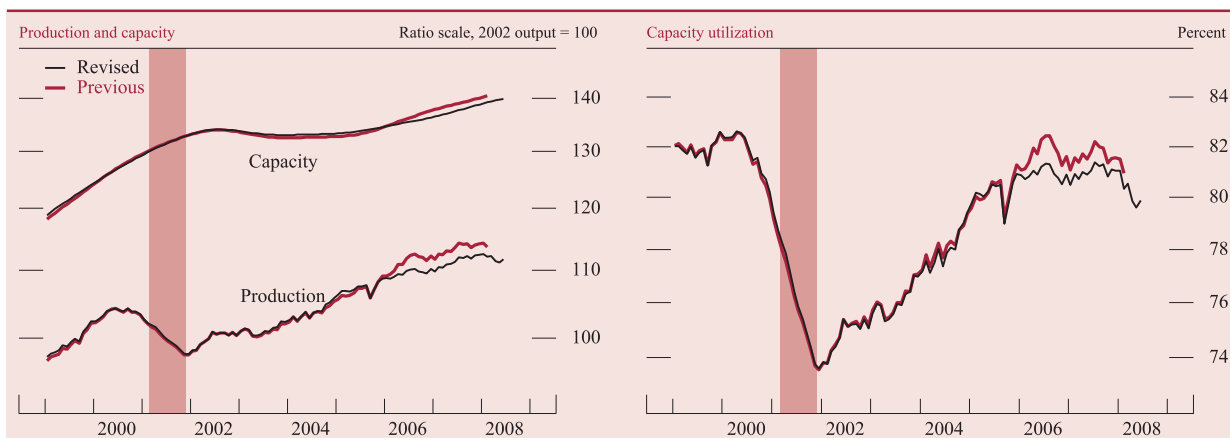
Services Annual Survey. Updated price deflators from the Bureau of Economic Analysis are used in the construction of the revised production estimates. In addition, new annual data on mineral extraction for 2005 and 2006 from the U.S. Geological Survey are used. Finally, the new monthly production estimates also reflect the incorporation of updated seasonal factors and monthly source data that became available (or were revised) after the closing of the reporting window.

The revised capacity utilization rates incorporate the results from the Census Bureau's 2006 Survey of Plant Capacity for the fourth quarter of that year. Moreover, the revisions to the capacity indexes and capacity utilization rates reflect the revised production indexes and newly available data on industrial capacity from the U.S. Geological Survey, the Energy Information Administration of the U.S. Department of Energy, and a number of private organizations.

### RESULTS OF THE REVISION

As revised, total IP for the fourth quarter of 2007 was 112.2 percent of output in 2002, and capacity stood at 138.5 percent of output in 2002. Both indexes are lower than reported previously. The capacity utiliza-

## 1. Industrial production, capacity, and capacity utilization: Total industry, January 1999–June 2008



NOTE: Here and in the following figures, the shaded areas are periods of business recession as defined by the National Bureau of Economic Research.

Data labeled "revised" correspond to the data in the Federal Reserve's

Statistical Release G.17, "Industrial Production and Capacity Utilization," published on July 16, 2008. Data labeled "previous" are those published before the March 28, 2008, annual revision.

tion rate for total industry in the fourth quarter of 2007, at 81.0 percent, was revised down slightly. Detailed results of the revision can be found in the appendix tables.<sup>5</sup>

### Industrial Production

The overall contour of IP in this revision is similar to that reported previously, although the revised data show a slightly flatter trajectory since 2005 (figure 1). The total index has risen modestly each year since 2003. Relative to the previous estimates, total IP increased 1.8 percent less in 2006, but the changes to the gains were smaller in other recent years. For earlier years, the change in total IP was revised up 0.4 percent in 2003 and 0.1 percent in 2004; it was revised down 0.6 percent in 2005. For 2007, the change in total IP was revised up 0.4 percent.

### Market Groups

The production index for final products and non-industrial supplies follows an output path similar to

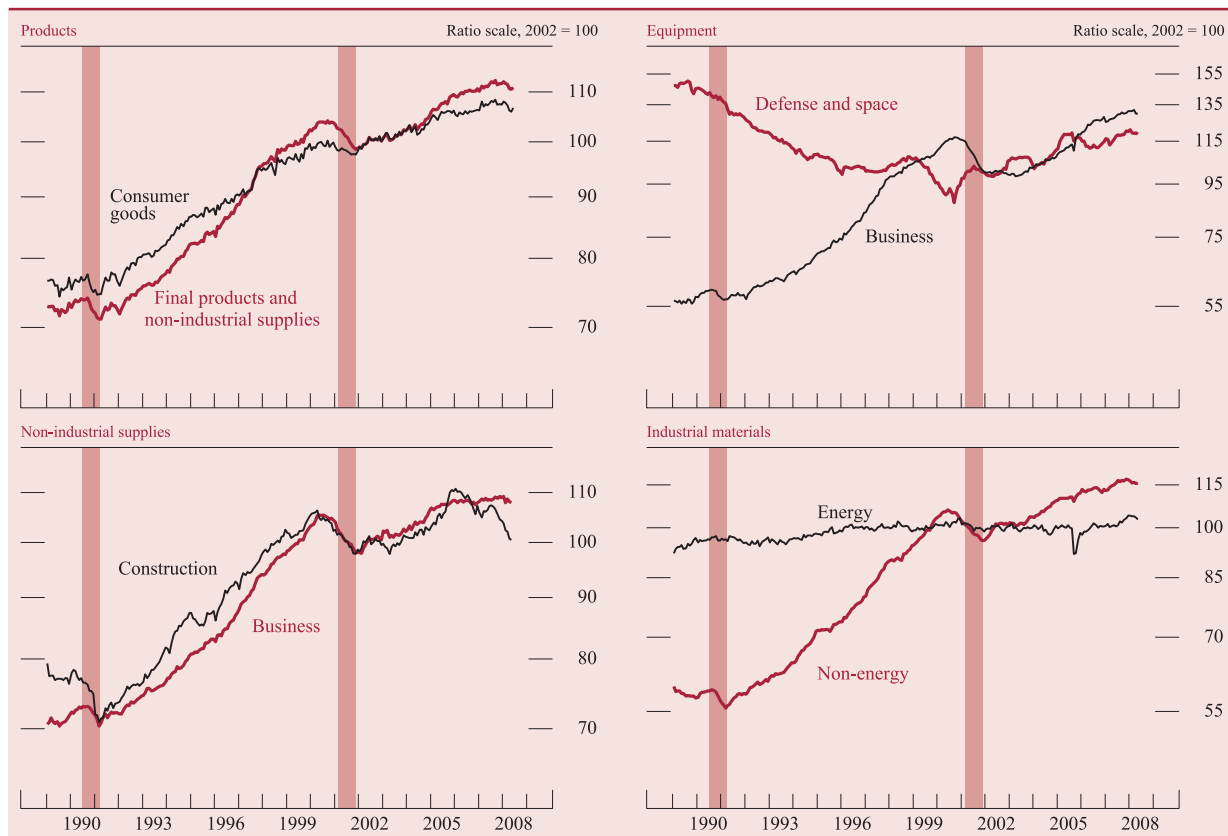
that for total IP and has posted moderate gains in recent years (figure 2 and table A.3). Compared with the previous estimates, the advance in the index is now reported to have been 1.5 percent lower for 2006. Overall changes to the rates of increase in other years were smaller. The index rose 0.3 percent faster in 2003 and 0.4 percent slower in 2005; the revisions were even smaller in 2004 and 2007.

The rise in the output of consumer goods was revised down, on net, over the period from 2003 through 2007. The output of durable consumer goods rose in 2003, 2005, and 2007 but declined in 2004 and 2006. The rates of change are now reported to have been lower than earlier estimates for all major categories of consumer durables other than automotive products. The most notable revisions were for the home electronics industry, in which output is now reported to have risen significantly less from 2003 to 2007 than was previously stated.

The index for consumer nondurables shows moderate gains in output in each of the past several years. The index is now reported to have increased a little less, on balance, over the period from 2003 through 2007. Among consumer nondurables, the indexes for foods and tobacco, clothing, and paper products were revised down for 2005 and 2006; however, the output of chemical products is now shown to have increased at a faster pace over the same time period. For 2007, the output of clothing is now reported to have declined somewhat less than earlier reports suggested. The index for consumer energy products is now reported to have edged down, rather than increased, in 2006, but revisions to the rates of change

5. Table A.1 shows the revised data for total IP, and table A.2 shows the revised data for capacity and capacity utilization for total industry. Tables A.3 and A.4 show the revised rates of change (fourth quarter to fourth quarter) of IP for market groups, industry groups, special aggregates, and selected detail for the years 2003 through 2007. Table A.5 shows the revised rates of change of annual IP indexes for market and industry groups for the years 2003 through 2007. Tables A.6 and A.7 show the revised figures for capacity and capacity utilization. Table A.8 shows the annual proportions of market groups and industry groups in total IP. Tables A.3, A.4, A.5, and A.6 also show the difference between the revised and previous rates of change. Table A.7 shows the difference between the revised and previous rates of capacity utilization for the final quarter of the year.

## 2. Industrial production: Market groups, January 1989–June 2008



for other years are fairly small. The path of consumer energy shows a decline in 2003, moderate gains in 2004 and 2005, a small dip in 2006, and another rise in 2007.

The production of business equipment has increased solidly since 2004; however, relative to previously published estimates, the revised index rose more slowly in 2005, 2006, and 2007. For transit equipment, the revised data show declines in output in 2003 and 2007 and smaller gains in 2005 and 2006 than were reported earlier. The production index for information processing equipment is now shown to have risen notably more rapidly in 2003 and 2006 than in previous reports.

In contrast to earlier estimates, the production of defense and space equipment is now estimated to have fallen in 2006 and to have risen in 2007.

The output of construction supplies posted solid gains in 2004 and 2005 but fell back in 2006 and 2007; relative to earlier estimates, the rates of change in recent years are generally lower. Although the production of business supplies edged down in 2006, it increased moderately in all other years since 2003;

the rates of change for output in 2005 and 2006 are now reported to have been weaker than previously stated.

The production of materials has increased moderately in recent years since 2003. As revised, the index for materials is now estimated to have expanded more rapidly in 2003, 2004, and 2007 and more slowly in 2005 and 2006. In particular, output gains for both durable and nondurable materials were markedly less in 2006 than stated earlier, although the rates of change for both categories are now reported to have been somewhat higher in 2007. Among durable materials, the downward revisions to the output index for equipment parts in 2005 and 2006 tempered the outsized gains in those years to render them more in line with the strong gains in other recent years. On balance, revisions to nondurable materials were small over the period from 2003 through 2007, as upward revisions to chemicals in every year except 2003 were about offset by net downward revisions to textiles and paper. In recent years, the output of textiles has trended down (sharply, in some years), the output of paper has been generally flat, and the output of

chemicals has risen. The index for energy materials is now shown to have been slightly weaker, on net, from 2003 through 2007.

### Industry Groups

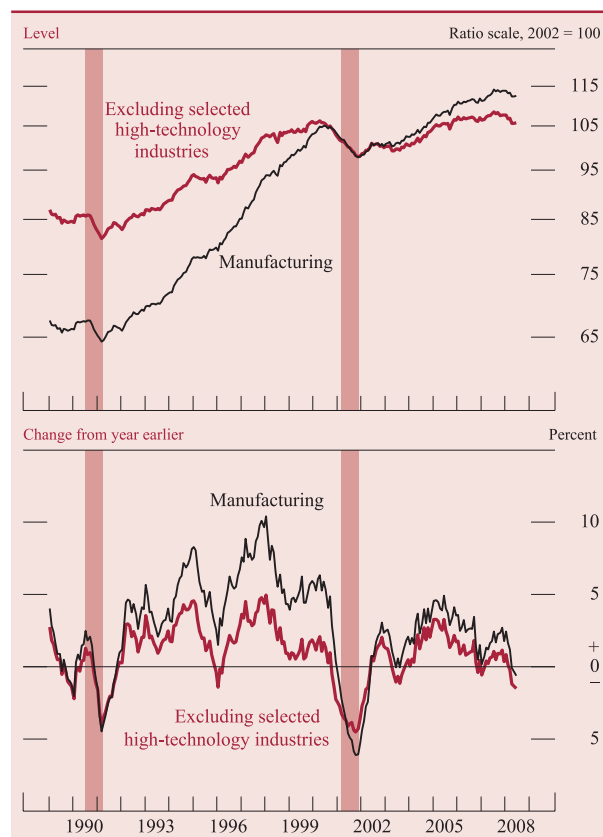
Manufacturing production has expanded in each year since 2003 (figure 3), albeit at a somewhat slower rate, on balance, than initially reported (table A.3).<sup>6</sup> Across all manufacturing industries, the largest downward revisions generally occurred for 2006, the year that marks the incorporation of the most recent ASM data.

