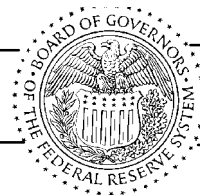


FEDERAL RESERVE statistical release



G.17 (419) 2024 Historical and Annual Revision

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Industrial Production and Capacity Utilization: The 2024 Annual Revision

The Federal Reserve has revised its index of industrial production (IP) and the related measures of capacity and capacity utilization.¹ On net, growth rates for total IP were little changed in recent years, with most years unchanged; the rates of change for 2020 and 2023 were revised up by 0.1 percentage point and down by 0.1 percentage point, respectively.² Similarly, the utilization rates for total industry are little changed from previous estimates.

Because revisions to the index of IP were minimal, the overall picture of performance in the industrial sector since the COVID-19 pandemic is unchanged. After contracting sharply in the first half of 2020 because of the pandemic, the industrial sector rebounded later in the year and in 2021, and it exhibited more modest growth in 2022. Output growth slowed further in 2023, with production roughly flat since 2022.

In the fourth quarter of 2023, capacity utilization for total industry stood at 78.3 percent, $\frac{1}{2}$ percentage point below its previous estimate and about $1\frac{1}{2}$ percentage points below its long-run (1972–2023) average. Most of the small downward revision to utilization reflects modest upward revisions to estimates of capacity. The utilization rates for 2018 to 2022 are close to previous estimates—within 0.3 percentage point—and revisions to earlier years are negligible.

Annual capacity growth for the industrial sector is revised up by 0.8 percentage point in 2023; earlier year revisions are very small. Capacity for total industry at the end of 2023 is now estimated to be $1\frac{1}{2}$ percent higher than at the end of 2018; previously, it was estimated to have increased about $\frac{1}{2}$ percent over this period.

This revision incorporated newly available annual data on output for logging and mining industries as well as annual data on shipments for publishing industries. The nominal data used in the benchmark indexes for manufacturing industries—the Census Bureau’s Census of Manufactures—are not yet available for 2022. Within mining, the indexes for metallic and nonmetallic minerals were updated with revised annual data for 2021 and with new data for 2022 from the U.S. Geological Survey (USGS). For publishing, the IP indexes folded in data for 2022 from the Census Bureau’s Service Annual Survey. The index for logging was updated to include data from 2021 and 2022 from the U.S. Forest Service.

With no new benchmark data for manufacturing, the annual rates of change for IP are very similar to the estimates published previously. The monthly pattern of production, however, has been updated to include late-arriving or revised quarterly or monthly indicator data, including information from the Bureau of Labor Statistics’ (BLS) benchmark revisions to the Current Employment Statistics. The IP estimates also reflect updated seasonal factors.

¹The revision affected rates of change for IP from 1972 forward. When necessary to maintain consistency with any revisions to the data for 1972 and subsequent years, the levels of production for the years before 1972 were multiplied by a constant. However, the rates of change in IP for the years before 1972 were not revised. Utilization rates and capacity growth rates were revised minimally between 1968 and 1971 but were unchanged before then.

²Rates of change are calculated as the percentage change in the seasonally adjusted index from the fourth quarter of the previous year to the fourth quarter of the year specified.

The revised estimates of capacity and capacity utilization incorporated data from the Census Bureau's Quarterly Survey of Plant Capacity Utilization for the fourth quarters of 2022 and 2023 along with new data on capacity from the USGS, the Energy Information Administration, and other organizations.

RESULTS OF THE REVISION

Industrial Production

Manufacturing output moved up about 3½ percent in 2021 and another ½ percent in 2022 before moving down approximately ½ percent in 2023. The strong recovery in manufacturing output following the onset of the pandemic moderated in 2022 before retreating somewhat in 2023, as previously reported, though output remains above its pre-pandemic level.

The revised contour for mining output shows a strong rebound in 2021 following the sharp, pandemic-induced decline in 2020 and further, more moderate gains in 2022 and 2023. The growth rate in 2022 is almost ½ percentage point stronger than previously reported, while the gain in 2023 is about ¼ percentage point weaker. The rates of change for utilities output are little changed from their previously reported values.

Production by Industry Group

The output of durables follows roughly the same contour as overall manufacturing. Output grew strongly in 2021 and then gradually moderated over the course of 2022 and 2023. Relative to the previous estimates, the reported rates of change in 2021, 2022, and 2023 are about ¼ percentage point weaker on average. Among durable goods manufacturing industries, revisions to most growth rates were modest. The largest single-year revision among durables came in the index for nonmetallic mineral products, which revised downward by 2½ percentage points for 2022. Elsewhere in durable goods manufacturing, the indexes for computer and electronic products and for electrical equipment, appliances, and components revised up by about 2 percentage points in 2022 and revised down by more than 1½ percentage points in 2023.

The index for nondurables was also little changed after the revision. Among nondurable manufacturing industries, the revisions to the rates of change were mixed, with the indexes for textiles and product mills, apparel and leather goods, and paper revising downward, on net, and the index for plastics and rubber products revising upward.

The output index for industries in scope for manufacturing IP that are not part of manufacturing under the North American Industry Classification System (NAICS)—that is, logging and publishing—continued its long-running trend of decline. The declines in 2021 and 2022 are reported to have been smaller than previously published, while the decrease in 2023 is larger.

Production by Market Group

Output of consumer goods was also little revised from previously reported values. Within consumer goods, a downward revision to the index for computers, video, and audio equipment in 2022 was more than offset by an upward revision in 2023. The rate of change for business equipment revised up by about ½ percentage point in 2021 and revised down by about ¾ percentage point in both 2022 and 2023; smaller revisions to the index were reported for earlier years. Relative to earlier reports, the index for transit equipment now recorded noticeably slower growth in 2022 and 2023, although growth for 2021 revised upward. The index for defense and space equipment revised down for both 2021 and 2023 due in part to a reassessment of annual deliveries based on manufacturer reports and Aviation Week magazine.

Revisions to the index for construction supplies were minor, with output somewhat weaker than

previously reported for 2022. Growth in the index for business supplies revised up for 2022 by more than 1 percentage point but revised modestly downward for 2023. The output of materials was little changed cumulatively from previously reported values.

Capacity Utilization

Capacity utilization for total industry moved down in 2019 and 2020 before jumping up to around 80 percent in 2021 and 2022 and then moving down modestly in 2023; the reading in May 2024 was 78.2 percent, about 1.5 percentage point below its 1972–2023 average. Previous estimates displayed a similar contour, with the main difference being that utilization now declines somewhat more in 2023 than previously estimated. The downward revision to utilization for total industry in 2023 is due primarily to considerably lower operating rates at mines than in previous estimates.

In manufacturing, capacity utilization moved up about 3¼ percentage points in 2021, remained flat in 2022, and moved down 1¼ percentage points in 2023. The factory operating rate in May 2024 was 77.3 percent, 1 percentage point below its long-run average. The current readings for manufacturing utilization are modestly higher than the previous estimates for 2020 to 2023. Revisions to utilization rates for 2023 were mixed among manufacturing industries and largely offsetting. The largest upward revisions in operating rates occurred in computer and electronic products, in food, and in electrical equipment, appliances, and components. The largest downward revisions in operating rates occurred in apparel, wood products, and chemicals.

The capacity utilization rate for mining decreased about 19 percentage points from 2018 to 2020 before rebounding in 2021 and 2022 to 90.2 percent, roughly back to its 2018 level and about 4 percentage points above its long-run average. Relative to its previously published rate, utilization at mines for the fourth quarter of 2023 is about 4½ percentage points lower. The operating rate for utilities declined about 6 percentage points from 2018 to 2020, was roughly flat in 2021 and 2022, and then moved down in 2023 to 72 percent, about 12 percentage points below its long-run average.

Capacity

Total industrial capacity declined in 2020 and 2021; it then rose by 1 percent in 2022 and 2.3 percent in 2023. Overall capacity is expected to rise 1.2 percent in 2024. Compared with previous estimates, overall capacity growth is roughly unchanged prior to 2023; the increase in 2023 is now about ¾ percentage point larger.

Manufacturing capacity is now reported to have contracted ½ percent per year, on average, from 2018 to 2021. Capacity at manufacturers expanded 0.4 percent in 2022 and 1.2 percent in 2023, modestly less than previous estimates. The small downward revisions to manufacturing capacity growth during this period were mostly among durable manufacturing industries. Manufacturing capacity is expected to grow by 1.3 percent in 2024.

Mining capacity rose in 2018 and 2019 before falling back by an equivalent amount in 2020 and 2021. Mining capacity moved up in both 2022 and 2023 by about 3.5 percent per year; these gains in capacity are somewhat stronger than our previous estimates. Mining capacity is expected to decline by 0.8 percent in 2024. Capacity for electric and gas utilities rose at a steady pace of 1½ percent per year, on average, from 2018 to 2022 before stepping up to a growth rate of 3½ percent in 2023. Capacity at utilities is expected to continue to rise at this faster rate in 2024. Revisions to the rates of capacity growth of utilities were, on net, very small.

TECHNICAL ASPECTS OF THE REVISION

The IP indexes represent the level of real output relative to a base year. At the monthly frequency, movements of the indexes are based on indicators that are derived using industry-specific data from a variety of government and private sources. The monthly production indexes are anchored to annual benchmarks that are less timely but typically based on more comprehensive data. In most cases, the annual benchmark is nominal gross output reported by the Census Bureau deflated by a suitable price index.

Annual revisions to the IP and capacity measures generally involve (1) incorporating new and revised annual benchmark data on output, prices, and value-added proportions; (2) incorporating new monthly or quarterly data that were revised or that arrived too late to be included in the regular six-month reporting window for monthly IP; (3) updating seasonal adjustment factors; (4) updating the methods used to construct the indexes; and (5) introducing changes to the industry- or market-group structure of the indexes based on changes to underlying data sources.

Annual Benchmark Data on Output, Prices, and Value-Added Proportions

Output

The annual benchmark output indexes for IP are measures of real gross output at the six-digit NAICS (2017) level. The Census Bureau provides annual figures for value-added and the cost of materials for manufacturing industries, which can be summed to obtain nominal gross output. The Census Bureau has not yet published the 2022 Census of Manufactures, so new nominal benchmark data are not available for manufacturing. The benchmark indexes for metallic and nonmetallic mineral mining were updated with any newly available data from 2021 through 2023 from the USGS, the benchmark index for publishing was advanced through 2022 based on data from the U.S. Census Bureau, and the benchmark index for logging includes new data from the U.S. Forest Service for 2021 and 2022.

Prices

Individual benchmarks of real gross output are obtained by deflating the measures of nominal gross output by annual price deflators. In general, the benchmark industry price deflators consist of price indexes from the Bureau of Economic Analysis (BEA) through 2011 that are extended through 2022 with the related producer price indexes (PPIs) from the BLS.³ However, for a few selected industries, the annual price deflators are constructed by the Federal Reserve.⁴

Value-Added Proportions (Weights for Aggregation)

The IP system is organized as a hierarchical structure where individual production indexes are combined using a version of the Fisher ideal index formula to construct aggregate indexes of production. Utilization rate aggregates are calculated on an annual basis through the most recent year as capacity-weighted aggregates of individual utilization rates.

The weights that are used to combine individual IP indexes into more aggregate indexes are based on the value-added from the industry, calculated as gross output less cost of materials. For individual IP indexes that are defined at the six-digit (or more aggregate) NAICS level, the value-added weights are derived from either the Economic Census or the Annual Survey of Manufacturers (ASM). For IP indexes that cover only part of a six-digit NAICS industry, the aggregation weights were constructed by allocating value-added (as defined by the Census Bureau) for a six-digit industry across the various components of IP that compose that industry.

³The BEA price deflators were discontinued at the six-digit NAICS level after 2011. Overall, at the industry level, the BEA and PPI measures are quite similar, as the BEA used weighted product-level PPIs to derive its industry-level shipments deflator.

⁴For selected industries, the Federal Reserve constructs price indexes from alternative sources. These industries include communications equipment (NAICS 3342), computer storage devices (NAICS 334112), semiconductors (NAICS 334413), and pharmaceuticals (NAICS 325412).

The allocation of value-added across each component was determined by that component's share of the industry's overall product shipments. As in the 2023 annual revision, this annual revision used data on product shipments based on the new 2017 North American Product Classification System (NAPCS). Because the 2022 Economic Census has not been published, we utilize data on product shipments through 2021. In earlier revisions, product shipments were classified based on NAICS and were included as part of the Census of Manufactures or the ASM. NAPCS is coded independently of NAICS, and a concordance was required to align the recent data with the historical data for the period before 2017. Missing values for specific NAPCS-based products were imputed where necessary.

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. For electric utilities, the measures of value-added incorporate data from the Energy Information Administration of the U.S. Department of Energy and from the Edison Electric Institute. For gas utilities, the value-added estimates incorporate data from the American Gas Association. The weights for aggregation for mining industries are derived from value-added data from the Economic Census. For the mining industries, figures for value-added for the years between the quinquennial Economic Censuses are estimated based on industry-specific nominal output measures (the product of real output indexes and price indexes).

The weights for aggregation, expressed as value-added per unit output, were estimated with data on producer prices for the period after 2022.

