
FEDERAL RESERVE statistical release



G.17 (419) 2004 Historical and Annual Revision

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INDUSTRIAL PRODUCTION AND CAPACITY UTILIZATION

Industrial Production and Capacity Utilization: The 2004 Annual Revision

The Federal Reserve has revised the index of industrial production (IP) and the related measures of capacity and capacity utilization for the period from January 1972 to November 2004. Overall, the changes to total industrial production are small. Measured from the fourth quarter of 2002 to the third quarter of 2004, industrial output is now reported to have increased a little less than shown previously. Production expanded more slowly in 2000 than indicated in the earlier estimates, while the contraction in 2001 was a little less steep. The rise in output in 2002 was slightly stronger than reported earlier.

Although the level of IP was a bit lower in the third quarter of 2004 than previously reported, the rate of industrial capacity utilization—the ratio of production to capacity—was revised upward. At 78.2 percent, the utilization rate for total industry is 0.9 percentage point higher than previously reported but still 2.9 percentage points below its 1972–2003 average. The current figures place the operating rate in manufacturing for the fourth quarter of 2003 and the third quarter of 2004 about 1/2 percentage point above their earlier estimates. Excluding selected high-technology industries, capacity utilization in manufacturing in 2003 and 2004 was little revised on balance. Capacity utilization rates at mines and utilities for the third quarter of 2004 are now about 2 percentage points higher than reported earlier.

The revision indicates that industrial capacity expanded at a slower rate in 2002 and 2004 than estimated previously. Capacity is now reported to have declined a bit in 2003; previously, a small increase had been reported. The current figures for capacity in 2000 and 2001 indicate a slightly stronger rate of increase than the earlier estimates.

The updated measures incorporate newly available and more comprehensive source data. In addition, the revision introduced improved methods for compiling sixteen monthly production series and one new capacity series. The annual source data are generally for 2002 and 2003, and the modified methods affect indexes largely from 1972 forward.

The main data source introduced in this year's annual IP revision is the U.S. Census Bureau's recently issued 2002 Census of Manufactures. Data introduced from other Census Bureau publications include the 2002 Census of Services and the 2003 Services Annual Survey (for publishing) and selected 2003 Current Industrial Reports. Additional government source data include new annual data on minerals for 2002 and 2003 from the U.S. Geological Survey (USGS) and updated deflators from the Bureau of Economic Analysis (BEA). In addition, the new monthly production estimates reflect updated seasonal factors and the inclusion of monthly source data that became available (or were revised) after the closing of the regular four-month reporting window.

The capacity indexes and capacity utilization rates were calculated using the revised production indexes; results from the Census Bureau's 2003 Survey of Plant Capacity (SPC) for the fourth quarter of the year; and newly available data on industrial capacity from the USGS, the Energy Information Agency of the Department of Energy, and other organizations.

RESULTS OF THE REVISION

Total industrial production for the third quarter of 2004 is currently reported to be 115.9 percent of output in 1997 (table 1A), and the capacity index now stands at 148.2 percent of output in 1997 (table 1B); both indexes are lower than reported previously (chart 1). However, because of the larger downward revision to capacity than to production, the utilization rate for total industry in the third quarter of 2004 was higher than earlier reports suggested.

Tables 2 and 3 show the revised rates of change of industrial production for market groups, industry groups, special aggregates, and selected detail for the years 2000 through 2004. Tables 4, 5, and 6 show the revised figures for capacity utilization, capacity, and electric power use. The tables also show the difference between the revised and earlier rates of change. For capacity utilization, the tables show the difference between revised and previous rates for the final quarter of the year (the third quarter was used for 2004). Tables 7, 8, and 9 report the revised production, capacity, and utilization series for manufacturing, for total industry excluding selected high-technology industries, and for manufacturing excluding selected high-technology industries.

Industrial Production

The revision indicates that the overall path of industrial production is much the same as stated earlier. The most significant feature of this revision, the incorporation of the 2002 Census of Manufactures, had little effect on the top-line estimates.

Relative to earlier reports, the current estimates for manufacturing IP indicate a more moderate upward trajectory for 2003 and 2004. Like the revisions to total industrial production, the revisions to manufacturing output in earlier years were very small.

Across industry groups, the revision path indicates that the output of durable goods manufacturers followed a generally lower trajectory in recent years than the previous estimates suggested. Downward revisions to the indexes for the computer and electronic products industry, the miscellaneous manufacturing industry, the fabricated metal products industry, the machinery industry, and the wood products industry contributed to the downward revision in 2003 and 2004.

Overall, the index for nondurable manufacturing is little changed from the previous estimates. In 2004, lower indexes for printing and support; chemicals; plastics and rubber products; and apparel and leather outweighed upward revisions to the indexes for petroleum and coal products; food, beverage, and tobacco products; textile and product mills; and paper.

The current revision indicates lower output in recent years for the industries that have historically been defined as manufacturers (namely publishing and logging) but are classified elsewhere under NAICS (North American Industry Classification System). In 2003 and 2004, the rates of change are about 4 percentage points lower than previously published.

Regarding a few special aggregates (table 3), the output of selected high-technology industries—computers and peripheral equipment, communications equipment, and semiconductors and related components—is now lower in recent years than previously estimated. Production is reported to have fallen somewhat more steeply in 2001 and to have risen somewhat less in 2002, 2003, and 2004. Relative to earlier estimates, the output of computers is now estimated to have increased much more slowly in 2002 and 2004 and more quickly in 2003. The index for communications equipment is currently reported to have declined at a faster pace in 2002 than was reported earlier; the rebound in 2003 is now shown to be markedly stronger. The expansion of semiconductor output is now estimated to have been much more moderate in 2003 and somewhat stronger in 2004 than earlier estimates suggested.

The current revision finds the overall swings in the output of motor vehicles and parts in recent years to have been a little wider than in earlier reports. Relative to earlier estimates, the index for motor vehicles and parts is now reported to have risen somewhat more in 2002 and 2003 and to have declined a bit more in 2000 and in 2004; industry output is now reported to have declined less in 2001 than recorded earlier.

Production by Market Groups

Among major market groups, the production index for final products and nonindustrial supplies is little changed from earlier estimates for recent years. The overall path of this index shows a rise in 2000, a dropback in 2001, and then increasingly large gains in the subsequent years. This revision places the output of consumer goods in recent years generally close to their earlier estimates; the decline in output in 2001 is now estimated to be 0.7 percentage point less than previously reported; a large upward revision to the index for home electronics is partly responsible. The production of business equipment is now reported to be somewhat weaker in the 2000-04 period, on balance, than in the

earlier estimates. Production of defense and space equipment is now reported to have risen a bit less in 2001 than earlier reports suggested, but the overall contour of the index still shows solid gains since 2001. On balance since 2000, the index for construction supplies is a little stronger than reported earlier. However, the index for business supplies is weaker over the same time period. Because of downward revisions to the production in both the energy and non-energy categories, the current revision indicates weaker output of materials in recent years, particularly in 2003 and 2004, than was reported earlier.

Capacity

The general contour of manufacturing capacity shows a slightly more rapid acceleration during the second half of the 1990s and a sharper deceleration since then. The revised capacity indexes for durable goods industries are the principal contributors to the changes in the contour of manufacturing capacity. The current estimates for nondurable manufactures over the same time period are, on balance, little changed from earlier reports.

Among selected high-technology industries, the overall picture of rapidly expanding capacity in the late 1990s followed by more-moderate increases still remains. However, the revision suggests a slower path of expansion in the 2000–04 period than indicated previously. Excluding high-technology industries, manufacturing capacity contracted slightly in 2002 and 2003; the estimate for 2004 was revised little.

Capacity at mines is now estimated to have decreased in four of the past five years and has declined, on balance, more than previously estimated. In contrast, capacity at electric and gas utilities accelerated sharply from 2000 to 2003, although the current measures show, on balance, a slower rate of expansion than previous estimates. For 2004, the increase in capacity at utilities moderated a bit from the pace seen over the preceding four years.

The revisions to the capacity estimates for stage-of-process groups occurred across all groups but were most pronounced in the category for primary and semifinished goods. For 2002 through 2004, the current capacity measures reflect lower rates of change than previously reported for each stage-of-process group.

Capacity Utilization

The revised rates of capacity utilization are somewhat higher than the previous estimates for recent years, owing mainly to the downward revision to capacity. For the fourth quarter of 2003 and the third quarter of 2004, the revised utilization rates for total industry are about 1 percentage point higher than earlier estimates. About one-half of this increase is accounted for by revisions to the factory operating rate, which is now estimated to be 77.0 percent in the third quarter of 2004. Higher utilization rates for selected high-technology industries in 2004 contributed heavily to the upward revision in manufacturing. The factory operating rate remains about 3 percentage points below its 1972–2003 average even though it rose 4.4 percentage points between its trough in the final quarter of 2001 and the third quarter of 2004.

Within manufacturing, the current estimates for durable and nondurable manufacturers in 2003 and 2004 are higher than stated previously. Over the same period, the utilization rates for other (non-NAICS) manufacturers are lower, particularly in 2004, than earlier estimates suggested.

The operating rate among the selected high-technology industries was 69.9 percent in the third quarter of 2004—1.8 percentage points above the previously reported pace and 11.6 percentage points above its trough in the second quarter of 2002. On balance for recent years, the current revision places utilization in the semiconductor industry at a higher rate than reported earlier but indicates a lower rate for communications equipment. On balance, operating rates in the computer industry are not much changed.

For recent years, the current revision places the utilization rates for mines and for gas and electric utilities at higher levels than reported earlier. The upward revisions to the utilization rates for utilities reflect downward revisions to the capacity estimates for electricity generation. For the third quarter of 2004, the utilization rate at mines was 86.3 percent, and the utilization rate at gas and electric utilities was 84.0 percent. Both measures are below their 1972–2003 averages.

TECHNICAL ASPECTS OF THE REVISION

The revision incorporates updated comprehensive annual data and revised monthly source data used in the estimation of production, capacity, and utilization. As noted earlier, this revision includes information drawn from the

recently released 2002 Census of Manufactures. Additionally, this revision incorporates the 2003 Survey of Plant Capacity, other annual industry reports, recent information on prices, and revised monthly source data on physical products and on labor and electricity inputs. Along with the individual production series and seasonal factors, the annual value-added weights used in aggregating the indexes to market and industry groups were also updated.

Changes to Benchmark Indexes

The benchmark indexes for manufacturing—defined for each six-digit NAICS industry as nominal gross output divided by a price index—were modified in this revision. The principal change to the indexes was the inclusion of new information from the 2002 Census of Manufactures and revisions to the estimates from the 2001 Annual Survey of Manufactures. In addition, the benchmark indexes incorporated newly available price indexes on a NAICS basis from the BEA. The new price data were not significantly different from the estimates that had been used previously. The calculation of nominal gross output for benchmark index was also revised for 1997 to the present. Previously, nominal gross output for an industry was defined to equal cost of materials plus value added. The updated methodology subtracts from that figure the cost of resold goods (those goods purchased by a manufacturer and then resold without any material transformation).

Changes to Individual Production Series

With this revision, the monthly production indicators for some series have changed. The source data for production indexes for the following eleven industries, which constituted 6.6 percent of IP in 2003, have been changed over their histories from electric power use to production-worker hours.

- (1) Other animal food (NAICS 311119)
- (2) Soft drink and ice (31211)
- (3) Wood container and pallet (32192)
- (4) Paving, roofing, and other petroleum and coal products (32412,9)
- (5) Pesticide and other agricultural chemicals (32532)
- (6) Concrete and product (32732–9)
- (7) Forging and stamping (3321)
- (8) Coating, engraving, heat treating, and allied activities (3328)
- (9) Motor vehicle metal stamping (33637)
- (10) Household and institutional furniture and kitchen cabinet (3371)
- (11) Medical equipment and supplies (3391)

The decision to switch the monthly indicators for these series, listed below, resulted from a deterioration in the sample of utilities that report for these industries as well as a review of the historical annual relationships between the output benchmarks and the two corresponding inputs to production.

This revision also incorporates new physical product indicators for five industries.

- (1) Aluminum foundries (NAICS 331521,4)
- (2) Machine tools (333512,3)
- (3) Engine manufacturing (333618)
- (4) Mattress manufacturing (33791)
- (5) Book publishing (51113)

Previously, these industries were combined with other industries in single IP indexes and then estimated from production-worker hours. The additional series raise the total number of individual output indexes that make up industrial production to 300.

Aluminum foundries (NAICS 331521,4) were formerly grouped with other nonferrous foundries in a single IP index based on production-worker hours. For 1992 and forward, this revision establishes separate indexes for aluminum foundries and for other nonferrous foundries. The production indicator for the new index for aluminum foundries is a value-weighted aggregate of quarterly shipments of dies, permanent molds, sand castings, and other castings, for which the underlying data are obtained from the Aluminum Association. These data are available from 1994 forward; the indexes for 1992 and 1993 are estimated based on hours. Other nonferrous foundries (331522, 5, 8) is now a separate index based on production-worker hours.

Machine tools (metal cutting and forming machinery, NAICS 333512,3) were formerly grouped with other metalworking machinery in a single IP index based on production-worker hours. For 1992 and forward, this revision introduces a new index for the machine tool industry that is based on quarterly shipments data from the Census Bureau's Current Industrial Report on Metalworking Machinery (MQ333W). This report covers a variety of machine tools, including boring and drilling machines; gear-cutting machines; grinding and polishing machines; lathes; milling machines; machining centers; punching, shearing, bending, and forming machines; and presses. Both unit and revenue measures for shipments are used to construct a Fisher index of real shipments. An estimate of the change in inventories is then added to the shipments index to compute a production index. Manufacturers are assumed to want to hold inventories proportional 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 in order to reach a desired inventory level; and the impact on stocks of shipments not equaling expected shipments. Other metalworking machinery (333511, 4, 5, 6, 8) is now a separate index based on production-worker hours.