For durable goods industries as a whole, output has risen solidly in recent years, although these gains—especially in 2006—have been moderated by the recent revision. The overall rise in the production of durable goods has been bolstered by the continued rapid expansion of the computer and electronic products industry and by recent high rates of increase for aerospace and miscellaneous transportation equipment.

The revisions to the changes in output of most durable goods industries were relatively modest in 2003 and 2004; two notable exceptions include upward revisions of 4.3 percentage points in 2003 for computer and electronic products and of 1.4 percentage points in 2004 for aerospace and miscellaneous transportation equipment. Relative to previous reports, changes in the output indexes are now stated to be lower in 2005 and 2006 for nonmetallic mineral products; computer and electronic products; electrical equipment, appliances, and components; motor vehicles and parts; aerospace and miscellaneous transportation equipment; and miscellaneous manufacturing. The rates of change for the production indexes for most durable goods industries in 2007 are now higher than in earlier reports.

The estimates for selected high-technology industries posted sizable revisions over the period from 2003 through 2007 and warrant special mention (figure 4 and table A.4). Overall, output in the high-technology sector is still reported to have increased rapidly in recent years, and all major components—

### 3. Industrial production: Manufacturing, and manufacturing excluding selected high-technology industries, January 1989–June 2008



NOTE: For definition of manufacturing, refer to text note 6.

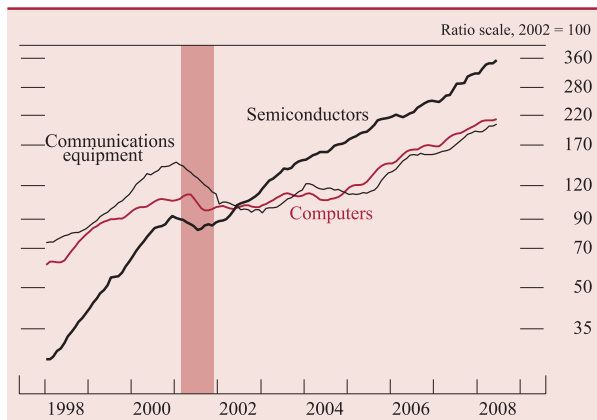
The selected high-technology industries are semiconductors and related electronic components (NAICS 334412–9), computers and peripheral equipment (NAICS 3341), and communications equipment (NAICS 3342).

computers and peripheral equipment, communications equipment, and semiconductors and related electronic components—have registered gains each year since 2003. However, relative to earlier estimates, production for the high-technology aggregate is now reported to have risen less sharply in 2004, 2005, and 2006 and to have increased more rapidly in 2003 and 2007.

Among the major high-technology components, increases in the index for computers and peripheral equipment were revised down in 2004, 2005, and 2007 but were revised up in 2003 and 2006. The average gain over the period from 2003 through 2007 for computers and peripheral equipment is about 15 percent, slightly lower than shown earlier; the smallest annual increase over this period was 1.6 percent in 2004, but that was followed by a gain of 28.8 percent in 2005. The output of communications equipment is now reported to have expanded less rapidly in 2004 but more rapidly in other recent years. Except for 2004, the index for communications equip-

6. In the IP index, manufacturing comprises the following categories in the North American Industry Classification System (NAICS): manufacturing (NAICS sectors 31–33), the logging industry (NAICS 1133), and the publishing industry (NAICS 5111), which includes publishers of newspapers, periodicals, books, and directories. Under NAICS, logging and publishing are classified within agriculture and information, respectively; however, historically they were considered manufacturing industries and were classified as such under the Standard Industrial Classification (SIC) system. In December 2002, the Federal Reserve reclassified all output indexes from the SIC system to NAICS.

#### 4. Industrial production: Selected high-technology industries, January 1998–June 2008



NOTE: For the NAICS categories of these industries, refer to the note to figure 3.

ment has posted solid annual gains in every year since 2003. The production of semiconductors and related electronic components has risen robustly in each of the past five years; however, the rate of increase is now reported to have been lower in 2005, and particularly in 2006, than estimated previously.

Production in nondurable manufacturing industries has advanced in every year since 2003 but at a more modest pace than the output of durables. The largest gain in nondurable output occurred in 2004. Within nondurable goods, the indexes for food, beverage, and tobacco products; petroleum and coal products; and chemicals have generally provided support to the output gains for the aggregate in recent years. In contrast, the indexes for textile and product mills, apparel and leather, and paper have generally fallen over the period.

For most recent years, the change in output in the nondurable goods sector was similar to previous estimates, except in 2006, when it rose about 1 percentage point less than reported earlier. Relative to earlier reports, the current revision found noticeably lower rates of change in 2005 and 2006 in food, beverage, and tobacco products; textile and product mills; apparel and leather; printing and support; and plastics and rubber products. In contrast, the output of chemicals is now reported to have declined less in 2005, and to have risen more in 2006, than indicated earlier.

The revision lowered the rates of change in the output index for the publishing and logging industries about 1 percentage point per year, on average, from 2003 through 2007; the IP index continues to include these two industries under manufacturing, although they are classified elsewhere under NAICS. The revised output index for this group is now reported to

have declined in every year since 2003 except 2004. The drop in 2006 was especially large.

The revised index for mining is relatively little changed from previous estimates. Output is still reported to have risen in 2003, to have fallen back in 2004, to have dropped more sharply in 2005, and then to have increased rapidly in 2006. The output gain in 2007 is more modest than in previous reports. For utilities, the revised output estimates are, in general, very similar to those reported earlier. The main exception is a downward revision of about 1 percentage point to the change in the index in 2006.

#### Capacity

Total industrial capacity is now estimated to have risen at an average annual rate of  $\frac{3}{4}$  percent over the period from 2003 through 2007,  $\frac{1}{4}$  percentage point more slowly than previously stated. By far, the most significant revision to industrial capacity was for 2006; capacity is now stated to have risen 1.1 percentage points more slowly than estimated earlier (table A.6). Relative to previous reports, total industrial capacity is now estimated to have declined a little less in 2003, to have risen more moderately in 2005, and to have been little changed in 2004 and 2007. The contour of manufacturing capacity and the revisions to that contour are similar to those for total industry. Manufacturing capacity is now shown to have expanded at an average annual rate of about 1 percent over the period from 2003 through 2007,  $\frac{1}{4}$  percentage point less than estimated earlier.

Within manufacturing, capacity for durable goods manufacturers increased modestly in 2003 and 2004 but rose more quickly in the subsequent years; however, the recent gains were tempered somewhat in the current revision. Relative to earlier estimates, the capacity index for nondurable goods is now reported to have fallen less in 2003 and 2004, to have increased more in 2005, and to have risen less in 2006 and 2007. Capacity for the logging and publishing industries fell from 2003 through 2005 but has risen since then; on balance, the rates of change are lower as a result of the revision.

For selected high-technology industries, aggregate capacity has increased substantially in recent years, especially since 2005. Relative to earlier estimates, high-technology capacity rose less quickly in 2005 and 2006 but increased somewhat more rapidly in other recent years. Excluding high-technology industries, manufacturing capacity advanced less in 2006 and 2007 than previously reported; revisions to the changes for earlier years were minor.

Capacity at mines is still estimated to have contracted from 2003 to 2005 and to have expanded since then. The gains in 2006 and 2007 are now reported to have been stronger than previously published. Capacity at electric and gas utilities has risen each year since 2003. The current estimates show a noticeably slower gain in 2006 than was reported earlier; revisions to the estimates for other years since 2003 were smaller.

By stage of processing, capacity in the crude stage is now reported to have risen more in 2006 and 2007 than previously shown; on net, revisions to earlier years were small. Capacity at the primary and semi-finished stages rose less in 2006 than stated earlier. Relative to previous estimates, increases in the index for finished goods processors were revised down, on net, over the period from 2003 through 2007.

### Capacity Utilization

For the past few years, the capacity utilization rate for total industry has remained near its long-run average of 81.0 percent (table A.7). On balance, the utilization rates for the 2005–07 period are lower than reported earlier, while those for earlier years are little changed. For the fourth quarter of 2007, total utilization stood at its average for 1972 through 2007 and was 0.5 percentage point lower than reported earlier. The utilization rate for total industry was revised down 0.8 percentage point for the fourth quarter of 2006, but the revision was smaller for 2005.

The capacity utilization rate for manufacturing is also now estimated to have been close to its long-run average in recent years. Relative to earlier reports, the factory operating rate was revised down in 2005, 2006, and 2007 and was little changed in 2004. For almost all major categories of manufacturing industries over the period from 2005 through 2007, utilization is now reported to have been lower than stated earlier, and downward revisions were particularly noticeable for 2006.

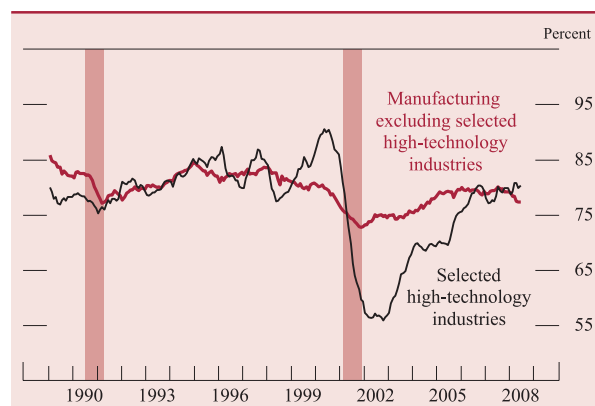
Among durable goods industries, some of the largest downward revisions to utilization over the period from 2005 through 2007 were for primary metals; electrical equipment, appliances, and components; motor vehicles and parts; aerospace and miscellaneous transportation equipment; and miscellaneous manufacturing. The durable goods industries that recorded the largest upward revisions since 2005 were wood products and computer and electronic products. For 2007, upward revisions to the utilization rate for computer and electronic products offset some of the downward revisions to the utilization rates for other durable goods industries.

Among nondurable goods industries, only chemicals registered higher rates of utilization since 2006 than previously reported; for all other categories, operating rates are now reported to have been lower than stated earlier. Capacity utilization in the other manufacturing industries (logging and publishing) was revised sharply downward for 2006 and 2007; utilization in the fourth quarter of 2007 was 79.2 percent, 5.3 percentage points lower than its long-run average.

The operating rate for the selected high-technology category rose steadily from 2004 to 2006 but edged down in 2007 (figures 5 and 6). Relative to earlier estimates, capacity utilization is now reported to have been lower in 2004 and 2005 but higher in 2006 and 2007. In the fourth quarter of 2007, the utilization rate was about 10 percentage points higher than it was in the fourth quarter of 2004, but at 79.9 percent, it was less than 2 percentage points above its long-run average. Among the selected high-technology industries for the period from 2004 through 2007, the operating rates for computers and peripheral equipment and for communications equipment are now shown to have been lower—especially for 2004, 2005, and 2007—than reported earlier. The utilization rates for semiconductors and related electronic components are now higher in each year than previously estimated.

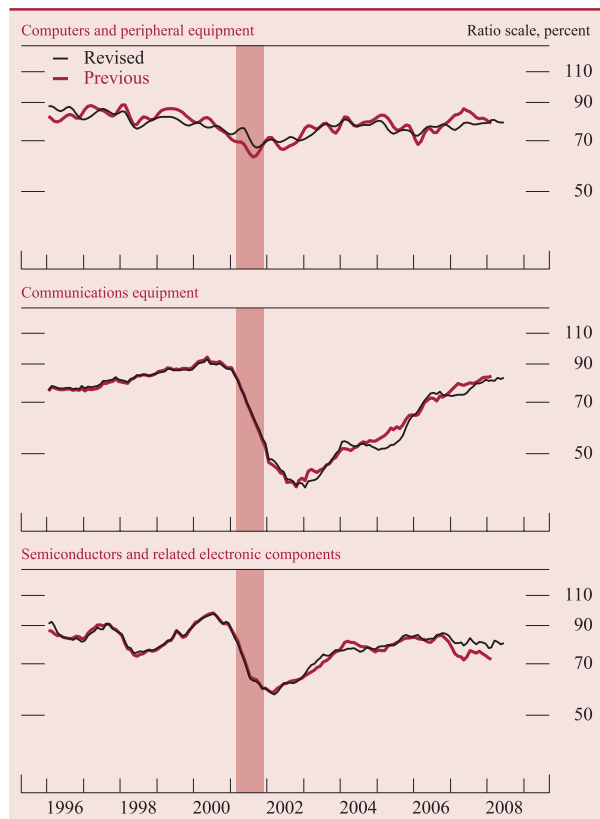
Capacity utilization in mining was revised up for 2004 and 2005, but it was revised down slightly for 2006 and lowered more noticeably for 2007. Nevertheless, as of the fourth quarter of 2007, the utilization rate for mining stood at 90.2 percent, almost 3 percentage points higher than its long-run average. In electric and gas utilities, capacity utilization rates were revised down for 2005 through 2007.