Revised Quarterly and Monthly Data

This revision incorporated source data on production, shipments, and inventories that became available or were revised after the regular six-month reporting window for monthly IP was closed. These data were released with too great of a lag to be included with monthly IP estimates but were available for inclusion in the annual revision.

Revised Seasonal Factors

IP indexes are adjusted to remove from the underlying data the predictable movements related to timing, holiday, workday, and monthly or quarterly seasonal patterns. Individual indexes are adjusted using the Census X-13ARIMA-SEATS seasonal adjustment program. The seasonal factors are based on the full history of data back to 1972, where available.

Seasonal factors for indexes based on production-worker hours were updated with data through March 2024. The updated factors for the physical-product-based indexes used data through March 2024, where available. Extreme movements in indexes are often explicitly treated as additive outliers in the seasonal adjustment procedure and thus excluded from the calculation of seasonal factors. Hurricanes that produce extreme drops for industries based in the Gulf Coast region are often specified to be outlier events. In recent years, the pandemic-related swings in most of the indexes were deemed outliers; in addition, February 2021 was deemed an outlier for many industries because of the extreme cold weather that caused widespread outages.

Seasonal factors for unit motor vehicle assemblies were previously updated, and projections through June 2025 are available on the Board's website at <https://www.federalreserve.gov/releases/g17/mvsf.htm>. These factors are based on production data through January 2024 and were revised back to January 2019. The seasonal factors explicitly incorporate the holiday schedule for the vehicle assembly lines specified in the latest collective bargaining agreements with domestic manufacturers.

Methodological Changes to Individual Production and Capacity Indexes

Change in Source Data for Two Production Indexes

With this revision, the source data for storage batteries (NAICS 335911) have been updated to reflect growth in the production of lithium-ion batteries for automobiles. Previously, the indexes reflected data on production of lead acid motor vehicle batteries from Battery Council International. These data continue to be used and are supplemented with data on production-worker hours for the industry and annual estimates of lithium-ion battery production from Benchmark Mineral Intelligence. The series for storage batteries is unpublished but available upon request.

The source data for ball and roller bearings (NAICS 332991) have been updated as well. The index for ball and roller bearings previously reflected data on the production of bearings from the American Bearing Manufacturers Association (ABMA) in addition to data on production-worker hours. The ABMA report was discontinued, so beginning in 2017 the series is based just on production-worker hours for the industry.

Change to Price Indexes for Semiconductors

With this revision, the price indexes used to deflate the nominal output for three semiconductor (chip) categories have been modified, and the source data used to estimate the product mix within the semiconductor industry have been changed.

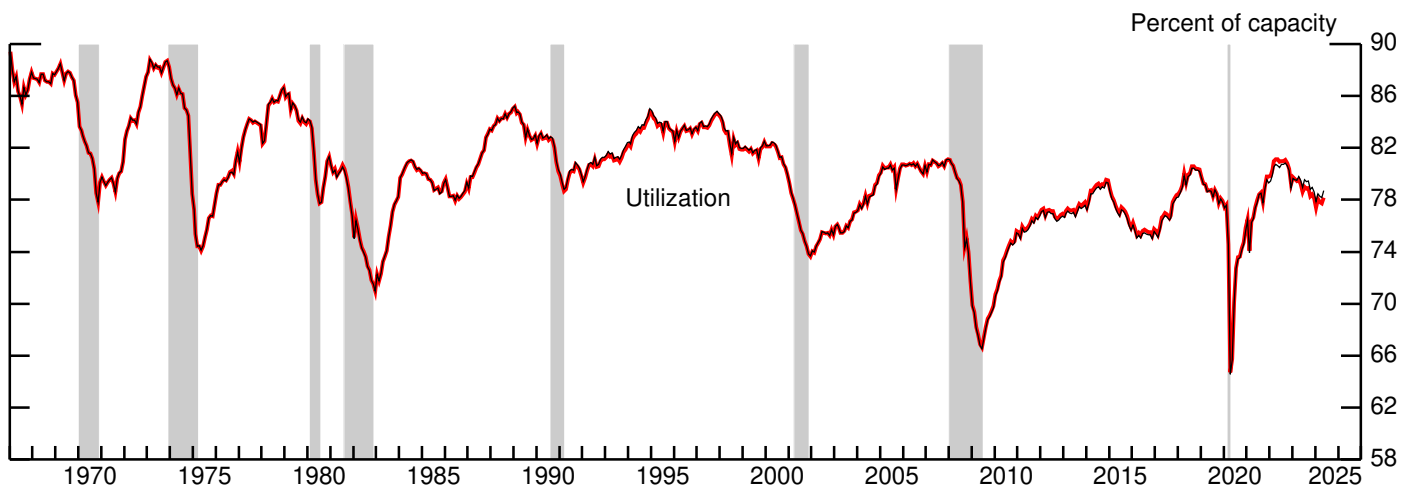
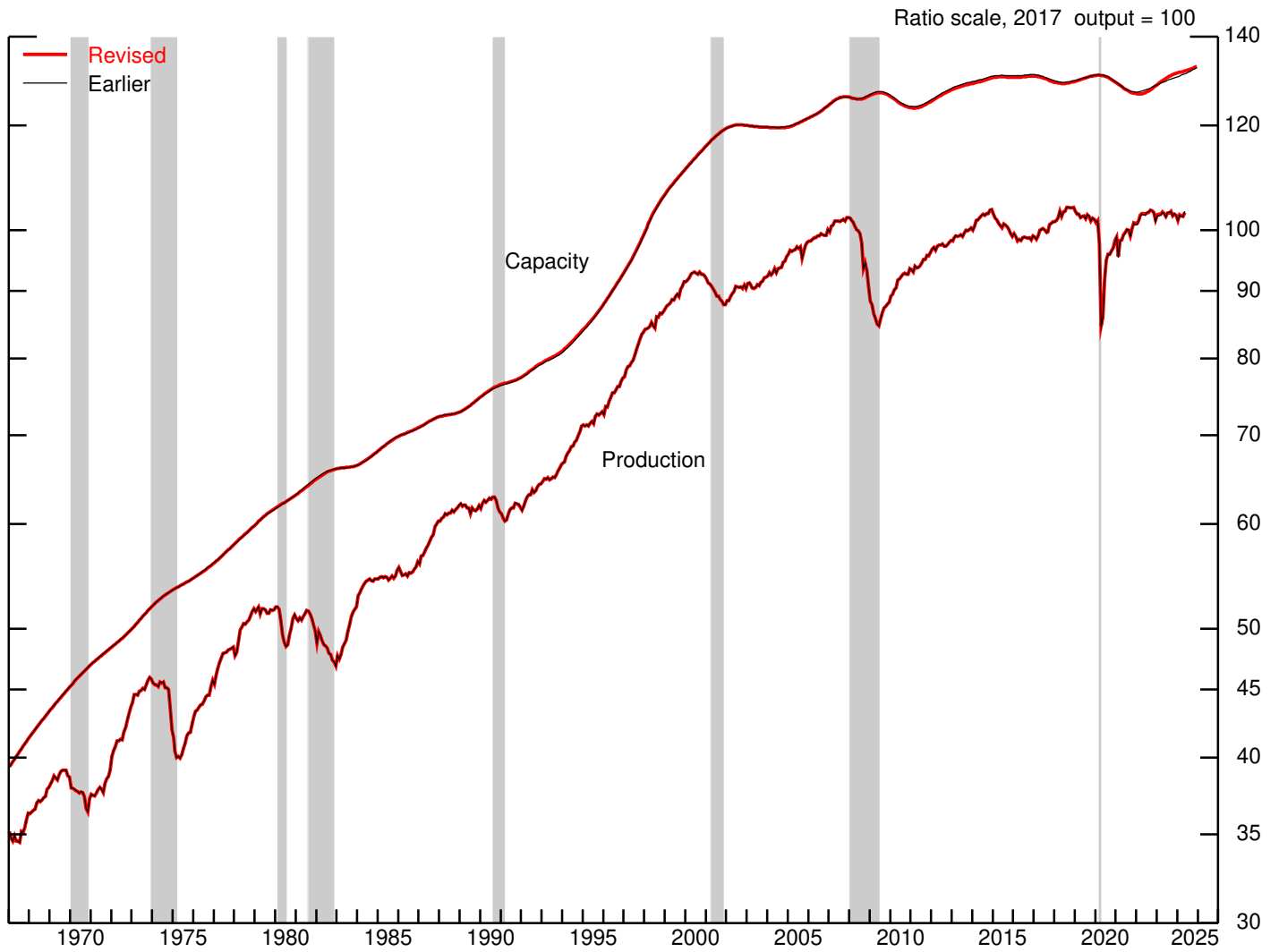
Beginning in 2018, price indexes previously used for the subindustry IP indexes for microprocessor units (MPUs), dynamic random-access memory (DRAM), and flash memory have been replaced. Global nominal output of these devices, reported by the Semiconductor Industry Association (SIA), is divided by Federal Reserve Board staff estimates of the number of transistors found on these devices. Transistors have been found to be a reliable indicator of the technical capability (quality) of these chips. This approach was adopted in 2023 for the subindustry IP index for metal-oxide semiconductor (MOS) logic devices excluding MPUs and memory chips.

The source data used to estimate the relative importance weights for the subindustry IP indexes for semiconductors have been changed beginning in 2018. Federal Reserve Board staff estimates for the U.S. share of global production for each semiconductor product were produced using data from Semiconductor Equipment and Materials International.

Data Availability and Publication Changes

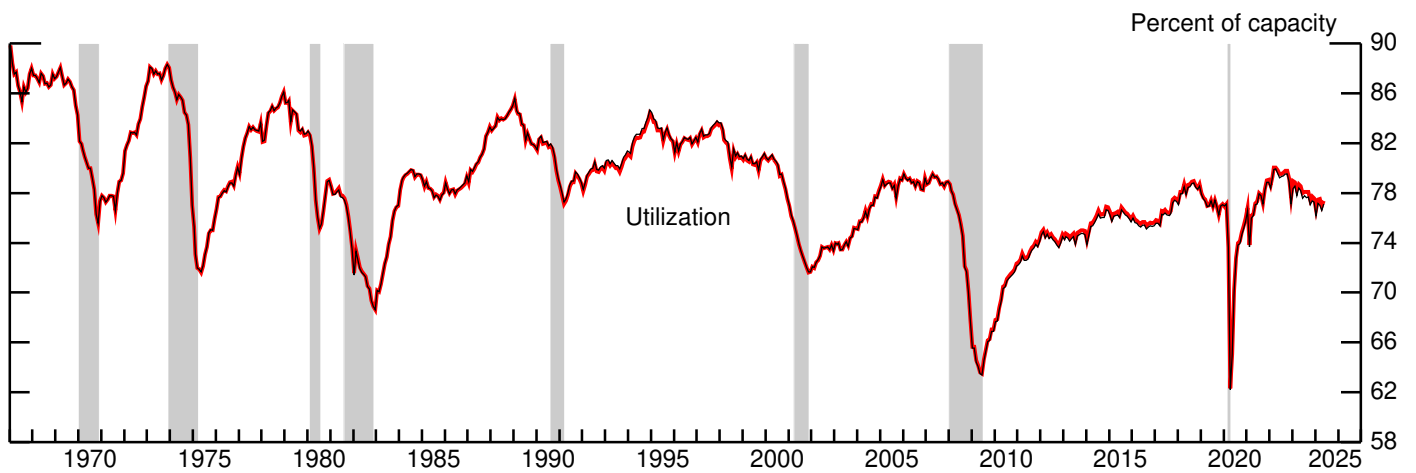
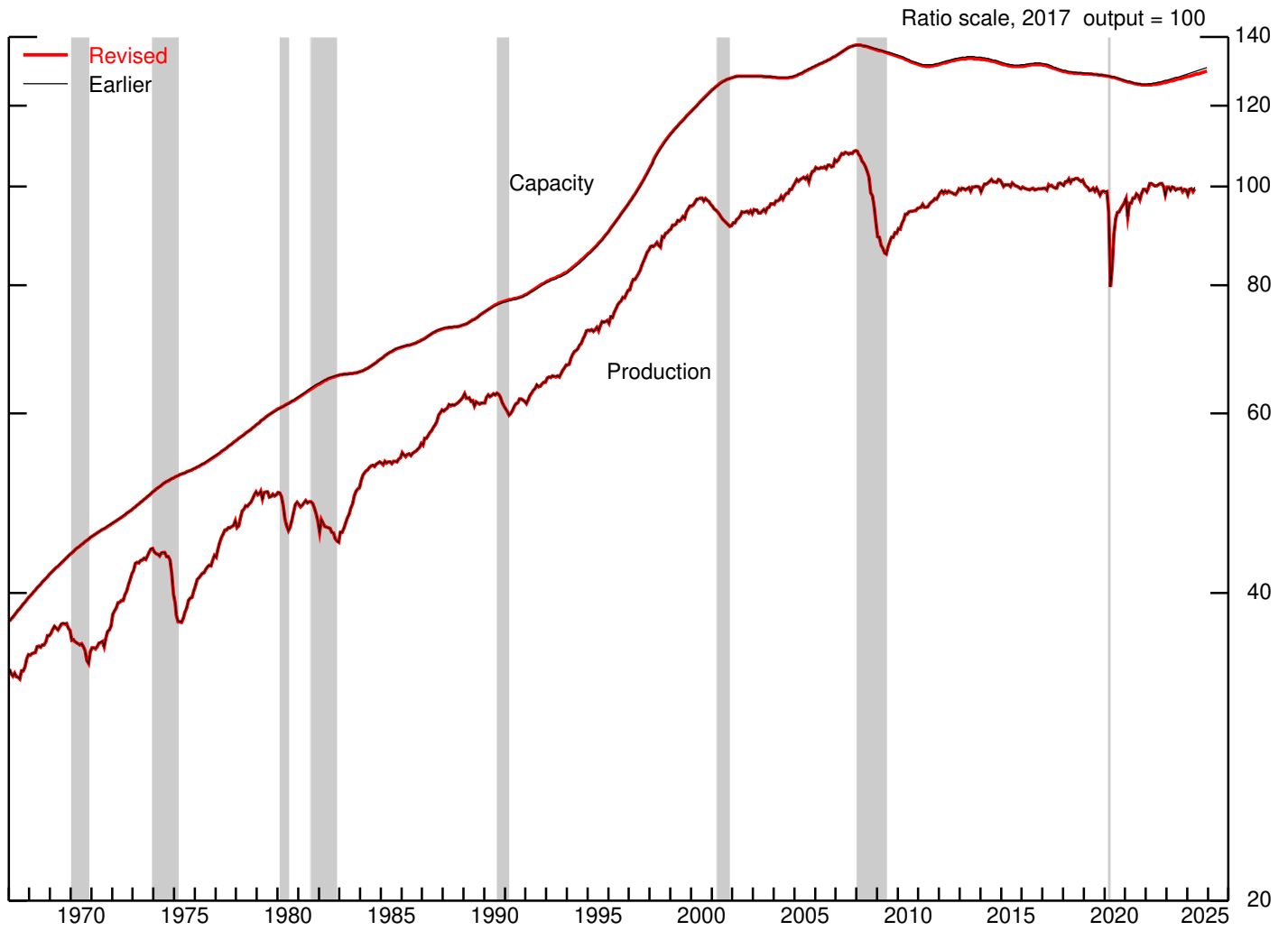
Files containing the revised data and the text and tables from this release are available on the Board's website at <https://www.federalreserve.gov/releases/g17>, as are updated data for the annual revision and for all of the regularly issued series on IP, capacity, and capacity utilization. Other changes are listed on the Board's website at https://www.federalreserve.gov/releases/g17/g17_revision_series.htm.

