
FEDERAL RESERVE statistical release



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INDUSTRIAL PRODUCTION AND CAPACITY UTILIZATION: A REVISION

The Federal Reserve's index of industrial production (IP) and its related measures of capacity and utilization have been revised principally for the period 1992 to date (chart 1).¹ For the third quarter of 1997, the revision places the production index at 125.2 percent of output in 1992, compared with 121.5 percent reported previously (table 1).² The revision places the capacity index at 151.3 percent of output in 1992, compared with 144.6 percent reported previously. The rate of capacity utilization—the ratio of production to capacity—has been revised downward about 1.3 percentage points, to 82.7 percent in the third quarter of 1997.

The central aspect of the revision is the updating of the comprehensive annual data and of the revised monthly source data used in the estimation of production, capacity, and utilization. Most important was the 1995 Annual Survey of Manufactures, which provided a stronger picture of the growth in output; a stronger picture also emerged from the inclusion of BEA's new quality-adjusted annual price index for telephone switching and switchboard equipment and a more rapid decline in the quality-adjusted price index for semiconductors. More up-to-date results were obtained from 1995 and 1996 annual industry reports, recent information on prices, and revised monthly source data on physical products and on labor and electricity inputs. Using the differences between the new annual and monthly source data, productivity relationships were revised and applied to the individual monthly source data to determine the final individual production indexes. Along with updating the individual production series, the annual value-added weights used in aggregating the indexes to market and industry groups were also updated. The revision of seasonal factors was based on data through mid-1997 or later.

The revisions to capacity and utilization reflect the new IP indexes, updated measures of manufacturing capital input, new information provided mainly by trade associations on physical capacity and utilization for selected industries, and, in particular, preliminary results of the 1996 Survey of Plant Capacity conducted by the Bureau of the Census, which yielded industry utilization rates for the fourth quarters of 1995 and 1996. The new Census data indicated that utilization in manufacturing was lower than the Federal Reserve had previously estimated; utilization in mining was revised downward as well.

The IP index now shows stronger growth in 1993–97 (table 3). The revised annual rate of growth averaged 4.5 percent since 1992, 0.7 percentage point higher than previously shown. From mid-1994 to mid-1995, the new index grew about 2 percentage points faster than formerly. The index, nevertheless, continues to show some slowing in growth in the first half of 1995 after a surge in 1994. Growth accelerated in 1996 and 1997, even though upward revisions averaged only about 1/4 percentage point in those years. Among major market groups,

1. In addition, two individual production series and a handful of capacity and utilization measures were modified between 1987 and 1992. The only substantial change was the restructuring of the production series for oil and gas field services (discussed below), which was carried back to 1987. This modification affects the levels of the aggregate indexes that contain this series prior to 1987 because the production indexes are chain linked and are expressed as a percentage of output in 1992. All aggregate indexes are subject to very small revisions between 1987 and 1992 because of the aggregation methodology; annual indexes were essentially unaffected.

2. The figures for August through October of this year are subject to further revision in the upcoming monthly statistical releases.

growth has been pervasive and substantial in recent years; only the production of defense and space equipment declined in 1996 and 1997, and the production of nondurable consumer products continued to grow slowly because it was held down by weak activity in apparel and tobacco products.

Among industry groups, growth was strongest in durable manufacturing (9.3 percent in 1997), which was boosted by growth of more than 40 percent in computers and semiconductors (table 4). But strong growth was not limited to the high-technology industries. The output of transportation equipment grew 10 percent in 1997 as assembly of commercial aircraft soared and the production of heavy trucks rebounded. With the strength in durable finished goods and construction activity, the output of primary metals; stone, clay, and glass products; and lumber rose 4 percent or more.

The upward revisions to the growth in industrial production were smaller than those to the growth in capacity, particularly in 1996 and 1997. The annual rate of industrial capacity growth has been revised upward 1.5 percentage points in 1995 and 0.8 percentage point in 1996 and 1997 (table 5). The annual rate of capacity growth in manufacturing has exceeded 5 percent since 1995. The rapid growth and upward revisions were again concentrated in durable manufacturing, especially in the high-technology industries, in which productivity has risen rapidly because of technological advances.

Capacity utilization in manufacturing in the third quarter of this year was revised to 81.6 percent, a level 1.4 percentage points less than the rate previously reported (table 6). Although revised downward a similar amount, the rate in primary-processing industries was nearly 4 percentage points above its 1967–96 average. Utilization rates remained above 90 percent in primary metals, paper and products, and petroleum products. Among advanced processors, utilization rates were below average overall. The capacity utilization rate for mining was revised downward roughly 3 percentage points, with downward revisions in utilization in oil and gas extraction, stone and earth minerals, and coal. The rate of utilization in electric utilities is now estimated to be higher; in the face of deregulation, electric utilities have been reluctant to add new generating capability. The estimated utilization in gas utilities was revised downward.

TECHNICAL ASPECTS OF THE REVISION

Changes in Series Structure

The series structure of the index of industrial production, which comprises 264 individual series, remains essentially unchanged. One series was added, and one was dropped. The measurement of oil and gas field services has been modified to more completely represent activity in that industry. Previously, a single series based on the count of rotary rigs running, issued by Baker Hughes, was used for all of SIC 138. Now there are two series: one for drilling and exploration (SIC 1381,2) and another for miscellaneous oil and gas field services (SIC 1389). The drilling and exploration series continues to be based on the count of rotary rigs running, but a much larger weight is given to each offshore rig than to a land rig, a difference that reflects the much higher rental cost of an offshore rig. For miscellaneous oil and gas field services, the production index is based on active well servicing units reported by Dresser Oil Tools plus workover rigs reported by Baker Hughes. The capacity and utilization estimates for SIC 138 continue to depend on both the new IP series and a fall survey of active and available rotary rigs conducted by the Reed Tool Company.

The separate series on defense nuclear materials has been discontinued because of the loss of source data. The single remaining series for nuclear manufacturing (part of SIC 2819) is based on the amount of electricity used in the production of such materials.

Weights

The IP index is an annually weighted Fisher index.³ The annual value-added weights for the aggregation of IP and capacity utilization, which are derived from annual estimates of industry value added, were updated and extrapolated. The Annual Survey of Manufactures as well as revenue and expense data reported by the Department of Energy and the American Gas Association provided industry value-added data for manufacturing and utilities through 1995. The latest value-added data for mining comes from the Census of

Mineral Industries for 1992. The weights are expressed as unit value added. Generally, the unit value-added measures track broad changes in corresponding producer prices. The weights required for aggregating IP in the most recent period are (1) estimated from available data on producer prices through the most recent year and (2) given the persistence of many relative price trends, extrapolated for the following year.

Revised Monthly Data

The monthly physical product data that are used to measure the monthly movements of many IP indexes have been updated to capture data that became available after the closing of the regular four-month reporting window. Monthly data on production-worker hours or sales of electric power in kilowatt-hours to industry groups, along with estimates of trends in output per worker-hour or kilowatt-hour, are used to indicate the monthly change in output for many individual IP indexes. The Bureau of Labor Statistics benchmark of the employment data for March 1996 was incorporated in this revision. Revised data on the sales of electricity to industries since 1992 were incorporated as well. The monthly kilowatt-hour sales figures were benchmarked to data on the annual use of electric power reported in the Annual Survey of Manufactures. Data through 1995 were available for this revision; they resulted in an average downward revision in industrial use of electric power of 0.3 percentage point per year over the 1993 to 1995 period (table 8). Seasonal factors for the electric power series have been reestimated using data through May 1997.⁴

Measurement of Capacity

To construct an individual capacity index, we first calculate preliminary, implied end-of-the-year indexes of capacity by dividing a production index by a utilization rate obtained from a survey for that end-of-year period. These ratios are expressed, like the indexes of industrial production, as percentages of production in 1992, and they give the general level and trend of the capacity estimates.

The Census Bureau's survey is the source of utilization rates for most manufacturing industries. The preliminary results of the Survey of Plant Capacity suggested that utilization rates were lower in recent years than those previously estimated by the Federal Reserve. Dividing the industrial production indexes, which were generally revised upward, by the lower-than-expected Census utilization rates yielded a noticeable upward revision of capacity.⁵ Compared with the surveys of previous years, the number of plants used for the 1996 survey was increased about 70 percent—from approximately 10,000 to 17,000. Because of the marked expansion of the reporting panel, results from panels of respondents who had previously participated in the survey were reviewed. The final Federal Reserve capacity indexes reflect this review and our efforts to maintain consistency over time. In the past, increasing the size of the reporting panel and including smaller firms in the sample have tended to lower the level of reported survey utilization rates.