Engines (NAICS 333618) were formerly grouped with power transmission equipment in a single IP index based on production-worker hours. For 1992 and forward, engines and power transmission equipment are separate indexes. The production indicator for the new index for engines is monthly diesel engine assemblies from Stark Communications, Inc. The remainder of the previous grouping—speed changers, drives, gears, and power transmission equipment (NAICS 333612,3)—is now a separate index and is still based on production-worker hours.

Mattresses (NAICS 33791) were formerly grouped with blinds and shades (33792) in a single IP index called "Other furniture related product," and estimates were based on production-worker hours. Under the current revision, mattress production for 1987 and forward is based on monthly unit sales data for mattresses and foundations from the International Sleep Products Association. The blinds and shades index continues to be based on production-worker hours.

Book publishing (NAICS 51113) was formerly grouped with other publishing operations except newspapers (51112, 4, 9) in a single index called "Periodical, book and other publishers." For 1987 and forward, book publishing is estimated separately from the other publishing operations. A Fisher index of real sales is constructed from sixteen separate categories of books and used as the indicator for the book publishing series. The underlying data, monthly gross revenue for book sales from the Association of American Publishers, are deflated by detailed producer price indexes from the Bureau of Labor Statistics. The new index for periodicals and other publishers is based on production-worker hours.

The new physical-product-based production indexes constituted 1.4 percent of IP in 2003. The table below summarizes the type of data (measured as a percent of value added in 2003) available in each month of the four-month IP publication window.

Availability of Monthly IP Data in Publication Window
(Percent of value added in 2003)

Type of data	Month of estimate			
	1st	2nd	3rd	4th
Physical product	26.1	40.8	49.9	50.1
Production-worker hours	34.7	34.7	34.7	34.7
Electric power use	0.0	11.7	11.7	11.7
IP data received	60.8	87.2	96.4	96.6
IP data estimated	39.2	12.8	3.6	3.4

The first estimate of output for a month is preliminary and is subject to revision in each of the subsequent three months as new source data become available. As the table indicates, by the third revision (fourth month of estimate), the physical product content of IP is 50.1 percent.

The revision incorporates refined methods for a few series. The coverage was broadened for some of the motor vehicles parts series to include more information for engines, brakes, transmissions, and axles. This revision also includes new methods for the production indicator for electronic computers; the new estimates incorporate a refined concordance between trade data from the Census Bureau and the source data for computer sales.

LAN Equipment

The 2000 revision introduced a new IP series for the production of local area network (LAN) equipment (routers, switches, and hubs). The series is not published in the monthly statistical release, but it is included in the broader IP aggregate for communications equipment and updated on an ongoing basis (see the March 2001 Bulletin article). The table below updates the results for LAN equipment.

U.S. LAN Equipment, 1997 to 2003			
	Production index	Price index	Value of Production (millions of dollars)
Annual Estimates (indexes are 1997=100)			
1997	100.0	100.0	12,935.4
1998	153.2	72.2	14,329.5
1999	223.0	59.1	17,138.9
2000	303.5	52.5	20,732.7
2001	357.9	41.2	19,205.4
2002	366.6	32.8	15,635.1
2003	412.5	25.4	13,549.1
Quarterly Estimates (indexes are 1997=100)			
1997q1	77.7	108.0	10,767.2
1997q2	88.8	97.4	11,634.7
1997q3	109.2	97.5	13,824.5
1997q4	124.3	97.9	15,423.2
1998q1	136.7	80.2	14,120.6
1998q2	154.8	71.1	15,041.5
1998q3	160.7	67.6	14,009.2
1998q4	160.7	69.7	14,191.5
1999q1	212.4	61.6	16,984.3
1999q2	225.2	56.3	17,383.2
1999q3	224.4	59.8	17,086.5
1999q4	229.8	58.6	17,138.6
2000q1	262.8	54.4	18,692.5
2000q2	304.4	49.8	20,542.1
2000q3	322.9	53.5	21,751.7
2000q4	323.8	52.7	21,853.8
2001q1	391.3	43.1	22,253.4
2001q2	336.8	42.2	18,933.4
2001q3	340.3	41.6	17,741.7
2001q4	363.4	38.0	17,938.4
2002q1	353.9	34.5	16,381.3
2002q2	360.0	33.5	16,034.4
2002q3	382.2	33.1	15,683.9
2002q4	370.2	30.2	14,438.5
2003q1	374.3	26.5	13,514.5
2003q2	400.6	27.0	14,365.4
2003q3	434.5	26.2	13,993.9
2003q4	440.7	21.7	12,336.1

Changes to Individual Capacity Series

The revision to the capacity indexes employs updated information for the publishing industry, for which there had been a gap in the collection of operating rates. Through 1998, the Survey of Plant Capacity (SPC), which covers the manufacturing sector, was conducted under the Standard Industrial Classification (SIC) system. The SIC system included the publishing industry in the manufacturing sector. In 1999, the SPC began to be conducted under NAICS, which excludes the publishing industry from the manufacturing sector. In 2002, the Census Bureau recommenced collection of publishing industry data under the SPC. The release of the 2003 SPC provided the Federal Reserve Board with two consecutive data points for the publishing industry and enabled the interpolation of industry information for the missing years 1999–2001.

The revisions to the capacity indexes also incorporate the Bureau of Economic Analysis's capital flow table for 1997. This table provides a detailed breakdown of the asset composition of industry investment. The Federal Reserve uses the capital flow table to estimate annual asset-by-industry investment flows—which is the first step in constructing measures of industry capital input. Before the current revision, the Federal Reserve used data for thirty-five asset categories; this revision adds a thirty-sixth, software investment.

Finally, the capacity series for semiconductors was split into two components. One covers microprocessor units (MPUs) and the other covers non-MPU semiconductors, such as memory, logic, and integrated circuit chips.

Weights for Aggregation

The IP index is an annually weighted Fisher index. This revision uses information from the Census of Manufactures 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 using the latest data on producer prices. Table 10 shows the annual value-added proportions incorporated in the IP index from 1996 through 2003.

Revised Monthly Data

This revision incorporates product data that become available after the regular four-month reporting window for monthly IP has closed. One example is the data on wine and tobacco issued by the Department of the Treasury's Alcohol and Tobacco Tax and Trade Bureau. These data are released with too great a lag to be published with monthly IP estimates; however, the data are available for inclusion in the annual revision.

Revised Seasonal Factors

Seasonal factors for all series were reestimated using data that extend into 2004. Factors for production-worker hours, which adjust for timing, holiday, and monthly seasonal patterns, were updated with data through September 2004 and were prorated to correspond with the seasonal factors for hours aggregated to the three-digit NAICS level. Factors for the electric power series were reestimated using data through June 2004. The updated factors for the physical product series, which include adjustments for holiday and workday patterns, used data through at least September 2004. Seasonal factors for unit motor vehicle assemblies have been updated, and projections through June 2005 are on the Board's website at www.federalreserve.gov/releases/g17/mvsf.htm.

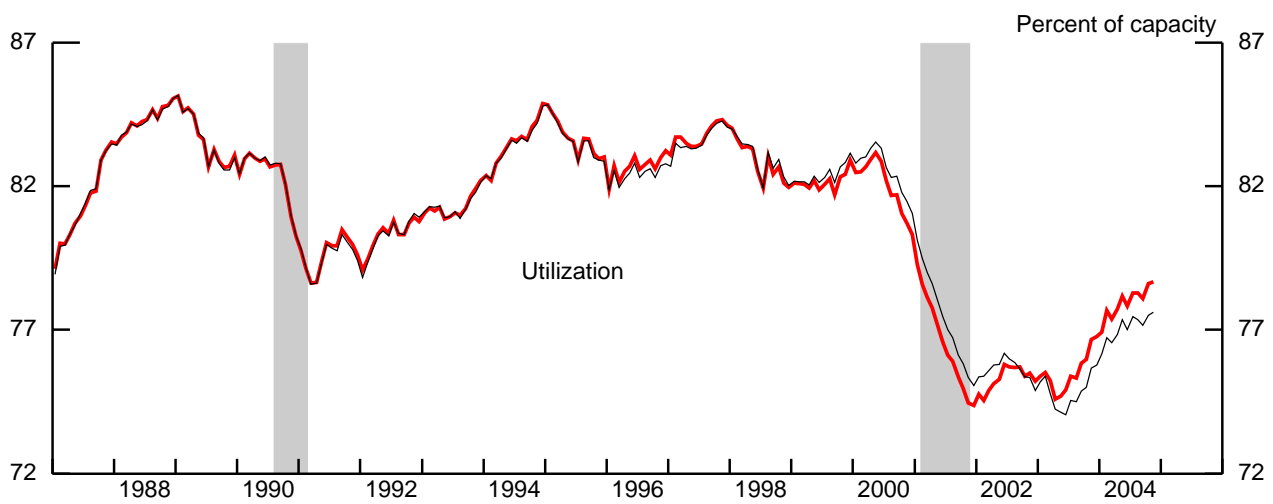
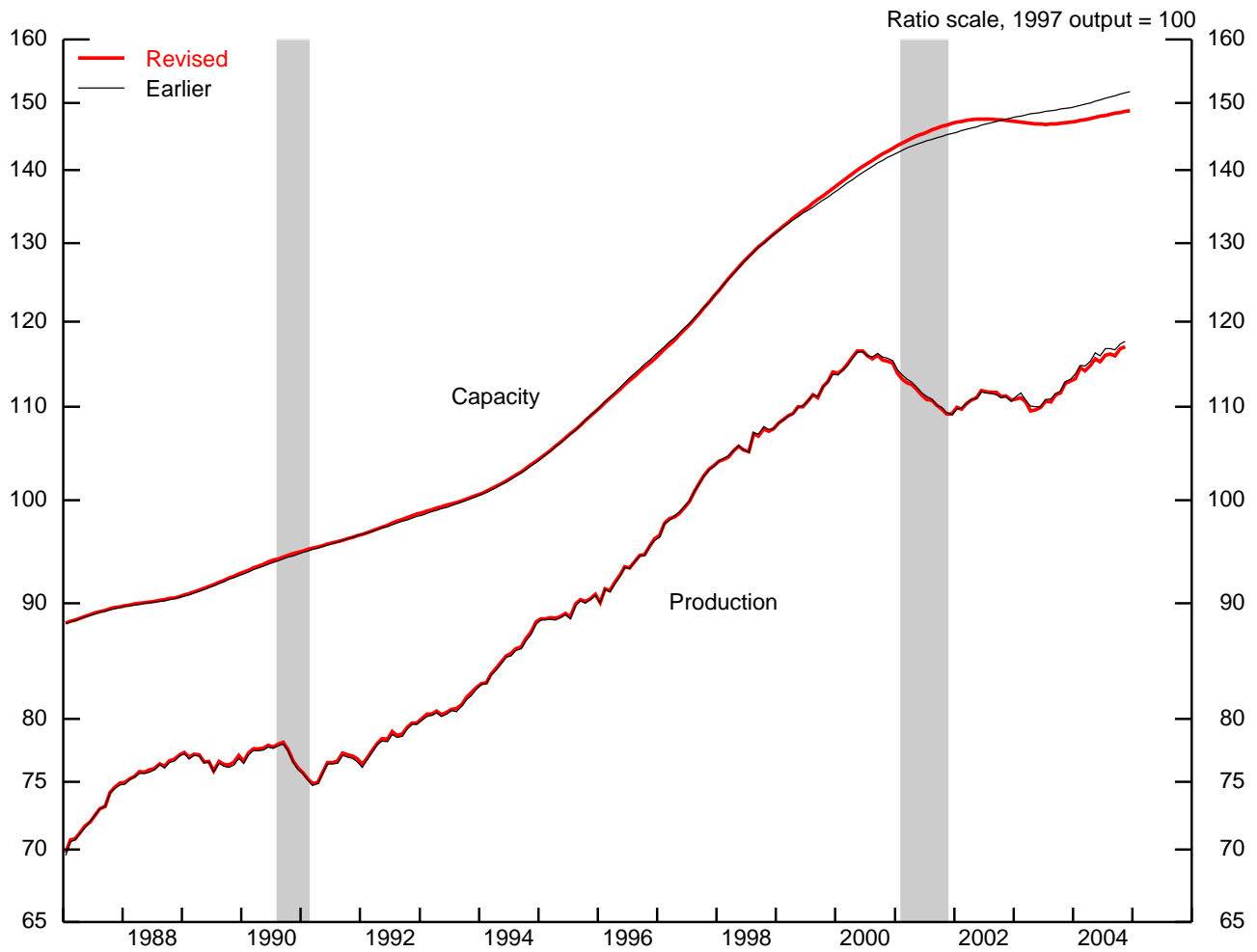
Data Availability and Publication Changes

Files containing the revised data and the text and tables from this release are available on the Board's web site, at www.federalreserve.gov/releases/g17, and on diskettes from Publications Services (telephone 202-452-3245). Updated data for all of the regularly issued series on industrial production, capacity, capacity utilization, and electric power use are available on the website. The revised data will also be available through the STAT-USA web site of the Department of Commerce (www.stat-usa.gov). Further information on these revisions is available from the Board's Industrial Output Section (telephone 202-452-3197).

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.