1. Total industrial production, capacity, and utilization



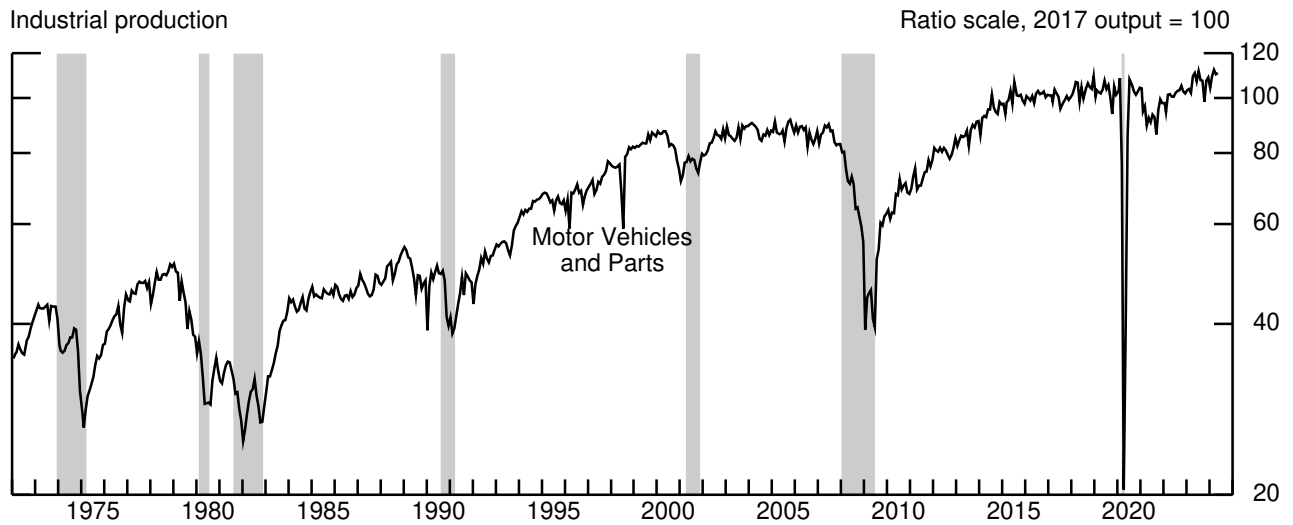
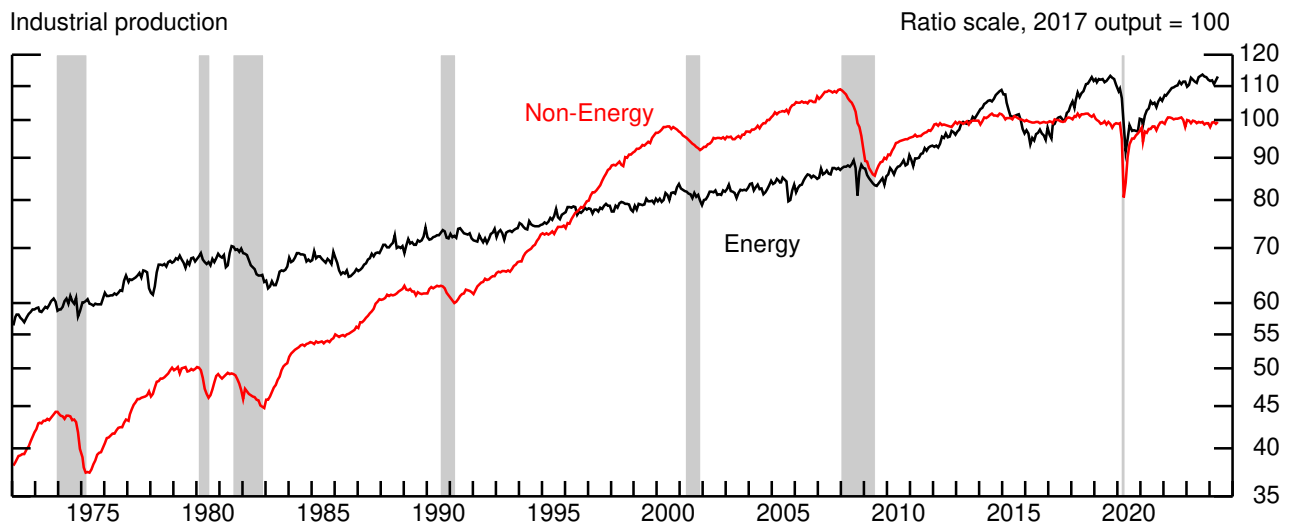
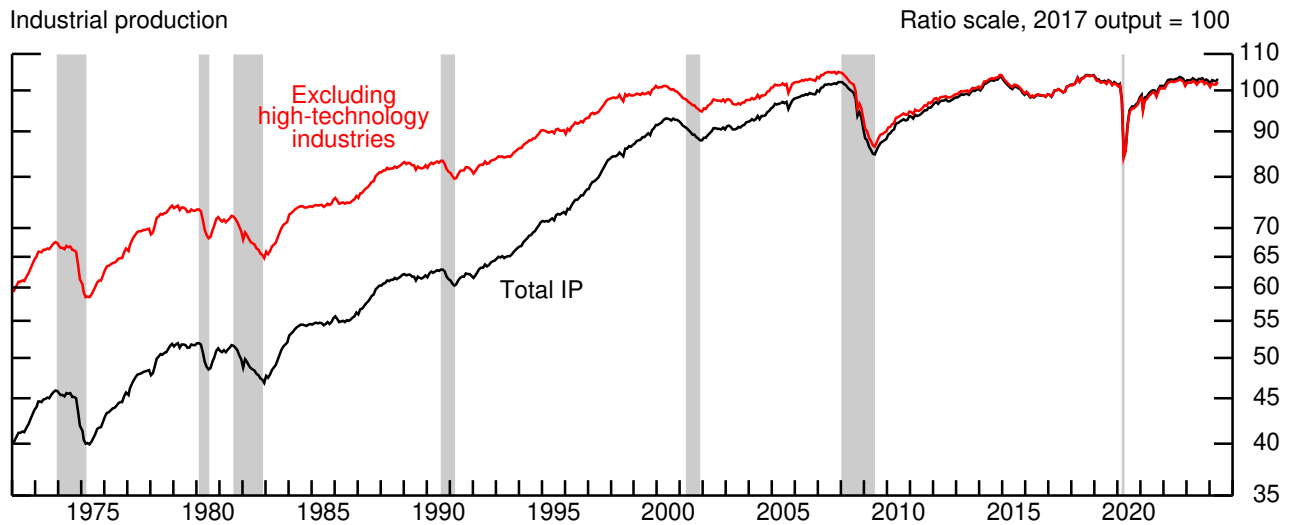
Note: The shaded areas represent periods of business recession as defined by the National Bureau of Economic Research (NBER).

2. Manufacturing industrial production, capacity, and utilization



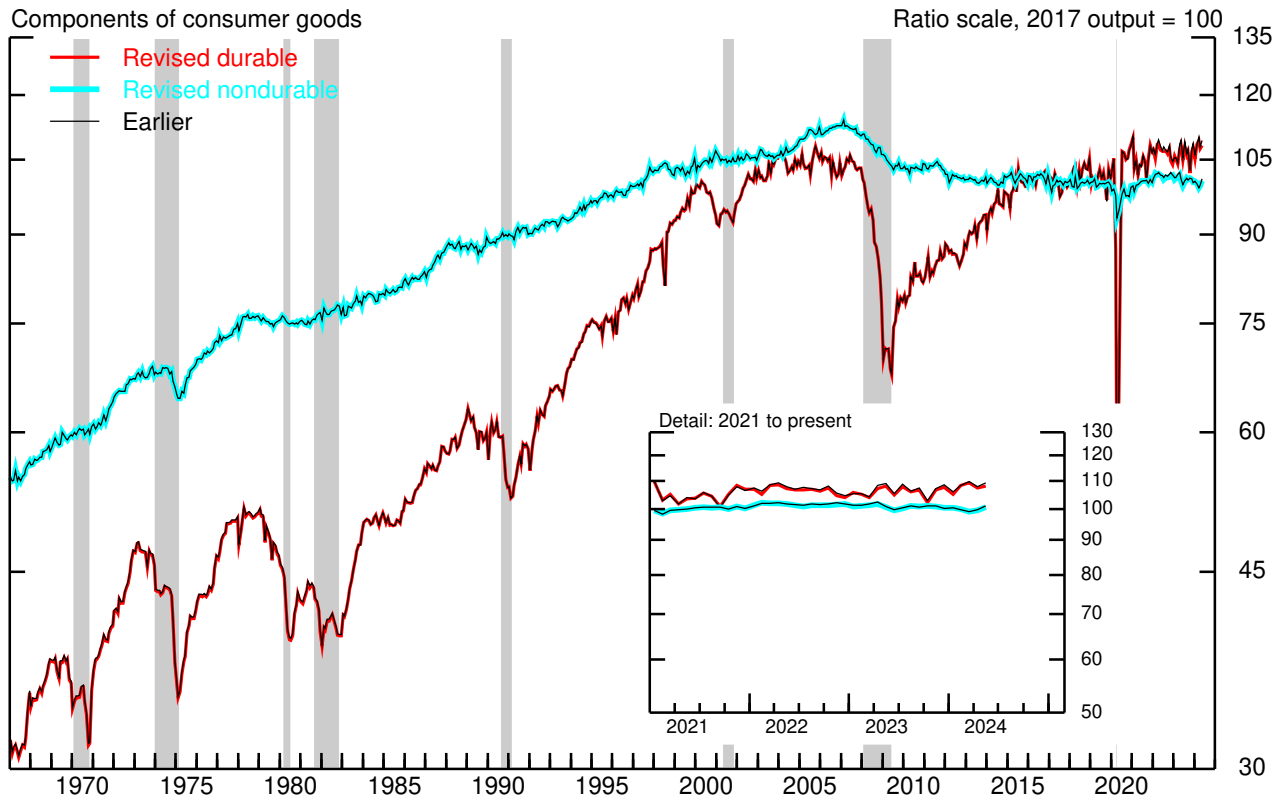
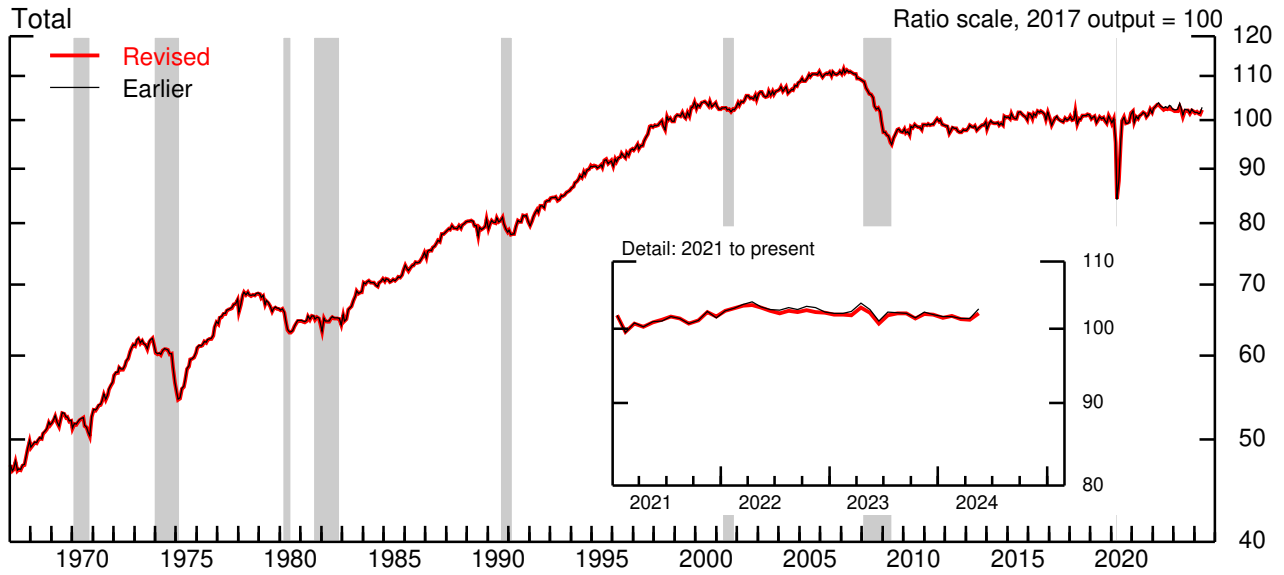
Notes: Manufacturing consists of those industries in the North American Industry Classification System, or NAICS, definition of manufacturing plus those industries--logging and newspaper, periodical, book, and directory publishing--that have traditionally been considered to be manufacturing and included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