Once the preliminary implied capacity indexes are calculated, measures of physical capacity or of capital input are used to estimate and extrapolate the annual movements of the capacity indexes. For most manufacturing industries, physical measures of capacity are lacking; in these cases, the annual growth in the capacity estimates is related to the growth in an industry's capital input. The revised capital input measures incorporate updated BEA estimates of new business investment and deflators by asset type for 1993–97, revised estimates of manufacturing investment in computers for 1968–97, and revised estimates of manufacturing investment in different types of structures for 1978–97. The new estimates of computer investment were developed from sample data collected in conjunction with the Census of Manufactures for 1977, 1982, 1987, and 1992, and the new estimates of detailed investment in structures were based on data collected by the Census Bureau in its 1994 Annual Capital Expenditures Survey.

3. The aggregation procedures are described in the *Federal Reserve Bulletin*, vol.83 (February 1997), pp.67–92.

4. Seasonal factors for the worker hours were based on data through October; factors for the monthly physical product series were based on data through June or later in the summer.

5. In contrast with the very preliminary utilization estimates used in earlier annual revisions, which were available only for roughly two-digit industries, the preliminary estimates incorporated into this annual revision were much more refined, and they were available at the four-digit level of industry detail.

NOTICE

These data were revised primarily from 1992 forward. However, many series were subject to small changes prior to 1992 and a few series were revised prior to 1987. All the changes prior to 1987 were constant adjustments to the level of series that include oil and gas field services as a component; no growth rates were altered. Among the series revised prior to 1987 are the total index, mining, total products, and total equipment. All the revised data and complete lists of the series revised prior to 1987 are available from the following electronic sources.

Files containing the revised data and the text and tables from this release are available on the internet and through the Economic Bulletin Board of the Department of Commerce. Files containing all the historical data for these series can be found under "Statistics: Releases and historical data" at <http://www.bog.frb.fed.us>, the Board's World Wide Web site. For information about the Economic Bulletin Board of the Department of Commerce, call 202-482-1986.

Diskettes containing either historical data (through 1985) or more recent data (1986 to those most recently published in the G.17 statistical release) are available from Publications Services, Board of Governors of the Federal Reserve System, Washington, DC 20551 (202-452-3245).

A document with printed tables of the revised estimates of series shown in the G.17 release is available upon request to the Industrial Output Section, Mail Stop 82, Division of Research and Statistics, Board of Governors of the Federal Reserve System, Washington, DC 20551.

1. Industrial production, capacity, and utilization

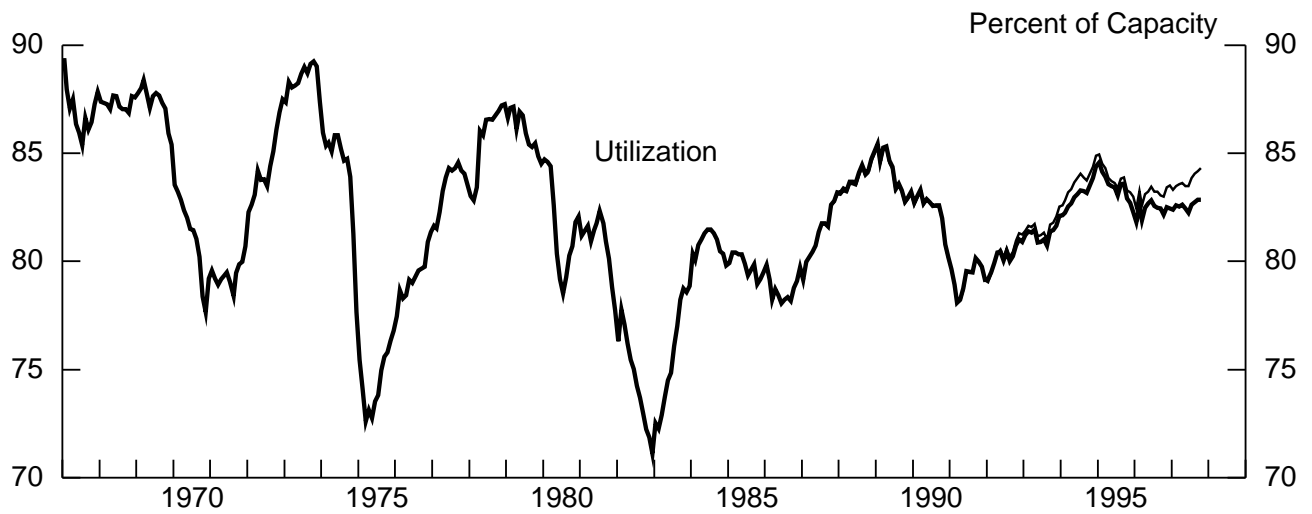
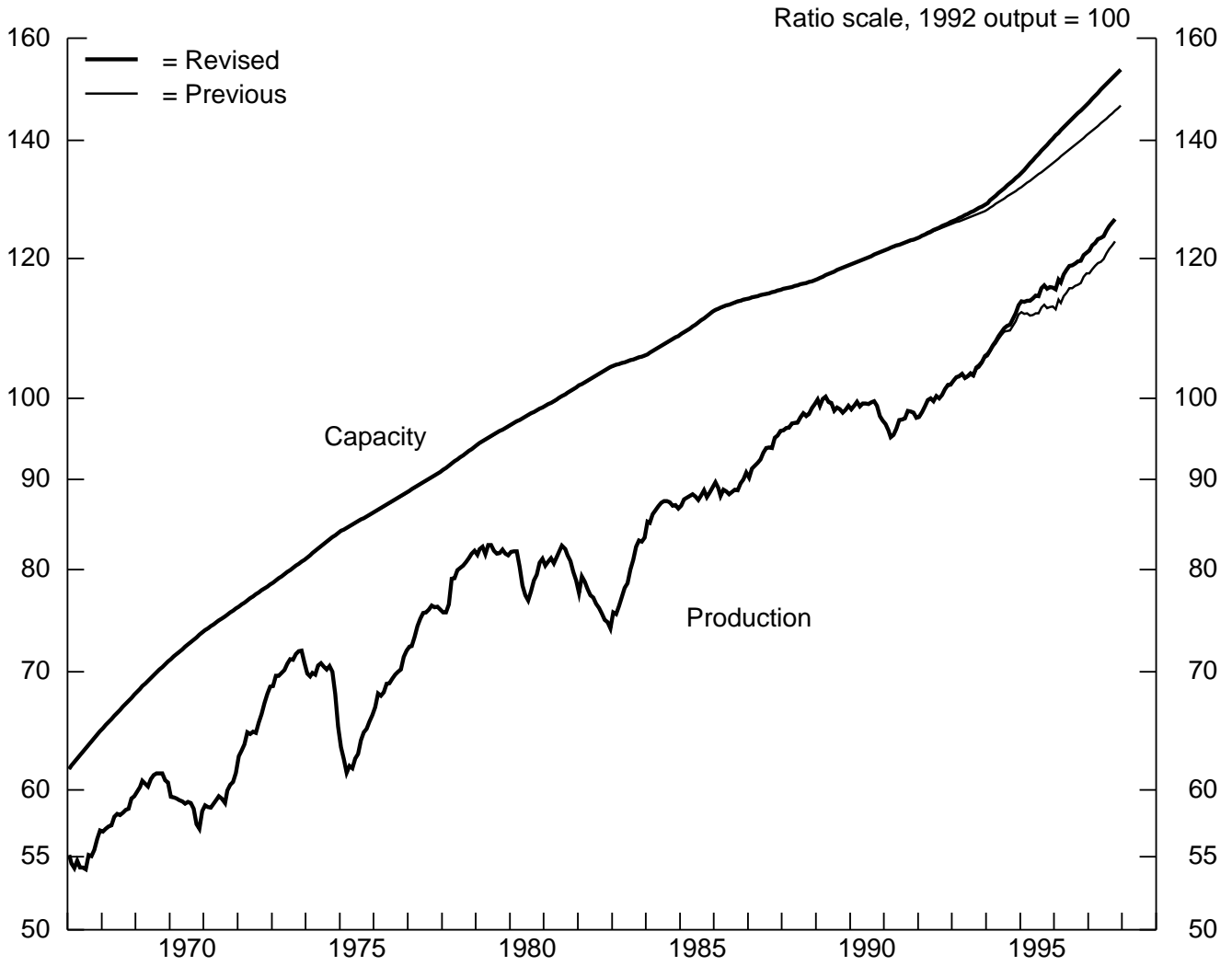