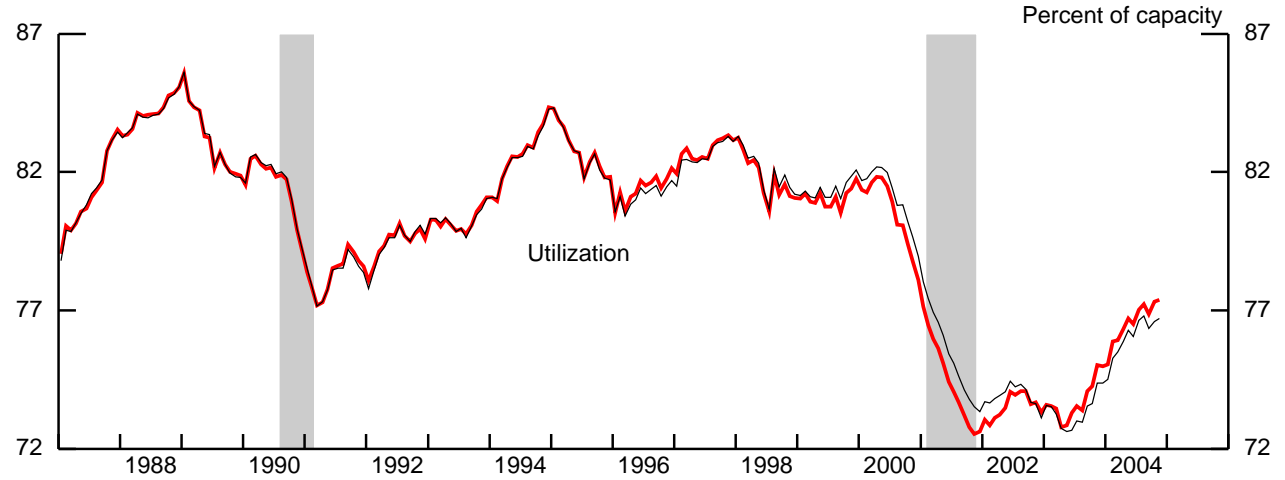
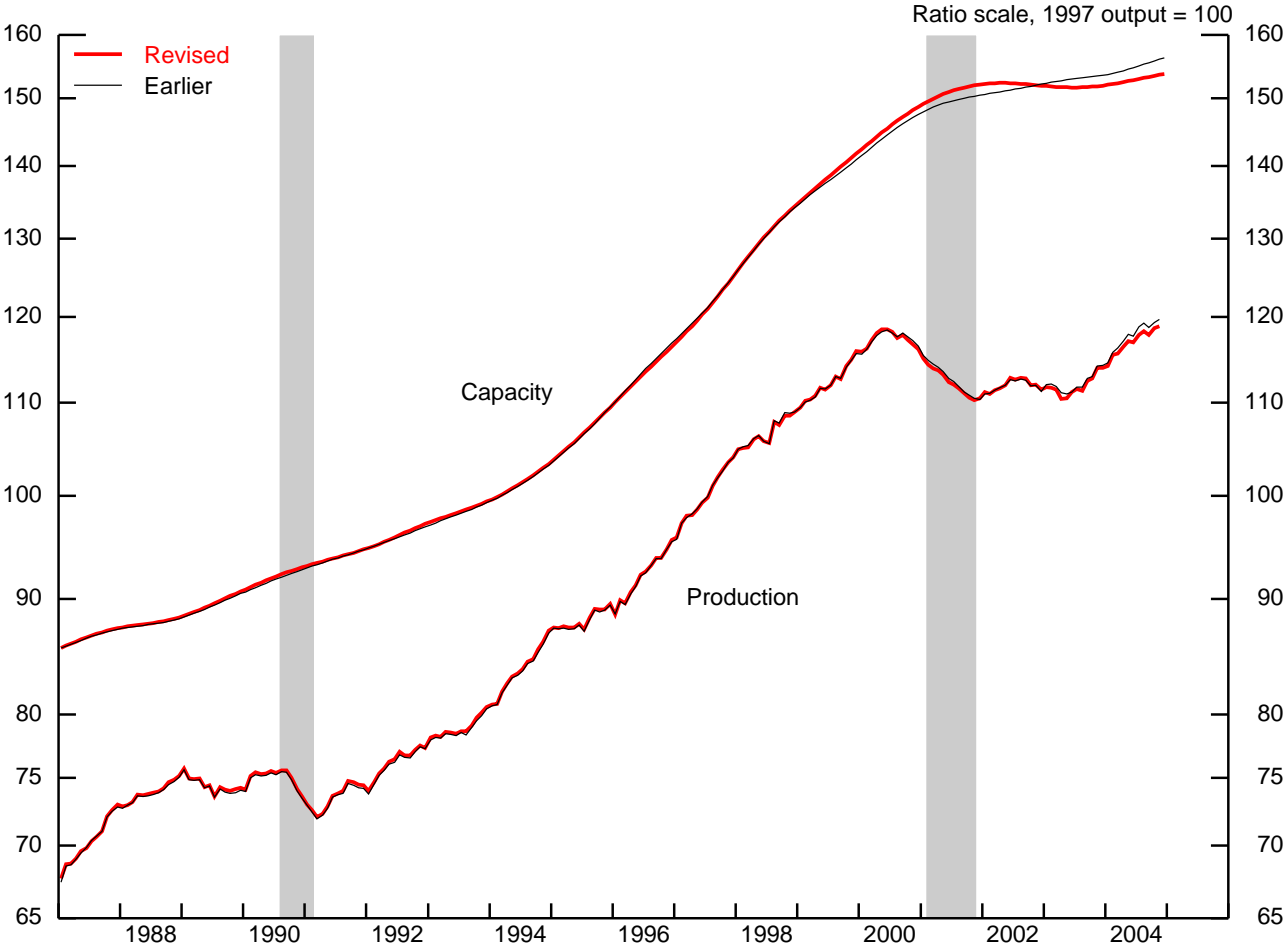
An expanded version of this release will be published in a forthcoming article in the Federal Reserve Bulletin.

1. Total industrial production, capacity, and utilization



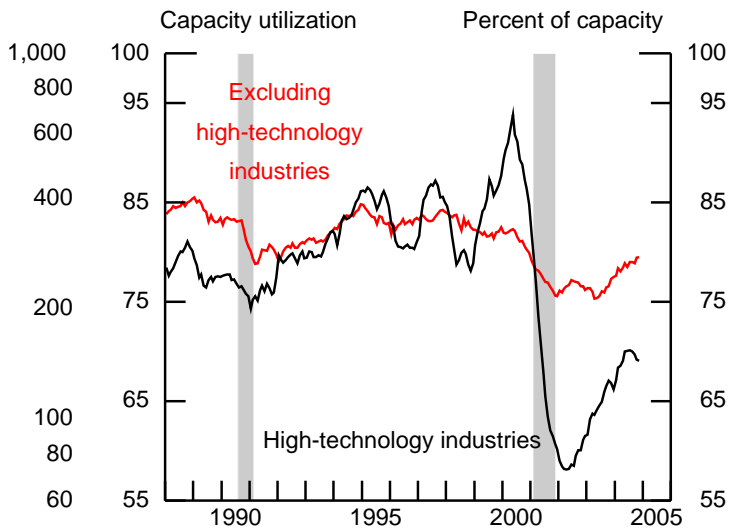
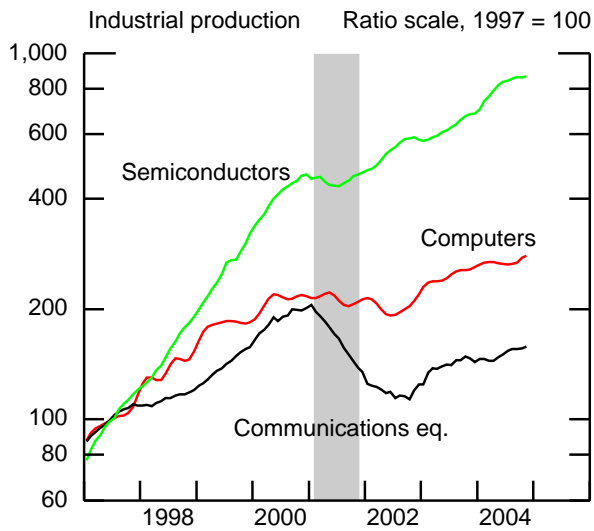
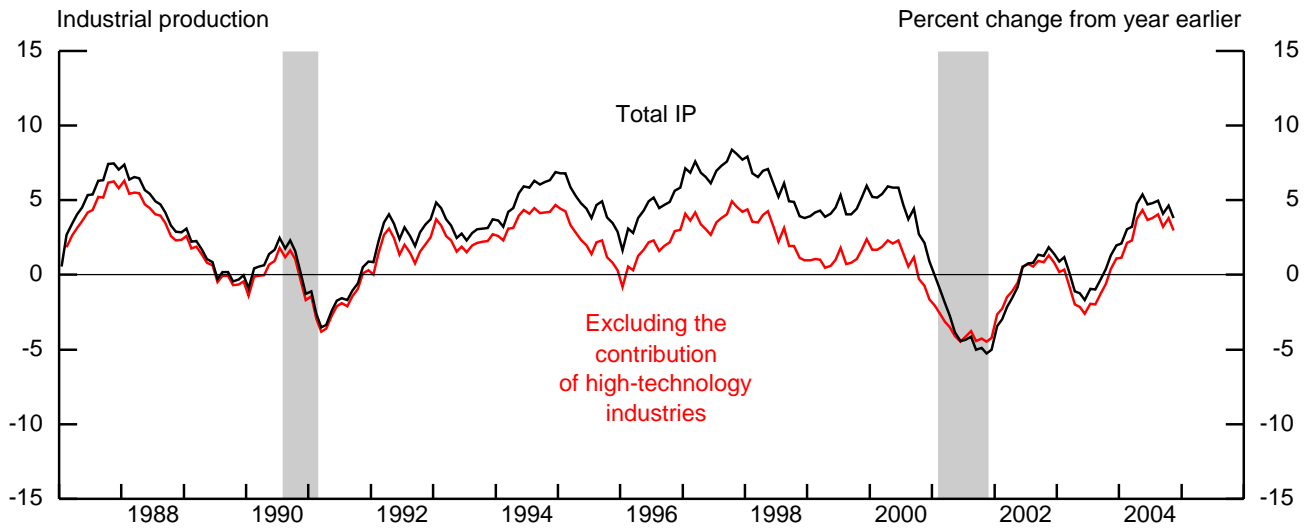
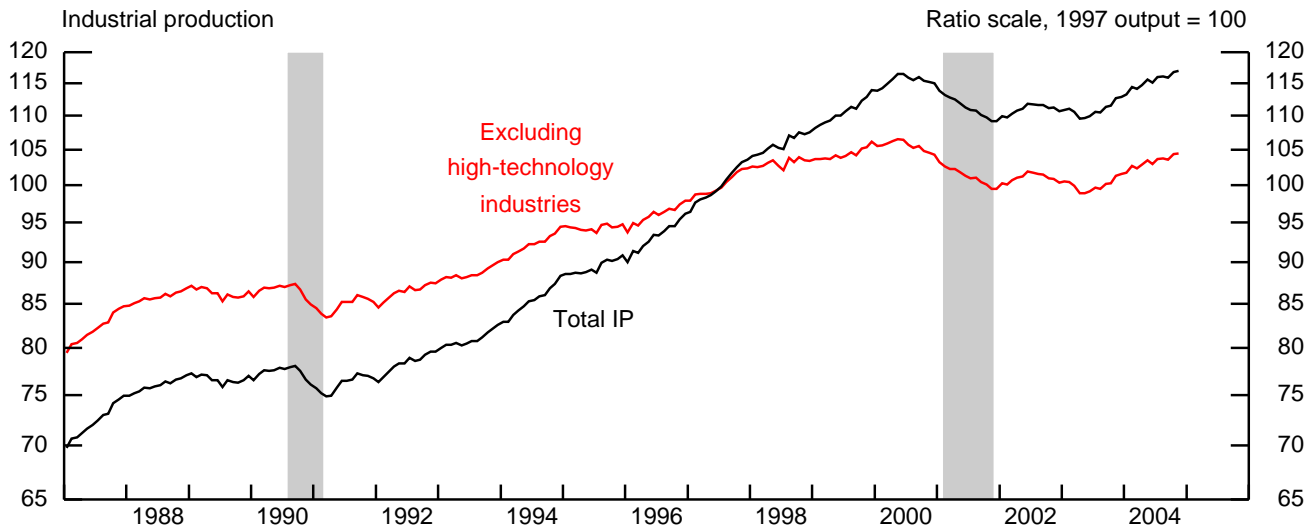
Note: The shaded areas are periods of business recession as defined by the National Bureau of Economic Research (NBER).