#### 5. Capacity utilization: Selected high-technology industries, and manufacturing excluding selected high-technology industries, January 1989–June 2008



NOTE: The high-technology industries are identified in the note to figure 3.

## 6. Capacity utilization: Selected high-technology industries, January 1996–June 2008



### TECHNICAL ASPECTS OF THE REVISION

The benchmark indexes for manufacturing—defined for each six-digit NAICS industry as nominal gross output divided by a price index—were updated to include new as well as revised information from the 2005 and 2006 ASMs. This revision also incorporates the 2006 Survey of Plant Capacity, other annual industry reports, recent information on prices, and revised monthly source data on production, shipments, and production-worker hours.

As mentioned earlier, the benchmark indexes for most industries incorporate updated price indexes from the industry output program of the Bureau of Economic Analysis. However, the price indexes for pharmaceuticals (NAICS 325412), semiconductors (NAICS 334413), and most components of communications equipment (NAICS 3342) are constructed by the Federal Reserve from alternative sources.

As in other recent years, the 2006 ASM did not provide data for all six-digit NAICS industries but combined some of them into higher-level industry aggregates. To maintain benchmark references that were consistent over time, the Federal Reserve used detailed information from the 2002 Census of Manu-

factures to impute estimates of gross output for those industries no longer reported separately.

### Changes to Individual Production Series

With this revision, the monthly production indicators for some series have changed, and some new series have been created.

#### High-Technology Goods

##### Communications equipment

Over the past several years, the Federal Reserve has regularly modified the IP index for the communications equipment industry to keep pace with the rapid technological change within the industry. Previous *Bulletin* articles have documented these changes, and the 2006 and current (2008) annual revisions have extended the Federal Reserve's earlier work.<sup>7</sup> In particular, the two most recent revisions have (1) provided a new structure for the measurement of communications equipment products, (2) introduced new data sources that provide extensive product-level detail, (3) used the detailed product information to construct new quarterly and annual production and price indexes, and (4) published new and revised price indexes at the detailed product level.

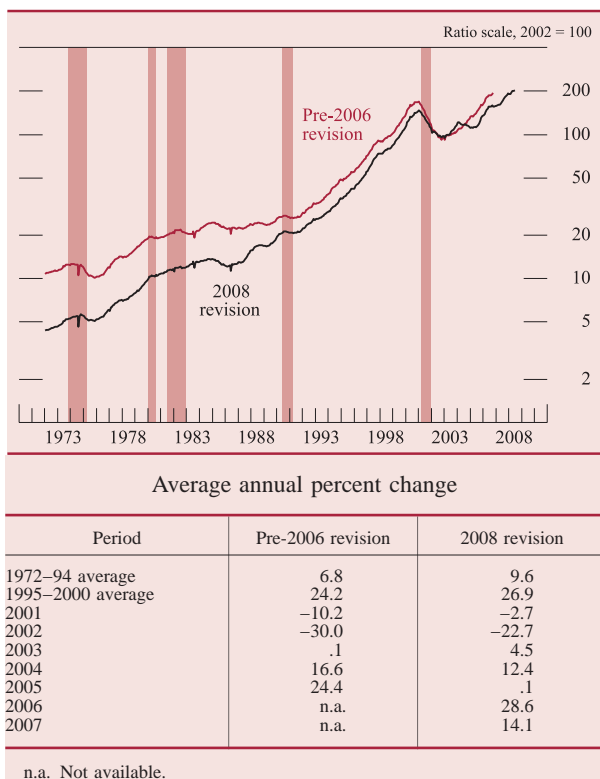
Relative to the previous estimates, the combined effect of the 2006 and 2008 annual revisions on communications equipment is that the revised production index expanded faster over the time period from 1972 through 2000, fell less in 2001 and 2002, and has increased more slowly since then (figure 7). Much of the difference between the previous (pre-2006 revision) and current estimates is derived from recently constructed price deflators developed from product-specific data.

The enhancements introduced in the most recent annual revision include the incorporation of new production data for a variety of types of communications equipment and the development of new price indexes at both quarterly and annual frequencies for the relevant products. The communications equipment industry is now represented by IP indexes for six product groups: data networking equipment; enterprise and home voice equipment; transmission, local loop, and legacy central office equipment; wireless system equipment; satellites and earth station equip-

7. Charles Gilbert and Maria Otoo (2007), "Industrial Production and Capacity Utilization: The 2006 Annual Revision," *Federal Reserve Bulletin*, vol. 93, pp. A17–A35, [www.federalreserve.gov/pubs/bulletin](http://www.federalreserve.gov/pubs/bulletin).



## 7. Industrial production: Communications equipment, January 1972–June 2008



ment; and other communications equipment.<sup>8</sup> The source data for estimating each of these indexes are described next. The newly developed price indexes for each of the six product groups are also included in this article (tables A.9 and A.10).

*Data networking equipment.* The 2006 annual revision introduced new source data for the index for data networking equipment. For the period ending in 2000, the index is based on quarterly data on U.S. domestic absorption from Gartner, an industry research group. For the period beginning in 2001, the index uses quarterly data from a different industry research group, Synergy, on U.S. domestic absorption of selected routers and switches, measured in nominal and unit terms. The quarterly matched-model price indexes are built from detailed product information available from the data sources and are aggregated to one index that covers all of data networking equipment.<sup>9</sup> For routers, the data cover several categories

of enterprise routers and service provider routers.<sup>10</sup> For switches, the index is aggregated from multiple product classes, grouped largely by speed.

The annual benchmark price deflator for data networking equipment incorporates additional data from Gartner on prices of wireless and security equipment that are available only on an annual basis. To construct the annual benchmark deflator, the quarterly price indexes constructed from the Synergy data on routers and switches are converted to an annual frequency and then combined with the Gartner-based price indexes on wireless and security equipment in a chained Fisher price index.

*Enterprise and home voice equipment.* The new IP index for enterprise and home voice equipment covers products such as telephones, switches, and gateways used in PBX (private branch exchange) systems. The current revision incorporates quarterly data on revenue and units of enterprise equipment; the data, from Synergy, extend from 2003. The two major subcategories of enterprise equipment are Internet Protocol telephony and traditional TDM (time-division multiplexing) equipment; the Synergy data cover a variety of detailed products within each of these categories.

The annual benchmark price deflator for enterprise and home voice equipment combines the quarterly price indexes (converted to an annual frequency) for the enterprise equipment with data on prices of home voice equipment that are available only on an annual basis. For 1987 and subsequent years, the data on home voice equipment include information from the Telecommunications Industry Association on fax machines, answering machines, corded telephones, and cordless telephones. For 1975 to 1987, the annual price index for home voice equipment is constructed from information in the Census Bureau's Current Industrial Reports (CIR) on push-button and dial phones.

*Transmission, local loop, and legacy central office equipment.* Transmission equipment, local loop equipment, and legacy central office equipment provide the infrastructure necessary to support large-scale telecommunications networks. Transmission equipment includes the devices used to exploit underground and undersea cables for long-haul, high-capacity signal transmission. Local loop equipment refers to the cables that run from the central office of a

8. Although the Federal Reserve constructs IP indexes for the six product types, only the aggregate index for communications equipment is published in the G.17 Statistical Release.

9. Matched-model price indexes are based on changes in the average prices of the same product in two different periods.

10. Small office/home office (SOHO) routers are omitted because they are generally not manufactured domestically. Domestic absorption reflects U.S. sales by domestic and foreign producers.

telecom service provider to neighborhood homes and businesses. Legacy central office equipment historically includes the equipment that facilitates phone connections and relays speech information.

This revision incorporates quarterly data on domestic absorption of transmission equipment; the data, from the Dell’Oro Group, are for 1998 and subsequent years. For 1992 to 1997, information on transmission equipment comes from annual reports from Gartner. The Dell’Oro data provide detailed information on three main types of transmission technologies: dense wave division multiplexing, SONET (Synchronous Optical Network), and optical switching.

The benchmark price indexes add data on local loop and legacy central office equipment that are available only at an annual frequency to the quarterly data on transmission equipment. The annual price data on local loop equipment are from Gartner and cover the period from 1993 to 2004. Since 2001, production of legacy central office equipment has been negligible, but for earlier years, the data underlying the benchmark price indexes are from multiple sources. For the period from 1995 through 2001, the data are from Gartner. For earlier years, the price index is drawn from academic research in this area. For the period from 1972 through 1982, the index is derived from Flamm (1989); for the period from 1982 through 1994, it is derived from the hedonic estimates of Grimm (1997) and Currie (2005).<sup>11</sup>

*Wireless system equipment.* This revision incorporates new quarterly data from Dell’Oro on domestic absorption of wireless system equipment for 2000 and subsequent years. Such equipment (often located on towers or the sides of buildings) manages signals to and from wireless handsets. Some of the main types of equipment include base transceiver stations, base station controllers, and mobile switching centers. The data include additional detail on the technological standard for mobile transmissions, such as GSM (global system for mobile communications), TDMA (time division multiple access), CDMA (code division multiple access), and W-CDMA (wideband code division multiple access).

11. Kenneth Flamm (1989), “Technological Advance and Costs: Computers versus Communications,” in Robert W. Crandall and Kenneth Flamm, eds., *Changing the Rules: Technological Change, International Competition, and Regulation in Communications* (Washington: Brookings Institution), pp. 13–61 and 371–410; Bruce T. Grimm (1997), “Quality-Adjusted Price Indexes for Digital Telephone Switches,” memorandum, Bureau of Economic Analysis, May 20; and Kent A. Currie (2005), “Hedonic Price Indices for Digital Circuit Switching Equipment: 1980–1998,” unpublished paper, SBC Services, August 7.

*Satellites and earth station equipment.* The monthly production index for satellites and earth station equipment is based on production-worker hours. The 2006 annual revision incorporated into the production indexes annual data from Futron Corporation and the *Satellite Encyclopedia* on satellite manufacturing revenues and total satellite capacity launched (proxied by transponder bandwidth).<sup>12</sup> The index for earth stations is proxied by the index for cellular base stations.

*Other communications equipment.* The monthly index for other communications equipment is based on production-worker hours. The annual benchmark price index uses the relevant producer price indexes with product weights developed from the CIR.

### Computers

The index for electronic computer manufacturing (NAICS 334111) was split into six separate product class indexes, and these indexes are now based on new source data and methods. The new product-based indexes are for consumer desktop computers, consumer mobile computers, business desktop computers, business mobile computers, business servers that use x86-based central processing units (CPUs), and business servers that use CPUs other than those based on x86 architecture.<sup>13</sup> Previously, electronic computer manufacturing comprised only two indexes: one for consumer computers and one for business computers. Although the six new product-level indexes are not published in the monthly statistical release, they are included in the broader IP aggregate for electronic computer manufacturing.

From 1995 forward, all of the product-based indexes for electronic computers are derived from quarterly data on domestic absorption from IDC, an industry research group. Data for 1994 are from Gartner, and data for earlier years are Federal Reserve Board estimates based on the CIR for computers. To construct the monthly indicator, the nominal absorption data are aggregated to the industry level and converted to industry shipments based on trade data from the Census Bureau (by adding exports and subtracting imports). The industry-level ratio of shipments to domestic absorption is applied to each of the six product-level absorption estimates to obtain

12. TBS Internet (2008), *The Satellite Encyclopedia* (Caen, France: TBS Internet, accessed January 23, 2008).

13. The index for consumer desktops also includes servers for consumer use. The term “x86” refers to CPUs with an instruction set that is based on the instruction set for the Intel 8086 CPU, which was introduced in 1978. These CPUs are used in most personal computers and in an increasing number of servers.

product-level shipments. These shipments are then adjusted by model-based estimates of the change in product-level inventories and divided by the relevant producer price index issued by the Bureau of Labor Statistics (BLS) to compute a production index.

The estimates for the change in inventories follow a procedure introduced in the 2004 annual revision; this procedure is currently used for several other industries.<sup>14</sup> In short, manufacturers are assumed to want to hold inventories in proportion to their expected shipments. The estimate of inventory change is computed as the sum of three components: a trend rate of stockbuilding, a portion of the adjustment to inventories that a manufacturer would need to make to reach a desired inventory level, and the effect on contemporaneous stocks of shipments deviating from expected shipments.

### *Semiconductors*

This revision introduced more detail and new price data to the MOS (metal-oxide semiconductor) memories portion of the semiconductor and related device manufacturing index (NAICS 334413). Before the current revision, all components of MOS memories were grouped in one index. To better track differential movements in specific product categories, this revision split the MOS memory index into three components: an index for DRAM (dynamic random access memory), an index for flash memory, and an index for all other MOS memories (primarily SRAM, or static random access memory). The underlying source data on nominal shipments for all memory components continue to be from the Semiconductor Industry Association (SIA). The new indexes for MOS memories are not published separately but continue to be included in the larger index for semiconductor and related device manufacturing.