Table 1
INDUSTRIAL PRODUCTION, CAPACITY AND UTILIZATION: 1987–1997¹

TOTAL INDUSTRY

Seasonally adjusted

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Q1	Q2	Q3	Q4	Annual ²
Industrial Production, Percent Change																	
1987	-.6	1.2	.4	.4	.4	.9	.6	.1	-.1	1.4	.3	.6	4.2	6.7	5.6	7.1	4.6
1988	.1	.3	.0	.6	.1	.1	.7	.5	-.4	.3	.8	.5	3.2	3.1	3.9	3.6	4.5
1989	.6	-.8	.9	.2	-.6	-.2	-1.0	.4	-.2	-.5	.4	.5	3.8	.5	-4.4	-.1	1.8
1990	-.5	.5	.5	-.6	.4	.0	.0	.2	.1	-.6	-1.3	-.6	2.0	.6	1.0	-5.8	-.2
1991	-.5	-.8	-.9	.3	.8	1.2	.1	.1	1.0	-.1	-.1	-.6	-8.3	1.5	6.2	1.1	-2.0
1992	.2	.6	.7	.8	.2	-.3	.7	-.3	.5	.8	.5	.1	1.4	6.2	1.9	5.5	3.1
1993	.5	.4	.1	.4	-.6	.2	.4	-.2	1.0	.3	.4	.8	4.4	1.1	2.1	5.8	3.6
1994	.3	.5	.7	.5	.7	.5	.5	.3	.2	.7	.8	1.0	6.0	7.1	5.5	7.5	5.4
1995	.6	-.1	.1	.0	.3	.3	.0	1.0	.4	-.4	.2	-.1	5.9	1.6	4.5	1.1	4.9
1996	-.2	1.2	-.4	1.1	.6	.5	.0	.3	.3	.0	.8	.3	2.0	7.5	3.6	3.8	3.5
1997	.3	.6	.3	.5	.2	.2	.8	.5	.5	.4			5.2	4.6	6.2		
Industrial Production																	
1987	90.2	91.2	91.6	92.0	92.4	93.2	93.7	93.8	93.7	95.0	95.3	95.9	91.0	92.5	93.8	95.4	93.2
1988	95.9	96.2	96.3	96.8	96.9	97.0	97.6	98.1	97.8	98.0	98.8	99.3	96.1	96.9	97.8	98.7	97.4
1989	99.8	99.0	100.0	100.2	99.6	99.4	98.4	98.8	98.6	98.2	98.6	99.0	99.6	99.7	98.6	98.6	99.1
1990	98.6	99.1	99.6	99.0	99.4	99.3	99.3	99.5	99.6	99.1	97.7	97.2	99.1	99.2	99.5	98.0	98.9
1991	96.7	95.9	95.0	95.4	96.1	97.2	97.3	97.4	98.4	98.3	98.1	97.5	95.9	96.2	97.7	98.0	97.0
1992	97.7	98.3	99.0	99.8	100.0	99.7	100.3	100.0	100.5	101.2	101.8	101.8	98.3	99.8	100.3	101.6	100.0
1993	102.4	102.8	102.9	103.3	102.7	102.9	103.3	103.1	104.1	104.4	104.9	105.7	102.7	103.0	103.5	105.0	103.6
1994	106.0	106.5	107.2	107.7	108.5	109.0	109.6	109.9	110.1	110.9	111.8	112.9	106.6	108.4	109.9	111.9	109.2
1995	113.5	113.4	113.6	113.6	113.9	114.3	114.3	115.4	115.9	115.4	115.6	115.5	113.5	113.9	115.2	115.5	114.5
1996	115.3	116.7	116.3	117.5	118.3	118.9	118.9	119.3	119.6	119.7	120.6	120.9	116.1	118.2	119.3	120.4	118.5
1997	121.3	122.1	122.5	123.1	123.3	123.5	124.5	125.2	125.8	126.3			121.9	123.3	125.2		
Capacity																	
1987	114.0	114.1	114.2	114.3	114.4	114.5	114.6	114.7	114.9	115.0	115.1	115.2	114.1	114.4	114.7	115.1	114.6
1988	115.3	115.5	115.6	115.7	115.8	115.9	116.0	116.2	116.3	116.4	116.5	116.7	115.5	115.8	116.2	116.5	116.0
1989	116.8	117.0	117.2	117.4	117.6	117.8	118.0	118.2	118.4	118.6	118.8	119.0	117.0	117.6	118.2	118.8	117.9
1990	119.2	119.3	119.5	119.7	119.9	120.1	120.2	120.4	120.6	120.8	121.0	121.2	119.3	119.9	120.4	121.0	120.2
1991	121.4	121.6	121.7	121.9	122.1	122.2	122.4	122.6	122.7	122.9	123.0	123.2	121.6	122.1	122.6	123.0	122.3
1992	123.4	123.6	123.8	124.1	124.3	124.5	124.8	125.0	125.2	125.4	125.6	125.8	123.6	124.3	125.0	125.6	124.6
1993	126.1	126.3	126.5	126.8	127.0	127.2	127.5	127.7	128.0	128.2	128.5	128.7	126.3	127.0	127.7	128.5	127.4
1994	129.1	129.5	129.9	130.3	130.7	131.2	131.6	132.0	132.4	132.8	133.3	133.7	129.5	130.7	132.0	133.3	131.4
1995	134.2	134.8	135.3	135.9	136.5	137.1	137.6	138.1	138.7	139.2	139.8	140.4	134.8	136.5	138.1	139.8	137.3
1996	140.9	141.4	142.0	142.5	143.0	143.6	144.1	144.6	145.1	145.6	146.1	146.7	141.4	143.0	144.6	146.1	143.8
1997	147.2	147.8	148.4	149.0	149.6	150.2	150.7	151.3	151.9	152.4			147.8	149.6	151.3		
Utilization																	
1987	79.1	80.0	80.2	80.5	80.7	81.4	81.8	81.8	81.6	82.6	82.8	83.2	79.8	80.8	81.7	82.9	81.3
1988	83.2	83.4	83.3	83.7	83.7	83.6	84.1	84.5	84.1	84.2	84.8	85.1	83.3	83.7	84.2	84.7	84.0
1989	85.4	84.6	85.3	85.3	84.7	84.4	83.4	83.6	83.3	82.8	83.0	83.2	85.1	84.8	83.4	83.0	84.1
1990	82.7	83.0	83.3	82.7	82.9	82.7	82.6	82.6	82.6	82.0	80.8	80.2	83.0	82.8	82.6	81.0	82.3
1991	79.6	78.9	78.1	78.2	78.7	79.6	79.5	79.5	80.2	80.0	79.8	79.2	78.9	78.8	79.7	79.6	79.3
1992	79.2	79.5	79.9	80.4	80.4	80.0	80.4	80.0	80.2	80.7	81.0	80.9	79.5	80.3	80.2	80.9	80.2
1993	81.2	81.4	81.3	81.5	80.9	80.9	81.0	80.7	81.4	81.4	81.6	82.1	81.3	81.1	81.0	81.7	81.3
1994	82.1	82.2	82.5	82.7	83.0	83.1	83.3	83.3	83.2	83.5	83.9	84.4	82.3	82.9	83.2	83.9	83.1
1995	84.6	84.2	83.9	83.6	83.5	83.4	83.1	83.6	83.6	82.9	82.7	82.3	84.2	83.5	83.4	82.6	83.4
1996	81.8	82.5	81.9	82.5	82.7	82.8	82.6	82.5	82.4	82.2	82.5	82.5	82.1	82.7	82.5	82.4	82.4
1997	82.4	82.6	82.5	82.6	82.4	82.3	82.6	82.8	82.9	82.9			82.5	82.4	82.7		