2. Manufacturing industrial production, capacity, and utilization



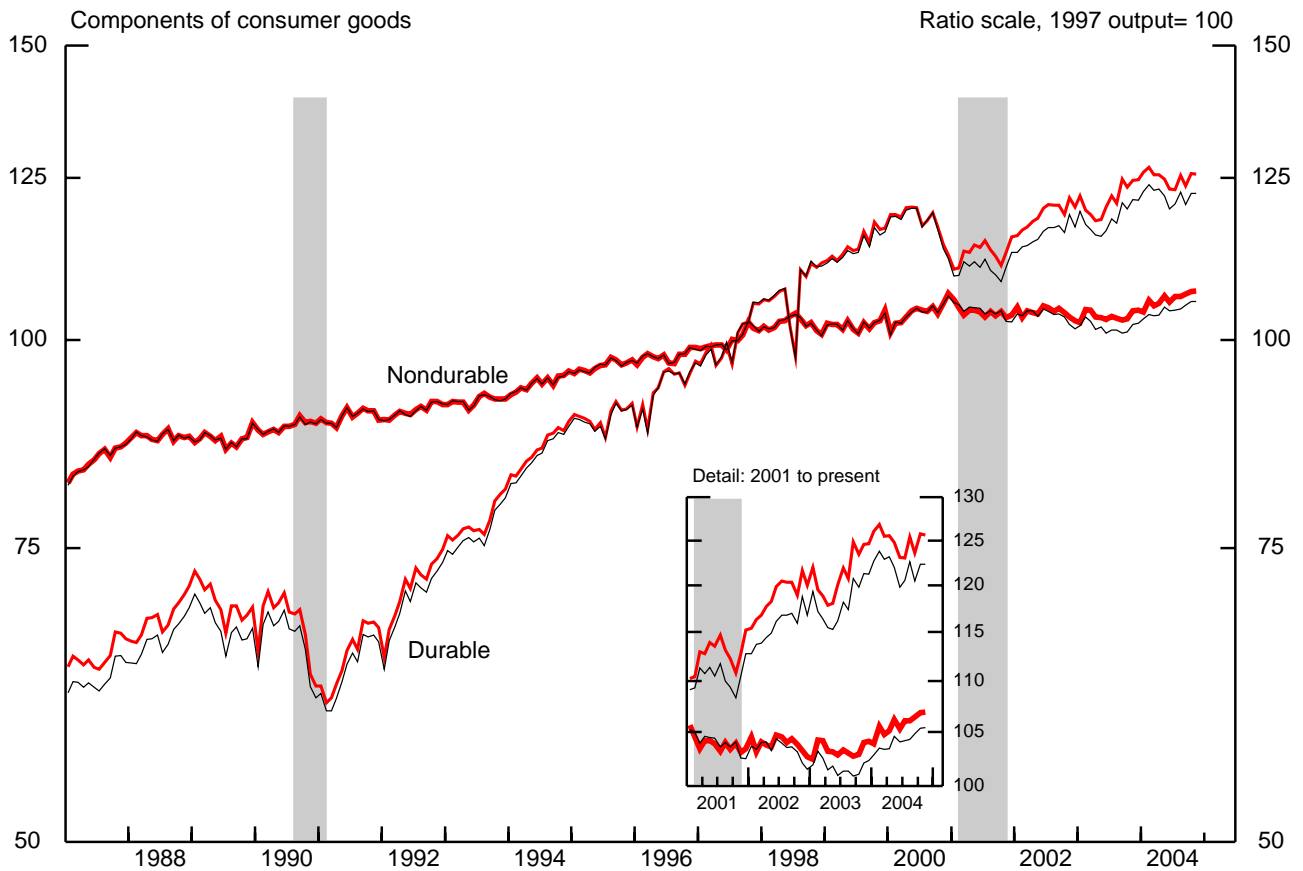
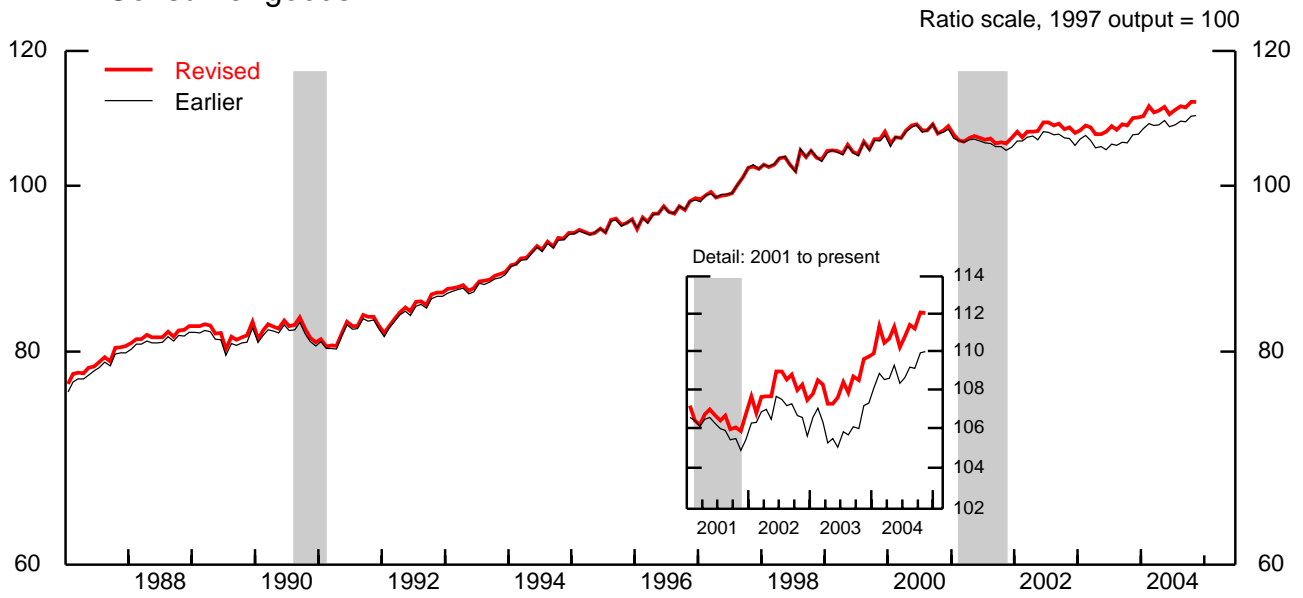
Notes: The shaded areas are periods of business recession as defined by the NBER. Manufacturing consists of those industries in the North American Industry Classification System, or NAICS, definition of manufacturing plus those industries--logging and newspaper, periodical, book and directory publishing--that have traditionally been considered to be manufacturing and included in the industrial sector.

3. Industrial production and capacity utilization



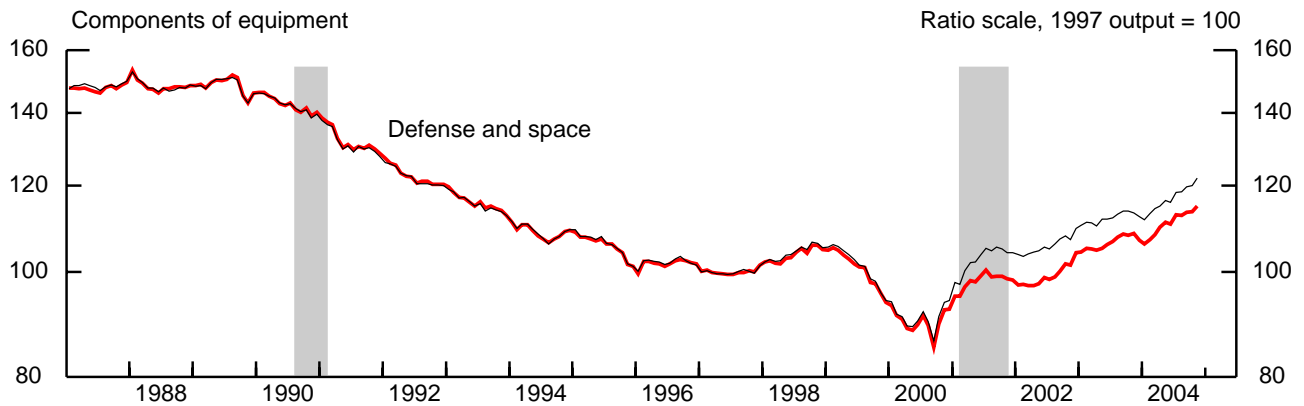
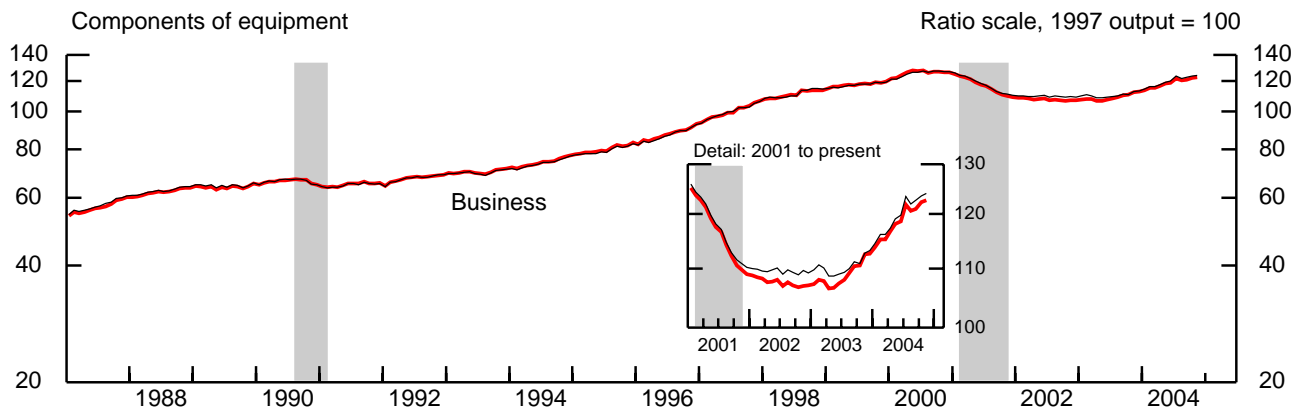
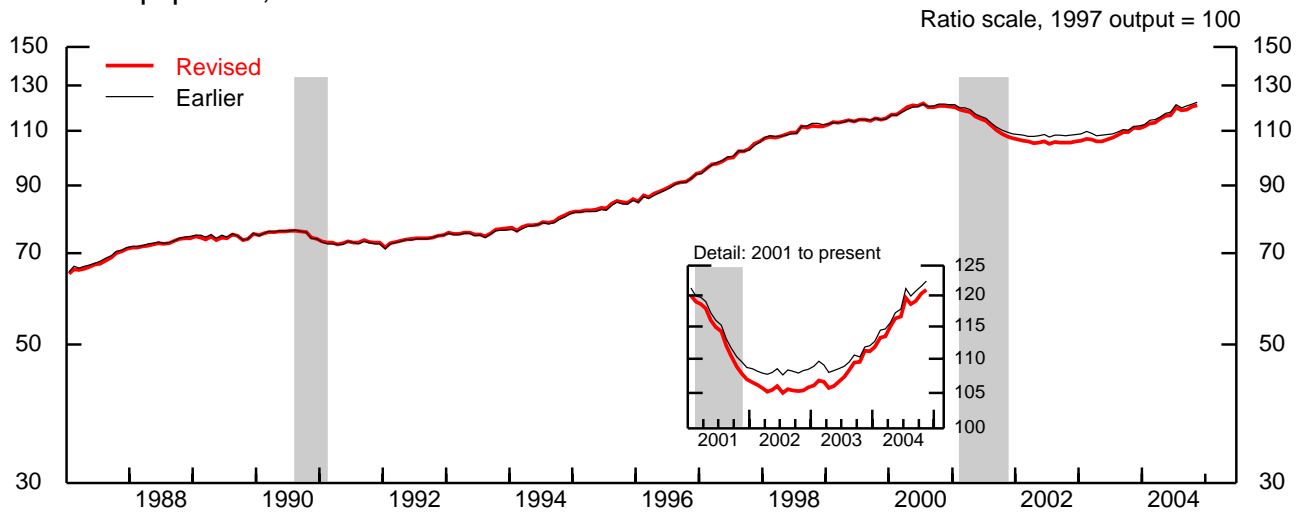
Notes: High-technology industries are defined as semiconductors and related electronic components (NAICS 334412-9), computers (NAICS 3341), and communications equipment (NAICS 3342). The shaded areas are periods of business recession as defined by the NBER.

4. Consumer goods



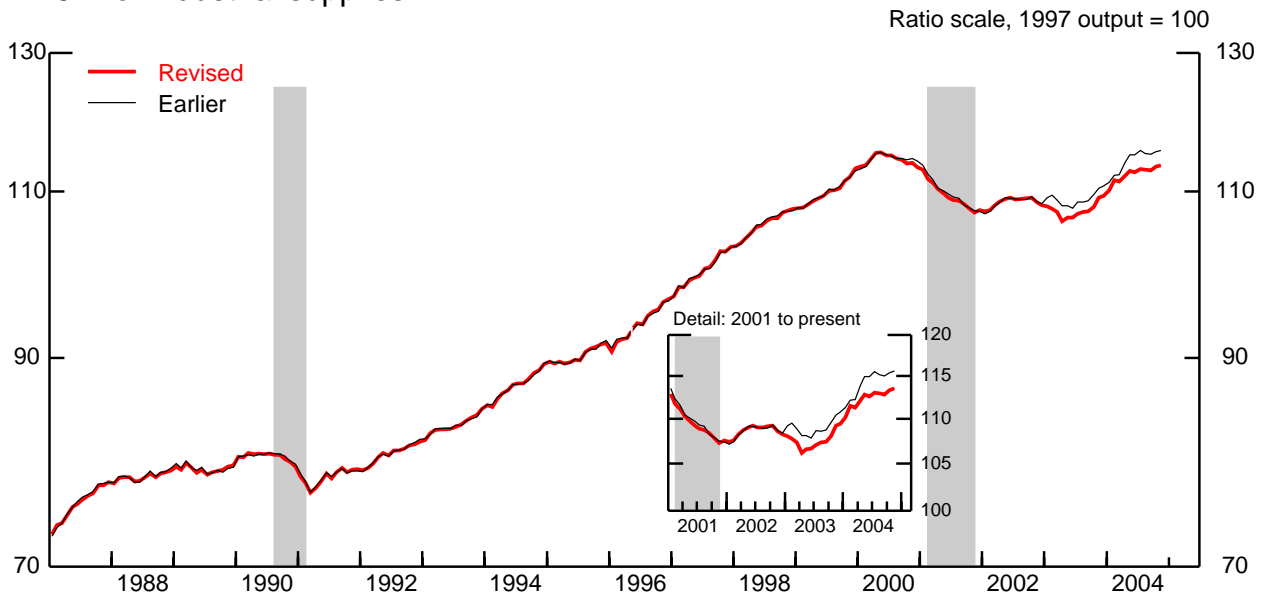
Note: The shaded areas represent periods of business recession as defined by the NBER.