The current revision incorporated quarterly data on prices from iSuppli, an industry research group, for all three categories of MOS memories. Previously, the DRAM portion of the index relied on quarterly prices from Gartner, and the non-DRAM portion used product-level producer price indexes from the BLS that have been discontinued. Monthly interpolations of the quarterly iSuppli prices are based on average sales prices from iSuppli for the DRAM index and on average sales prices from SIA for the indexes for flash and other memories.

### *Vacuum Cleaners*

The index for household vacuum cleaner manufacturing (NAICS 335212) is now based on monthly data on unit shipments from the Association of Home Appliance Manufacturers (AHAM) with a model-based inventory adjustment. Formerly, the index was based on quarterly data from the Vacuum Cleaner Manufacturers Association (VCMA). In 2003, AHAM assumed responsibility from VCMA for issuing the data. With this revision, the monthly time series was long enough to construct seasonal factors.

### *Reliability of Monthly Estimates*

The extended six-month reporting window will allow additional source data to be incorporated into IP before an annual revision. The first estimate of output for a month is preliminary and is subject to revision in each of the subsequent five months as new source data become available.

Some of the IP series that particularly benefit from the new six-month window include electric and gas utilities (NAICS 2211 and 2212), crude oil extraction (part of NAICS 211111), and tobacco manufacturing (NAICS 312221). The indexes for electric and gas utilities depend on data from the U.S. Department of Energy (DOE) that generally arrive with a three-month lag; however, the data for earlier months tend to be revised, and these revisions often were not available in time to be incorporated into the four-month window. Although the aggregate data from DOE on crude oil extraction are available within the four-month window, the full complement of detailed geographic data used for specific IP series typically was not available until after the window had closed. The data on tobacco manufacturing are from the Alcohol and Tobacco Tax and Trade Bureau of the U.S. Department of the Treasury. Over the past several years, these data have been received with too great a lag to get folded into the four-month IP window; however, more recently, the timeliness has improved somewhat. The six-month window will permit these data to be incorporated in a timely manner more often.

Most of the series that rely on quarterly data benefit from the extended window. Under the four-month window, some data that are quarterly in frequency arrived too late to be fully incorporated into IP. Often, only one or two months of the quarter were open by the time the data were received. In addition, for some quarterly series such as construction paints and industrial paints (both in NAICS 325510), even when preliminary estimates were available for much or all

14. Charles Gilbert and Kimberly Bayard (2005), "Industrial Production and Capacity Utilization: The 2004 Annual Revision," *Federal Reserve Bulletin*, vol. 91 (Winter), pp. 9–25, [www.federalreserve.gov/pubs/bulletin](http://www.federalreserve.gov/pubs/bulletin).

## 2. Availability of monthly IP data in publication window

Percent of value added in 2007

Type of data	Month of estimate			
	1st	2nd	3rd	4th
Physical product .....	29	42	56	56
Production-worker hours .....	42	42	42	42
IP data received .....	70	84	98	98
IP data estimated .....	30	16	2	2

of the quarter, these estimates were revised—sometimes substantially—in later months, and the revisions could not be fully adopted because some or all of the relevant quarter had fallen outside the reporting window.

Table 2 shows the availability of source data during 2007 with a four-month reporting window. The six-month window will permit almost all of the indexes estimated in the fourth month to be calculated from source data.

### *Weights for Aggregation*

The IP index is a Fisher index. This revision used information from the ASM to obtain updated estimates of the industry value-added weights used in the aggregation of IP indexes and capacity utilization rates. The Federal Reserve derives estimates of value added for the electric and gas utility industries from annual revenue and expense data issued by other organizations. The weights for aggregation, expressed as unit value added, were estimated with the latest

data on producer prices for the period after 2006. Table A.8 shows the annual value-added proportions in the IP index from 1999 through 2007.

### *Revised Monthly Data*

This revision incorporated product data that became available, or were revised, after the regular four-month reporting window for monthly IP was closed. These data were released with too great a lag to be included with monthly IP estimates; however, the data were available for inclusion in the annual revision.

### *Revised Seasonal Factors*

Seasonal factors for all series were reestimated with data that extend into 2007 or 2008. Factors for production-worker hours—which adjust for timing, holiday, and monthly seasonal patterns—were updated with data through January 2008 and were prorated to correspond with the seasonal factors for hours aggregated to the three-digit NAICS level. The updated factors for the product series, which include adjustments for holiday and workday patterns, used data through 2007. Seasonal factors for unit motor vehicle assemblies have been updated, and projections through December 2008 are on the Federal Reserve Board's website at [www.federalreserve.gov/releases/g17/mvsf.htm](http://www.federalreserve.gov/releases/g17/mvsf.htm). □

*Appendix tables start on page A53*

## A.1. Revised data for industrial production for total industry, 1978–2008

Seasonally adjusted data except as noted

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Quarter				Annual avg. <sup>1</sup>
													1	2	3	4	
Industrial production (percent change)																	
1978	-1.4	.5	1.8	2.1	.3	.7	-1	.4	.3	.8	.7	.6	-1.3	16.7	3.5	7.5	5.5
1979	-7	.6	.3	-1.1	.8	.0	-2	-7	.1	.6	-1	.1	1.9	-6	-1.4	1.5	3.0
1980	.5	.0	-3	-2.0	-2.5	-1.2	-7	.3	1.6	1.3	1.7	.6	1.8	-15.9	-6.3	16.2	-2.5
1981	-6	-5	.6	-5	.7	.5	.7	.0	-6	-8	-1.1	-1.1	.8	1.4	4.2	-8.7	1.3
1982	-1.9	1.9	-7	-8	-7	-4	-3	-8	-4	-8	-4	-8	-7.8	-4.9	-5.8	-7.4	-5.2
1983	1.9	-6	.9	1.2	.7	.6	1.6	1.1	1.5	.8	.3	.5	4.6	9.5	14.6	10.8	2.8
1984	2.0	.5	.5	.6	.5	.4	.3	.1	-2	-1	.4	.1	12.2	6.3	2.7	.3	8.9
1985	-3	.4	.1	-2	.1	.1	-6	.4	.4	-4	.3	1.0	1.2	.4	-6	2.4	1.2
1986	.5	-7	-6	.1	.1	-3	.6	-2	.2	.5	.5	.9	2.3	-2.4	1.7	4.6	1.0
1987	-3	1.3	.2	.6	.7	.5	.6	.7	.3	1.5	.5	.5	5.4	7.2	7.3	10.2	5.2
1988	.0	.4	.3	.6	-1	.2	.2	.5	-3	.6	.2	.4	3.5	3.5	2.1	3.2	5.2
1989	.2	-5	.2	.0	-7	.0	-9	.9	-3	-1	.3	.7	1.5	-1.8	-2.5	1.8	.9
1990	-5	.9	.5	-1	.2	.3	-1	.2	.2	-7	-1.2	-7	3.2	2.8	1.4	-6.0	1.0
1991	-5	-7	-5	.2	1.0	1.0	.0	.1	.8	-2	-2	-3	-7.5	2.6	5.5	.7	-1.6
1992	-6	.7	.8	.7	.4	.0	.8	-5	.2	.7	.4	.0	-3	7.3	2.9	3.9	2.8
1993	.5	.3	.0	.3	-4	.2	.3	.0	.4	.7	.4	.5	3.5	1.2	2.1	6.0	3.3
1994	.4	.0	1.1	.5	.6	.7	.2	.5	.2	.8	.7	1.1	5.2	7.4	5.2	8.2	5.3
1995	.3	.0	.1	-1	.2	.3	-4	1.3	.4	-2	.3	.5	5.3	.9	3.8	3.3	4.8
1996	-6	1.7	-2	.7	.6	.9	-1	.6	.5	.0	.9	.7	3.5	7.7	5.1	5.6	4.4
1997	.1	1.2	.8	.0	.6	.5	.6	1.4	.9	.7	.9	.4	8.0	6.3	9.7	10.7	7.3
1998	.4	.0	.0	.5	.6	-5	-4	2.1	-3	.7	-1	.3	4.1	3.1	2.9	5.2	5.9
1999	.5	.4	.2	.2	.7	-2	.6	.5	-4	1.3	.6	.8	4.3	3.8	4.0	8.0	4.3
2000	.1	.4	.4	.6	.2	.1	-2	-2	.4	-4	.0	-3	4.9	5.0	-3	-1.3	4.2
2001	-7	-6	-3	-3	-7	-6	-5	-4	-4	-6	-5	.0	-5.5	-5.2	-5.9	-5.2	-3.4
2002	.5	.1	.7	.4	.5	1.0	-3	.1	.0	-3	.4	-5	2.3	6.3	2.3	-5	-1
2003	.6	.4	-2	-8	.0	.2	.4	-1	.5	.1	.8	-1	2.7	-2.9	2.8	3.7	1.2
2004	.3	.5	-5	.5	.7	-8	.7	.3	-1	1.0	.3	.6	2.6	2.0	2.0	5.8	2.5
2005	.5	.6	.0	-1	.3	.4	.0	.2	-1.8	1.2	1.1	.5	5.4	1.9	-4	3.7	3.3
2006	.1	-1	.2	.4	-1	.5	.3	.1	-4	-1	-2	.6	3.2	2.6	1.9	-9	2.2
2007	-4	.7	-1	.5	.0	.3	.6	.0	.3	-4	.4	.1	1.5	3.2	3.6	.3	1.7
2008	.2	-4	.1	-7	-2	.5	...	...	...	...	...	...	.5	-3.1	...	...	...
Industrial production (2002=100)																	
1978	53.5	53.7	54.7	55.8	56.0	56.4	56.4	56.6	56.7	57.2	57.6	58.0	54.0	56.1	56.6	57.6	56.1
1979	57.6	57.9	58.1	57.5	57.9	57.9	57.8	57.4	57.5	57.8	57.7	57.8	57.9	57.8	57.6	57.8	57.8
1980	58.1	58.1	57.9	56.8	55.3	54.7	54.3	54.5	55.3	56.0	57.0	57.3	58.0	55.6	54.7	56.8	56.3
1981	57.0	56.7	57.0	56.7	57.1	57.4	57.8	57.8	57.5	57.0	56.4	55.8	56.9	57.1	57.7	56.4	57.0
1982	54.7	55.7	55.3	54.9	54.5	54.3	54.1	53.7	53.5	53.0	52.8	52.4	55.3	54.6	53.8	52.7	54.1
1983	53.4	53.1	53.5	54.2	54.6	54.9	55.8	56.4	57.2	57.7	57.9	58.2	53.3	54.6	56.5	57.9	55.6
1984	59.3	59.6	59.9	60.3	60.6	60.8	60.9	61.0	60.9	60.8	61.0	61.1	59.6	60.5	60.9	61.0	60.5
1985	61.0	61.2	61.3	61.2	61.2	61.3	60.9	61.1	61.4	61.2	61.4	62.0	61.2	61.2	61.1	61.5	61.3
1986	62.3	61.8	61.4	61.5	61.6	61.4	61.8	61.7	61.8	62.1	62.3	62.9	61.8	61.5	61.7	62.4	61.9
1987	62.7	63.5	63.6	64.0	64.4	64.7	65.1	65.6	65.8	66.8	67.1	67.4	63.3	64.4	65.5	67.1	65.1
1988	67.5	67.7	67.9	68.3	68.2	68.4	68.5	68.8	68.6	69.0	69.1	69.4	67.7	68.3	68.6	69.2	68.4
1989	69.6	69.3	69.4	69.4	69.0	69.0	68.3	69.0	68.8	68.7	68.9	69.4	69.4	69.1	68.7	69.0	69.1
1990	69.0	69.6	70.0	69.9	70.0	70.2	70.1	70.3	70.4	69.9	69.1	68.6	69.5	70.0	70.3	69.2	69.7
1991	68.3	67.8	67.5	67.6	68.3	69.0	68.9	69.0	69.6	69.5	69.4	69.1	67.8	68.3	69.2	69.3	68.7
1992	68.7	69.2	69.8	70.3	70.6	70.6	71.2	70.8	71.0	71.5	71.8	71.8	69.3	70.5	71.0	71.7	70.6
1993	72.1	72.4	72.4	72.6	72.4	72.5	72.8	72.8	73.1	73.6	73.9	74.3	72.3	72.5	72.9	73.9	72.9
1994	74.6	74.6	75.4	75.8	76.2	76.7	76.9	77.3	77.4	78.1	78.6	79.5	74.9	76.2	77.2	78.7	76.8
1995	79.7	79.7	79.8	79.7	79.9	80.1	79.9	80.9	81.2	81.0	81.3	81.7	79.8	79.9	80.7	81.3	80.4
1996	81.2	82.5	82.4	83.0	83.5	84.2	84.1	84.6	85.1	85.1	85.8	86.4	82.0	83.6	84.6	85.8	84.0
1997	86.5	87.6	88.3	88.3	88.9	89.3	89.8	91.0	91.8	92.5	93.4	93.8	87.5	88.8	90.9	93.2	90.1
1998	94.1	94.2	94.2	94.7	95.3	94.7	94.4	96.3	96.1	96.7	96.7	97.0	94.2	94.9	95.6	96.8	95.4
1999	97.5	97.9	98.1	98.3	99.0	98.9	99.5	100.0	99.6	100.9	101.6	102.4	97.8	98.7	99.7	101.6	99.5
2000	102.5	102.8	103.2	103.9	104.1	104.3	104.0	103.8	104.3	103.8	103.8	103.5	102.8	104.1	104.0	103.7	103.7
2001	102.7	102.2	101.8	101.6	100.9	100.2	99.8	99.4	99.0	98.4	97.9	97.8	102.2	100.9	99.4	98.0	100.1
2002	98.3	98.4	99.1	99.5	100.0	100.9	100.6	100.7	100.7	100.4	100.9	100.4	98.6	100.1	100.7	100.6	100.0
2003	101.0	101.4	101.3	100.4	100.4	100.6	101.1	101.0	101.5	101.6	102.4	102.3	101.2	100.5	101.2	102.1	101.2
2004	102.6	103.1	102.6	103.1	103.8	102.9	103.6	103.9	103.8	104.8	105.2	105.8	102.8	103.3	103.8	105.3	103.8
2005	106.3	106.9	106.8	106.8	107.1	107.6	107.6	107.7	105.8	107.1	108.2	108.8	106.7	107.1	107.0	108.0	107.2
2006	108.8	108.7	109.0	109.4	109.3	109.9	110.1	110.2	109.8	109.7	109.5	110.2	108.9	109.5	110.1	109.8	109.6
2007	109.8	110.5	110.4	111.0	111.0	111.4	112.0	112.0	112.3	111.8	112.3	112.4	110.2	111.1	112.1	112.2	111.4
2008	112.6	112.2	112.2	111.4	111.2	111.7	...	...	...	...	...	...	112.3	111.4	...	...	...