3. Industrial production of selected industries



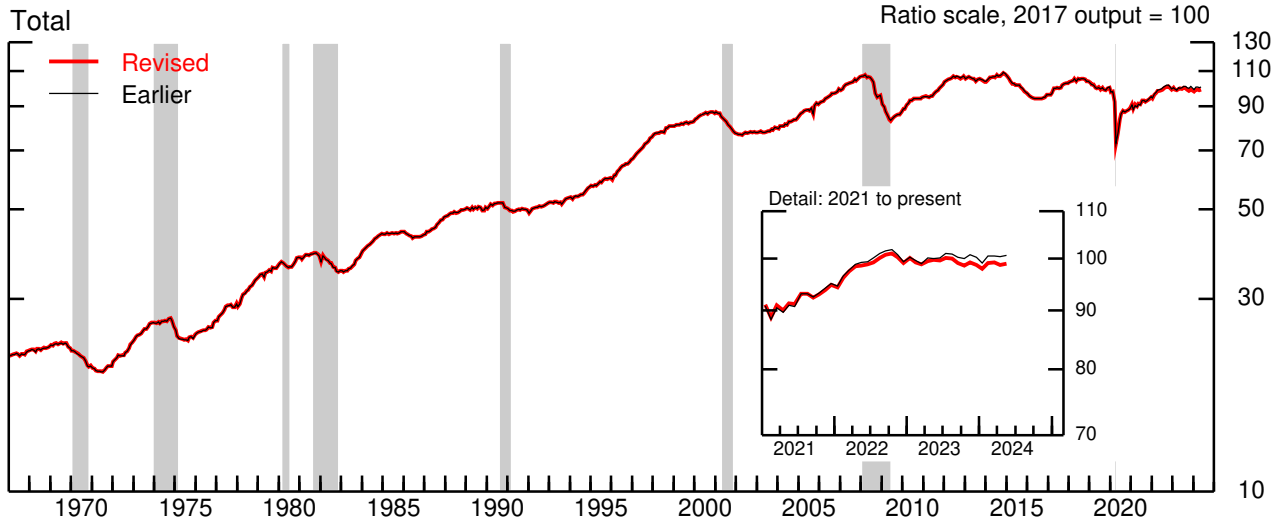
Notes: High-technology industries are defined as semiconductors and related electronic components (NAICS 3344), computers (NAICS 3341), and communications equipment (NAICS 3342). The shaded areas represent periods of business recession as defined by the NBER.

4. Consumer goods

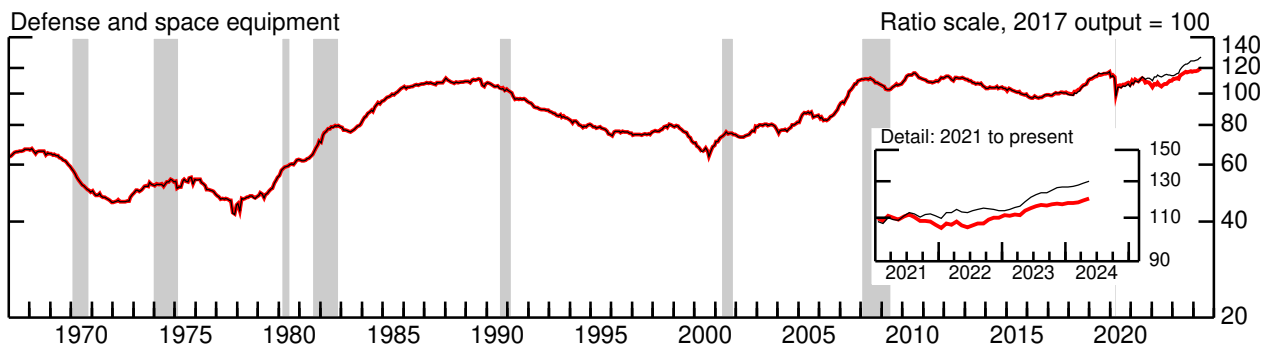
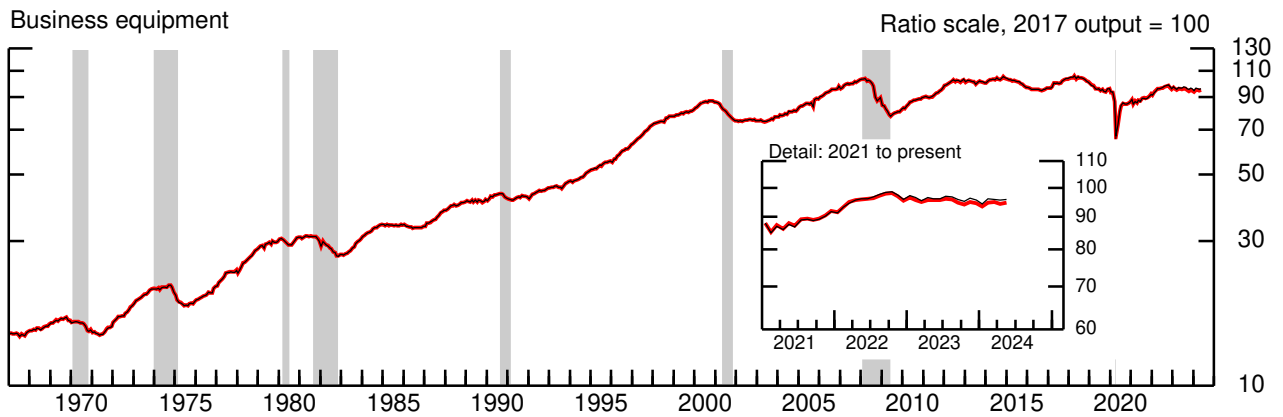


Note: The shaded areas represent periods of business recession as defined by the NBER.

5. Equipment

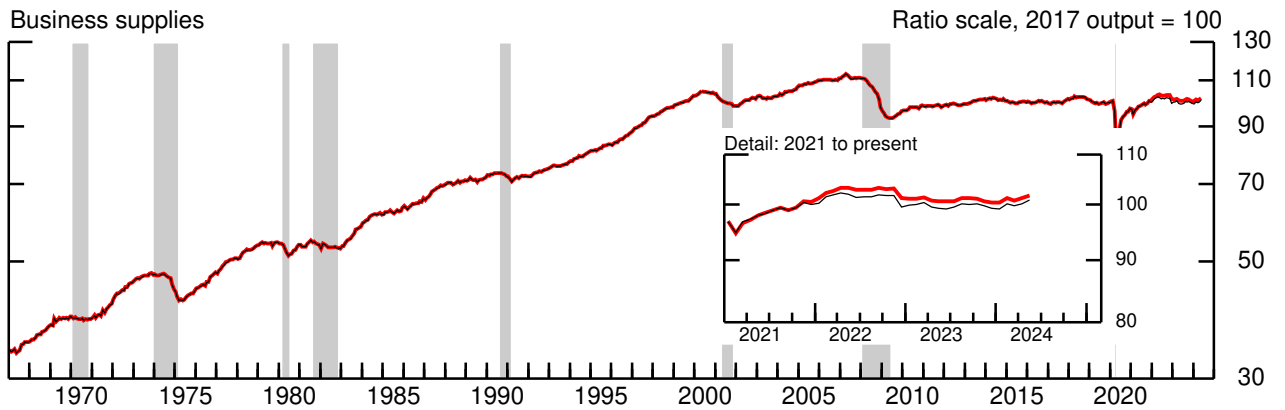
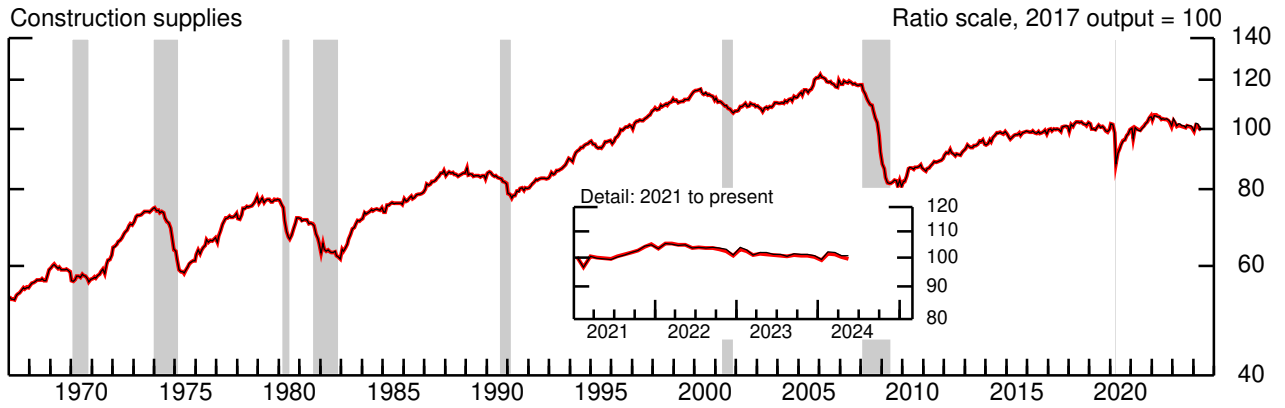
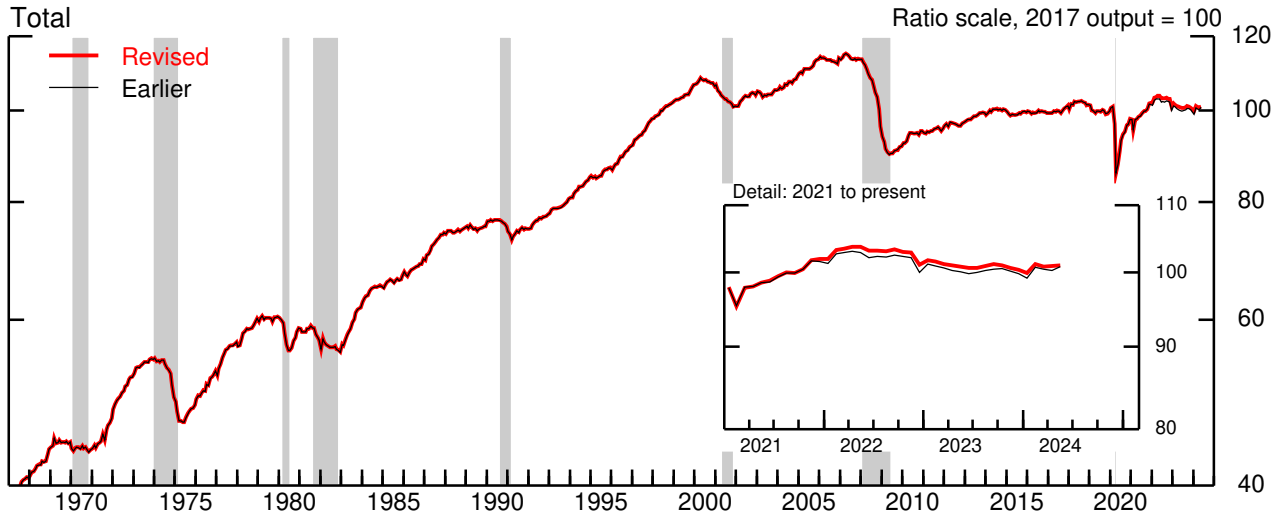


Note: Includes business equipment, defense and space equipment, oil and gas well drilling, and manufactured homes.