5. Equipment, total

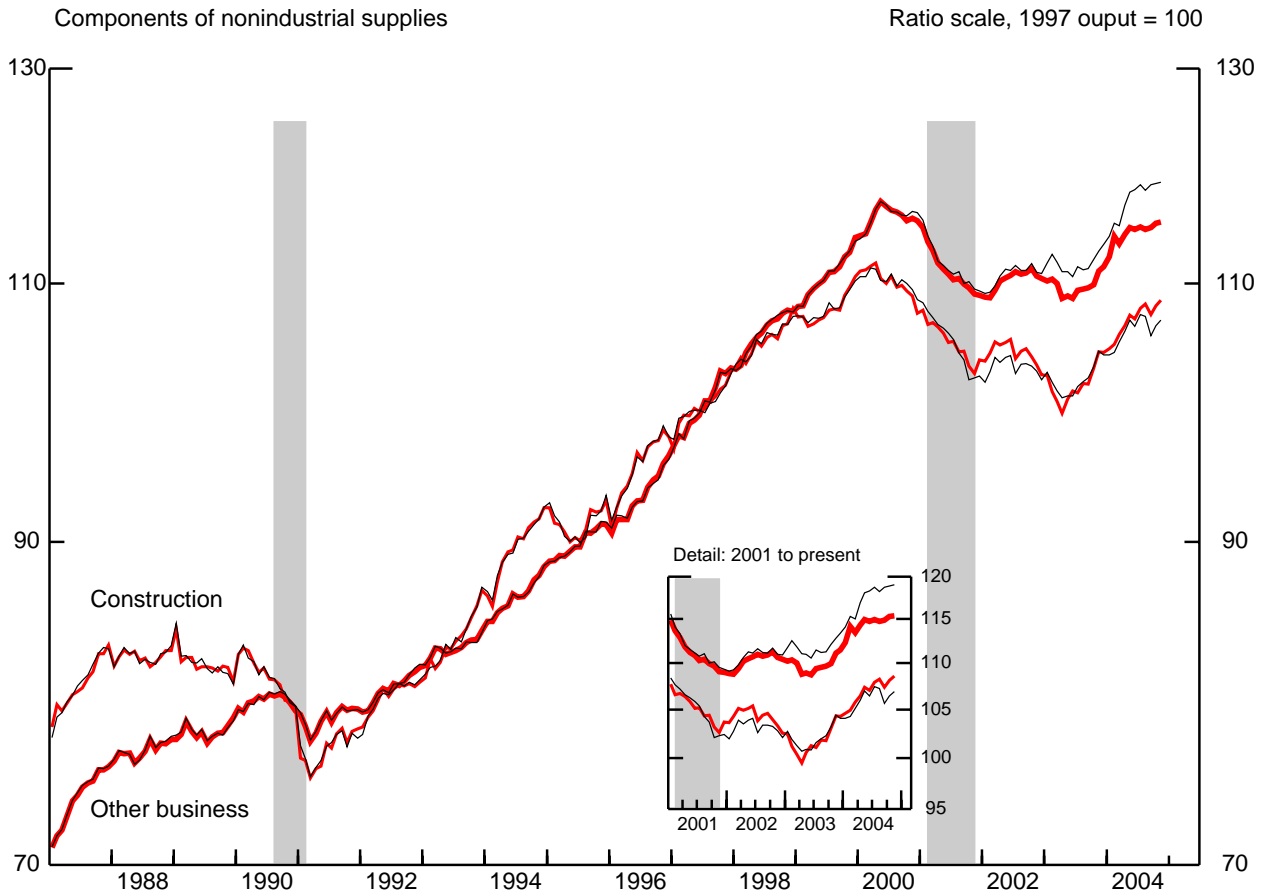


Note: The shaded areas represent periods of business recession as defined by the NBER.

6. Nonindustrial supplies

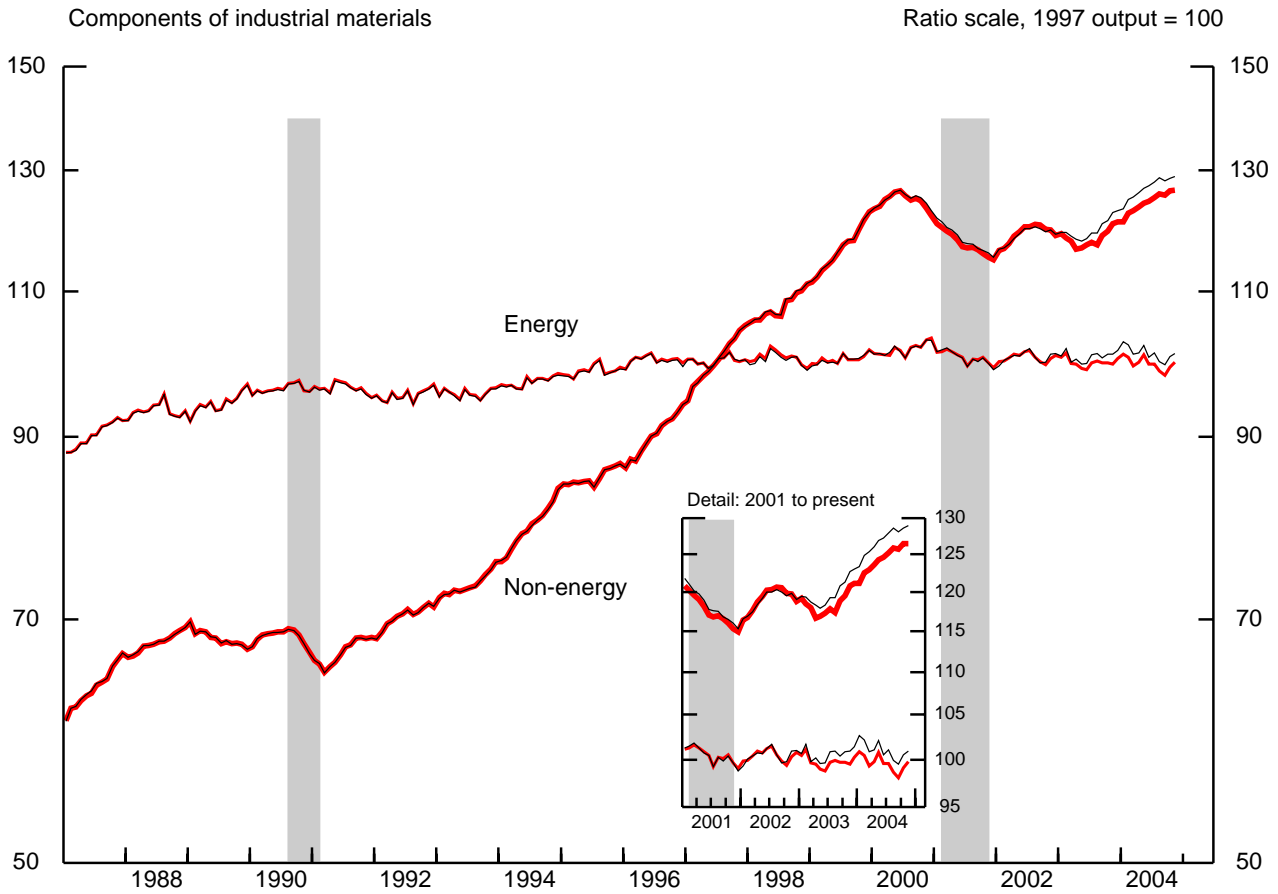
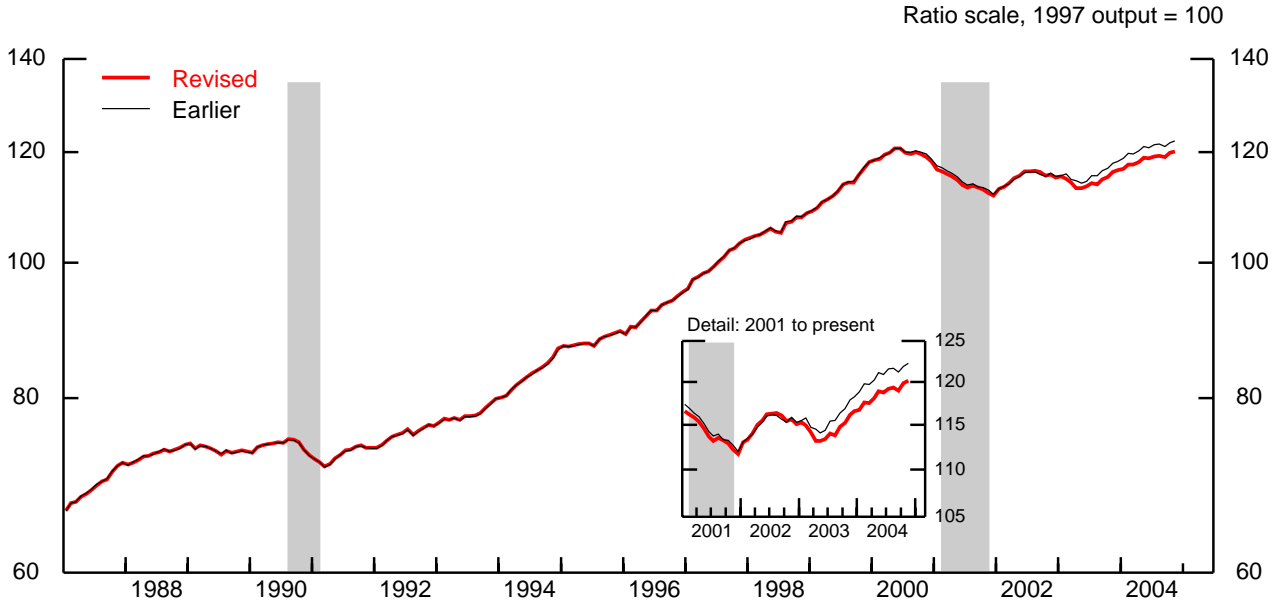


Components of nonindustrial supplies



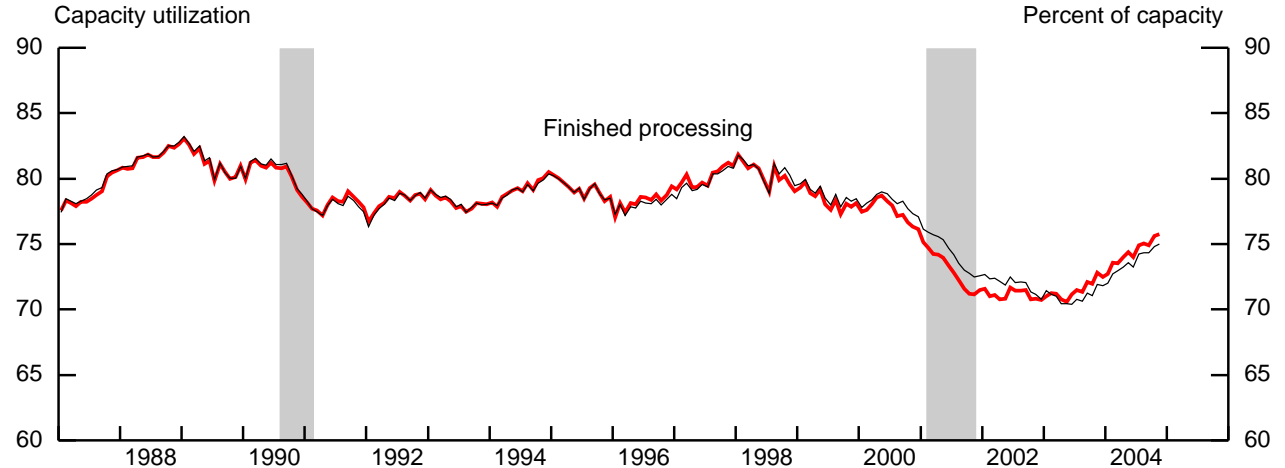
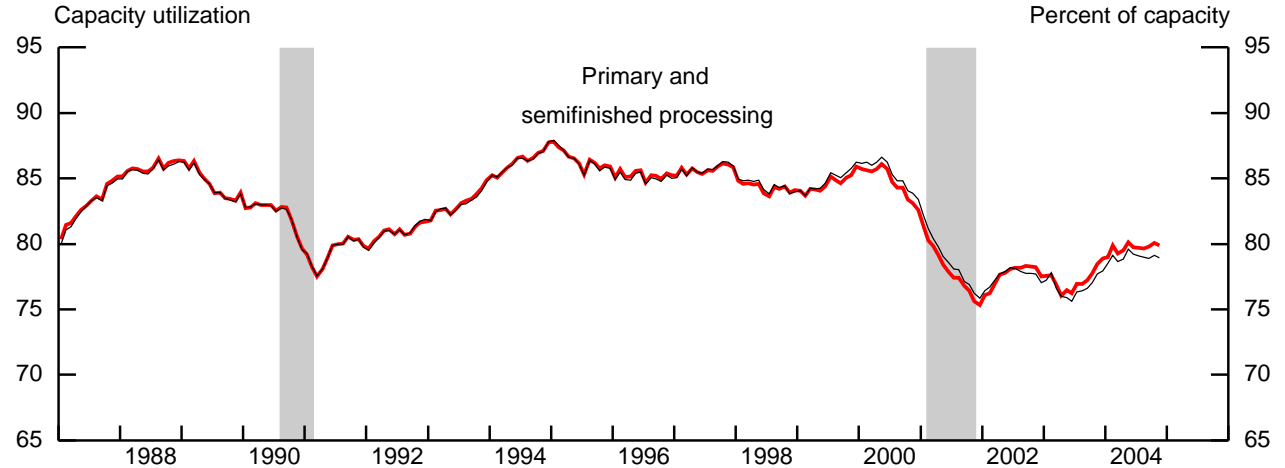
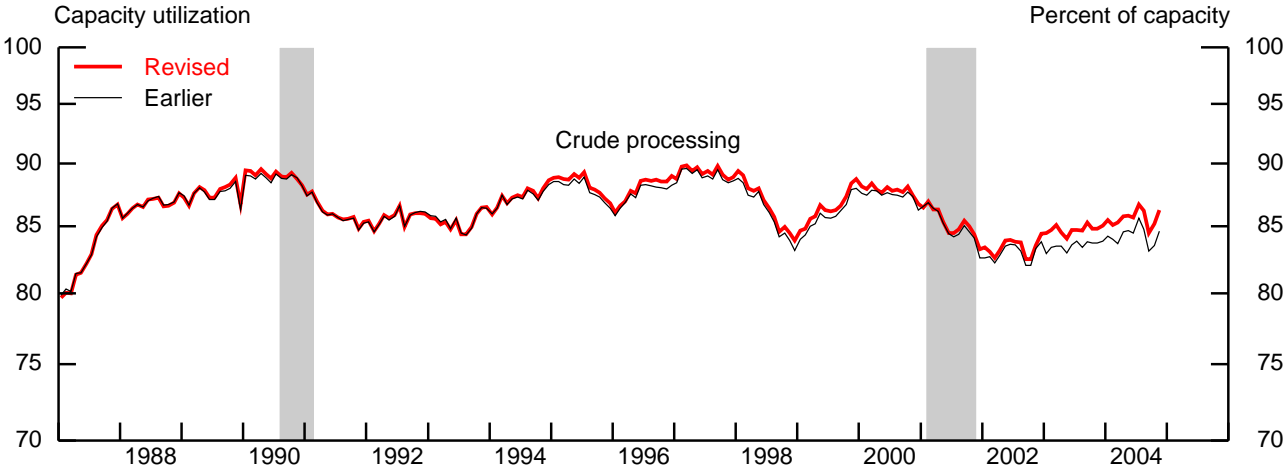
Note: The shaded areas represent periods of business recession as defined by the NBER.