NOTE: Monthly percent change figures show the change from the previous month; quarterly figures show the change from the previous quarter at a compound annual rate of change. Production and capacity indexes are expressed as percentages of output in 2002.

Estimates from February 2008 through June 2008 are subject to further revision in the upcoming monthly releases.

1. Annual averages of industrial production are calculated from not seasonally adjusted indexes.

... Not available as of July 16, 2008.

A.2. Revised data for capacity and capacity utilization for total industry, 1978–2008

Seasonally adjusted data

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Quarter				Annual avg.
													1	2	3	4	
Capacity (percent of 2002 output)																	
1978	65.0	65.2	65.4	65.6	65.7	65.9	66.1	66.3	66.5	66.6	66.8	66.9	65.2	65.7	66.3	66.8	66.0
1979	67.1	67.3	67.4	67.6	67.7	67.8	68.0	68.1	68.3	68.4	68.6	68.7	67.3	67.7	68.1	68.6	67.9
1980	68.8	69.0	69.1	69.3	69.4	69.6	69.7	69.9	70.1	70.2	70.4	70.5	69.0	69.4	69.9	70.4	69.7
1981	70.7	70.9	71.0	71.2	71.4	71.5	71.7	71.9	72.0	72.2	72.4	72.5	70.9	71.4	71.9	72.4	71.6
1982	72.7	72.8	73.0	73.1	73.3	73.4	73.5	73.6	73.7	73.8	73.9	73.9	72.8	73.3	73.6	73.9	73.4
1983	74.0	74.0	74.1	74.1	74.1	74.1	74.2	74.2	74.2	74.3	74.3	74.4	74.0	74.1	74.2	74.3	74.2
1984	74.5	74.6	74.7	74.8	74.9	75.0	75.2	75.4	75.5	75.7	75.9	76.0	74.6	74.9	75.4	75.9	75.2
1985	76.2	76.4	76.6	76.8	77.0	77.2	77.3	77.5	77.6	77.8	77.9	78.0	76.4	77.0	77.5	77.9	77.2
1986	78.2	78.3	78.4	78.4	78.5	78.6	78.7	78.8	78.9	79.0	79.1	79.2	78.3	78.5	78.8	79.1	78.7
1987	79.3	79.5	79.6	79.8	79.9	80.1	80.3	80.4	80.6	80.7	80.8	80.9	79.5	79.9	80.4	80.8	80.2
1988	81.0	81.1	81.2	81.2	81.3	81.3	81.4	81.4	81.5	81.6	81.7	81.8	81.1	81.3	81.4	81.7	81.4
1989	81.9	82.0	82.1	82.2	82.4	82.5	82.7	82.9	83.0	83.2	83.4	83.5	82.0	82.4	82.9	83.4	82.7
1990	83.7	83.9	84.1	84.2	84.4	84.6	84.7	84.9	85.0	85.2	85.3	85.5	83.9	84.4	84.9	85.3	84.6
1991	85.6	85.7	85.8	86.0	86.1	86.2	86.3	86.4	86.5	86.6	86.7	86.9	85.7	86.1	86.4	86.7	86.2
1992	87.0	87.1	87.3	87.4	87.6	87.8	88.0	88.1	88.3	88.5	88.6	88.8	87.1	87.6	88.1	88.6	87.9
1993	88.9	89.1	89.2	89.3	89.4	89.5	89.6	89.7	89.8	90.0	90.1	90.3	89.1	89.4	89.7	90.1	89.6
1994	90.4	90.6	90.9	91.1	91.3	91.6	91.9	92.2	92.5	92.8	93.1	93.4	90.7	91.4	92.2	93.1	91.8
1995	93.8	94.1	94.4	94.8	95.1	95.5	95.8	96.2	96.6	97.0	97.4	97.8	94.1	95.1	96.2	97.4	95.7
1996	98.3	98.7	99.2	99.6	100.1	100.6	101.0	101.5	102.0	102.5	103.0	103.5	98.7	100.1	101.5	103.0	100.8
1997	104.0	104.5	105.1	105.6	106.2	106.8	107.4	108.0	108.7	109.4	110.1	110.8	104.5	106.2	108.0	110.1	107.2
1998	111.5	112.2	112.9	113.6	114.3	115.0	115.6	116.2	116.7	117.3	117.8	118.4	112.2	114.3	116.2	117.8	115.1
1999	118.9	119.4	119.8	120.3	120.8	121.2	121.7	122.1	122.6	123.1	123.5	124.0	119.4	120.8	122.1	123.5	121.4
2000	124.4	124.9	125.3	125.8	126.2	126.6	127.0	127.4	127.8	128.2	128.6	129.0	124.9	126.2	127.4	128.6	126.8
2001	129.4	129.8	130.1	130.5	130.8	131.2	131.5	131.8	132.1	132.4	132.7	132.9	129.8	130.8	131.8	132.7	131.3
2002	133.2	133.4	133.6	133.7	133.8	133.9	133.9	134.0	133.9	133.9	133.8	133.7	133.4	133.8	133.9	133.8	133.7
2003	133.6	133.5	133.4	133.3	133.2	133.1	133.1	133.0	133.0	133.0	132.9	132.9	133.5	133.2	133.0	132.9	133.2
2004	133.0	133.0	133.0	133.0	133.0	133.0	133.1	133.1	133.1	133.1	133.1	133.2	133.0	133.0	133.1	133.2	133.1
2005	133.2	133.3	133.3	133.4	133.5	133.6	133.7	133.8	134.0	134.1	134.3	134.4	133.3	133.5	133.9	134.3	133.7
2006	134.6	134.7	134.9	135.0	135.2	135.3	135.4	135.6	135.7	135.9	136.0	136.2	134.7	135.2	135.6	136.1	135.4
2007	136.4	136.6	136.8	137.0	137.2	137.4	137.6	137.9	138.1	138.3	138.5	138.7	136.6	137.2	137.9	138.5	137.5
2008	139.0	139.1	139.3	139.5	139.7	139.9	...	...	...	...	...	...	139.1	139.7	...	...	...
Capacity utilization (percent)																	
1978	82.3	82.4	83.6	85.1	85.2	85.6	85.3	85.4	85.4	85.9	86.3	86.6	82.8	85.3	85.3	86.2	84.9
1979	85.8	86.1	86.2	85.1	85.6	85.4	85.0	84.3	84.2	84.5	84.2	84.2	86.0	85.3	84.5	84.3	85.0
1980	84.4	84.2	83.8	81.9	79.7	78.6	77.9	79.0	79.8	81.0	81.3	84.1	80.1	78.3	80.7	80.8	
1981	80.6	80.0	80.3	79.7	80.1	80.3	80.6	80.4	79.8	79.0	77.9	76.9	80.3	80.0	80.3	77.9	79.6
1982	75.2	76.5	75.8	75.0	74.4	74.0	73.6	72.9	72.5	71.8	71.5	70.9	75.9	74.5	73.0	71.4	73.7
1983	72.2	71.7	72.3	73.2	73.7	74.1	75.2	76.0	77.1	77.7	77.9	78.2	72.1	73.6	76.1	77.9	74.9
1984	79.7	80.0	80.2	80.6	80.9	81.0	81.1	81.0	80.6	80.4	80.5	80.4	80.0	80.8	80.9	80.4	80.5
1985	80.0	80.1	80.0	79.7	79.5	79.4	78.7	78.9	79.1	78.6	78.7	79.4	80.0	79.5	78.9	78.9	79.3
1986	79.7	79.0	78.4	78.4	78.4	78.1	78.5	78.3	78.3	78.6	78.8	79.4	79.0	78.3	78.4	78.9	78.7
1987	79.0	79.9	79.9	80.2	80.6	80.8	81.2	81.6	81.7	82.8	83.1	83.4	79.6	80.5	81.5	83.1	81.2
1988	83.3	83.5	83.7	84.1	83.9	84.1	84.2	84.5	84.2	84.6	84.6	84.9	83.5	84.0	84.3	84.7	84.1
1989	85.0	84.5	84.6	84.4	83.7	83.6	82.6	83.2	82.8	82.6	82.6	83.1	84.7	83.9	82.9	82.8	83.6
1990	82.5	83.0	83.2	82.9	82.9	83.0	82.7	82.8	82.8	82.1	80.9	80.3	82.9	83.0	82.8	81.1	82.4
1991	79.8	79.1	78.6	78.6	79.3	80.0	79.9	79.9	80.5	80.2	80.0	79.6	79.2	79.3	80.1	79.9	79.6
1992	79.0	79.5	80.0	80.4	80.5	80.4	80.9	80.3	80.4	80.8	80.9	80.8	79.5	80.5	80.9	80.3	80.3
1993	81.1	81.2	81.1	81.3	80.9	81.1	81.2	81.1	81.4	81.8	82.0	82.3	81.2	81.1	81.2	82.1	81.4
1994	82.5	82.3	83.0	83.2	83.4	83.7	83.7	83.8	83.7	84.2	84.4	85.1	82.6	83.4	83.7	84.5	83.6
1995	85.0	84.7	84.5	84.1	84.0	83.9	83.3	84.1	84.1	83.6	83.5	83.5	84.7	84.0	83.8	83.5	84.0
1996	82.6	83.6	83.1	83.3	83.4	83.7	83.2	83.4	83.4	83.0	83.4	83.5	83.1	83.5	83.3	83.3	83.3
1997	83.2	83.8	84.0	83.6	83.7	83.6	83.6	84.2	84.5	84.6	84.8	84.6	83.7	83.6	84.1	84.7	84.0
1998	84.4	83.9	83.4	83.3	83.3	82.4	81.6	82.9	83.3	82.5	82.0	82.0	83.9	83.0	82.3	82.2	82.8
1999	82.0	82.0	81.8	81.7	82.0	81.6	81.8	81.9	81.3	82.0	82.2	82.6	82.0	81.8	81.6	82.3	81.9
2000	82.4	82.4	82.4	82.6	82.5	82.4	81.9	81.5	81.6	81.0	80.7	80.2	82.4	82.5	81.6	80.6	81.8
2001	79.4	78.7	78.2	77.8	77.1	76.4	75.9	75.4	74.9	74.3	73.8	73.6	78.8	77.1	75.4	73.9	76.3
2002	73.8	73.8	74.2	74.4	74.7	75.4	75.1	75.2	75.2	75.0	75.4	75.1	73.9	74.8	75.2	75.2	74.8
2003	75.6	75.9	75.9	75.3	75.4	75.6	75.9	75.9	76.3	76.4	77.0	77.0	75.8	75.4	76.1	76.8	76.0
2004	77.2	77.6	77.1	77.5	78.0	77.4	77.9	78.1	78.0	78.7	79.0	79.4	77.3	77.6	78.0	79.1	78.0
2005	79.8	80.2	80.1	80.0	80.2	80.5	80.4	80.5	79.0	79.8	80.6	80.9	80.0	80.3	80.0	80.4	80.2
2006	80.9	80.7	80.8	81.1	80.9	81.2	81.3	81.3	80.9	80.8	80.5	80.9	80.8	81.0	81.2	80.7	80.9
2007	80.5	80.9	80.7	81.0	80.9	81.0	81.4	81.2	81.3	80.8	81.1	81.0	80.7	81.0	81.3	81.0	81.0
2008	81.0	80.3	80.5	79.9	79.6	79.9	...	...	...	...	...	...	80.6	79.8	...	...	...