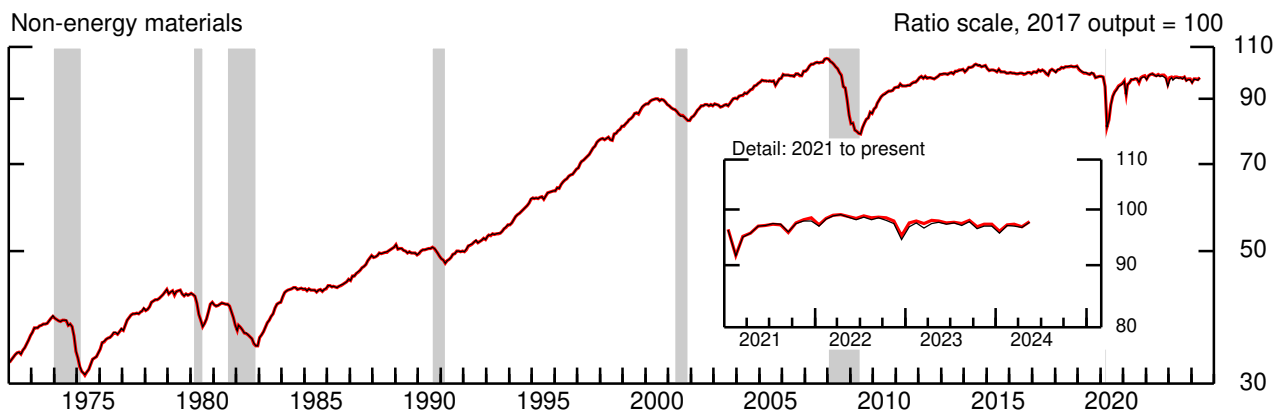
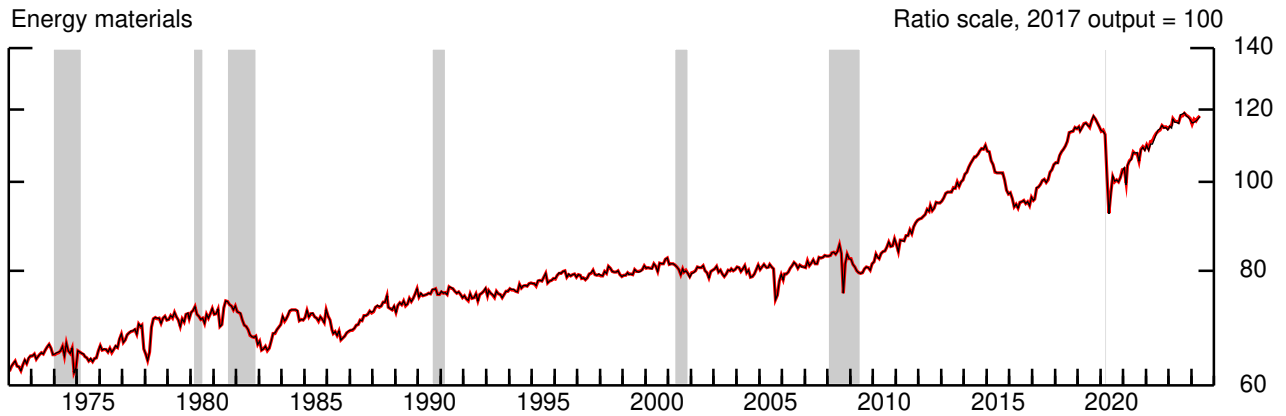
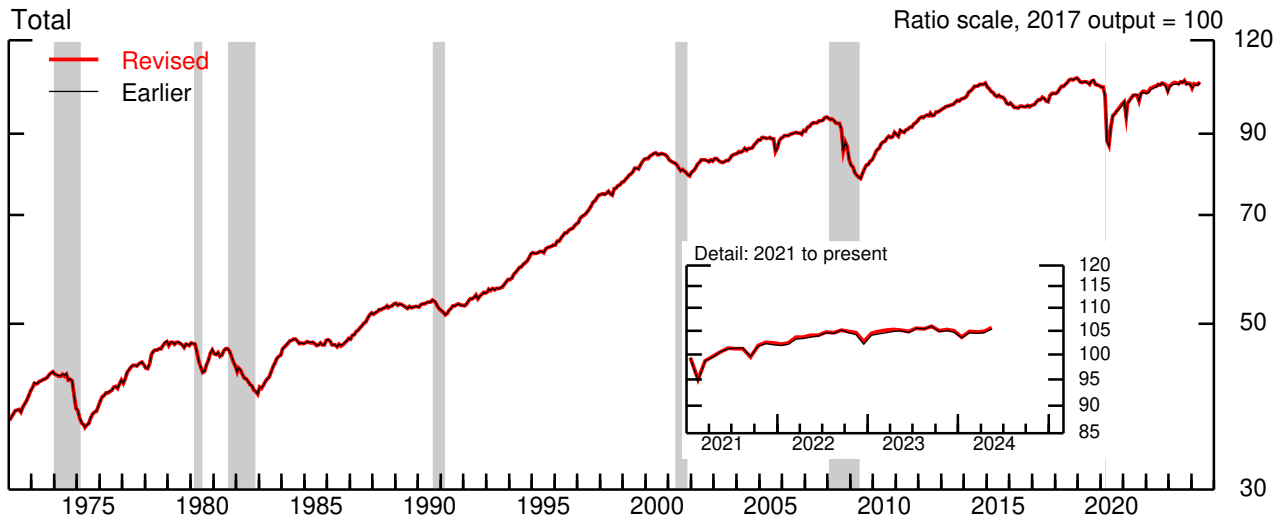
Note: The shaded areas represent periods of business recession as defined by the NBER.

6. Nonindustrial supplies



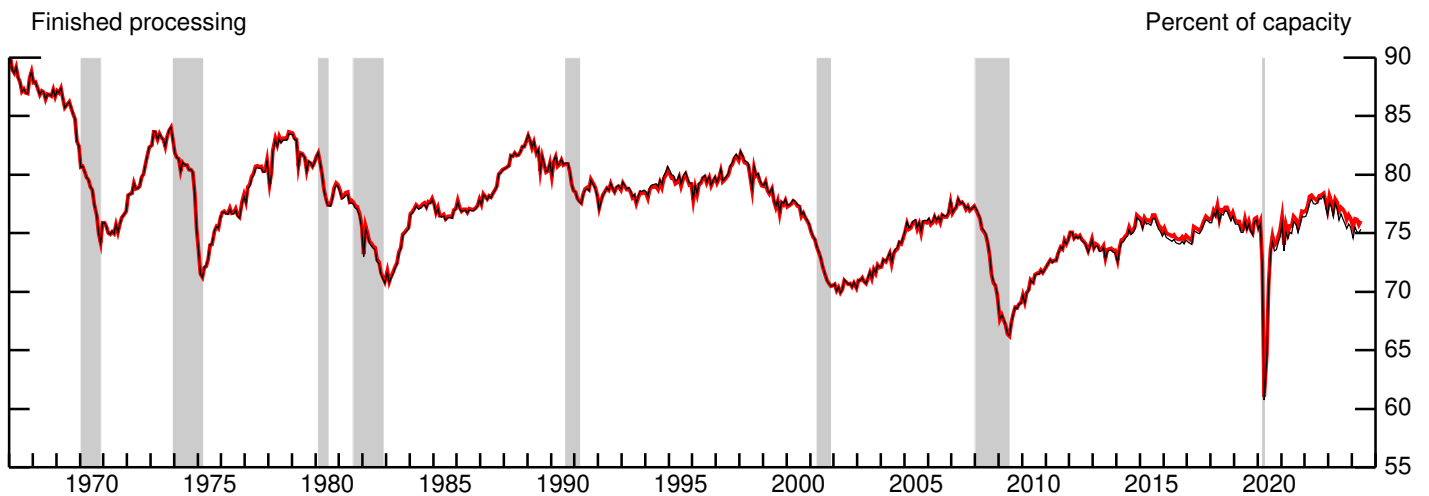
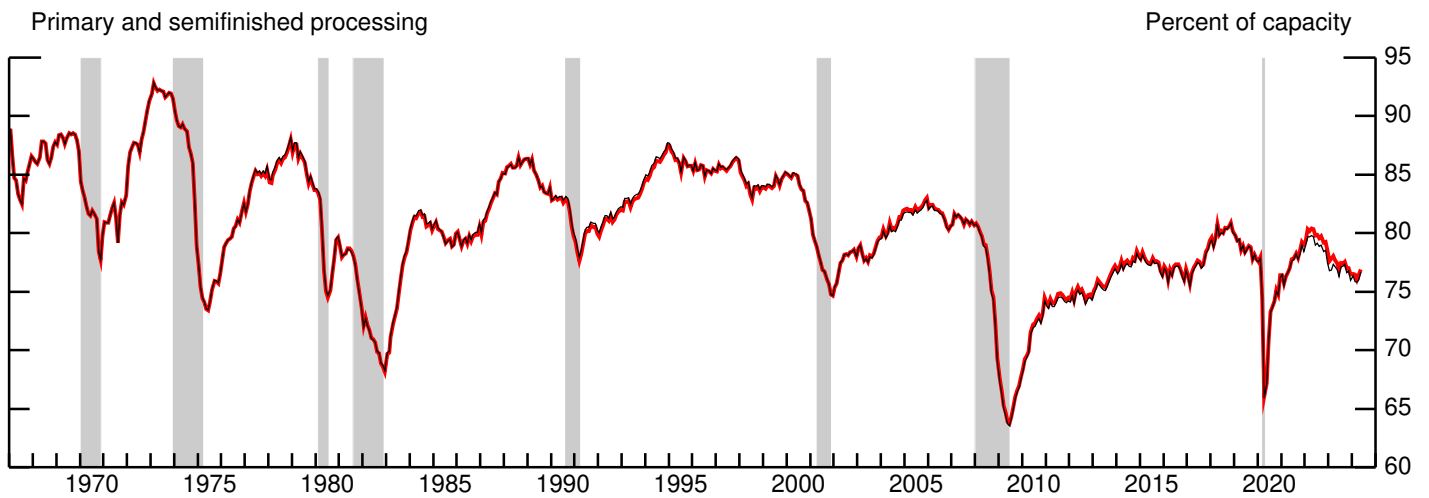
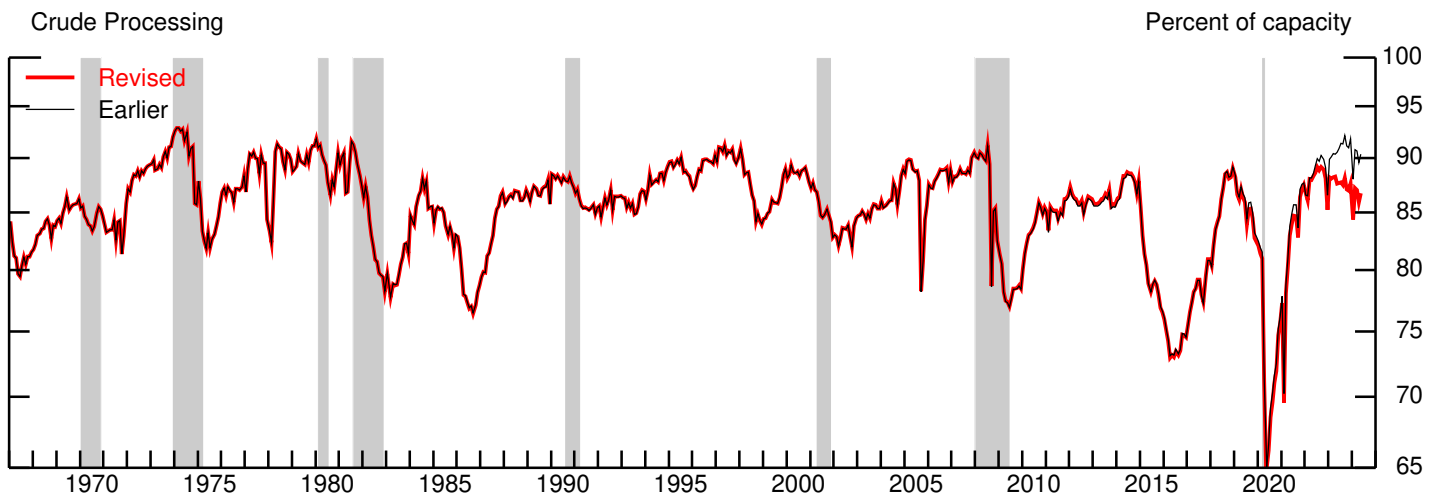
Note: The shaded areas represent periods of business recession as defined by the NBER.

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 represent periods of business recession as defined by the NBER.