7. Industrial materials



Note: The shaded areas represent periods of business recession as defined by the NBER.

8. Capacity utilization by stage of process



Note: The shaded areas are periods of business recession as defined by the NBER.

Table 2
RATES OF CHANGE IN INDUSTRIAL PRODUCTION, MARKET AND INDUSTRY GROUP SUMMARY: 2000–2004¹

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Total IP	1.9	-5.1	1.5	1.2	4.3	-4	.2	.1	-.3	-.6
MARKET GROUPS										
Final products and nonindustrial supplies	2.0	-4.7	.6	1.7	4.7	-4	.3	.1	.5	-.6
Consumer goods	.9	-1.5	1.6	1.3	2.3	-1	.7	.6	.8	-.4
Durable	-2.1	-1.3	6.4	3.3	-2	-2	1.6	.4	.3	-.7
Automotive products	-4.5	2.3	10.1	5.2	-2.8	.5	1.2	.2	.3	-2.3
Home electronics	13.7	5.8	-4.0	34.8	-12.0	-2.0	16.1	-8.4	9.8	-1.8
Appliances, furniture, carpeting	-.9	-3.4	1.8	1.4	3.6	-.3	-1.4	.0	.4	2.6
Miscellaneous goods	-1.5	-6.6	4.3	-3.5	4.7	-1.2	1.5	1.9	-1.3	.8
Nondurable	2.0	-1.6	-.2	.4	3.3	.0	.3	.5	.8	-.2
Non-energy	.8	-.8	-2.3	.8	4.3	-.2	.3	.5	.8	-.7
Foods and tobacco	1.2	-1.2	-3.6	2.4	4.7	.5	-.6	-.2	4.0	1.4
Clothing	-7.7	-20.8	-9.7	-14.9	-6.4	-2.2	-5.6	-7.3	-1.7	-2.6
Chemical products	3.8	7.0	.9	.6	4.1	-.6	4.0	2.7	-2.9	-2.7
Paper products	-2.0	-2.7	-.8	.6	7.1	-.9	.6	.1	-4.9	-4.6
Energy	7.9	-5.2	10.1	-1.4	-1.2	.8	.6	1.3	.6	1.3
Business equipment	6.2	-13.3	-2.6	4.7	11.3	-.6	-.5	-1.2	1.9	-1.3
Transit	-11.7	-3.5	-12.6	.2	10.2	-.5	2.5	2.5	3.5	2.3
Information processing	19.8	-17.4	-3.7	16.3	9.4	.6	-4.6	-9.2	7.9	-4.1
Industrial and other	3.6	-13.7	2.1	-.5	12.8	-1.3	1.4	3.0	-1.8	-.9
Defense and space equipment	-4.3	8.0	3.8	5.3	6.4	-1.3	-4.4	.2	.7	-.4
Construction supplies	-1.1	-5.0	.1	.6	5.1	-.9	1.5	-.4	-.5	1.4
Business supplies	2.3	-5.5	1.4	.0	4.9	-.6	.1	.1	-1.4	-2.1
Materials	1.9	-5.6	2.8	.5	3.7	-.4	.1	.2	-1.4	-.6
Non-energy	1.8	-6.5	3.5	.8	5.7	-.6	.1	.5	-1.6	-.8
Durable	4.9	-7.2	4.6	2.2	7.0	-.7	-.1	.3	-2.0	-.8
Consumer parts	-8.5	-7.9	7.1	2.7	-.4	-1.4	-.8	.4	.7	.1
Equipment parts	22.2	-7.9	6.2	5.8	17.5	-.8	-.5	.3	-5.9	.1
Other	-4.3	-6.2	1.9	-.9	3.0	-.4	.6	.4	-.4	-1.4
Nondurable	-3.9	-5.2	1.7	-1.3	3.5	-.2	.4	.8	-.8	-.7
Textile	-10.2	-9.5	2.0	-13.0	-4.4	-.4	2.2	3.0	-2.7	1.5
Paper	-4.1	-6.3	2.1	-4.3	4.5	.6	-.2	.6	.2	-1.0
Chemical	-4.4	-4.6	2.1	2.0	5.5	-.5	.5	.4	-.7	-.8
Energy	1.9	-2.8	.4	-.3	-1.4	.2	.0	-.6	-.8	-.2
INDUSTRY GROUPS										
Manufacturing	1.5	-5.4	1.3	1.5	5.3	-.5	.2	.2	-.3	-.9
Manufacturing (NAICS)	1.7	-5.3	1.6	1.6	5.2	-.5	.2	.3	-.1	-.6
Durable manufacturing	4.1	-7.2	3.2	3.3	6.7	-.7	.1	.2	-.4	-.8
Wood products	321	-6.9	-1.6	.0	3.2	1.3	-.4	.6	1.8	-.6
Nonmetallic mineral products	327	-3.4	-2.5	.3	1.7	4.7	-1.8	3.1	-1.8	4.1
Primary metal	331	-10.2	-8.7	7.1	.6	3.8	-1.0	2.0	3.6	1.2
Fabricated metal products	332	.0	-8.6	-.2	-2.9	4.4	.0	-.2	-.1	-1.1
Machinery	333	1.8	-16.7	1.3	.6	14.4	-.6	.3	2.2	-2.2
Computer and electronic products	334	29.0	-9.0	5.6	14.5	16.1	-.4	-1.4	-5.2	-1.2
Electrical equip., appliances, and components	335	2.5	-14.7	-5.2	1.1	8.1	.2	-1.9	-3.0	.0
Motor vehicles and parts	3361–3	-9.7	-2.1	11.3	4.8	-1.1	-.6	.7	1.4	1.0
Aerospace and other miscellaneous transportation equipment	3364–9	-4.8	4.7	-7.5	.8	4.2	-.9	-.2	2.3	.3
Furniture and related products	337	-.7	-6.3	4.2	-1.8	3.5	-1.3	1.2	4.6	-.9
Miscellaneous	339	2.9	-1.5	7.4	-2.2	4.2	-3.2	1.3	3.8	-1.0
Nondurable manufacturing	-1.5	-2.9	-.4	-.4	3.2	-.1	.3	.5	.3	-.5
Food, beverage, and tobacco products	311,2	1.0	-.8	-2.9	2.1	4.0	.5	-.4	.7	3.3
Textile and product mills	313,4	-6.7	-9.5	.4	-8.5	-1.6	-.3	.7	1.7	-1.6
Apparel and leather	315,6	-7.5	-21.0	-9.3	-14.3	-5.7	-2.1	-5.6	-7.3	-1.9
Paper	322	-4.7	-5.7	4.1	-3.3	4.8	.1	.3	1.2	-.6
Printing and support	323	-1.3	-8.1	-3.2	-3.5	.6	.0	-1.4	-1.5	2.0
Petroleum and coal products	324	-1.1	.8	4.1	1.2	3.4	.6	3.3	2.9	-1.3
Chemical	325	-.6	.2	1.0	1.2	4.2	-.4	1.5	1.1	-1.8
Plastics and rubber products	326	-4.0	-4.4	2.4	-2.2	1.9	-.8	1.3	.2	-1.8
Other manufacturing (non-NAICS) 1133,5111	-1.9	-6.3	-3.9	.3	6.5	-.4	.0	-1.7	-4.0	-3.9
Mining 21	1.3	-.6	-3.8	.2	-1.5	-.3	.4	-1.5	-.1	.6
Utilities 2211,2	6.1	-5.1	7.1	-.6	.6	.0	.1	.5	.0	.4
Electric	2211	4.9	-3.7	5.7	.5	1.5	.0	.0	.2	1.1
Natural gas	2212	13.2	-12.8	15.4	-6.2	-3.6	.3	.0	2.0	-3

NOTE. Estimates for the third quarter of 2004 are subject to further revision in the upcoming monthly releases.

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. For 2004, the rates are calculated from the fourth quarter of 2003 to the third quarter of 2004 and annualized.

Table 3

RATES OF CHANGE IN INDUSTRIAL PRODUCTION, SPECIAL AGGREGATES AND SELECTED DETAIL: 2000–2004¹

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Total industry	1.9	-5.1	1.5	1.2	4.3	-4	.2	.1	-.3	-.6
Energy	4.3	-3.3	2.9	-.3	-.4	-.4	.3	.0	-.3	.3
Consumer products	7.9	-5.2	10.1	-1.4	-1.2	.8	.6	1.3	.6	1.3
Commercial products	6.2	-1.3	4.7	.1	4.8	.2	.3	1.2	-1.3	-.6
Oil and gas well drilling	34.8	-8.1	-15.5	21.0	6.0	5.5	2.8	-.7	17.0	12.9
Converted fuel	5.5	-8.1	4.0	.0	-.6	.1	-.2	.3	-1.0	.5
Primary materials	.0	.0	-1.5	-.4	-1.9	.3	.2	-1.0	-.7	-.6
Non-energy	1.5	-5.4	1.2	1.5	5.3	-.5	.2	.2	-.3	-.9
Selected high-technology industries	37.6	-10.1	8.1	18.7	20.2	-.6	-1.6	-7.2	-2.6	-1.5
Computer and peripheral equipment	3341	18.6	-3.6	.9	21.8	4.5	-.6	2.1	-23.0	7.7
Communications equipment	3342	28.6	-30.3	-14.3	22.5	8.4	1.0	-7.5	-8.8	16.7
Semiconductors and related electronic components	334412-9	51.2	1.7	25.2	16.2	35.2	-1.6	.9	.3	-18.2
Excluding selected high-technology industries		-2.0	-5.0	.7	.4	4.4	-.5	.3	.7	-.2
Motor vehicles and parts	3361-3	-9.7	-2.1	11.3	4.8	-1.1	-.6	.7	1.4	1.0
Motor vehicles	3361	-11.8	2.5	11.1	6.7	-2.4	.3	.9	-.5	3.0
Motor vehicle parts	3363	-7.1	-5.0	10.8	2.7	-1.5	-1.4	.3	3.0	-.3
Excluding motor vehicles and parts		-1.2	-5.2	-.4	.0	5.0	-.5	.3	.6	-.3
Consumer goods		.4	-1.7	-1.2	.7	3.9	-.3	.3	.7	.5
Business equipment		2.9	-10.0	-2.2	.1	11.8	-.9	1.4	2.4	-.9
Construction supplies		-1.4	-4.8	.2	.6	5.0	-.9	1.6	-.2	-.5
Business supplies		-1.5	-6.4	-.2	-.9	3.9	-.8	.1	-.2	-1.1
Materials		-3.2	-7.2	.7	-.9	4.2	-.3	.0	.4	-.6
Measures excluding selected high-technology industries										
Total industry		-1.0	-4.6	1.0	.3	3.5	-.4	.3	.6	-.2
Manufacturing ²		-1.9	-4.9	.7	.4	4.3	-.5	.3	.8	-.2
Durable		-2.3	-6.5	2.3	1.2	5.0	-.7	.4	1.3	-.1
Measures excluding motor vehicles and parts										
Total industry		2.8	-5.2	.8	.9	4.7	-.4	.2	.0	-.4
Manufacturing ²		2.5	-5.6	.4	1.2	5.9	-.5	.2	.1	-.5
Durable		6.5	-7.9	1.6	2.9	8.4	-.8	.0	-.1	-.7
Measures excluding selected high-technology industries and motor vehicles and parts										
Total industry		-.2	-4.8	.3	-.1	3.9	-.3	.3	.5	-.3
Manufacturing ²		-1.2	-5.2	-.3	.0	4.9	-.4	.3	.6	-.3
Measure of non-energy material inputs to										
Finished processors		7.4	-7.7	5.5	1.9	8.5	-.7	-.3	.5	-2.7
Semifinished and primary processors		-3.7	-5.3	1.7	.0	3.4	-.4	.5	.5	-.7
STAGE-OF-PROCESS GROUPS										
Crude		-2.8	-2.9	-1.0	-1.4	1.0	.0	-.1	-.2	-.7
Primary and semifinished		2.3	-5.9	3.4	.3	4.2	-.4	.4	.4	-1.5
Finished		2.7	-4.4	-.4	3.3	5.3	-.4	.0	-.1	1.5

NOTE. Estimates for the third quarter of 2004 are subject to further revision in the upcoming monthly releases.