NOTE: See the general note to table A.1.

... Not available as of July 16, 2008.

A.3. Rates of change in industrial production, by market and industry groups, 2003–07<sup>1</sup>

Item	NAICS code <sup>2</sup>	Revised rate of change (percent)					Difference between rates of change: revised minus previous (percentage points)				
		2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
<b>Total industry</b> .....	...	<b>1.5</b>	<b>3.1</b>	<b>2.6</b>	<b>1.7</b>	<b>2.1</b>	<b>.4</b>	<b>.1</b>	<b>-.6</b>	<b>-1.8</b>	<b>.4</b>
MARKET GROUPS											
Final products and nonindustrial supplies .....	...	1.5	2.6	4.4	1.0	1.3	.3	.0	-.4	-1.5	.1
Consumer goods .....	...	1.4	1.7	2.4	.2	1.1	.0	-.1	-.4	-.9	.1
Durable .....	...	3.4	-.7	1.5	-3.9	.9	.0	-.4	-.8	-1.4	-.1
Automotive products .....	...	4.7	-2.9	-1.9	-5.3	3.6	-.1	.3	-.1	-.7	.9
Home electronics .....	...	18.5	2.5	11.0	11.5	14.2	-1.9	-11.8	-5.7	-1.6	-4.5
Appliances, furniture, carpeting .....	...	2.9	1.6	1.6	-6.1	-6.0	.6	-.6	-1.4	-1.4	-.5
Miscellaneous goods .....	...	-1.4	2.0	5.6	-2.8	-1.5	-.1	-.1	-.7	-2.2	-.7
Nondurable .....	...	.5	2.6	2.7	1.5	1.2	.0	.0	-.2	-.7	.1
Non-energy .....	...	1.1	2.2	3.0	2.1	.9	.0	.0	-.3	-.6	.1
Foods and tobacco .....	...	2.6	2.3	3.9	.3	1.5	.0	.0	-.9	-1.9	.2
Clothing .....	...	-10.9	-9.8	-2.1	.3	-1.9	.0	.7	-1.9	-.4	1.4
Chemical products .....	...	2.1	4.0	3.1	7.7	.0	-.2	.2	2.2	3.9	.3
Paper products .....	...	-3.8	2.2	-.9	-2.4	1.1	.5	-1.0	-3.1	-5.7	-.4
Energy .....	...	-1.8	3.9	1.7	-.2	1.9	-.1	.2	.1	-.8	.0
Business equipment .....	...	1.9	5.2	10.3	7.8	2.8	.8	.0	-.9	-2.0	-.5
Transit .....	...	-1.2	7.2	15.9	9.1	-3.4	-1.6	1.3	-4.6	-7.8	-5.5
Information processing .....	...	10.5	6.3	14.6	12.8	8.9	3.5	-.9	.9	2.6	.4
Industrial and other .....	...	-1.9	4.0	5.9	4.4	1.7	.1	.0	-.8	-2.5	.7
Defense and space equipment .....	...	2.9	3.1	6.9	-2.6	5.2	1.3	.6	3.1	-4.9	5.8
Construction supplies .....	...	.9	1.7	7.5	-3.5	-1.6	-.1	.2	-.5	-1.5	-.6
Business supplies .....	...	1.3	3.2	2.6	-.3	1.1	.4	.2	-.7	-2.7	.0
Materials .....	...	1.5	3.7	.3	2.5	3.2	.5	.3	-.8	-2.2	.7
Non-energy .....	...	2.1	5.4	2.4	1.3	3.5	.7	.6	-1.1	-3.2	1.3
Durable .....	...	4.1	6.0	5.4	1.2	5.4	1.1	.7	-1.6	-4.5	1.6
Consumer parts .....	...	-1.4	.0	.5	-5.8	-2.0	.1	-.2	-1.2	-2.6	-.5
Equipment parts .....	...	12.0	11.1	11.3	9.4	12.5	3.2	1.7	-4.7	-10.0	5.7
Other .....	...	.5	4.9	2.9	-2.0	3.0	.0	.5	.2	-1.2	-.6
Nondurable .....	...	-1.2	4.3	-2.2	1.6	.6	-.1	.6	-.2	-1.0	.9
Textile .....	...	-8.3	-.9	.5	-12.2	-9.4	-.7	2.5	.3	-4.9	.3
Paper .....	...	-5.5	3.8	-1.1	1.6	-1.3	-.3	-.1	-1.0	-1.0	.7
Chemical .....	...	2.3	8.6	-5.8	4.9	2.1	-.2	.9	.8	.1	1.3
Energy .....	...	.2	-.5	-4.0	5.2	2.7	.1	-.3	.1	-.1	-.6
INDUSTRY GROUPS											
Manufacturing <sup>3</sup> .....	...	1.7	3.7	3.7	1.1	2.3	.4	.2	-.7	-2.2	.6
Manufacturing (NAICS) .....	31–33	2.0	3.8	3.9	1.4	2.5	.4	.3	-.6	-2.1	.6
Durable manufacturing .....	...	3.4	4.0	6.9	1.6	3.9	.8	.2	-1.0	-3.1	1.0
Wood products .....	321	4.6	1.4	11.6	-13.3	-6.8	.1	-.3	1.2	1.2	-1.4
Nonmetallic mineral products .....	327	1.3	4.4	5.3	-3.5	.7	-.6	-.5	-.5	-1.6	.6
Primary metal .....	331	4.5	8.1	-1.1	-4.2	4.1	.2	.7	1.2	-.7	-1.9
Fabricated metal products .....	332	-2.4	1.9	6.2	3.2	3.4	-.2	.3	.1	-.6	.9
Machinery .....	333	-2.0	5.1	8.3	2.5	-.7	.0	.2	.1	-2.8	.9
Computer and electronic products .....	334	17.9	10.2	15.1	12.2	13.9	4.3	.0	-3.2	-6.1	4.4
Electrical equipment, appliances, and components .....	335	-.9	2.3	1.8	-.5	3.7	.1	.3	-2.0	-2.8	1.1
Motor vehicles and parts .....	3361–3	3.2	-1.4	-.3	-5.9	-2.2	.1	.3	-.6	-2.1	-.4
Aerospace and miscellaneous transportation equipment .....	3364–9	-4.0	3.4	11.5	4.5	10.9	-.2	1.4	-3.6	-10.2	3.4
Furniture and related products .....	337	.2	3.4	1.6	-1.6	-1.7	.1	-.1	.0	-.4	1.2
Miscellaneous .....	339	.3	1.6	6.6	2.7	1.5	.2	-.5	-2.1	-2.0	-1.7
Nondurable manufacturing .....	...	.2	3.5	.7	1.3	.9	-.1	.3	-.2	-1.0	.3
Food, beverage, and tobacco products .....	311,2	2.5	1.3	4.1	.3	2.1	.0	.1	-1.1	-2.3	.4
Textile and product mills .....	313,4	-5.1	.5	-.3	-11.7	-8.1	-.4	1.2	-2.2	-4.0	-.2
Apparel and leather .....	315,6	-10.6	-8.9	-1.3	-.8	-2.0	-.1	.7	-1.7	-.7	1.3
Paper .....	322	-5.6	2.8	-.7	.3	-2.2	-.2	-.2	-.6	.4	.2
Printing and support .....	323	-2.7	2.4	.5	1.9	-1.3	-.3	.6	-1.4	-3.3	.9
Petroleum and coal products .....	324	.9	10.4	-3.7	2.2	-.5	-.2	.5	-.1	-.4	-.5
Chemical .....	325	1.9	6.6	-1.2	5.0	1.4	-.2	.5	1.3	1.3	.8
Plastics and rubber products .....	326	-.2	.9	2.6	-3.6	4.4	.0	.1	-.4	-3.9	-.7
Other manufacturing (non-NAICS) .....	1133, 5111	-2.8	2.0	-.5	-4.5	-1.4	.6	-.6	-1.2	-4.7	-.8
Mining .....	21	1.0	-.9	-4.9	8.2	.2	.3	-.2	.6	.2	-1.0
Utilities .....	2211,2	.6	1.8	2.0	-.7	3.1	.0	.1	-.1	-1.0	-.2
Electric .....	2211	1.9	2.3	3.5	-1.2	3.3	.1	.1	.1	-1.2	-.1
Natural gas .....	2212	-6.2	-1.1	-4.6	1.5	2.0	-.2	.3	-1.2	-.4	2.2

1. Rates of change are calculated as the percent change in the seasonally adjusted index from the fourth quarter of the previous year to the fourth quarter of the year specified in the column heading.

2. North American Industry Classification System.

3. Manufacturing comprises North American Industry Classification System (NAICS) manufacturing industries (sector 31-33) plus the logging industry and the newspaper, periodical, book, and directory publishing industries. Logging

and publishing are classified elsewhere in NAICS (under agriculture and information respectively), but historically they were considered to be manufacturing industries and were included in the industrial sector under the Standard Industrial Classification (SIC) system. In December 2002 the Federal Reserve reclassified all its industrial output data from the SIC system to NAICS.

... Not applicable.

A.4. Rates of change in industrial production, special aggregates and selected detail, 2003–07<sup>1</sup>

Item	NAICS code <sup>2</sup>	Revised rate of change (percent)					Difference between rates of change: revised minus previous (percentage points)				
		2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
<b>Total industry</b> .....	...	<b>1.5</b>	<b>3.1</b>	<b>2.6</b>	<b>1.7</b>	<b>2.1</b>	<b>.4</b>	<b>.1</b>	<b>-.6</b>	<b>-1.8</b>	<b>.4</b>
Energy .....	...	.7	1.3	-1.8	3.7	2.3	.1	-.2	.0	-.3	-.5
Consumer products .....	...	-1.8	3.9	1.7	-.2	1.9	-.1	.2	.1	-.8	.0
Commercial products .....	...	4.7	4.5	.4	1.2	2.0	.0	.0	-.1	-1.1	-1.2
Oil and gas well drilling .....	213111	21.3	8.4	11.9	14.8	-.8	.1	.1	.1	.1	-.2
Converted fuel .....	...	1.0	2.3	-2.6	2.5	5.3	.0	.2	-.1	.3	-1.0
Primary materials .....	...	-.1	-1.7	-4.6	6.4	1.6	.3	-.5	.3	-.4	-.3
Non-energy .....	...	1.7	3.5	3.9	1.1	2.1	.4	.2	-.7	-2.2	.6
Selected high-technology industries .....	...	23.8	9.4	22.4	17.3	22.3	6.7	-1.0	-5.7	-7.3	5.5
Computers and peripheral equipment .....	3341	9.9	1.6	28.8	18.0	16.7	5.1	-4.9	-1.5	5.9	-7.7
Communications equipment .....	3342	17.4	.7	13.7	20.6	20.6	3.5	-5.5	.8	5.8	5.9
Semiconductors and related electronic components .....	334412-9	34.0	17.3	24.0	15.4	25.9	9.5	3.6	-9.7	-19.4	11.4
Excluding selected high-technology industries .....	...	.2	3.1	2.7	.0	.8	.0	.3	-.4	-1.9	.3
Motor vehicles and parts .....	3361-3	3.2	-1.4	-.3	-5.9	-2.2	.1	.3	-.6	-2.1	-.4
Motor vehicles .....	3361	7.7	-2.7	-2.3	-7.0	-2.7	.0	.3	.2	-1.0	-1.2
Motor vehicle parts .....	3363	-1.9	-.8	-.6	-4.3	.5	.2	.3	-1.9	-4.1	.6
Excluding motor vehicles and parts .....	...	-.1	3.6	3.0	.6	1.1	.0	.3	-.4	-1.9	.3
Consumer goods .....	...	1.1	2.3	3.1	1.0	.3	.0	-.1	-.5	-.8	.0
Business equipment .....	...	-2.0	5.2	7.3	5.8	2.8	-.4	.8	-1.6	-4.4	.5
Construction supplies .....	...	.7	1.7	7.5	-3.7	-1.9	-.1	.2	-.4	-1.5	-.8
Business supplies .....	...	-.9	2.2	2.4	-1.6	-.1	.1	.2	-.7	-2.6	.0
Materials .....	...	-.5	5.0	.6	.7	1.8	-.1	.6	-.2	-1.6	.5
<i>Measures excluding selected high-technology industries</i>											
Total industry .....	...	.3	2.7	1.6	.9	1.2	.0	.2	-.4	-1.5	.2
Manufacturing <sup>3</sup> .....	...	.2	3.3	2.5	.1	1.1	.0	.3	-.4	-1.9	.3
Durable .....	...	.6	3.2	4.7	-.5	1.5	-.1	.4	-.5	-2.5	.4
<i>Measures excluding motor vehicles and parts</i>											
Total industry .....	...	1.4	3.5	2.8	2.1	2.4	.4	.1	-.6	-1.8	.4
Manufacturing <sup>3</sup> .....	...	1.6	4.2	4.0	1.7	2.6	.4	.2	-.7	-2.2	.7
Durable .....	...	3.5	5.1	8.1	2.8	4.8	.9	.2	-1.1	-3.2	1.2
<i>Measures excluding selected high-technology industries and motor vehicles and parts</i>											
Total industry .....	...	.1	3.1	1.7	1.4	1.4	.0	.2	-.3	-1.5	.2
Manufacturing <sup>3</sup> .....	...	-.1	3.8	2.7	.6	1.3	-.1	.3	-.4	-1.9	.4
<i>Measures of non-energy materials inputs to</i>											
Finished processors .....	...	3.7	6.0	5.6	2.8	5.1	1.4	.8	-2.7	-6.2	2.8
Primary and semifinished processors .....	...	.7	4.9	.1	.3	2.4	.0	.5	.1	-1.0	.2
<i>Stage-of-process groups</i>											
Crude .....	...	-.3	2.6	-6.6	7.2	1.7	.1	-.4	.7	.3	-.5
Primary and semifinished .....	...	1.1	3.7	3.3	-1.0	2.6	.5	.5	-1.0	-3.3	.7
Finished .....	...	2.7	2.4	5.4	3.4	1.7	.3	-.2	-.2	-.6	.2

1. Rates of change are calculated as the percent change in the seasonally adjusted index from the fourth quarter of the previous year to the fourth quarter of the year specified in the column heading.