1. Estimates from August 1997 through October 1997 are subject to further revision in the upcoming monthly releases.

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

Table 2
INDUSTRIAL PRODUCTION, CAPACITY AND UTILIZATION: 1987–1997¹

MANUFACTURING

Seasonally adjusted

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Q1	Q2	Q3	Q4	Annual ²
Industrial Production, Percent Change																	
1987	-.8	1.6	.2	.5	.3	1.0	.7	-.2	.1	1.3	.5	.6	5.0	7.0	5.5	7.6	5.3
1988	-.2	.4	-.1	1.0	-.1	.0	.7	.3	.2	.2	.9	.6	2.3	4.1	3.7	5.2	4.7
1989	.9	-1.2	.8	.1	-.7	.0	-1.1	.3	-.3	-.6	.4	.1	4.3	-.7	-4.5	-1.4	1.9
1990	-.2	.9	.3	-.8	.4	-.1	.0	.3	-.1	-.6	-1.3	-.6	2.9	-.1	.8	-6.3	-.5
1991	-.9	-.7	-1.1	.3	.7	1.4	.2	.2	1.1	-.1	-.2	-.5	-9.7	1.2	7.8	1.7	-2.4
1992	.4	.7	.8	.7	.4	-.1	.6	-.3	.4	.7	.6	-.1	2.8	7.0	2.4	5.0	4.0
1993	1.0	.2	.1	.6	-.5	.0	.4	-.3	1.1	.2	.5	.9	5.0	1.6	1.6	6.2	3.8
1994	.1	.6	.8	.8	.8	.2	.7	.4	.3	.9	.9	1.0	6.3	8.8	6.2	9.0	6.0
1995	.6	-.2	.2	.0	.2	.4	-.2	.9	.7	-.4	.0	-.1	6.4	1.4	3.9	1.5	5.4
1996	-.1	1.2	-.6	1.4	.6	.6	.4	.2	.3	.0	.8	.5	1.5	8.1	4.9	4.2	3.6
1997	.3	.7	.4	.4	.2	.3	.6	.7	.2	.5			6.2	4.9	6.1		
Industrial Production																	
1987	89.6	91.0	91.2	91.6	91.9	92.8	93.4	93.3	93.4	94.6	95.1	95.6	90.6	92.1	93.4	95.1	92.8
1988	95.4	95.8	95.7	96.7	96.6	96.6	97.3	97.5	97.7	97.9	98.9	99.4	95.6	96.6	97.5	98.7	97.1
1989	100.3	99.1	99.9	100.0	99.4	99.4	98.3	98.7	98.4	97.8	98.2	98.3	99.8	99.6	98.5	98.1	99.0
1990	98.1	99.0	99.3	98.6	99.0	98.9	98.8	99.1	99.0	98.4	97.2	96.6	98.8	98.8	99.0	97.4	98.5
1991	95.8	95.1	94.1	94.4	95.0	96.3	96.6	96.8	97.8	97.8	97.6	97.1	95.0	95.2	97.0	97.5	96.2
1992	97.4	98.1	98.9	99.6	100.0	99.8	100.5	100.2	100.6	101.3	101.9	101.7	98.1	99.8	100.4	101.6	100.0
1993	102.7	102.9	103.0	103.6	103.1	103.1	103.5	103.2	104.4	104.6	105.2	106.0	102.9	103.3	103.7	105.3	103.8
1994	106.2	106.8	107.7	108.5	109.4	109.6	110.4	110.9	111.2	112.2	113.2	114.3	106.9	109.2	110.8	113.2	110.0
1995	115.1	114.9	115.1	115.1	115.3	115.8	115.5	116.6	117.5	117.0	117.0	116.9	115.0	115.4	116.5	116.9	116.0
1996	116.7	118.1	117.4	119.0	119.7	120.4	120.9	121.1	121.5	121.5	122.5	123.1	117.4	119.7	121.1	122.4	120.2
1997	123.5	124.4	124.9	125.4	125.7	126.1	126.9	127.8	128.1	128.7			124.2	125.7	127.6		
Capacity																	
1987	113.2	113.4	113.6	113.8	113.9	114.1	114.2	114.4	114.6	114.7	114.9	115.0	113.4	113.9	114.4	114.9	114.1
1988	115.2	115.3	115.4	115.6	115.7	115.8	116.0	116.1	116.3	116.5	116.6	116.8	115.3	115.7	116.1	116.6	115.9
1989	117.0	117.3	117.5	117.8	118.0	118.3	118.5	118.7	119.0	119.2	119.5	119.7	117.3	118.0	118.7	119.5	118.4
1990	119.9	120.1	120.3	120.5	120.7	120.9	121.1	121.3	121.5	121.7	122.0	122.2	120.1	120.7	121.3	122.0	121.0
1991	122.4	122.6	122.8	123.0	123.1	123.3	123.5	123.7	123.8	124.0	124.2	124.3	122.6	123.1	123.7	124.2	123.4
1992	124.6	124.8	125.1	125.3	125.6	125.8	126.1	126.3	126.6	126.8	127.0	127.3	124.8	125.6	126.3	127.0	125.9
1993	127.6	127.8	128.1	128.3	128.6	128.9	129.1	129.4	129.7	129.9	130.2	130.5	127.8	128.6	129.4	130.2	129.0
1994	130.9	131.3	131.8	132.2	132.7	133.2	133.6	134.1	134.6	135.1	135.5	136.0	131.3	132.7	134.1	135.5	133.4
1995	136.6	137.2	137.8	138.5	139.1	139.8	140.4	141.1	141.7	142.4	143.0	143.7	137.2	139.2	141.1	143.0	140.1
1996	144.3	144.9	145.6	146.2	146.8	147.4	148.0	148.6	149.2	149.8	150.4	151.0	144.9	146.8	148.6	150.4	147.7
1997	151.6	152.3	152.9	153.6	154.3	155.0	155.7	156.3	157.0	157.6			152.3	154.3	156.3		
Utilization																	
1987	79.1	80.2	80.3	80.6	80.7	81.4	81.8	81.5	81.5	82.5	82.8	83.1	79.9	80.9	81.6	82.8	81.3
1988	82.9	83.1	82.9	83.7	83.5	83.4	83.8	84.0	84.0	84.1	84.8	85.1	83.0	83.5	83.9	84.7	83.8
1989	85.7	84.5	85.0	85.0	84.2	84.1	83.0	83.1	82.7	82.1	82.2	82.1	85.1	84.4	82.9	82.1	83.6
1990	81.8	82.5	82.6	81.8	82.0	81.8	81.6	81.7	81.5	80.9	79.7	79.0	82.3	81.9	81.6	79.9	81.4
1991	78.2	77.5	76.6	76.8	77.1	78.1	78.2	78.2	79.0	78.9	78.6	78.1	77.5	77.3	78.5	78.5	77.9
1992	78.2	78.6	79.1	79.5	79.6	79.4	79.7	79.3	79.5	79.9	80.2	79.9	78.6	79.5	79.5	80.0	79.4
1993	80.5	80.5	80.4	80.7	80.2	80.0	80.2	79.8	80.5	80.5	80.8	81.3	80.5	80.3	80.1	80.8	80.5
1994	81.1	81.3	81.7	82.1	82.4	82.3	82.6	82.7	82.6	83.0	83.5	84.1	81.4	82.3	82.6	83.5	82.5
1995	84.3	83.7	83.5	83.1	82.9	82.8	82.3	82.6	82.9	82.2	81.8	81.3	83.8	82.9	82.6	81.8	82.8
1996	80.8	81.5	80.6	81.4	81.6	81.7	81.7	81.5	81.4	81.1	81.5	81.5	81.0	81.6	81.5	81.4	81.4
1997	81.4	81.7	81.6	81.6	81.4	81.3	81.5	81.8	81.6	81.7			81.6	81.5	81.6		

1. Estimates from August 1997 through October 1997 are subject to further revision in the upcoming monthly releases.

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

Table 3
RATES OF GROWTH IN INDUSTRIAL PRODUCTION, BY MAJOR MARKET GROUPS, 1993–1997¹

Item	Revised growth rate (percent)					Difference between revised and earlier growth rates (percentage points)				
	1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
Total index	3.3	6.5	3.3	4.2	5.3	.4	.8	1.5	.3	.2
Products, total	2.4	4.6	1.8	3.9	4.0	.5	.3	.8	.1	.0
Final products	2.3	4.7	2.2	4.0	4.5	.3	.4	.9	-.1	-.3
Consumer goods	1.9	4.4	1.7	2.4	1.8	-.3	.5	.9	-.1	.4
Durable	9.5	6.8	.6	3.4	4.4	-.8	.3	-.4	1.0	-.4
Automotive products	10.6	6.0	-2.1	1.6	4.9	-1.0	.3	-1.2	.7	-.1
Other durable goods	8.8	7.4	2.7	4.8	4.0	-.7	.2	.3	1.4	-.7
Nondurable	.0	3.7	2.0	2.1	1.1	-.2	.5	1.3	-.5	.6
Nonenergy products	-.6	5.1	1.3	2.0	1.0	-.2	.6	1.6	-.6	.5
Energy products	3.3	-4.1	6.4	2.8	1.8	-.1	-.1	-.3	.3	1.1
Equipment, total	2.9	5.1	3.1	6.7	9.2	1.4	.2	.7	.0	-1.2
Business equipment	4.1	8.6	5.4	8.2	10.9	.7	.5	.8	.3	-.9
Industrial	6.7	9.8	7.7	.0	5.7	.0	.9	.5	.2	-.4
Information processing & related	3.8	13.5	13.0	11.8	12.9	1.8	2.0	.8	1.1	-2.7
Transit	-2.3	-2.5	-12.8	19.1	14.8	-.2	-3.7	.6	-2.4	.7
Other	9.2	6.1	1.8	4.8	12.2	-.4	.8	2.6	1.2	1.8
Defense and space equipment	-6.1	-7.6	-8.6	-1.5	-2.9	.4	.5	-.4	-.3	-1.2
Intermediate products	2.9	4.4	.6	3.7	2.5	1.1	.0	.5	.7	.9
Construction supplies	5.9	7.2	-.5	5.8	1.9	.1	.6	.3	.1	-.3
Business supplies	1.0	2.7	1.2	2.4	2.9	1.6	-.3	.6	1.1	1.7
Materials	4.8	9.6	5.4	4.7	7.3	.1	1.7	2.6	.7	.6
Durable	8.2	13.9	10.4	6.7	11.1	.0	3.0	4.7	1.2	.9
Nondurable	2.4	6.2	-2.4	3.7	2.9	.7	.3	-.1	.9	.3
Energy	-.6	2.0	.8	.4	2.1	.0	-.1	-.1	-.6	.4
SPECIAL AGGREGATES										
Total excluding:										
Computers	3.1	6.2	2.7	3.7	4.8	.4	.9	1.6	.6	.5
Business equipment excluding:										
Computer and office equipment	3.1	6.9	2.3	5.7	8.7	.7	.7	1.2	1.3	.1

1. Growth rates 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. For 1997, the growth rates are calculated from the fourth quarter of 1996 to the third quarter of 1997 and annualized.