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. For 2004, the rates are calculated from the fourth quarter of 2003 to the third quarter of 2004 and annualized.

2. Manufacturing consists of those industries included in the North American Industry Classification System, or NAICS, definition of manufacturing plus those industries – logging and newspaper, periodical, book and directory publishing – that have traditionally been considered to be a part of manufacturing and are included in the industrial sector.

Table 4
REVISED AND EARLIER CAPACITY UTILIZATION RATES, BY INDUSTRY GROUPS

Percent of capacity, seasonally adjusted

Item	Revised Rate						Difference between revised and earlier rates (percentage points)		
	1972–2003 Ave.	1988–1989 High	1990–1991 Low	2002 Q4	2003 Q4	2004 Q3	2002 Q4	2003 Q4	2004 Q3
Total industry	81.1	85.1	78.6	75.4	76.5	78.2	.2	1.0	.9
Manufacturing	79.9	85.6	77.2	73.5	74.8	77.0	.1	.6	.4
Manufacturing (NAICS)	79.7	85.5	77.0	73.2	74.3	76.5	.0	.7	.7
Durable manufacturing	78.1	84.5	73.4	70.7	72.1	74.5	.2	.7	1.0
Wood products 321	80.1	88.9	73.1	74.4	77.4	78.5	.9	.8	.9
Nonmetallic mineral products 327	79.2	84.9	72.0	76.8	78.0	80.3	-1.1	-8	1.5
Primary metal 331	80.5	94.3	74.6	78.6	79.3	82.1	1.4	2.8	.9
Fabricated metal products 332	76.9	80.2	71.6	69.4	67.7	70.1	-.3	-.4	-.1
Machinery 333	78.9	84.8	73.0	67.9	69.9	77.5	1.1	.6	.4
Computer and electronic products 334	79.0	81.7	76.6	62.7	67.7	70.9	-.4	.9	2.4
Electrical equip., appliances, and components 335	82.8	87.5	75.1	72.6	74.8	80.0	-1.5	-.8	-.5
Motor vehicles and parts 3361–3	77.6	90.3	56.0	80.9	81.9	79.8	-.3	.1	.2
Aerospace and other miscellaneous transportation equipment 3364–9	72.7	88.7	82.1	63.2	63.2	64.8	-1.1	-1.5	-2.1
Furniture and related products 337	78.8	83.6	69.4	72.6	71.1	73.5	1.5	1.9	2.2
Miscellaneous 339	76.5	81.7	77.7	75.9	74.1	76.4	-.8	-1.6	-2.4
Nondurable manufacturing	81.9	87.1	81.7	76.6	77.3	79.3	-.2	.5	.1
Food, beverage, and tobacco products 311,2	81.9	85.6	81.0	76.6	78.7	81.0	-.7	1.7	1.4
Textile and product mills 313,4	83.4	91.5	77.2	76.8	73.4	74.8	1.9	1.3	2.5
Apparel and leather 315,6	79.6	84.2	77.3	66.7	64.9	68.5	-.4	.8	2.2
Paper 323	88.2	93.7	85.2	84.8	83.5	86.8	-.1	-.1	-.3
Printing and support 324	84.1	91.6	82.7	73.0	71.7	71.9	-1.3	.5	-2.9
Petroleum and coal products 325	86.0	88.9	82.9	87.0	88.9	90.2	-1.1	-.2	1.2
Chemical 326	78.5	85.7	80.9	73.5	74.1	75.9	.6	-.2	-1.0
Plastics and rubber products 326	83.7	91.1	77.1	81.1	81.2	83.1	1.5	.3	.1
Other manufacturing (non-NAICS) 1133,5111	84.8	90.5	80.4	80.7	83.3	87.5	1.8	-.1	-2.9
Mining 21	87.1	85.8	83.5	85.4	87.1	86.3	.8	1.8	2.4
Utilities 2211,2	86.9	92.8	84.2	87.9	84.8	84.0	.7	1.7	1.9
Selected high-technology industries	78.6	81.0	74.3	60.9	66.7	69.9	-.9	-.3	1.8
Computer and peripheral equipment 3341	78.6	80.2	67.5	70.9	74.1	73.6	-.7	.7	-.8
Communications equipment 3342	76.6	80.8	73.4	42.8	52.8	56.7	-5.4	2.1	2.7
Semiconductors and related electronic components 334412–9	81.2	82.8	77.5	69.8	74.8	78.5	3.2	-.7	4.4
Measures excluding selected high-technology industries	81.2	85.5	78.8	76.4	77.1	78.9	.1	.6	.4
Total industry	81.2	85.5	78.8	76.4	77.1	78.9	.1	.6	.4
Manufacturing ¹	80.0	86.0	77.3	74.6	75.4	77.8	.0	.2	-.2
STAGE-OF-PROCESS GROUPS	86.4	88.9	84.8	83.5	84.9	85.8	.4	1.1	1.3
Crude	86.4	88.9	84.8	83.5	84.9	85.8	.4	1.1	1.3
Primary and semifinished	82.2	86.5	77.5	78.0	78.4	79.7	.5	.8	.7
Finished	78.0	83.1	77.2	70.8	72.4	75.0	-.3	.8	.7

NOTE. Estimates for the third quarter of 2004 are subject to further revision in the upcoming monthly releases.

1. See footnote 2 to table 3.

Table 5
RATES OF CHANGE IN CAPACITY, BY INDUSTRY GROUPS: 2000 to 2004¹

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Total industry	4.3	2.7	.5	-.2	1.2	.2	.4	-1.2	-1.3	-.4
Manufacturing ²	5.0	2.6	.0	-.1	1.1	.1	.4	-1.1	-1.1	-.5
Manufacturing (NAICS)	5.3	2.8	.2	.1	1.2	.1	.4	-1.1	-1.0	-.6
Durable manufacturing	8.5	4.9	.7	1.3	2.2	.2	.2	-2.0	-1.2	-1.4
Nondurable manufacturing	1.0	.2	-.5	-1.3	-.2	.1	.6	-.1	-.6	.3
Other manufacturing (non-NAICS)	.7	-1.3	-2.5	-2.9	.1	1.0	-.3	-.9	-1.5	.7
Mining	-1.0	2.0	-.6	-1.7	-.4	.2	-.7	-.9	-1.2	-.4
Utilities	3.2	3.9	4.6	3.0	1.9	.7	.2	-1.4	-1.3	.4
Selected high-technology industries	38.8	27.4	8.0	8.4	13.4	-3.4	2.5	-9.7	-3.4	-7.3
Manufacturing ² ex. selected high-technology industries	1.7	.5	-.4	-.6	.1	.4	.1	-.2	-.4	-.1
STAGE-OF-PROCESS GROUPS										
Crude	-.9	.9	-.8	-2.2	-.2	.4	-.3	-.4	-1.1	-.1
Primary and semifinished	5.1	3.0	.8	-.2	2.0	.0	.2	-1.0	-2.0	-.3
Finished	4.7	2.4	.3	.6	.3	.4	.6	-1.4	-.2	-.7

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 footnote 2 to table 3.

Table 6
RATES OF CHANGE IN ELECTRIC POWER USE: 2000 to 2004¹

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Total Industry	1.0	-6.4	-.3	-1.3	.8	.0	1.3	-.8	1.4	-.8
Manufacturing²	1.2	-6.7	.1	-1.2	.7	.0	1.4	-.8	1.6	-.8
Durable	-.1	-7.0	1.5	-2.5	2.7	.0	1.2	-.7	1.2	-.1
Nondurable	2.4	-6.4	-1.0	-.2	-.9	.0	1.5	-.9	1.9	-1.3
Mining	-2.7	-3.1	-5.0	-3.4	2.3	.0	.1	-.4	-1.0	-.1
Total ex. nuclear nondefense	.2	-5.4	-.4	-1.1	.8	.0	1.3	-.8	1.4	-.5
Utility sales to industry	.6	-7.4	-.3	-1.5	.9	.0	1.2	-.7	1.5	-.6
Industrial generation	9.1	2.8	.7	.9	.2	.0	2.6	-1.4	-.1	.3

NOTE. Estimates for the third quarter of 2004 are subject to further revision in the upcoming monthly releases.

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. For 2004, the percent change is calculated from the fourth quarter of 2003 to the third quarter of 2004.
2. See footnote 2 to table 3.

Table 10
ANNUAL PROPORTIONS IN INDUSTRIAL PRODUCTION, MARKET AND INDUSTRY GROUP SUMMARY

Item	1996	1997	1998	1999	2000	2001	2002	2003
Total IP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MARKET GROUPS								
Final products and nonindustrial supplies	56.4	56.9	58.1	57.7	57.6	59.1	58.8	58.4
Consumer goods	27.7	27.6	28.0	28.2	28.5	30.1	30.9	30.9
Durable	7.8	7.9	7.9	8.0	7.8	8.1	8.9	8.8
Automotive products	3.6	3.7	3.7	3.9	3.7	4.0	4.6	4.7
Home electronics	.4	.4	.4	.4	.4	.4	.3	.4
Appliances, furniture, carpeting	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.4
Miscellaneous goods	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.3
Nondurable	19.9	19.7	20.1	20.2	20.7	22.0	22.0	22.1
Non-energy	16.3	16.3	16.9	16.7	16.9	18.1	18.1	17.9
Foods and tobacco	8.7	8.7	9.2	9.1	9.3	10.0	9.7	9.7
Clothing	1.8	1.6	1.5	1.3	1.2	1.1	.9	.8
Chemical products	3.7	3.7	3.8	3.8	3.9	4.5	4.9	4.9
Paper products	1.7	1.8	1.9	1.9	2.0	2.0	2.0	2.0
Energy	3.7	3.4	3.3	3.5	3.8	3.8	3.9	4.2
Business equipment	11.2	11.8	12.3	11.9	11.7	11.2	10.3	9.9
Transit	1.8	2.1	2.5	2.3	2.0	2.0	1.9	1.7
Information processing	3.7	4.0	4.0	4.1	4.1	3.8	3.0	3.1
Industrial and other	5.7	5.8	5.8	5.5	5.6	5.4	5.3	5.1
Defense and space equipment	2.0	1.9	1.9	1.8	1.5	1.8	1.8	2.0
Construction supplies	4.1	4.1	4.3	4.3	4.3	4.3	4.3	4.3
Business supplies	11.0	11.1	11.2	11.2	11.2	11.3	11.2	11.0
Materials	43.6	43.1	41.9	42.3	42.4	40.9	41.2	41.6
Non-energy	33.4	33.8	33.3	33.1	32.3	30.8	30.9	30.2
Durable	21.4	21.7	21.4	21.4	20.9	19.6	19.3	18.7
Consumer parts	4.1	4.2	4.2	4.4	4.1	3.8	4.1	4.1
Equipment parts	8.1	8.3	8.2	8.1	8.1	7.3	6.7	6.2
Other	9.2	9.2	9.1	8.9	8.6	8.4	8.5	8.4
Nondurable	12.1	12.1	11.9	11.7	11.4	11.3	11.6	11.5
Textile	1.1	1.1	1.0	1.0	.9	.8	.8	.7
Paper	3.0	2.9	2.8	2.9	2.8	2.8	2.8	2.7
Chemical	4.8	4.9	4.6	4.5	4.3	4.2	4.5	4.5
Energy	10.2	9.3	8.6	9.2	10.1	10.0	10.3	11.4
INDUSTRY GROUPS								
Manufacturing	84.4	85.7	86.5	85.8	84.5	84.1	83.8	82.5
Manufacturing (NAICS)	80.3	81.2	81.8	81.0	79.6	79.2	79.0	77.7
Durable manufacturing	45.5	46.5	47.1	46.6	45.5	44.2	43.7	42.7
Wood products 321	1.5	1.5	1.5	1.6	1.4	1.4	1.5	1.5
Nonmetallic mineral products 327	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.2
Primary metal 331	3.0	3.1	2.9	2.8	2.5	2.3	2.4	2.5
Fabricated metal products 332	6.0	6.0	6.1	6.0	6.1	5.9	5.8	5.6
Machinery 333	6.2	6.2	6.2	5.8	5.9	5.6	5.4	5.2
Computer and electronic products 334	10.0	10.4	10.3	10.3	10.3	9.2	7.9	7.6
Electrical equip., appliances, and components 335	2.6	2.6	2.6	2.5	2.5	2.4	2.2	2.1
Motor vehicles and parts 3361-3	6.5	6.7	6.6	7.0	6.6	6.5	7.4	7.5
Aerospace and other miscellaneous transportation equipment 3364-9	3.2	3.5	4.1	3.8	3.3	3.8	3.6	3.5
Furniture and related products 337	1.5	1.6	1.7	1.7	1.7	1.7	1.8	1.7
Miscellaneous 339	2.8	2.8	2.8	2.8	2.9	3.1	3.3	3.2
Nondurable manufacturing	34.7	34.7	34.7	34.4	34.1	35.0	35.3	35.0
Food, beverage, and tobacco products 311,2	10.1	10.1	10.6	10.4	10.7	11.4	11.3	11.4
Textile and product mills 313,4	1.7	1.7	1.6	1.5	1.4	1.3	1.3	1.2
Apparel and leather 315,6	1.9	1.8	1.6	1.4	1.3	1.2	1.0	.8
Paper 322	3.3	3.2	3.2	3.2	3.2	3.1	3.1	3.1
Printing and support 323	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.3
Petroleum and coal products 324	1.6	1.6	1.5	1.7	1.9	1.7	1.6	1.9
Chemical 325	9.9	10.1	9.9	9.6	9.4	9.8	10.6	10.6
Plastics and rubber products 326	3.6	3.7	3.7	3.8	3.7	3.7	3.8	3.7
Other manufacturing (non-NAICS) 1133,5111	4.1	4.4	4.7	4.8	4.9	5.0	4.8	4.8
Mining 21	6.0	5.4	4.8	5.5	6.5	6.4	6.4	7.6
Utilities 2211,2	9.6	9.0	8.7	8.6	9.0	9.5	9.7	9.9
Electric 2211	8.1	7.7	7.5	7.4	7.6	8.1	8.3	8.2
Natural gas 2212	1.4	1.3	1.2	1.2	1.4	1.4	1.5	1.6

NOTE. The IP proportion data are estimates of the industries' relative contributions to overall IP change between the reference year and the following year. For example, a 1 percent increase in durable goods manufacturing between 2003 and 2004 would account for a 0.427 percent increase in total IP.