Table 2

RATES OF CHANGE IN INDUSTRIAL PRODUCTION, MARKET AND INDUSTRY GROUP SUMMARY: 2019–23¹

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	
Total IP	-2.0	-4.6	3.8	1.8	-1	.0	.1	.0	.0	-1	
MARKET GROUPS											
Final products and nonindustrial supplies	-2.1	-3.2	3.3	1.9	-1.0	.0	.1	.0	-1	-1	
Consumer goods	-1.0	.1	1.6	.6	-6	.0	.1	-1	-5	.3	
Durable	-3.4	6.7	-2	-1.3	.2	.0	.0	.1	-1.1	.2	
Automotive products	-3.2	10.0	-5.1	.6	1.6	.1	.0	.4	-1.3	-1	
Home electronics	-4	15.3	9.4	-4	20.1	-4	1.4	-1.4	-3.4	5.7	
Appliances, furniture, carpeting	-4.0	3.9	1.7	-9.0	-4.6	-1	-2	.0	-1.0	-8	
Miscellaneous goods	-3.5	.3	9.1	-1.0	-1.3	.0	.1	-2	-4	.9	
Nondurable	-.3	-1.9	2.2	1.2	-.8	.0	.1	-1	-.4	.4	
Non-energy	1.4	-4	1.3	.6	-.3	.0	.1	-1	-.3	.7	
Foods and tobacco	2.3	.8	-.2	-.4	-1.4	.0	.1	-2	-.4	1.1	
Clothing	-1.3	-8.1	5.2	-.7	-10.0	-1	.2	-.9	-3.2	1.7	
Chemical products	1.7	-1.5	3.8	3.2	3.1	.1	.1	-2	-.2	.4	
Paper products	-7.1	-3.3	.1	-4.2	-6.0	.1	-.3	.9	.2	-2.7	
Energy	-5.1	-7.6	6.2	2.5	-2.0	.0	.2	-1	-.5	-.4	
Business equipment	-6.6	-9.9	5.9	6.8	-2.4	-1	-1	.5	-.8	-.7	
Transit	-13.7	-19.2	-3.1	19.1	-.4	-5	-7	2.8	-2.3	-1.1	
Information processing	-.6	-6.2	9.5	-1.0	.7	.0	.0	-1	-.3	-.6	
Industrial and other	-5.4	-7.1	7.2	6.1	-4.1	.0	.0	.0	-.7	-.6	
Defense and space equipment	7.2	-7.3	.2	1.7	6.8	-6	1.3	-4.7	-.6	-3.5	
Construction supplies	-2.3	-.8	5.4	-1.7	-1.4	.0	.0	.0	-.4	.0	
Business supplies	-2.0	-3.1	3.9	2.2	-1.6	.0	.1	.2	1.2	-.4	
Materials	-1.9	-6.4	4.4	1.8	1.0	.0	.2	.0	.1	-.2	
Non-energy	-3.9	-2.9	3.1	-.9	-.1	.1	.2	.0	.3	-.3	
Durable	-4.9	-4.3	2.8	1.5	-.4	.1	.2	.0	.4	-.1	
Consumer parts	-9.6	-1.2	-5.6	3.6	3.9	.1	.2	-.4	-.5	-.6	
Equipment parts	-2.5	-6.4	6.9	3.2	-.1	.4	.5	.0	2.2	-.7	
Other	-4.6	-4.2	3.6	.1	-1.9	.0	.1	.1	-.2	.2	
Nondurable	-2.4	-.6	3.5	-4.4	.4	-.1	.2	.0	.1	-.2	
Textile	-4.2	-6.5	1.7	-7.9	-6.9	.0	-.2	.3	-2.0	-3.0	
Paper	-.2	-8.4	.1	-4.7	-5.2	.0	.0	.1	.0	-2.9	
Chemical	-5.0	1.7	6.5	-6.3	3.5	.1	.3	-.1	-.4	.5	
Energy	1.5	-12.5	7.3	5.3	2.7	.0	.1	.1	.0	-.1	
INDUSTRY GROUPS											
Manufacturing²	-2.7	-2.9	3.4	.5	-.4	.0	.1	-.1	.0	-.1	
Manufacturing (NAICS)	31–33	-2.6	-2.9	3.5	.6	-.3	.0	.2	-.2	-.1	.0
Durable manufacturing	-4.1	-3.7	3.3	2.3	-.4	.0	.2	-.2	-.2	-.4	
Wood products	321	.2	2.1	.4	-4.5	-1.4	.0	.1	.4	-.3	
Nonmetallic mineral products	327	-.6	.3	2.6	4.4	-3.0	-1	.0	-.3	-2.5	
Primary metals	331	-7.2	-4.3	5.9	-5.2	1.9	.0	.2	-1	.0	
Fabricated metal products	332	-4.7	-7.3	6.1	1.9	-1.8	.0	.0	.1	.4	
Machinery	333	-6.9	-7.1	8.3	3.4	-3.6	.2	-.3	.1	-1.4	
Computer and electronic products	334	1.0	-.8	5.8	.6	2.9	-.2	1.3	-.9	2.0	
Electrical equip., appliances, and components	335	-3.0	-.4	3.7	2.7	-1.2	.0	-.1	.5	1.7	
Motor vehicles and parts	3361–3	-5.4	2.7	-5.1	5.8	1.6	.1	.0	.1	-1.2	
Aerospace and miscellaneous transportation equipment	3364–9	-3.4	-13.2	-1.4	9.7	3.0	-.4	.5	-1.2	.3	
Furniture and related products	337	-5.4	-6.9	2.7	-3.5	-10.5	.0	-.1	.3	-.7	
Miscellaneous	339	-6.0	-1.2	7.7	3.6	.7	.0	.1	-.4	-.9	
Nondurable manufacturing	-1.1	-2.0	3.8	-1.1	-.1	.0	.1	-.2	.0	.5	
Food, beverage, and tobacco products	311,2	2.4	.8	-.1	.0	-1.4	-.2	.1	-.1	-.3	
Textile and product mills	313,4	-3.8	-4.7	3.6	-9.6	-6.5	.0	-.2	.3	-1.5	
Apparel and leather	315,6	-1.8	-8.1	5.8	.2	-8.8	-.1	.2	-.8	-3.1	
Paper	322	-.4	-4.1	-1.0	-6.0	-3.3	.0	.0	.0	-.2	
Printing and support	323	-4.3	-8.2	3.5	1.2	-10.2	.1	-.1	.4	.4	
Petroleum and coal products	324	-5.3	-18.8	17.8	-2.6	3.9	-.1	.1	-.3	-.1	
Chemicals	325	-1.6	.1	5.7	-1.3	2.1	.1	.2	-.1	.2	
Plastics and rubber products	326	-3.8	-.5	3.0	.2	.3	.1	.1	-.6	1.0	
Other manufacturing (non-NAICS)	1133,5111	-3.7	-2.5	-.3	-1.6	-8.1	.2	-.6	2.5	2.2	
Mining	21	1.8	-17.6	10.4	6.2	2.6	.0	.1	.3	.4	
Utilities	2211,2	-1.6	-2.3	.2	4.1	-1.2	.0	.1	.2	-.2	
Electric	2211	-1.2	-1.4	.6	2.6	.1	.0	.1	.2	.0	
Natural gas	2212	-4.1	-8.4	-2.0	13.3	-8.7	.0	-.1	.4	-1.4	

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. 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 3
RATES OF CHANGE IN INDUSTRIAL PRODUCTION, SPECIAL AGGREGATES AND SELECTED DETAIL: 2019–23¹

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Total industry	-2.0	-4.6	3.8	1.8	-1	.0	.1	.0	.0	-1
Energy	-.3	-12.1	7.7	5.1	1.3	.0	.1	.1	.1	-.2
Consumer products	-5.1	-7.6	6.2	2.5	-2.0	.0	.2	-1	-.5	-4
Commercial products	.9	-8.2	6.1	6.3	.4	-1	-1	.0	.7	-7
Oil and gas well drilling 213111	-12.9	-48.4	59.2	21.4	-7.9	.0	-4	6.1	9.7	1.5
Converted fuel	-2.6	-3.7	4.1	3.3	2.4	.1	.1	-1	.6	-3
Primary energy	3.3	-16.3	8.7	6.0	2.9	.0	.1	.2	-.2	.1
Non-energy	-2.6	-2.2	2.8	.5	-.6	.0	.1	.0	.0	-.2
Selected high-technology industries	4.3	5.9	5.1	6.5	7.8	-4	3.2	-2.0	4.7	-4.9
Computers and peripheral equipment 3341	-.5	-8.2	18.4	8.2	6.9	.4	.6	.0	-4.0	-5.4
Communications equipment 3342	.2	2.0	18.0	10.4	14.3	-2	-.3	-.5	-.3	-.7
Semiconductors and related electronic components 3344	6.7	9.5	-.5	5.0	5.9	-6	4.8	-2.6	7.8	-6.2
Excluding selected high-technology industries	-2.8	-2.5	2.7	.3	-.8	.0	.1	.0	-.2	-1
Motor vehicles and parts 3361–3	-5.4	2.7	-5.1	5.8	1.6	.1	.0	.1	-1.2	-1.0
Motor vehicles 3361	-3.4	7.0	-10.1	11.0	1.3	.2	-1	.3	-2.1	-1.2
Motor vehicle parts 3363	-8.3	-1.0	-4.1	7.3	2.7	.1	.2	-.3	-.7	-.9
Excluding motor vehicles and parts	-2.6	-2.9	3.5	-.1	-1.0	.0	.1	.0	-.1	.0
Consumer goods	.4	.1	2.0	-.1	-.6	.0	.1	-1	-.4	.5
Business equipment	-6.9	-9.3	5.2	6.0	-3.0	-2	-1	.6	-.8	-3
Construction supplies	-2.3	-.8	5.4	-1.8	-1.5	.0	.0	.0	-.4	.0
Business supplies	-3.3	-1.9	3.4	.7	-2.8	.1	-1	.5	1.0	-1
Materials	-4.0	-3.7	4.1	-1.9	-.6	.1	.0	.1	.1	.0
Measures excluding selected high-technology industries										
Total industry	-2.2	-4.8	3.8	1.7	-.3	.0	.1	.0	-.1	-1
Manufacturing ²	-2.9	-3.1	3.4	.4	-.6	.0	.1	.0	-.2	.0
Durable	-4.5	-4.2	3.1	2.0	-.9	.0	.0	-1	-.5	-2
Measures excluding motor vehicles and parts										
Total industry	-1.8	-5.1	4.5	1.6	-.2	.0	.1	.0	.1	-1
Manufacturing ²	-2.4	-3.4	4.2	.1	-.6	.0	.2	-1	.0	.0
Durable	-3.8	-4.8	4.9	1.7	-.8	.0	.2	-2	-.1	-.3
Measures excluding selected high-technology industries and motor vehicles and parts										
Total industry	-2.0	-5.3	4.5	1.5	-.3	.0	.1	.0	.0	-1
Manufacturing ²	-2.7	-3.6	4.2	-.1	-.8	.0	.1	.0	-.1	.1
Stage-of-process components of non-energy materials, measures of the input to										
Finished processors	-4.4	-5.2	1.7	1.5	.1	.2	.3	-1	.9	-1.1
Primary and semifinished processors	-3.7	-1.5	3.9	-2.0	-.2	.0	.2	.0	.0	.2
STAGE-OF-PROCESS GROUPS										
Crude	.5	-11.0	6.6	2.5	2.9	.0	.1	.1	.3	-.3
Primary and semifinished	-3.7	-3.9	3.7	.7	-1.1	.1	.1	.1	.2	-.3
Finished	-.9	-2.8	2.8	2.8	-.2	-.1	.1	-2	-.5	.1

1. See footnote 1 to table 2.

2. See footnote 2 to table 2.

Table 4**ANNUAL RATES OF CHANGE FOR INDUSTRIAL PRODUCTION: 2019–23¹**

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Total IP	-7	-7.1	4.4	3.4	.2	.0	.1	.0	.0	-.1
MARKET GROUPS										
Consumer goods	-.4	-3.3	4.4	1.5	-.7	.0	.0	.0	-.3	.2
Durable	-1.6	-5.4	9.9	1.7	-.5	.0	.0	.1	-.6	.4
Nondurable	-.1	-2.7	2.8	1.5	-.7	.0	.0	.0	-.2	.1
Business equipment	-7.2	-12.9	5.7	8.3	-.4	.3	-.3	.5	-.5	-.8
Defense and space equipment	10.1	-5.6	1.5	-1.8	6.7	-1.2	1.2	-1.8	-4.6	.1
Construction supplies	-1.4	-3.9	4.7	2.7	-2.5	.1	.1	-.1	-.1	-.5
Business supplies	-2.1	-5.8	4.6	4.4	-1.7	.0	.1	.0	1.2	-.1
Materials	.5	-8.5	4.1	3.6	1.2	.0	.1	.0	.2	-.1
Non-energy	-2.3	-7.2	4.8	1.8	-.6	.0	.1	.0	.2	.0
Energy	4.9	-10.8	2.9	6.2	3.9	.0	.1	.0	.2	-.3
INDUSTRY GROUPS										
Manufacturing²	-2.0	-6.5	4.9	2.7	-.5	.0	.0	.0	.0	.0
Manufacturing (NAICS)	-1.9	-6.5	5.0	2.7	-.4	.0	.0	.0	-.2	.1
Durable manufacturing	-2.8	-8.9	6.1	4.0	.2	.0	.1	-.1	-.3	-.1
Nondurable manufacturing	-.9	-3.9	3.9	1.5	-.9	.0	.0	.0	.0	.4
Other manufacturing (non-NAICS)	-4.4	-7.8	2.9	.7	-6.8	.0	.0	.4	4.7	-3.4
Mining	6.6	-14.7	3.2	7.5	4.8	.0	.2	.0	.6	-.2
Utilities	-.8	-2.9	2.0	3.0	-1.9	.0	.0	.0	-.1	-.1

1. The rates of change are calculated as the percent change in the annual averages of not seasonally adjusted industrial production indexes rather than as the percent change between the fourth quarter of one year and the fourth quarter of the next.