Table 4
RATES OF GROWTH IN INDUSTRIAL PRODUCTION, BY INDUSTRY GROUPS, 1993–1997¹

Item	SIC	Revised growth rate (percent)					Difference between revised and earlier growth rates (percentage points)				
		1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
Total index		3.3	6.5	3.3	4.2	5.3	.3	.8	1.5	.3	.2
Manufacturing		3.6	7.6	3.3	4.7	5.7	.3	1.1	1.7	.6	.2
Primary processing		4.2	6.6	−.4	3.5	3.3	.2	.4	.5	.6	.1
Advanced processing		3.3	8.0	5.1	5.2	6.9	.3	1.3	2.3	.4	.2
Durable		5.9	9.9	6.2	6.5	9.3	.1	1.7	2.5	.8	.1
Lumber and products	24	2.0	5.0	1.2	2.8	4.1	−.2	.9	1.3	.1	.4
Furniture and fixtures	25	3.1	5.3	.4	7.3	3.0	−.3	1.4	2.1	4.8	1.3
Stone, clay, and glass products	32	4.0	5.6	1.5	3.8	4.8	−.2	.9	2.0	1.9	2.1
Primary metals	33	7.4	8.9	−.4	3.5	5.0	.2	.5	.5	−.2	.3
Iron and steel	331,2	8.9	7.8	−.9	2.2	3.1	−.1	.8	.3	−.2	.3
Raw steel		5.7	6.2	.7	−1.7	7.0	.1	.1	.1	.0	−.3
Nonferrous	333–6,9	5.4	10.4	.2	4.9	7.3	.5	.1	.9	−.3	.5
Fabricated metal products	34	4.4	9.0	1.2	3.2	2.1	−.2	.5	.3	.5	−.5
Industrial machinery and equipment	35	11.6	15.3	12.4	7.6	12.6	−.4	.6	.7	−2.4	−2.4
Computer and office equip.	357	18.9	30.5	37.8	36.5	40.2	−1.2	−.7	−2.9	−.9	3.3
Electrical machinery	36	10.4	27.2	25.7	12.6	19.2	1.8	8.6	9.8	5.5	2.6
Semiconductors	3672–9	16.5	55.0	59.3	25.5	43.4	.0	17.7	22.9	9.5	9.6
Transportation equipment	37	4.5	1.3	−5.3	5.5	10.0	−.3	.1	.8	−1.0	.3
Motor vehicles and parts	371	17.5	7.8	−1.6	−1.4	8.3	−.5	1.0	1.4	.2	1.2
Autos and light trucks		13.2	5.1	−4.5	1.0	4.2	−.4	−.6	−1.2	1.4	−.4
Aerospace and misc.	372–6,9	−9.0	−7.1	−10.8	17.0	12.4	−.1	−1.1	−.2	−1.9	−.6
Instruments	38	−1.8	.7	1.9	4.2	3.1	−.1	−.5	1.4	1.5	−.5
Miscellaneous	39	5.7	3.9	3.3	5.2	5.9	.2	1.3	2.4	2.0	1.5
Nondurable		1.0	4.9	−.1	2.5	1.6	.5	.3	.8	.2	.4
Foods	20	1.6	2.4	1.6	1.7	1.6	.0	.3	.8	−.4	.6
Tobacco products	21	−16.3	43.5	−5.2	2.4	−1.4	.0	3.0	3.6	−.2	.9
Textile mill products	22	4.8	6.0	−5.1	.1	4.2	−.3	.1	.4	−.4	−.2
Apparel products	23	1.7	6.6	−4.5	−3.4	−2.2	−.5	1.4	3.1	−.6	−.4
Paper and products	26	6.6	4.6	−2.8	2.3	4.9	.1	−.1	−.2	.6	−.3
Printing and publishing	27	−.5	1.2	.0	1.6	1.5	2.1	.0	1.3	1.2	1.3
Chemicals and products	28	−1.0	4.7	2.1	5.4	.6	.4	.1	.5	.4	.5
Petroleum products	29	2.6	−1.0	.5	3.3	2.8	−.2	−.1	.1	−.2	.1
Rubber and plastics products	30	6.7	9.6	.0	3.4	3.4	.3	.1	.5	.9	−.7
Leather and products	31	−3.3	−8.9	−11.0	−4.0	−8.2	.5	−.6	−2.1	.7	−.2
Mining		1.7	.9	−.8	1.7	3.4	2.0	−.7	.5	−1.7	−.3
Metal mining	10	2.5	−3.1	4.5	3.3	−1.7	.3	−.1	−.2	1.6	−.2
Coal mining	12	−3.1	9.2	−.1	2.5	2.6	.2	.3	.1	−1.6	−.4
Oil and gas extraction	13	2.2	−1.2	−1.5	.9	4.3	2.8	−.9	1.0	−2.1	−.6
Stone and earth minerals	14	5.7	6.9	−1.2	5.4	1.9	.1	−.1	−1.4	−1.5	1.2
Utilities		2.0	−.3	6.4	1.5	2.3	.0	−.2	−.1	.1	1.1
Electric	491,3pt	1.1	1.7	5.3	1.0	3.2	.1	−.2	.0	.1	.6
Gas	492,3pt	5.2	−7.7	10.8	3.1	−.8	−.3	−.5	−.1	.0	2.3
SPECIAL AGGREGATES											
Manufacturing excluding:											
Computer and office equipment		3.3	7.1	2.6	4.0	5.1	.3	1.1	1.9	.7	.5

1. Growth rates 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. For 1997, the growth rates are calculated from the fourth quarter of 1996 to the third quarter of 1997 and annualized.

Note—Primary processing manufacturing includes textile mill products, paper and products, industrial chemicals, synthetic materials, and fertilizers, petroleum products, rubber and plastics products, lumber and products, primary metals, fabricated metals, and stone, clay, and glass products. Advanced processing manufacturing includes foods, tobacco products, apparel products, printing and publishing, chemical products and other agricultural chemicals, leather and products, furniture and fixtures, industrial and commercial machinery and computer equipment, electrical machinery, transportation equipment, instruments, and miscellaneous manufactures.