2. North American Industry Classification System.

3. See table A.3, note 3.

... Not applicable.



A.5. Rates of change for annual industrial production indexes, 2003–07<sup>1</sup>

Item	Revised rate of change (percent)					Difference between rates of change: revised minus previous (percentage points)				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
<b>Total industry</b> .....	<b>1.2</b>	<b>2.5</b>	<b>3.3</b>	<b>2.2</b>	<b>1.7</b>	<b>.2</b>	<b>.0</b>	<b>.1</b>	<b>-1.8</b>	<b>-.4</b>
MARKET GROUPS										
Consumer goods .....	1.3	1.3	2.8	.3	1.7	.0	-.1	-.1	-1.0	-.2
Durable .....	3.2	1.1	.5	-1.3	-.3	-.1	-.3	-.5	-1.2	-1.3
Nondurable .....	.5	1.4	3.6	.8	2.3	.0	.0	.1	-.9	.1
Business equipment .....	-.3	5.2	7.3	10.4	3.3	-.5	.9	-.6	-1.3	-2.9
Defense and space equipment .....	6.3	-.8	10.5	-3.2	3.8	2.5	-1.0	5.1	-5.6	6.8
Construction supplies .....	-.4	2.1	4.5	2.2	-2.5	-.2	.2	-.3	-1.3	-1.2
Business supplies .....	1.7	2.2	3.4	.6	.6	.3	.0	.0	-2.4	-1.2
Materials .....	1.3	3.0	2.3	2.2	1.9	.4	-.1	.2	-2.4	-.1
Non-energy .....	1.8	4.3	3.9	2.5	2.1	.6	.0	.4	-3.4	.3
Energy .....	.0	-.4	-1.2	1.6	1.6	.1	-.2	.1	.0	-1.0
INDUSTRY GROUPS										
Manufacturing <sup>2</sup> .....	1.3	2.9	4.0	2.4	1.7	.2	.0	.1	-2.2	-.4
Manufacturing (NAICS) .....	1.5	3.1	4.2	2.8	1.8	.2	.1	.2	-2.2	-.2
Durable manufacturing .....	2.7	4.1	5.5	4.6	2.6	.4	.1	.0	-3.0	-.4
Nondurable manufacturing .....	.1	1.9	2.8	.8	1.0	-.1	.0	.4	-1.4	.1
Other manufacturing (non-NAICS) .....	-2.9	.8	.7	-4.3	-1.5	.1	-.1	-1.1	-3.0	-3.6
Mining .....	.2	-.6	-1.3	3.1	.1	.3	.0	.4	.4	-1.1
Utilities .....	1.9	1.4	2.1	-.6	3.3	.0	.0	.0	-.8	.4

1. The rates of change are calculated from annual averages of seasonally adjusted industrial production indexes rather than between the fourth quarter of one year and the fourth quarter of the next.

2. See table A.3, note 3.

 A.6. Rates of change in capacity, by industry groups, 2003–07<sup>1</sup>

Item	Revised rate of change (percent)					Difference between rates of change: revised minus previous (percentage points)				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
<b>Total industry</b> .....	<b>-.6</b>	<b>.2</b>	<b>.8</b>	<b>1.3</b>	<b>1.8</b>	<b>.3</b>	<b>.0</b>	<b>-.2</b>	<b>-1.1</b>	<b>.0</b>
Manufacturing <sup>2</sup> .....	-.6	.2	1.4	1.4	2.0	.3	.1	-.3	-1.3	-.2
Manufacturing (NAICS) .....	-.3	.2	1.5	1.4	2.0	.3	.1	-.3	-1.4	-.2
Durable manufacturing .....	.3	.5	2.6	2.4	3.3	.5	.0	-.7	-1.8	-.2
Nondurable manufacturing .....	-1.0	-.1	.5	.3	.7	.2	.3	.2	-.8	-.1
Other manufacturing (non-NAICS) .....	-4.8	-.6	-.2	1.1	.6	-1.0	-.5	-.8	.1	-.2
Mining .....	-1.4	-1.3	-1.1	1.4	1.7	.7	-1.0	.6	.8	1.3
Utilities .....	3.6	2.9	.7	.8	1.2	.5	.3	.7	-1.2	-.3
Selected high-technology industries .....	4.2	5.5	13.1	10.3	21.4	2.8	1.2	-5.2	-9.3	1.9
Manufacturing except selected high-technology industries <sup>2</sup> .....	-.7	-.2	.7	.8	.8	.1	.0	.1	-.6	-.2
<i>Stage-of-process groups</i>										
Crude .....	-1.8	-.7	-.8	.9	1.4	.4	-.6	.3	.7	1.0
Primary and semifinished .....	-.8	.7	.8	1.2	2.1	.6	.3	-.6	-1.8	-.1
Finished .....	.3	.4	2.3	1.8	1.7	.0	-.1	.3	-.5	-.3

1. Rates of change are calculated as the percent change in the seasonally adjusted index from the fourth quarter of the previous year to the fourth quarter of the year specified in the column heading.

2. See table A.3, note 3.

## A.7. Capacity utilization rates, by industry groups, 2004–07

Item	NAICS code <sup>1</sup>	Revised rate (percent of capacity, seasonally adjusted)					Difference between rates of change: revised minus previous (percentage points)			
		1972– 2007 avg.	2004:Q4	2005:Q4	2006:Q4	2007:Q4	2004:Q4	2005:Q4	2006:Q4	2007:Q4
<b>Total industry</b> .....	...	<b>81.0</b>	<b>79.1</b>	<b>80.4</b>	<b>80.7</b>	<b>81.0</b>	<b>.0</b>	<b>–.2</b>	<b>–.8</b>	<b>–.5</b>
Manufacturing <sup>2</sup> .....	...	79.7	77.5	79.2	79.0	79.3	–.1	–.3	–1.1	–.5
Manufacturing (NAICS) .....	31-33	79.5	77.1	78.9	78.9	79.3	–.1	–.4	–.9	–.3
Durable manufacturing .....	...	78.0	74.8	78.0	77.3	77.8	.0	–.2	–1.1	–.3
Wood products .....	321	79.9	81.4	89.9	75.9	70.1	.1	1.4	1.6	–.1
Nonmetallic mineral products .....	327	79.4	80.3	83.3	78.9	78.2	–.8	–.5	–.8	–.2
Primary metal .....	331	80.9	86.7	83.9	80.8	83.9	–.1	.2	–1.4	–2.6
Fabricated metal products .....	332	77.5	73.8	78.0	79.9	81.3	.2	.1	–.3	.2
Machinery .....	333	78.7	73.2	78.5	79.4	77.3	–.2	–.2	–1.5	–.6
Computer and electronic products .....	334	78.3	71.1	74.7	78.0	77.4	–.6	–.4	.7	3.4
Electrical equip., appliances, and components .....	335	83.2	79.9	83.2	82.1	83.4	.8	–.2	–2.2	–2.1
Motor vehicles and parts .....	3361–3	77.4	79.2	78.3	72.3	72.4	.3	–.3	–2.4	–3.7
Aerospace and miscellaneous transportation equipment .....	3364–9	72.7	63.0	70.0	72.8	80.4	1.6	–.2	–5.9	–2.5
Furniture and related products .....	337	78.6	77.0	79.0	77.5	76.6	.5	.3	–.8	.6
Miscellaneous .....	339	76.6	74.9	76.9	76.5	74.7	–.1	–1.4	–2.3	–3.0
Nondurable manufacturing .....	...	81.6	79.8	80.0	80.8	81.0	–.3	–.6	–.8	–.4
Food, beverage, and tobacco products .....	311,2	81.5	78.4	80.7	80.3	81.1	.3	–.7	–1.9	–1.0
Textile and product mills .....	313,4	82.0	77.2	79.7	72.5	68.9	1.6	–.1	–3.3	–2.8
Apparel and leather .....	315,6	78.4	67.9	69.6	71.8	73.0	.0	–1.9	–2.3	–1.3
Paper .....	322	87.6	83.7	84.0	84.3	82.6	–.8	–1.0	–1.2	–1.4
Printing and support .....	323	83.5	76.5	77.7	78.5	76.4	.6	–.3	–1.9	–.7
Petroleum and coal products .....	324	85.9	92.0	87.3	88.9	88.9	–2.4	–.6	–1.2	–1.3
Chemical .....	325	78.3	78.1	75.5	79.1	78.9	–.4	–.1	1.4	1.4
Plastics and rubber products .....	326	83.6	83.8	85.9	82.3	84.6	–1.2	–1.4	–2.5	–2.1
Other manufacturing (non-NAICS) .....	1133, 5111	84.5	85.7	85.4	80.7	79.2	.5	.2	–3.9	–4.3
Mining .....	21	87.5	88.8	85.5	91.2	90.2	.4	.4	–.1	–1.9
Utilities .....	2211,2	86.8	84.6	85.7	84.4	85.9	.0	–.8	–.6	–.2
Selected high-technology industries .....	...	78.1	69.5	75.2	80.0	79.9	–1.2	–1.3	.3	2.0
Computers and peripheral equipment .....	3341	77.9	78.2	74.3	77.5	78.3	–1.6	–1.9	–.8	–2.3
Communications equipment .....	3342	75.7	52.4	61.8	73.3	80.1	–2.0	–2.0	.0	–1.9
Semiconductors and related electronic components .....	334412–9	80.8	77.4	84.2	85.1	80.5	.6	1.0	2.4	5.6
<i>Measures excluding selected high-technology industries</i>										
Total industry .....	...	81.2	79.7	80.7	80.7	81.0	.2	–.2	–1.0	–.8
Manufacturing <sup>2</sup> .....	...	79.8	78.1	79.5	79.0	79.2	.0	–.3	–1.4	–1.0
<i>Stage-of-process groups</i>										
Crude .....	...	86.6	88.0	83.3	89.2	89.3	.1	.4	.0	–1.1
Primary and semifinished .....	...	82.2	81.4	83.4	81.3	81.3	.0	–.1	–1.0	–.5
Finished .....	...	77.7	73.8	75.9	77.0	77.6	–.1	–.6	–1.3	–.7

1. North American Industry Classification System.

2. See table A.3, note 3.

... Not applicable.