2. See footnote 2 to table 2.

Table 5**RATES OF CHANGE IN CAPACITY, BY INDUSTRY GROUPS: 2020–24¹**

Item	Revised change (percent)					Difference between revised and earlier changes (percentage points)				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Total industry	-.8	-2.1	1.0	2.3	1.2	-.1	-.1	.1	.8	-.5
Manufacturing²	-1.1	-1.0	.4	1.2	1.3	-.1	.0	-.3	-.1	-.4
Manufacturing (NAICS)	-1.0	-.9	.6	1.4	1.4	-.1	.0	-.3	-.1	-.4
Durable manufacturing	-.4	-.5	1.1	1.0	1.6	-.7	.1	-.4	-.7	-.2
Nondurable manufacturing	-1.7	-1.1	.1	1.7	1.3	.5	-.1	-.2	.4	-.5
Other manufacturing (non-NAICS)	-5.2	-5.3	-5.4	-5.0	-4.6	-.1	-.2	.2	.1	.1
Mining	-2.7	-9.8	3.5	3.4	-.8	.1	.1	1.5	3.8	-1.5
Utilities	2.5	1.3	2.3	3.6	3.6	.0	-1.0	-.8	.2	-.1
Selected high-technology industries	4.6	.1	4.4	9.8	12.0	-.6	-3.6	-2.1	-.6	-1.4
Manufacturing ² ex. selected high-technology industries	-1.3	-1.1	.3	1.0	1.0	-.1	.1	-.3	.0	-.3
STAGE-OF-PROCESS GROUPS										
Crude	-2.2	-8.1	2.5	2.7	-.5	.2	.0	1.4	3.1	-1.3
Primary and semifinished	-.2	-1.0	.6	1.7	1.6	.1	-.3	-.5	.3	-.2
Finished	-1.1	.1	.9	1.6	1.8	-.4	.0	-.4	-.6	-.4

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 2.

Table 6**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)				
	1972-2023 Ave.	2020 Q4	2021 Q4	2022 Q4	2023 Q4	2020 Q4	2021 Q4	2022 Q4	2023 Q4	
Total industry		79.7	75.0	79.5	80.2	78.3	.2	.3	.2	-.5
Manufacturing¹		78.3	75.4	78.8	78.8	77.6	.2	.2	.3	.3
Manufacturing (NAICS)	31–33	78.2	75.4	78.8	78.8	77.5	.2	.1	.3	.3
Durable manufacturing		76.9	73.5	76.3	77.2	76.1	.8	.7	.9	1.0
Wood products	321	76.7	81.5	83.1	78.4	76.4	-1.2	-1.4	-2.1	-2.7
Nonmetallic mineral products	327	73.7	75.6	79.6	83.6	80.9	1.8	2.0	.1	-.2
Primary metals	331	77.5	66.2	74.6	69.4	70.7	.2	.0	.2	1.1
Fabricated metal products	332	78.4	73.8	76.8	78.0	76.5	1.0	-.8	-1.0	-1.0
Machinery	333	77.8	73.1	81.0	84.3	81.9	-1.6	-.4	-.2	2.1
Computer and electronic products	334	77.4	75.3	78.9	77.1	76.0	4.9	5.6	7.3	6.6
Electrical equip., appliances, and components	335	81.9	78.5	80.3	81.4	80.1	.1	1.4	3.4	3.1
Motor vehicles and parts	3361–3	75.0	72.8	69.5	72.4	71.7	.3	-.2	-.8	-2.0
Aerospace and miscellaneous transportation equipment	3364–9	73.8	62.8	62.4	68.3	70.6	.3	-.5	-.2	-.8
Furniture and related products	337	77.4	80.0	80.5	76.9	69.5	1.2	1.5	1.3	.6
Miscellaneous	339	77.1	83.6	87.9	85.8	82.0	1.4	1.8	1.6	1.5
Nondurable manufacturing		80.1	77.6	81.4	80.4	79.0	-.5	-.6	-.3	-.3
Food, beverage, and tobacco products	311,2	80.3	78.9	80.5	81.5	80.5	-2.0	-.2	1.2	3.4
Textile and product mills	313,4	78.1	70.0	75.1	70.2	68.1	-.4	.7	1.1	.1
Apparel and leather	315,6	75.5	67.5	73.4	72.9	65.6	-1.2	-2.2	-3.2	-1.9
Paper	322	86.5	86.7	88.5	83.5	81.5	-.3	.0	-.2	-2.0
Printing and support	323	79.2	72.4	78.1	80.3	72.2	-1.3	-2.2	-3.7	-6.1
Petroleum and coal products	324	85.4	71.4	91.1	89.7	90.6	-.5	.4	2.0	.0
Chemicals	325	77.0	75.7	78.7	76.4	76.1	1.1	-.8	-2.0	-2.4
Plastics and rubber products	326	81.9	82.9	82.6	79.9	77.0	-1.1	-2.0	-.6	-.1
Other manufacturing (non-NAICS)	1133,5111	78.4	75.1	79.1	82.3	79.6	-.3	1.9	3.6	.8
Mining	21	86.5	71.8	87.8	90.2	89.4	.0	.2	-.8	-4.5
Utilities	2211,2	84.5	75.0	74.2	75.5	72.0	.2	1.1	1.5	1.2
Selected high-technology industries		77.5	76.8	80.5	82.1	80.6	1.5	2.8	7.9	4.8
Computers and peripheral equipment	3341	76.5	57.9	70.6	74.2	76.3	.9	1.3	-.9	-2.3
Communications equipment	3342	75.3	63.9	71.9	73.3	74.9	.9	1.1	.5	-1.1
Semiconductors and related electronic components	3344	79.3	85.8	85.7	87.1	83.5	1.6	3.8	12.6	8.6
Measures excluding selected high-technology industries										
Total industry		79.8	74.9	79.5	80.1	78.2	.2	.2	.1	-.7
Manufacturing ¹		78.3	75.4	78.7	78.8	77.5	.2	.1	.1	.2
STAGE-OF-PROCESS GROUPS										
Crude		85.6	74.1	87.0	87.4	87.2	-.5	-.4	-1.1	-4.1
Primary and semifinished		80.2	75.5	78.9	79.0	76.8	.1	.4	.8	.4
Finished		76.8	74.7	76.6	77.7	76.4	.5	.4	.3	.8

1. See footnote 2 to table 2.

Table 7A
INDUSTRIAL PRODUCTION: Manufacturing¹
 Seasonally adjusted

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Q1	Q2	Q3	Q4	Annual ²
IP (percent change)																	
1994	.1	.2	1.3	.9	.6	.3	.4	.9	.4	.9	.8	1.1	4.9	9.5	6.1	10.0	5.9
1995	.2	-2	.3	-3	.4	.5	-7	1.2	.9	-1	.1	.3	4.4	.7	3.3	4.1	5.1
1996	-6	1.5	-2	1.2	.8	.9	.4	.4	.8	-1	.9	.8	2.0	10.1	7.8	5.9	4.9
1997	.1	1.4	1.0	-1	.7	.6	.8	1.2	.9	.9	1.0	.5	9.3	7.0	10.7	11.6	8.4
1998	.8	.2	-2	.5	.5	-7	-4	2.4	-1	.9	.1	.6	6.1	2.1	3.4	7.7	6.7
1999	.3	.9	.0	.3	.8	-2	.4	.6	-4	1.5	.7	.7	5.2	4.4	3.3	8.7	5.1
2000	.0	.2	.7	.6	.0	.2	.1	-7	.5	-4	-3	-6	4.4	4.9	-3	-2.7	4.1
2001	-4	-7	-2	-4	-6	-6	-5	-4	-4	-4	-4	.2	-5.6	-5.2	-5.8	-4.0	-3.6
2002	.7	.0	.7	.3	.5	1.0	-1	.1	.1	-3	.5	-6	3.6	5.8	3.2	-5	.5
2003	.8	-1	.1	-8	.0	.5	.3	-5	.8	.1	.9	-1	2.1	-2.2	2.5	4.4	1.4
2004	-1	.8	.0	.3	.7	-7	.9	.5	.0	.9	.0	.8	2.7	3.3	4.0	5.5	3.1
2005	.6	.9	-5	.4	.3	.2	-3	.5	-1.1	1.4	.9	.1	6.4	2.6	-6	6.1	4.1
2006	.8	-3	.0	.3	-2	.3	-3	.7	.1	-5	.1	1.5	3.9	.7	1.1	1.7	2.6
2007	-4	.3	.8	.6	-1	.3	-1	-3	.3	-2	.5	.2	4.7	5.5	.1	1.3	2.8
2008	-2	-7	-4	-1.0	-6	-7	-1.1	-1.3	-3.4	-6	-2.5	-3.4	-2.0	-8.4	-14.1	-22.0	-4.8
2009	-3.2	-1	-1.8	-7	-1.0	-2	1.6	1.1	1.0	.1	1.0	-1	-24.7	-10.3	9.1	7.2	-13.8
2010	1.0	-1	1.3	.8	1.3	.0	.5	.1	.1	.1	.1	.5	6.7	10.4	4.3	1.6	6.0
2011	.0	.2	.6	-5	.0	.1	.6	.4	.3	.5	-2	.7	3.0	-2	4.2	3.8	2.9
2012	.8	.4	-5	.5	-3	.3	-2	-1	-2	-2	.6	.7	5.4	.5	-1.2	1.1	2.6
2013	-3	.4	-1	-3	.3	.2	-8	.9	.1	.1	.0	-2	2.7	.2	.2	1.7	.9
2014	-1.1	.9	.9	.0	.3	.3	.4	-6	.0	-1	.7	-2	-1.1	4.7	1.4	.3	1.1
2015	-6	-8	.4	.0	.0	-4	.7	-3	-3	-1	-2	-3	-3.4	-6	.8	-2.6	-5
2016	.4	-3	-1	-1	-1	.2	.1	-4	.2	.1	-1	.0	-6	-1.1	.0	.5	-8
2017	.2	-1	-4	1.1	-2	.1	-4	-2	.0	1.1	.1	-2	.0	3.1	-2.2	4.1	.6
2018	-3	.8	-1	.7	-8	.7	.0	.3	.0	-5	-3	.3	.4	2.3	1.6	-1.7	1.3
2019	-9	-5	-2	-7	.1	.5	-7	.7	-7	-9	.9	.1	-4.7	-3.1	-8	-2.1	-2.0
2020	-3	.2	-4.6	-15.4	4.4	7.8	3.5	1.5	.0	.9	.6	.7	-5.2	-43.7	54.0	8.4	-6.5
2021	.9	-4.0	3.1	.0	1.1	.1	.8	-3	-9	1.4	.9	.1	-4	5.8	3.0	5.3	4.9
2022	-6	.9	.9	.0	-2	-3	.1	.2	.2	.1	-7	-1.8	2.7	2.5	.0	-3.0	2.7
2023	1.8	-1	-6	.7	-1	-6	.3	.1	.1	-7	.5	-1	.3	-2	-4	-1.4	-5
2024	-1.0	1.1	.2	-6	.6								-6				
IP (2017=100)																	
1994	66.9	67.0	67.9	68.5	68.9	69.1	69.3	70.0	70.2	70.9	71.5	72.2	67.3	68.8	69.8	71.5	69.4
1995	72.4	72.2	72.4	72.1	72.4	72.8	72.3	73.1	73.7	73.7	73.7	74.0	72.3	72.4	73.0	73.8	72.9
1996	73.5	74.6	74.4	75.3	75.9	76.6	76.9	77.3	77.9	77.8	78.5	79.2	74.1	75.9	77.4	78.5	76.5
1997	79.3	80.4	81.1	81.1	81.6	82.2	82.8	83.8	84.6	85.4	86.2	86.6	80.3	81.6	83.7	86.1	82.9
1998	87.3	87.4	87.3	87.7	88.2	87.5	87.2	89.3	89.2	89.9	90.1	90.6	87.3	87.8	88.5	90.2	88.5
1999	90.8	91.6	91.6	91.9	92.6	92.4	92.8	93.4	93.0	94.4	95.0	95.7	91.3	92.3	93.1	95.0	92.9
2000	95.7	95.9	96.6	97.2	97.2	97.4	97.4	96.8	97.3	96.9	96.6	96.0	96.1	97.2	97.2	96.5	96.7
2001	95.6	95.0	94.8	94.4	93.9	93.3	92.9	92.5	92.1	91.7	91.4	91.6	95.1	93.9	92.5	91.6	93.3
2002	92.2	92.1	92.8	93.1	93.5	94.4	94.3	94.4	94.5	94.2	94.7	94.1	92.4	93.7	94.4	94.3	93.7
2003	94.9	94.7	94.8	94.1	94.2	94.6	94.9	94.5	95.2	95.4	96.2	96.1	94.8	94.3	94.9	95.9	95.0
2004	96.0	96.8	96.7	97.1	97.8	97.1	98.0	98.4	98.4	99.3	99.3	100.1	96.5	97.3	98.3	99.6	97.9
2005	100.7	101.6	101.1	101.5	101.8	102.0	101.7	102.2	101.1	102.5	103.4	103.5	101.1	101.8	101.7	103.2	101.9
2006	104.3	104.1	104.1	104.4	104.2	104.5	104.1	104.9	104.9	104.5	104.6	106.1	104.2	104.4	104.6	105.1	104.6
2007	105.8	106.1	107.0	107.7	107.6	107.9	107.9	107.6	107.9	107.7	108.2	108.4	106.3	107.7	107.8	108.1	107.5
2008	108.2	107.5	107.0	105.9	105.3	104.5	103.4	102.0	98.5	97.9	95.5	92.3	107.6	105.2	101.3	95.2	102.3
2009	89.3	89.2	87.6	87.0	86.1	85.9	87.2	88.2	89.1	89.2	90.1	90.0	88.7	86.3	88.2	89.7	88.2
2010	90.9	90.8	91.9	92.7	93.9	93.9	94.4	94.5	94.5	94.6	94.7	95.2	91.2	93.5	94.5	94.8	93.5
2011	95.2	95.4	96.0	95.5	95.4	95.6	96.1	96.5	96.8	97.3	97.1	97.8	95.5	95.5	96.5	97.4	96.2
2012	98.6	99.0	98.5	98.9	98.6	98.9	98.7	98.5	98.3	98.1	98.7	99.5	98.7	98.8	98.5	98.8	98.7
2013	99.2	99.6	99.5	99.2	99.5	99.7	98.9	99.8	99.9	100.0	100.0	99.8	99.4	99.5	99.5	99.9	99.6
2014	98.8	99.7	100.5	100.5	100.8	101.1	101.6	101.0	101.0	100.9	101.5	101.4	99.7	100.8	101.2	101.3	100.7
2015	100.8	100.0	100.4	100.3	100.4	100.0	100.7	100.4	100.1	100.0	99.8	99.5	100.4	100.2	100.4	99.8	100.2
2016	99.9	99.5	99.4	99.3	99.2	99.5	99.5	99.2	99.4	99.5	99.4	99.5	99.6	99.3	99.3	99.5	99.4
2017	99.6	99.5	99.2	100.3	100.1	100.2	99.8	99.6	99.6	100.7	100.8	100.6	99.5	100.2	99.7	100.7	100.0
2018	100.2	101.1	101.0	101.7	100.8	101.5	101.6	101.8	101.9	101.4	101.1	101.5	100.8	101.3	101.7	101.3	101.3
2019	100.5	100.0	99.8	99.1	99.2	99.6	98.9	99.6	98.9	98.0	98.8	99.0	100.1	99.3	99.1	98.6	99.3
2020	98.7	98.9	94.3	79.8	83.3	89.7	92.9	94.3	94.4	95.2	95.7	96.4	97.3	84.3	93.9	95.8	92.8
2021	97.3	93.4	96.3	96.3	97.4	97.4	98.3	98.0	97.1	98.4	99.3	99.4	95.7	97.0	97.8	99.0	97.4
2022	98.8	99.7	100.6	100.6	100.4	100.0	100.1	100.3	100.6	100.7	99.9	98.1	99.7	100.3	100.3	99.6	100.0
2023	99.9	99.8	99.2	99.9	99.8	99.2	99.4	99.5	99.6	98.9	99.3	99.2	99.7	99.6	99.5	99.1	99.5
2024	98.2	99.3	99.5	98.9	99.5								99.0				