Table 5
RATES OF GROWTH IN CAPACITY, BY INDUSTRY GROUPS, 1993–1997¹

Item	SIC	Revised growth rate (percent)					Difference between revised and earlier growth rates (percentage points)				
		1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
Total index		2.3	3.7	4.9	4.5	4.7	.5	.9	1.5	.8	.8
Manufacturing		2.5	4.1	5.5	5.1	5.3	.5	1.0	1.8	1.0	1.0
Primary processing		1.4	2.3	2.9	3.3	3.4	.2	.3	.8	1.0	1.0
Advanced processing		3.0	5.0	6.8	5.9	6.3	.6	1.4	2.3	1.1	1.0
Durable		3.1	5.9	8.3	7.5	8.0	.5	1.8	2.8	1.3	1.4
Lumber and products	24	.7	2.9	3.9	4.4	4.0	.4	.4	1.7	1.6	.8
Furniture and fixtures	25	2.2	2.5	3.9	5.8	4.9	1.0	1.1	2.6	3.6	2.6
Stone, clay, and glass products	32	.0	.8	2.3	3.3	3.7	-.1	-.1	1.1	1.1	1.3
Primary metals	33	-.4	2.4	2.5	3.6	3.8	-.2	1.1	.7	.3	.3
Iron and steel	331,2	-1.0	2.8	1.6	4.3	3.9	.0	.0	-.3	-.2	.2
Raw steel		-4.2	.9	3.1	2.8	5.8	.0	.0	.0	1.6	-.2
Nonferrous	333-6,9	.4	2.0	3.5	2.8	3.7	-.5	2.3	1.9	1.0	.3
Fabricated metal products	34	2.4	2.6	4.0	4.7	5.1	1.0	1.1	1.3	1.8	2.4
Industrial machinery and equipment	35	4.8	8.3	10.8	11.4	11.6	.1	2.0	1.8	.0	-1.1
Computer and office equip.	357	20.0	21.8	31.2	39.9	41.0	1.0	-.9	2.2	3.8	1.4
Electrical machinery	36	10.2	18.3	25.9	19.3	19.2	2.1	6.6	9.4	2.8	3.7
Semiconductors	3672-9	22.7	41.2	56.0	31.8	36.8	2.1	13.9	20.9	2.1	8.0
Transportation equipment	37	.6	3.2	3.8	2.4	3.3	-.1	.2	1.0	1.1	1.6
Motor vehicles and parts	371	2.6	7.1	8.1	4.7	4.6	-.3	-.4	.9	1.3	3.1
Autos and light trucks		.2	5.2	5.9	1.2	2.3	.2	-.3	.0	-.6	.1
Aerospace and misc.	372-6,9	-1.8	-1.1	-1.2	-.8	1.9	.1	1.0	1.3	.7	-.2
Instruments	38	1.2	.1	.5	.8	1.8	.7	.0	.4	.8	1.4
Miscellaneous	39	2.0	1.9	2.8	3.2	3.2	.6	.5	1.4	1.8	1.6
Nondurable		1.9	2.0	2.3	2.4	2.2	.4	.2	.7	.7	.6
Foods	20	1.9	2.1	2.9	2.6	2.4	.0	.1	.8	.7	.6
Textile mill products	22	2.8	3.8	3.2	2.1	1.8	.2	.2	-.9	-.3	1.2
Apparel products	23	.8	1.5	2.2	.3	.0	.3	1.0	-.8	-1.0	-.1
Paper and products	26	2.0	1.4	2.4	2.4	1.8	-.4	-.1	.5	.8	.8
Printing and publishing	27	.1	.7	.8	.9	.7	.9	.8	.9	1.5	1.4
Chemicals and products	28	3.2	2.8	2.7	3.6	3.3	1.0	-.2	.7	.2	.0
Petroleum products	29	-.6	1.9	-.2	.3	1.7	.0	.0	.0	.0	.8
Rubber and plastics products	30	3.5	4.3	5.1	4.5	4.2	.2	.1	2.8	2.8	1.4
Leather and products	31	-2.5	-2.1	-2.5	-2.3	-2.7	-.4	-.4	-.7	-.9	.0
Mining		.7	1.0	-.5	.2	.7	1.2	.4	.0	.6	-.7
Metal mining	10	1.5	-1.6	.8	.7	.7	-.2	.0	.0	-.4	-.3
Coal mining	12	1.7	4.1	-.3	1.0	1.7	.3	-.2	.6	.2	.4
Oil and gas extraction	13	-.2	.3	-1.0	-.3	.2	1.4	.4	-.2	.8	-1.2
Stone and earth minerals	14	4.2	2.4	2.4	3.4	4.0	2.3	1.4	.5	1.6	1.7
Utilities		.7	1.3	2.0	1.5	1.4	.0	.1	.1	-.6	-.2
Electric	491,3pt	1.4	1.0	2.6	1.6	1.3	.0	.0	.4	-.9	-.5
Gas	492,3pt	.2	.4	.5	2.1	1.9	.0	.0	.0	1.3	1.4
SPECIAL AGGREGATES											
Total excluding:											
Computer and office equipment		2.0	3.4	4.5	4.0	4.1	.5	1.0	1.6	1.0	1.1
Manufacturing excluding:											
Computer and office equipment		2.2	3.7	5.0	4.5	4.6	.5	1.1	1.9	1.2	1.3

1. Growth rates 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.

Note—Primary processing manufacturing includes textile mill products, paper and products, industrial chemicals, synthetic materials, and fertilizers, petroleum products, rubber and plastics products, lumber and products, primary metals, fabricated metals, and stone, clay, and glass products. Advanced processing manufacturing includes foods, tobacco products, apparel products, printing and publishing, chemical products and other agricultural chemicals, leather and products, furniture and fixtures, industrial and commercial machinery and computer equipment, electrical machinery, transportation equipment, instruments, and miscellaneous manufactures.

Table 6
REVISED AND EARLIER CAPACITY UTILIZATION RATES, BY INDUSTRY GROUPS

Percent of capacity, seasonally adjusted

Item	SIC	Revised rate						Difference between revised and earlier rates (percentage points)		
		1967-1996 Ave.	1988-1989 High	1990-1991 Low	1995 Q4	1996 Q4	1997 Q3	1995 Q4	1996 Q4	1997 Q3
Total index		82.1	85.4	78.1	82.6	82.4	82.7	-5	-9	-1.3
Manufacturing		81.1	85.7	76.6	81.8	81.4	81.6	-5	-9	-1.4
Primary processing		82.3	88.9	77.7	85.8	85.9	85.8	-4	-7	-1.3
Advanced processing		80.5	84.2	76.1	80.0	79.4	79.8	-6	-1.0	-1.5
Durable		79.4	84.6	73.1	81.2	80.4	81.1	-8	-1.3	-2.1
Lumber and products	24	82.6	93.6	75.5	84.0	82.7	82.7	-7	-2.0	-2.3
Furniture and fixtures	25	81.6	86.6	72.5	79.9	81.0	79.9	-1.4	-5	-1.2
Stone, clay, and glass products	32	78.1	83.5	69.7	80.9	81.3	82.0	1.6	2.2	2.7
Primary metals	33	80.8	92.7	73.7	90.8	90.7	91.5	-3	-7	-7
Iron and steel	331,2	80.7	95.2	71.8	92.0	90.2	89.7	1.3	1.3	1.4
Raw steel		80.6	92.7	71.5	92.7	88.7	89.5	.2	-1.2	-1.5
Nonferrous	333-6,9	81.2	89.3	74.2	89.7	91.5	93.9	-2.1	-3.2	-3.3
Fabricated metal products	34	77.9	82.0	71.9	81.8	80.6	78.9	-2.6	-3.6	-5.2
Industrial machinery and equipment	35	81.3	85.4	72.3	87.8	84.9	85.4	-2.4	-4.2	-5.2
Computer and office equip.	357	81.0	86.9	66.9	84.6	82.5	82.1	-5.1	-8.1	-7.2
Electrical machinery	36	81.0	84.0	75.0	87.0	82.0	82.0	-3	1.8	1.2
Semiconductors	3672-9	79.6	81.0	75.5	87.6	83.3	86.5	-6	4.4	5.3
Transportation equipment	37	75.8	85.8	68.5	69.8	71.8	75.3	.4	-1.1	-1.8
Motor vehicles and parts	371	76.6	89.1	55.9	76.6	72.1	74.0	1.9	1.1	.1
Autos and light trucks ¹			92.3	53.3	76.7	76.6	77.7	-1.1	.5	.2
Aerospace and misc.	372-6,9	75.1	87.3	79.2	60.6	71.5	77.0	-1.9	-4.0	-4.6
Instruments	38	81.7	81.4	77.2	76.8	79.5	80.3	-7	-3	-1.4
Miscellaneous	39	75.2	79.0	71.7	77.7	79.2	80.8	.1	.2	.1
Nondurable		83.4	87.3	80.7	82.4	82.5	82.2	-1	-5	-6
Foods	20	83.0	85.4	82.7	81.6	80.9	80.4	.1	-8	-7
Textile mill products	22	85.5	90.4	77.7	84.1	82.5	83.9	.5	.4	-4
Apparel products	23	81.2	85.1	75.5	79.8	76.8	75.5	2.4	2.5	2.3
Paper and products	26	89.3	93.5	85.0	88.6	88.5	90.5	-4	-6	-1.3
Printing and publishing	27	85.8	91.7	79.6	80.9	81.4	81.9	-5	-7	-8
Chemicals and products	28	79.5	86.2	79.3	78.4	79.7	78.2	-5	-3	.0
Petroleum products	29	86.3	88.5	85.1	91.7	94.4	95.2	-1	-2	-7
Rubber and plastics products	30	84.8	89.6	77.4	88.8	87.9	87.4	-2.1	-3.8	-5.2
Leather and products	31	81.2	83.3	76.1	72.5	71.3	68.2	-5	.7	.6
Mining		87.5	88.0	87.0	87.0	88.3	90.0	-1.0	-3.0	-2.9
Metal mining	10	78.6	89.4	79.9	88.2	90.5	89.0	.5	2.2	2.3
Coal mining	12	86.9	91.5	83.4	84.9	86.2	86.8	.0	-1.4	-2.0
Oil and gas extraction	13	88.5	88.2	88.7	87.7	88.7	91.4	-7	-3.2	-3.1
Stone and earth minerals	14	84.8	89.0	79.4	85.1	86.8	85.5	-6.0	-9.0	-9.2
Utilities		87.2	92.6	83.4	90.0	90.0	90.6	-3	.2	1.1
Electric	491,3pt	89.1	95.0	87.1	91.4	90.9	92.1	-4	.5	1.3
Gas	492,3pt	82.4	85.0	67.1	84.4	85.3	83.5	-8	-1.9	-1.2
SPECIAL AGGREGATES										
Total excluding:										
Computer and office equipment		82.1	85.5	78.3	82.6	82.4	82.8	-4	-7	-1.1
Manufacturing excluding:										
Computer and office equipment		81.1	85.8	76.8	81.7	81.4	81.6	-4	-7	-1.2

1. Series begins in 1977.

Note—The "high" column refers to periods in which utilization generally peaked; the "low" column refers to recession years in which utilization generally bottomed out. The monthly highs and lows are specific to each series, and all did not occur in the same month.