EXPLANATORY NOTE

The **Industrial Production and Capacity Utilization** statistical release, which is published around the middle of the month, 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. More detailed descriptions of industrial production, capacity utilization, and electric power are available at www.federalreserve.gov/releases/G17 at the Board's World Wide Web site. In addition, files containing data shown in the release, more detailed series that were published in the G.17 prior to December 2000, and historical data are available at the Board's Web site. Instructions for searching for and downloading specific series are provided as well. For paid access to the data files through the Department of Commerce's Economic Bulletin Board or World Wide Web site, please call STAT-USA at 1-800-STAT-USA or 202-452-1986. Diskettes containing historical data and the data published in this release also 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 the real output of the manufacturing, mining, and electric and gas utilities industries; the reference period for the index is 1997. Manufacturing consists of those industries included in the North American Industry Classification System, or NAICS, definition of manufacturing *plus* those industries—logging and newspaper, periodical, book and directory publishing—that have traditionally been considered to be manufacturing and included in the industrial sector. For the period since 1997, the total IP index has been constructed from 300 individual series based on the 2002 North American Industrial Classification System (NAICS) codes. These individual series are classified in two ways: (1) market groups, and (2) industry groups. Market groups consist of products and materials. Total products are the aggregate of final products, such as consumer goods and equipment, and nonindustrial supplies (which are inputs to nonindustrial sectors). Materials are inputs in the manufacture of products. Major industry groups include three-digit NAICS industries and aggregates of these industries—for example, durable and nondurable manufacturing, mining, and utilities. A complete description of the market and industry structures, including details regarding series classification, relative importance weights, and data sources, is available on the Board's web site (www.federalreserve.gov/releases/G17/About.html). Changes in output for the market and industry groups are summarized in table 1 and the levels of output (in index form) are shown in table 4. Special aggregates, that highlight the relative importance and contributions of several key industries, such as high-technology and motor vehicles, are summarized in tables 2 and 5. For a detailed description of the contents of the statistical tables, see below.

Source data. 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 and from government agencies; data of this type are used to estimate monthly IP wherever possible and appropriate. Production indexes for a few industries are derived by dividing estimated nominal output (calculated using unit production or sales and unit values) by a corresponding Fisher price index; the most notable of these fall within the high-technology grouping and include computers, communications equipment, and semiconductors. When suitable data on physical product are not available, 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 annual data used to benchmark the IP indexes; these factors also may be influenced by technological or cyclical developments. The annual data used in benchmarking 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 United States Geological Survey of the Department of the Interior; and publications of the Department of Energy.

Aggregation Methodology and Weights. The aggregation method for the IP index is a version of the Fisher-ideal index formula. (For a detailed discussion of the aggregation method, see *Federal Reserve Bulletin* February 1997 and March 2001.) In the IP index, series that measure the output of an individual industry are combined using weights derived from their proportion in the total value-added output of all industries. The IP index, which extends back to 1919, is built as a chain-type index since 1972. The current formula for the growth in monthly IP (or any of the sub-aggregates) since 1972 is the geometric mean of the change in output (I), and, as can be seen below, is computed using the unit value added estimate for the current month (p_m) and the estimate for previous month:

$$\frac{I_m^A}{I_{m-1}^A} = \sqrt{\frac{\sum I_m p_{m-1} \times \sum I_m p_m}{\sum I_{m-1} p_{m-1} \times \sum I_{m-1} p_m}}$$

The IP proportions (typically shown in the first column of the relevant tables in the G.17 release) are estimates of the industries' relative contributions to overall growth in the following year. For example, the relative importance weight of the motor vehicles and parts industry is about 5 percent. If output in this industry increased 10 percent in a month, then this gain would boost growth in total IP by ½ percentage point ($0.05 \times 10\% = 0.5\%$). To assist users with calculations, the Federal Reserve's web site provides supplemental monthly statistics that represent the exact proportionate contribution of a monthly change in a component index to the monthly change in the total index (www.federalreserve.gov/releases/G17/ipdisk/ipweights.sa).

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.) For the first estimate of output for a given month, about 55 percent of the source data (in value-added terms) are available; the fraction of available source data increases to about 84 percent for estimates in the second month that the estimate is published, 95 percent in the third month, and 96 percent in the fourth month. Data availability by data type is summarized in the table below:

Availability of Monthly IP Data in Publication Window (Percent of value added in 2003)

Type of data	Month of estimate			
	1st	2nd	3rd	4th
Physical product	26	41	50	50
Production-worker hours	35	35	35	35
Electric power use	0	12	12	12
IP data received	61	87	96	97
IP data estimated	39	13	4	3

NOTE—The physical product group includes series based on either monthly or quarterly data. As can be seen in the first line of the table, in the first month, a physical product indicator is available for about half of the series (in terms of value added) that ultimately are based on physical product data (26 percent out of total of 48 percent). Of the 26 percent, about two-thirds (17 percent of total IP) include series that are derived from weekly physical product data and for which actual monthly data may lag up to several months. On average, quarterly product data are received for the third estimate of industrial production. Specifically, quarterly data are available for the second estimate of the last month of a quarter, the third estimate of the second month of a quarter, and the fourth estimate of the first month of a quarter. About 4 percent of the source data for monthly IP—all physical product measures—are available too late for direct inclusion in the current index and are incorporated at the time of an annual historical revision.

Seasonal adjustment. Individual series are seasonally adjusted using Census X-12 ARIMA. For series based on production-worker hours, the current seasonal factors were estimated with data through September 2004; for other series, the factors were estimated with data through at least June 2004. Series are pre-adjusted for the effects of holidays or the business cycle when appropriate. For the data since 1972, 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 0.27 percent during the 1987–2003 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 1987–2003 period. In most cases (about 85 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

Overview. The Federal Reserve Board constructs estimates of capacity and capacity utilization for industries in manufacturing, mining, and electric and gas utilities. For a given industry, the capacity utilization rate is equal to an output index (seasonally adjusted) divided by a capacity index. The Federal Reserve Board's capacity indexes attempt to capture the concept of *sustainable maximum output*—the greatest level of output a plant can maintain within the framework of a realistic work schedule, after factoring in normal downtime and assuming sufficient availability of inputs to operate the capital in place.

Coverage. Capacity indexes are constructed for 85 detailed industries (67 in manufacturing, 16 in mining, and 2 in utilities), which mostly correspond to industries at the three- and four-digit NAICS level. Estimates of capacity and utilization are available for a variety of groups, including durable and nondurable manufacturing, total manufacturing, mining, utilities, and total industry. Manufacturing consists of those industries included in the North American Industry Classification System, or NAICS, definition of manufacturing *plus* those industries—logging and newspaper, periodical, book and directory publishing—that have traditionally been considered to be manufacturing and included in the industrial sector. Also, special aggregates are available, such as high-tech industries and manufacturing excluding high-tech industries.

Source Data. The monthly rates of capacity utilization are designed to be consistent with both the monthly data on production and the periodically available data on capacity and utilization. Because there is no direct monthly information on overall industrial capacity or utilization rates, the Federal Reserve first estimates annual capacity indexes from the source data. Capacity data reported in physical units from government sources (primarily from the U.S. Geological Survey and the Department of Energy's Energy Information Administration) and trade sources are available for portions of several industries in manufacturing (*e.g.*, paper, industrial chemicals, petroleum refining, motor vehicles), as well as for electric utilities and mining; these industries represent about 18 percent of total industrial capacity. When physical product data are unavailable for manufacturing industries, capacity indexes are based on responses to the Bureau of the Census's *Survey of Plant Capacity* (SPC); these industries account for a bit less than 78 percent of total industry capacity. In the absence of utilization data for a few mining and petroleum series, capacity is based on trends through peaks in production (roughly 4 percent of total industry capacity). A detailed description of the methodology used to construct the capacity indexes is available on the Board's web site (www.federalreserve.gov/releases/G17/cap_notes.html).

Aggregation Methodology. Monthly capacity aggregates are calculated in three steps: (1) utilization aggregates are calculated on an annual basis through the most recent full year as capacity-weighted aggregates of individual utilization rates; (2) the annual aggregate capacity is derived from the corresponding production and utilization aggregates; (3) the monthly capacity aggregate is obtained by interpolating with a Fisher index of its constituent monthly capacity series. Utilization rates for the

individual series and aggregates are calculated by dividing the pertinent monthly production index by the related capacity index.

Consistency. A major aim is that the Federal Reserve utilization rates be consistent over time so that, for example, a rate of 85 percent means about the same degree of tightness that it meant in the past. A major task for the Federal Reserve in developing reasonable and consistent time series of capacity and utilization is dealing with inconsistencies between the movements of the industrial production index and the survey-based utilization rates. The McGraw-Hill/DRI Survey, now discontinued, was the primary source of manufacturing utilization rates for many years. This was a survey of large companies that reported, on average, higher utilization rates than those reported by establishments covered by the SPC (currently the primary source of factory operating rates) for the fourteen years they overlapped. Adjustments have been made to keep the industry utilization rates currently reported by the Federal Reserve roughly in line with rates formerly reported by McGraw-Hill. As a consequence, the rates reported by the Federal Reserve tend to be higher than the rates reported in the SPC.

Perspective. Over the 1972–2003 period, the average total industry utilization rate is 81.1 percent; for manufacturing, the average factory operating rate has been 79.9 percent. 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. The highs and lows in capacity utilization shown in table 7 are specific to each series and do not all occur in the same month.

ELECTRIC POWER

Coverage. Electric power data for sales by utilities to industry users and for electric power produced by cogenerators (manufacturing and mining firms that produce electricity for their own use or to sell to a utility) are generally collected at the 4-digit NAICS and 3-digit SIC level for mining and manufacturing. Aggregates for 3-digit industries, as well as for total mining, durable, nondurable, total manufacturing and total industrial electric power use, are computed. Manufacturing consists of those industries included in the North American Industry Classification System, or NAICS, definition of manufacturing *plus* those industries—logging and newspaper, periodical, book and directory publishing—that have traditionally been considered to be manufacturing and included in the industrial sector. An aggregate showing total industry excluding nuclear nondefense is shown separately because the value-added proportion for the nondefense nuclear material series (part of NAICS 3251) in total IP is considerably less than its share of total electric power use. In addition, aggregates for utility sales to industrial users and industry generation are computed. While only the major aggregates are shown in the release, data for the 3- and 4-digit industries are available on the Board's web site (www.federalreserve.gov/releases/G17).

Source Data. Electric power data are collected from a sample of utilities and cogenerators covering all twelve Federal Reserve Districts. The primary criterion for inclusion of a utility in the panel is whether the utility provides electric power to industrial customers. A comparison of Federal Reserve kilowatt-hour aggregates to estimates from the 1997 *Census of Manufactures* (the most recent available) and recent reporting panel statistics suggests the Federal Reserve data cover about 50 percent of the overall sales to manufacturing in that year. The cogeneration panel covers about 50 percent of cogeneration used directly by manufacturers. In order to provide more complete coverage and correct for any shortcomings of the survey, the series are benchmarked at the 4-digit industry level to the latest available data from the *Annual Survey of Manufactures* and the *Census of Manufactures*.

Methodology. The data we receive from utilities and cogenerators are edited for anomalies and aggregated, using self weights, to the 4-digit NAICS industry levels and above. Where reports are late or unavailable for some reason, responses are estimated.

Seasonal Adjustment. Series are seasonal adjusted at the 4-digit NAICS level, with seasonally-adjusted aggregates typically computed as sums of seasonally adjusted components. The seasonal adjustment procedure (Census X-12 program) is used without trading-day adjustments because the reporting periods of the various utilities are not the same. A leap year adjustment is also made where appropriate.

REFERENCES AND RELEASE DATES

References. The annual revision published in December 2004 will be described in an article published in an upcoming *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. The Federal Reserve methodology for constructing industry-level measures of capital is detailed in “Capital Stock Estimates for Manufacturing Industries: Methods and Data” by Mike Mohr and Charles Gilbert (1996), which can be obtained at:

www.federalreserve.gov/releases/g17/capital_stock_doc-latest.pdf.
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. 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, February 1997, February 1998, January 1999, March 2000, March 2001, March 2002, April 2003, Winter 2004).

Release Schedule

At 9:15 a.m. on

2005: January 14, February 16, March 16, April 15, May 17, June 15, July 15, August 16, September 14, October 14, November 17, and December 15.