## A.8. Annual proportion in industrial production, by market groups and industry groups, 1999–2007

Item	NAICS code <sup>1</sup>	1999	2000	2001	2002	2003	2004	2005	2006	2007
<b>Total industry</b> .....	...	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
MARKET GROUPS										
Final products and nonindustrial supplies .....	...	57.4	57.2	58.7	58.5	57.8	56.6	56.6	56.5	56.1
Consumer goods .....	...	28.1	28.3	29.8	30.8	30.7	29.9	29.6	29.1	29.3
Durable .....	...	8.0	7.8	8.1	8.9	8.7	7.9	7.4	7.0	6.7
Automotive products .....	...	3.9	3.7	4.0	4.7	4.6	4.0	3.6	3.3	3.2
Home electronics .....	...	.4	.4	.4	.4	.4	.4	.3	.3	.3
Appliances, furniture, carpeting .....	...	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.1
Miscellaneous goods .....	...	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.1
Nondurable .....	...	20.1	20.5	21.7	21.9	22.0	22.0	22.2	22.1	22.6
Non-energy .....	...	16.6	16.8	17.9	18.0	17.8	17.1	16.5	16.2	16.3
Foods and tobacco .....	...	9.1	9.3	9.9	9.7	9.7	9.4	9.0	8.8	9.0
Clothing .....	...	1.3	1.2	1.1	.9	.8	.7	.6	.6	.5
Chemical products .....	...	3.8	3.9	4.4	4.9	4.9	4.8	4.7	4.8	4.7
Paper products .....	...	1.9	1.9	2.0	2.0	1.8	1.7	1.7	1.6	1.6
Energy .....	...	3.5	3.7	3.8	3.9	4.2	4.9	5.7	5.8	6.4
Business equipment .....	...	11.8	11.6	11.2	10.2	9.6	9.4	9.3	9.6	9.4
Transit .....	...	2.3	2.0	2.0	1.8	1.6	1.6	1.6	1.8	1.7
Information processing .....	...	4.1	4.1	3.8	3.1	2.9	2.9	2.8	2.8	2.7
Industrial and other .....	...	5.4	5.6	5.3	5.3	5.0	4.9	4.9	5.0	5.0
Defense and space equipment .....	...	1.8	1.5	1.8	1.8	1.8	1.7	1.8	1.7	1.7
Construction supplies .....	...	4.3	4.2	4.3	4.3	4.3	4.3	4.4	4.4	4.2
Business supplies .....	...	11.1	11.1	11.1	11.0	11.0	10.8	10.9	10.8	10.6
Materials .....	...	42.6	42.8	41.3	41.5	42.2	43.4	43.4	43.5	43.9
Non-energy .....	...	33.1	32.1	30.6	30.5	30.0	30.0	29.6	29.6	29.3
Durable .....	...	21.4	20.8	19.5	19.0	18.6	18.5	18.1	18.0	17.6
Consumer parts .....	...	4.3	4.1	3.8	4.0	3.8	3.5	3.3	3.1	2.9
Equipment parts .....	...	8.1	8.1	7.3	6.6	6.5	6.4	6.2	6.1	6.0
Other .....	...	8.9	8.6	8.4	8.4	8.3	8.6	8.6	8.8	8.6
Nondurable .....	...	11.7	11.3	11.2	11.5	11.4	11.5	11.5	11.6	11.7
Textile .....	...	1.0	.9	.8	.8	.7	.7	.7	.6	.5
Paper .....	...	2.9	2.8	2.8	2.7	2.5	2.4	2.3	2.3	2.2
Chemical .....	...	4.5	4.2	4.1	4.5	4.6	5.2	5.4	5.5	5.8
Energy .....	...	9.5	10.6	10.6	11.0	12.2	13.3	13.8	13.9	14.6
INDUSTRY GROUPS										
Manufacturing <sup>2</sup> .....	...	85.5	84.0	83.5	83.2	81.7	80.5	79.5	79.2	78.7
Manufacturing (NAICS) .....	31–33	80.7	79.2	78.6	78.5	77.2	76.2	75.4	75.4	75.0
Durable manufacturing .....	...	46.6	45.3	44.0	43.2	42.0	40.7	39.6	39.6	38.5
Wood products .....	321	1.5	1.4	1.4	1.5	1.6	1.6	1.5	1.4	1.2
Nonmetallic mineral products .....	327	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2
Primary metal .....	331	2.8	2.5	2.3	2.3	2.3	2.7	2.6	2.8	2.7
Fabricated metal products .....	332	5.9	6.0	5.8	5.7	5.5	5.3	5.3	5.5	5.6
Machinery .....	333	5.8	5.9	5.5	5.3	5.0	4.9	4.9	5.0	4.9
Computer and electronic products .....	334	10.5	10.4	9.4	8.1	7.9	7.8	7.4	7.2	6.8
Electrical equipment, appliances, and components .....	335	2.5	2.5	2.4	2.2	2.0	1.9	1.9	1.9	1.9
Motor vehicles and parts .....	3361–3	7.0	6.6	6.5	7.4	7.2	6.4	5.9	5.5	5.1
Aerospace and miscellaneous transportation equipment .....	3364–9	3.7	3.2	3.7	3.5	3.3	3.1	3.2	3.3	3.5
Furniture and related products .....	337	1.7	1.7	1.7	1.8	1.7	1.6	1.6	1.5	1.4
Miscellaneous .....	339	2.8	2.9	3.1	3.3	3.3	3.1	3.1	3.1	3.1
Nondurable manufacturing .....	...	34.2	33.9	34.6	35.3	35.2	35.5	35.8	35.7	36.5
Food, beverage, and tobacco products ..	311,2	10.4	10.6	11.3	11.3	11.4	10.9	10.5	10.4	10.7
Textile and product mills .....	313,4	1.5	1.4	1.3	1.4	1.3	1.2	1.2	1.0	.9
Apparel and leather .....	315,6	1.4	1.3	1.2	1.0	.9	.7	.6	.6	.6
Paper .....	322	3.2	3.1	3.1	3.1	2.9	2.7	2.6	2.6	2.5
Printing and support .....	323	2.6	2.6	2.6	2.4	2.2	2.1	2.0	1.9	1.9
Petroleum and coal products .....	324	1.7	1.8	1.7	1.8	2.1	3.2	4.2	4.5	5.2
Chemical .....	325	9.5	9.3	9.7	10.7	10.8	11.2	11.3	11.4	11.6
Plastics and rubber products .....	326	3.8	3.7	3.7	3.8	3.6	3.4	3.3	3.2	3.0
Other manufacturing (non-NAICS) .....	1133, 5111	4.8	4.8	4.8	4.7	4.5	4.3	4.1	3.9	3.7
Mining .....	21	5.9	7.1	7.1	7.2	8.5	9.8	10.7	11.0	11.6
Utilities .....	2211,2	8.6	8.9	9.4	9.6	9.8	9.7	9.8	9.7	9.7
Electric .....	2211	7.4	7.6	8.0	8.2	8.2	8.0	8.0	8.1	8.0
Natural gas .....	2212	1.2	1.4	1.4	1.4	1.6	1.7	1.8	1.6	1.7

NOTE: The IP proportion data are estimates of the industries' relative contributions to the overall IP change between the reference year and the following year. For example, a 1 percent increase in durable goods manufacturing between 2007 and 2008 would account for a .385 percent increase in total IP.

1. North American Industry Classification System.

2. See table A.3, note 3.

... Not applicable.

## A.9. Annual production and price indexes for selected communications equipment, 1998–2007

Year	Index, 2002=100											
	Data networking		Enterprise and home voice		Transmission and related <sup>1</sup>		Wireless system		Satellites and earth station		Other	
	Production	Prices	Production	Prices	Production	Prices	Production	Prices	Production	Prices	Production	Prices
1998	n.a.	234.4	n.a.	141.3	118.7	189.3	n.a.	167.7	76.7	163.1	83.4	108.4
1999	n.a.	194.4	n.a.	130.5	153.5	169.6	n.a.	146.2	68.8	145.2	86.1	106.3
2000	n.a.	174.1	n.a.	123.7	229.6	149.3	n.a.	131.3	92.7	131.7	110.7	100.4
2001	123.6	133.2	n.a.	111.1	202.5	116.5	n.a.	110.5	86.9	124.4	95.4	100.9
2002	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2003	113.2	76.6	84.5	94.6	80.7	90.5	118.1	88.5	108.1	99.0	98.4	98.6
2004	124.6	59.9	71.0	87.6	76.5	83.2	151.3	79.3	154.1	83.2	90.6	99.4
2005	161.5	54.1	63.2	80.9	61.7	77.4	168.9	76.9	150.5	85.5	71.3	100.4
2006	255.6	51.3	59.7	78.8	69.5	66.5	134.8	64.4	306.1	64.2	67.4	99.8
2007	287.8	n.a.	56.5	n.a.	76.5	n.a.	127.5	n.a.	391.0	n.a.	77.8	n.a.

NOTE: The complete set of annual prices necessary to compute the annual price indexes for 2007 are not available. The estimates for the quarterly price indexes for 2007 (shown in table A.10) are based on only incomplete data.

1. Category consists of transmission, local loop, and legacy central office equipment.  
n.a. Not available.

## A.10. Quarterly production and price indexes for selected communications equipment, 1998:Q1–2008:Q1

Year and quarter	Index, 2002=100							
	Data networking		Enterprise and home voice		Transmission and related <sup>1</sup>		Wireless system	
	Production	Prices	Production	Prices <sup>2</sup>	Production	Prices	Production	Prices
1998:Q1	n.a.	n.a.	n.a.	n.a.	101.0	118.6	n.a.	n.a.
Q2	n.a.	n.a.	n.a.	n.a.	117.1	118.7	n.a.	n.a.
Q3	n.a.	n.a.	n.a.	n.a.	122.9	117.1	n.a.	n.a.
Q4	n.a.	n.a.	n.a.	n.a.	133.9	117.6	n.a.	n.a.
1999:Q1	n.a.	n.a.	n.a.	n.a.	131.9	120.2	n.a.	n.a.
Q2	n.a.	n.a.	n.a.	n.a.	142.9	127.2	n.a.	n.a.
Q3	n.a.	n.a.	n.a.	n.a.	166.1	129.2	n.a.	n.a.
Q4	n.a.	n.a.	n.a.	n.a.	173.1	128.0	n.a.	n.a.
2000:Q1	n.a.	n.a.	n.a.	n.a.	198.7	134.0	n.a.	121.8
Q2	n.a.	n.a.	n.a.	n.a.	232.7	138.0	n.a.	122.6
Q3	n.a.	n.a.	n.a.	n.a.	238.1	140.0	n.a.	123.7
Q4	n.a.	n.a.	n.a.	n.a.	249.3	135.6	n.a.	124.6
2001:Q1	150.8	148.0	n.a.	n.a.	241.9	115.2	n.a.	124.3
Q2	126.7	137.1	n.a.	n.a.	199.8	112.7	n.a.	122.3
Q3	110.0	127.4	n.a.	n.a.	218.9	109.5	n.a.	114.6
Q4	107.6	126.9	n.a.	n.a.	150.9	106.0	n.a.	110.6
2002:Q1	104.5	110.7	115.7	n.a.	132.8	102.3	97.8	109.1
Q2	99.6	107.3	102.1	n.a.	104.7	102.2	100.3	106.2
Q3	98.4	91.6	92.5	n.a.	87.7	98.0	99.0	94.0
Q4	97.7	90.6	91.1	n.a.	75.8	97.6	101.7	90.9
2003:Q1	97.2	87.9	91.4	104.3	81.3	94.7	100.4	87.5
Q2	110.4	80.8	84.8	100.7	78.7	91.1	102.6	83.8
Q3	119.8	70.7	89.3	97.9	78.6	89.2	124.6	69.3
Q4	125.2	63.0	73.6	97.2	84.3	91.6	143.0	65.8
2004:Q1	139.3	60.5	76.8	97.2	79.2	92.1	149.8	65.9
Q2	119.9	59.6	74.5	95.4	76.3	89.6	147.0	68.7
Q3	123.3	58.2	68.3	90.9	73.6	88.1	148.6	68.6
Q4	116.4	56.4	65.3	89.4	77.2	88.5	158.0	74.1
2005:Q1	132.0	53.9	60.1	86.4	71.1	85.2	164.5	77.2
Q2	147.7	53.5	61.8	86.7	63.4	79.3	174.4	74.8
Q3	162.1	53.0	66.8	82.9	58.2	79.2	171.0	70.3
Q4	203.6	51.9	64.7	82.1	54.6	76.4	163.7	66.4
2006:Q1	217.2	51.9	62.0	82.1	59.0	75.8	150.3	64.5
Q2	247.6	50.6	61.5	81.1	68.3	74.2	141.1	65.3
Q3	270.0	49.5	58.3	80.5	76.7	75.2	133.2	68.4
Q4	286.8	48.7	57.8	79.9	73.9	73.4	113.3	71.2
2007:Q1	281.1	49.4	58.5	80.4	75.3	71.1	116.0	70.9
Q2	287.2	50.1	56.0	78.0	77.8	69.0	112.2	68.7
Q3	288.2	48.9	58.0	77.5	77.6	67.2	129.3	58.3
Q4	294.9	47.6	54.2	76.6	75.5	66.5	150.5	48.7
2008:Q1	297.1	n.a.	52.9	n.a.	74.7	n.a.	163.7	n.a.

NOTE: Quarterly production and price indexes are not available for two categories of communications equipment shown in table A.9: "satellites and earth station" and "other."

1. Category consists of transmission, local loop, and legacy central office equipment.

2. Index, 2003=100.  
n.a. Not available.