Table 7
ANNUAL PROPORTIONS IN INDUSTRIAL PRODUCTION, BY INDUSTRY GROUPS

Item	SIC	1989	1990	1991	1992	1993	1994	1995	1996
Total index		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Manufacturing		84.5	84.4	84.5	85.4	85.9	86.6	86.5	85.9
Primary processing		27.6	26.8	26.1	26.6	27.0	28.2	28.2	27.6
Advanced processing		56.9	57.6	58.4	58.8	58.9	58.4	58.3	58.3
Durable		45.7	44.8	44.2	44.9	45.6	46.2	46.1	46.1
Lumber and products	24	1.9	1.8	1.8	2.1	2.2	2.2	2.1	2.1
Furniture and fixtures	25	1.4	1.4	1.3	1.4	1.4	1.4	1.3	1.4
Stone, clay, and glass products	32	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2
Primary metals	33	3.5	3.3	3.1	3.1	3.3	3.5	3.5	3.4
Iron and steel	331,2	2.0	1.9	1.7	1.8	1.9	2.0	1.9	1.8
Raw steel		.1	.1	.1	.1	.1	.1	.1	.1
Nonferrous	333-6,9	1.5	1.4	1.4	1.4	1.4	1.6	1.6	1.6
Fabricated metal products	34	5.2	5.1	4.9	5.0	5.1	5.2	5.2	5.3
Industrial machinery and equipment	35	8.6	8.3	7.9	7.8	8.1	8.3	8.6	8.7
Computer and office equip.	357	2.1	1.8	1.6	1.6	1.6	1.6	1.6	1.6
Electrical machinery	36	6.8	6.7	6.8	7.1	7.3	7.8	8.4	8.4
Semiconductors	3672-9	2.2	2.2	2.3	2.5	2.6	2.8	3.4	3.3
Transportation equipment	37	9.7	9.7	9.6	9.4	9.5	9.3	8.8	8.6
Motor vehicles and parts	371	4.8	4.7	4.6	4.7	5.1	5.5	5.4	5.1
Autos and light trucks		2.7	2.7	2.6	2.5	2.6	2.8	2.7	2.6
Aerospace and misc.	372-6,9	4.9	5.0	5.0	4.7	4.4	3.8	3.4	3.5
Instruments	38	5.1	5.1	5.4	5.4	5.3	4.9	4.7	4.8
Miscellaneous	39	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Nondurable		38.8	39.6	40.3	40.6	40.2	40.4	40.4	39.8
Foods	20	8.7	9.0	9.4	9.6	9.6	9.3	9.4	9.4
Tobacco products	21	1.3	1.5	1.6	1.6	1.1	1.2	1.3	1.3
Textile mill products	22	1.8	1.7	1.7	1.8	1.8	1.8	1.7	1.6
Apparel products	23	2.1	2.1	2.2	2.2	2.1	2.1	2.0	1.9
Paper and products	26	3.9	3.7	3.7	3.5	3.4	3.8	3.9	3.5
Printing and publishing	27	6.4	6.7	6.8	6.8	6.8	6.6	6.5	6.5
Chemicals and products	28	9.5	9.8	9.9	10.0	9.9	10.0	10.0	10.0
Petroleum products	29	1.7	1.6	1.5	1.4	1.5	1.6	1.7	1.8
Rubber and plastics products	30	3.1	3.2	3.3	3.5	3.6	3.8	3.7	3.7
Leather and products	31	.3	.3	.3	.3	.3	.2	.2	.2
Mining		7.7	7.9	7.5	6.8	6.4	6.0	6.0	6.4
Metal mining	10	.5	.5	.5	.5	.4	.5	.5	.4
Coal mining	12	1.1	1.2	1.1	1.0	.9	.9	.9	.9
Oil and gas extraction	13	5.5	5.6	5.3	4.8	4.4	4.0	4.1	4.5
Stone and earth minerals	14	.6	.6	.6	.6	.6	.6	.6	.6
Utilities		7.8	7.7	8.0	7.8	7.7	7.4	7.5	7.7
Electric	491,3pt	6.2	6.3	6.5	6.2	6.1	5.9	5.9	6.1
Gas	492,3pt	1.6	1.5	1.5	1.6	1.6	1.6	1.5	1.6

Note— The IP proportion data are estimates of the industries' relative contributions to overall IP growth in the following year. For example, a 1 percent increase in durable goods manufacturing in 1997 would account for a 0.461 percent increase in total IP.

Table 8
RATES OF GROWTH IN ELECTRIC POWER USE, 1993–1997¹

Item	Revised growth rate (percent)					Difference between revised and earlier growth rates (percentage points)				
	1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
Total	-.1	4.7	-1.1	1.0	.0	-.3	-.2	-.4	.0	.2
Manufacturing	.1	4.9	-1.2	.9	.1	-.3	-.2	-.4	.0	.3
Durable	.1	3.3	.1	-.9	2.6	-.4	-.3	-.6	-.3	-.8
Lumber and products	24	5.1	2.9	2.0	5.1	4.6	-1.2	.4	-1.1	1.1
Furniture and fixtures	25	7.0	7.2	-3.3	4.4	.5	-.7	1.5	-2.2	2.2
Stone, clay, & glass products	32	1.3	1.5	-.2	3.0	.8	-1.1	-.1	-.2	.1
Primary metals	33	-2.7	3.0	.2	-6.1	5.3	.0	-.1	-.7	-.8
Fabricated metal products	34	3.0	5.1	-.2	3.5	1.4	-1.0	-.7	.5	.7
Industrial machinery and equipment	35	.4	3.6	-.1	1.6	2.2	-1.1	-.2	-.2	1.0
Electrical machinery	36	2.8	2.2	2.4	3.6	.3	-.7	-2.2	-2.1	-1.5
Transportation equipment	37	1.3	4.5	-1.1	.3	.3	.7	.9	-.3	-.1
Instruments	38	-1.6	1.0	-.6	-3.6	.1	-.8	-1.5	-.4	-.7
Miscellaneous manufactures	39	4.4	11.2	-3.6	8.3	1.9	-1.5	-1.9	-.7	-1.7
Nondurable	.1	6.2	-2.3	2.3	-1.9	-.2	-.2	-.2	.3	1.0
Foods	20	3.0	3.5	1.6	1.1	-.3	-.7	-1.4	-.7	-.8
Tobacco products	21	-.8	-5.2	7.5	1.9	-.9	2.8	.5	-1.3	-2.3
Textile mill products	22	4.1	5.4	-3.2	2.6	1.5	-.3	.7	.3	.8
Apparel products	23	3.9	6.3	-6.7	-2.6	-8.3	3.2	1.2	-3.6	-1.2
Paper and products	26	-.2	2.8	-.6	.3	-1.9	.1	.1	-.4	.2
Printing and publishing	27	1.8	3.7	.7	.5	.3	-.6	-1.2	-.8	-.8
Chemicals and products	28	-2.8	9.4	-6.6	5.5	-4.1	.3	.1	-.1	.9
Petroleum products	29	.8	2.7	6.2	-4.5	.4	-1.8	-.9	1.2	-.9
Rubber and plastics products	30	5.9	8.7	-.2	3.6	.2	-1.0	-.5	-1.1	.5
Leather and products	31	-5.9	-2.9	-10.0	3.1	-4.7	-1.0	-1.6	-5.0	1.3
Mining	-2.1	2.2	1.0	2.4	-.4	-.1	.1	-.1	.3	-.5
Metal mining	10	-.7	5.9	8.7	2.7	-1.7	.0	.1	-.7	.2
Coal mining	12	-10.4	7.5	-1.2	.0	1.3	.0	.0	.6	.1
Oil and gas extraction	13	1.3	-4.8	-5.0	3.0	-.1	-.4	.0	.0	.8
Stone and earth minerals	14	-1.2	7.4	5.2	3.4	-.8	.1	.2	-.3	-.5
SUPPLEMENTARY GROUPS										
Total, excluding nuclear nondefense	.3	3.5	.3	.5	1.0	-.3	-.2	-.4	.0	.0
Utility sales to industry	.0	4.9	-1.5	1.6	.3	-.3	-.2	-.4	.2	.2
Industrial generation	-1.6	1.6	4.9	-5.7	-.6	.2	.3	.2	-.1	-1.6

1. Growth rates 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. For 1997, the growth rates are calculated from the fourth quarter of 1996 to the third quarter of 1997 and annualized.

Explanatory Note

The statistical release of **Industrial Production and Capacity Utilization** reports measures of output, capacity, and capacity utilization in manufacturing, mining, and the electric and gas utilities industries. The release also includes monthly indexes on the use of electric power in manufacturing and mining. Data in the release and historical data are available under statistical releases at <http://www.bog.frb.fed.us>, the Board's World Wide Web site. These data are also available on line on the day of issue through the Economic Bulletin Board of the Department of Commerce. For information, call (202) 482-1986. Diskettes containing historical data and the data published in this release are available from the Board of Governors of the Federal Reserve System, Publications Services, (202) 452-3245.

Industrial Production

Coverage. The industrial production (IP) index measures output in the manufacturing, mining, and electric and gas utilities industries; the reference period for the index is 1992. For the period since 1992, the total IP index has been constructed from 264 individual series based on the 1987 Standard Industrial Classification (SIC). These individual series are classified in two ways: (1) market groups (shown in table 1), such as consumer goods, equipment, intermediate products, and materials; and (2) industry groups (shown in tables 2 and 6), such as two-digit SIC industries and major aggregates of these industries—for example, durable and nondurable manufacturing, mining, and utilities.

Market groups. For purposes of analysis, the individual IP series are grouped into final products, intermediate products, and materials. Final products are assumed to be purchased by consumers, businesses, or government for final use. Intermediate products are expected to become inputs in nonindustrial sectors, such as construction, agriculture, and services. Materials are industrial output requiring further processing within the industrial sector. Total products comprise final and intermediate products, and final products are divided into consumer goods and equipment.

Timing. The first estimate of output for a month is published around the 15th of the following month. The estimate is preliminary (denoted by the superscript "p" in tables) and subject to revision in each of the subsequent three months as new source data become available. (Revised estimates are denoted by the superscript "r" in tables.) After the fourth month, indexes are not revised further until the time of an annual revision or a benchmark revision. The last three benchmark revisions were published in 1990, 1985, and 1976.

Source data. In annual or benchmark revisions, the individual IP indexes are constructed from a variety of source data, such as the quinquennial *Censuses of Manufactures and Mineral Industries* and the *Annual Survey of Manufactures*, prepared by the Bureau of the Census; the *Minerals Yearbook*, prepared by the Department of the Interior; and publications of the Department of Energy. On a monthly basis, the individual indexes of industrial production are constructed from two main types of source data: (1) output measured in physical units and (2) data on inputs to the production process, from which output is inferred. Data on physical products, such as tons of steel or barrels of oil, are obtained from private trade associations as well as from government agencies including those listed above; data of this type are used to estimate monthly IP where possible and appropriate. When suitable data on physical product are unavailable, estimates of output are based on either production-worker hours or electric power use by industry. Data on hours worked by production workers are collected in the monthly establishment survey conducted by the Bureau of Labor Statistics. The data on electric power use are described below. The factors used to convert inputs into estimates of production are based on historical relationships between the inputs and the comprehensive data used to benchmark the IP indexes; these factors also may be influenced by technological or cyclical developments. Especially for the first and second estimates for a given month, the available source data are limited and subject to revision.

Weights. In the index, series that measure the output of an individual industry are weighted according to their proportion in the total value-added output of all industries. The industrial production index, which extends back to 1919, is built as an annually weighted chain-type index since 1977. The components of IP are combined using estimates of value added per unit of output. For months from January to June, the weights are drawn from the year containing the month being estimated and the preceding year; for months from July to December, the weights are drawn from the current and following year. The IP proportions shown in column 1 of tables 1A, 2A, and 6 are estimates of the industries' relative contributions to overall growth in the following year. For example, a 1 percent increase in durable goods manufacturing in 1997 would account for an increase in total IP of nearly 1/2 percent.

Seasonal adjustment. Individual series are seasonally adjusted by the X-11 ARIMA method, developed at Statistics Canada. For series based on production-worker hours, the current seasonal factors were estimated with data through October 1997; for other series, the factors were estimated with data through at least June 1997. In some cases, series were preadjusted for the effects of holidays or the business cycle before using X-11 ARIMA. For the data since 1977, all seasonally adjusted aggregate indexes are calculated by aggregating the seasonally adjusted indexes of the individual series.

Reliability. The average revision to the *level* of the total IP index, without regard to sign, between the first and the fourth estimates was 0.28 percent during the 1987-96 period. The average revision to the *percent change* in total IP, without regard to sign,

from the first to the fourth estimates was 0.21 percentage point during the 1987-96 period. In most cases (about 81 percent), the direction of change in output indicated by the first estimate for a given month is the same as that shown by the fourth estimate.

Rounding. The published percent changes are calculated from unrounded indexes, and may not be the same as percent changes calculated from the rounded indexes shown in the release.

Capacity Utilization

Definition. Capacity utilization is calculated for the manufacturing, mining, and electric and gas utilities industries. For a given industry, the utilization rate is equal to an output index divided by a capacity index. Output is measured by seasonally adjusted indexes of industrial production. The capacity indexes attempt to capture the concept of sustainable practical capacity, which is defined as the greatest level of output that a plant can maintain within the framework of a realistic work schedule, taking account of normal downtime, and assuming sufficient availability of inputs to operate the machinery and equipment in place. The 76 individual capacity indexes are based on a variety of data, including capacity data measured in physical units compiled by trade associations, surveys of utilization rates and investment, and estimates of growth of the capital input.

Groups. Estimates of capacity and utilization are available for a variety of groups, including primary and advanced processing industries within manufacturing, durable and nondurable manufacturing, total manufacturing, mining, utilities, and total industry. Component industries of the primary and advanced processing groups within manufacturing are listed in the note on tables 2 and 3 of the release.

Weights. Although each utilization rate is the result of dividing an IP series by a corresponding capacity index, aggregate utilization rates are equivalent to combinations of individual utilization rates aggregated with proportions that reflect current capacity levels of output valued in current-period value added per unit of actual output. The implied proportions of individual industry operating rates in the rate for total industry for the most recent year are shown in the first column of table 3.

Perspective. The historical highs and lows in capacity utilization shown in the tables above are specific to each series and did not all occur in the same month. Industrial plants usually operate at capacity utilization rates that are well below 100 percent: none of the broad aggregates has ever reached 100 percent. For total industry and total manufacturing, utilization rates have exceeded 90 percent only in wartime.

Electric Power

Data on electric power (expressed in kilowatt hours) are collected by the Federal Reserve District Banks from electric utilities and also from manufacturing and mining establishments that generate electric power for their own use (cogenerators). The indexes of power use shown in table 9 are sums of kilowatt hours used by an industry or industry group expressed as a percentage of that industry's or group's usage in 1992. The first column of the table shows, for reference, electric power use in billions of kilowatt hours as reported by manufacturing and mining industries in the 1992 censuses of those industries. The supplementary group, "Total, less nuclear nondefense," is shown separately because the value-added proportion for the nondefense nuclear material series (part of SIC 2819) in total IP is considerably smaller than its share of total electric power use. Excluding this component from total power use facilitates comparisons with total IP.

References

This annual revision will be described more completely in the February 1998 *Federal Reserve Bulletin*.

A description of the aggregation methods for industrial production and capacity utilization is included in an article in the *Federal Reserve Bulletin*, vol. 83 (February 1997), pp. 67-92. *Industrial Production—1986 Edition* contains a more detailed description of the other methods used to compile the industrial production index, plus a history of its development, a glossary of terms, and a bibliography. To obtain *Industrial Production—1986 Edition* (\$9.00 per copy), write to Board of Governors of the Federal Reserve System, Publications Services, Washington, DC 20551. The major revisions to the IP indexes and capacity utilization since 1990 have been described in the *Federal Reserve Bulletin* (April 1990, June 1990, June 1993, March 1994, January 1995, January 1996, and February 1997). The basic methodology used to estimate capacity and utilization is discussed in the June 1990 *Federal Reserve Bulletin*.

Release Schedule for 1998

At 9:15 a.m. on January 16, February 17, March 17, April 17, May 15, June 16, July 16, August 14, September 16, October 16, November 16, and December 16.