NOTE: Estimates from January 2024 through May 2024 are subject to further revision in the upcoming monthly releases.

1. See footnote 2 to table 2.

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

Table 8
ANNUAL PROPORTIONS IN INDUSTRIAL PRODUCTION, MARKET AND INDUSTRY GROUP SUMMARY

Item		2016	2017	2018	2019	2020	2021	2022	2023
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		56.9	56.0	55.3	55.8	55.5	53.4	53.7	54.6
Consumer goods		28.4	27.6	27.1	27.7	28.5	27.5	27.2	27.7
Durable		6.5	6.1	6.0	6.2	6.2	6.0	5.9	6.1
Automotive products		3.6	3.4	3.3	3.4	3.4	3.3	3.2	3.3
Home electronics		.2	.1	.1	.1	.1	.1	.1	.1
Appliances, furniture, carpeting		.9	.9	.9	.9	1.0	1.0	.9	.9
Miscellaneous goods		1.8	1.6	1.6	1.7	1.7	1.7	1.7	1.7
Nondurable		22.0	21.5	21.1	21.5	22.3	21.5	21.3	21.6
Non-energy		17.1	16.2	15.7	16.8	17.5	15.7	15.4	16.1
Foods and tobacco		9.8	9.5	9.2	9.7	10.4	9.5	9.5	9.7
Clothing		.2	.2	.2	.2	.2	.2	.2	.2
Chemical products		5.5	5.2	5.0	5.4	5.5	4.8	4.6	5.0
Paper products		1.0	.9	.9	.9	.9	.8	.8	.8
Energy		4.9	5.3	5.3	4.8	4.8	5.8	5.9	5.5
Business equipment		10.0	10.2	10.0	9.6	8.6	8.0	8.4	8.8
Transit		2.8	3.0	2.9	2.2	1.5	1.5	1.6	1.8
Information processing		2.1	2.1	2.0	2.1	2.1	1.8	1.7	1.8
Industrial and other		5.1	5.1	5.1	5.3	5.0	4.8	5.1	5.2
Defense and space equipment		2.2	2.2	2.2	2.2	2.1	1.8	1.6	1.7
Construction supplies		4.6	4.6	4.6	4.8	5.1	5.1	5.2	5.2
Business supplies		11.1	10.8	10.7	10.8	10.7	10.4	10.6	10.6
Materials		43.1	44.0	44.7	44.2	44.5	46.6	46.3	45.4
Non-energy		28.3	27.7	27.4	27.9	28.4	27.9	27.3	27.4
Durable		17.3	16.9	16.8	17.3	17.2	16.7	16.5	16.8
Consumer parts		3.3	3.2	3.1	3.1	2.8	2.8	2.7	2.9
Equipment parts		5.1	5.0	4.9	5.1	4.8	4.5	4.5	4.6
Other		8.9	8.8	8.8	9.1	9.5	9.5	9.3	9.3
Nondurable		11.1	10.8	10.6	10.6	11.2	11.1	10.8	10.5
Textile		.4	.4	.4	.4	.4	.3	.3	.3
Paper		1.9	1.8	1.7	1.8	1.7	1.6	1.6	1.5
Chemical		5.4	5.4	5.2	5.1	5.5	5.8	5.5	5.4
Energy		14.8	16.2	17.3	16.3	16.1	18.8	19.0	18.1
INDUSTRY GROUPS									
Manufacturing		78.4	77.0	75.8	76.5	76.7	74.7	74.2	75.1
Manufacturing (NAICS)	31–33	76.0	74.7	73.7	74.4	74.7	72.9	72.6	73.5
Durable manufacturing		39.7	39.1	38.7	38.9	37.9	36.3	36.3	37.3
Wood products	321	1.4	1.4	1.4	1.5	1.9	2.0	1.8	1.6
Nonmetallic mineral products	327	2.2	2.1	2.1	2.2	2.3	2.1	2.2	2.4
Primary metals	331	2.6	2.6	2.6	2.5	2.8	3.2	2.9	2.7
Fabricated metal products	332	5.8	5.7	5.8	6.0	5.9	5.7	5.9	6.1
Machinery	333	5.4	5.4	5.5	5.6	5.3	5.1	5.4	5.7
Computer and electronic products	334	5.2	5.1	5.0	5.2	5.2	4.6	4.3	4.4
Electrical equip., appliances, and components	335	1.9	1.8	1.8	1.9	2.0	1.9	2.0	2.1
Motor vehicles and parts	3361–3	6.1	5.8	5.7	5.8	5.3	5.0	5.1	5.5
Aerospace and miscellaneous transportation equipment	3364–9	4.8	5.1	4.8	4.1	3.4	3.0	2.9	3.2
Furniture and related products	337	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.0
Miscellaneous	339	3.1	2.8	2.8	2.8	2.7	2.5	2.6	2.7
Nondurable manufacturing		36.3	35.6	35.0	35.5	36.8	36.6	36.3	36.1
Food, beverage, and tobacco products	311,2	12.1	11.7	11.4	12.1	13.0	12.0	11.9	12.2
Textile and product mills	313,4	.7	.7	.6	.7	.6	.6	.6	.5
Apparel and leather	315,6	.2	.2	.2	.2	.2	.2	.2	.2
Paper	322	2.6	2.5	2.5	2.5	2.6	2.4	2.3	2.2
Printing and support	323	1.5	1.5	1.4	1.4	1.3	1.2	1.3	1.3
Petroleum and coal products	324	2.9	3.7	3.8	3.0	2.7	4.3	4.4	4.0
Chemicals	325	12.4	11.9	11.6	11.9	12.6	12.2	11.9	12.0
Plastics and rubber products	326	3.7	3.5	3.6	3.6	3.7	3.7	3.7	3.7
Other manufacturing (non-NAICS)	1133,5111	2.4	2.2	2.1	2.1	2.0	1.8	1.7	1.6
Mining	21	10.4	12.2	13.4	12.5	12.1	15.1	15.3	14.2
Utilities	2211,2	11.2	10.8	10.8	11.0	11.2	10.3	10.5	10.7
Electric	2211	9.7	9.3	9.3	9.6	9.7	8.8	9.0	9.3
Natural gas	2212	1.5	1.5	1.4	1.4	1.5	1.5	1.5	1.4

NOTE: The IP proportion data are estimates of the industries' relative contributions to the overall change in IP between the reference year and the following year. For example, a 1 percent increase in durable goods manufacturing between 2022 and 2023 would account for a 0.362 percent increase in total IP.

Table 9

INDUSTRIAL PRODUCTION AND CAPACITY UTILIZATION: SUMMARY

Seasonally adjusted

Industrial production	2017=100						Percent change						May '23 to May '24
	2023 Dec. ^r	2024 Jan. ^r	Feb. ^r	Mar. ^r	Apr. ^r	May ^r	2023 Dec. ^r	2024 Jan. ^r	Feb. ^r	Mar. ^r	Apr. ^r	May ^r	
Total index	102.6	101.7	102.7	102.5	102.4	103.1	-2	-9	1.0	-2	-1	.7	.1
<i>Previous estimates</i>	102.6	101.7	102.6	102.4	102.5	103.3	-3	-8	.8	-1	.0	.9	.4
Major market groups													
Final Products	100.8	100.3	100.9	100.6	100.3	101.1	-3	-5	.6	-3	-3	.8	-.3
Consumer goods	102.0	101.5	101.9	101.4	101.2	102.2	-2	-4	.3	-5	-2	1.0	-.1
Business equipment	94.5	93.5	94.9	94.9	94.4	94.7	-5	-1.0	1.4	.1	-.6	.3	-1.0
Nonindustrial supplies	100.3	99.9	101.2	100.8	100.8	101.0	-3	-4	1.3	-4	.0	.1	.2
Construction	100.3	99.0	101.3	101.1	100.1	99.5	-4	-1.3	2.3	-2	-1.0	-.7	-1.7
Materials	104.9	103.5	104.8	104.7	104.8	105.6	-2	-1.4	1.3	-1	.0	.8	.4
Major industry groups													
Manufacturing (see note below)	99.2	98.2	99.3	99.5	98.9	99.5	-.1	-1.0	1.1	.2	-.6	.6	-.3
<i>Previous estimates</i>	99.4	98.1	99.5	99.4	99.0	99.8	.0	-1.3	1.4	-.1	-.4	.9	.1
Mining	120.5	115.5	120.5	119.8	118.7	118.8	.6	-4.1	4.3	-.6	-.9	.1	-.6
Utilities	103.1	107.5	103.6	101.1	105.8	107.6	-2.4	4.3	-3.6	-2.4	4.7	1.7	4.2
Capacity utilization													Capacity growth
	Percent of capacity												
	Average 1972-2023	1988-89 high	1990-91 low	1994-95 high	2008-09 low	2023 May	2023 Dec. ^r	2024 Jan. ^r	Feb. ^r	Mar. ^r	Apr. ^r	May ^r	May '23 to May '24
Total industry	79.7	85.2	78.7	84.8	66.6	79.2	78.1	77.4	78.1	77.8	77.7	78.2	1.5
<i>Previous estimates</i>	79.6	85.2	78.8	85.0	66.6	79.5	78.6	77.9	78.4	78.3	78.2	78.7	1.4
Manufacturing (see note below)	78.3	85.5	77.1	84.4	63.5	78.5	77.6	76.7	77.4	77.5	76.9	77.3	1.3
<i>Previous estimates</i>	78.2	85.6	77.3	84.6	63.4	78.2	77.3	76.2	77.2	77.0	76.6	77.1	1.4
Mining	86.5	86.3	84.3	88.6	78.9	89.8	89.7	86.1	89.9	89.4	88.6	88.8	.5
Utilities	84.5	93.2	84.7	93.2	78.1	72.2	70.6	73.4	70.5	68.6	71.6	72.6	3.5
Stage-of-process groups													
Crude	85.6	87.9	84.9	90.0	77.0	87.6	87.6	84.4	87.2	87.0	85.9	86.7	.4
Primary and semifinished	80.2	86.5	77.6	87.5	63.7	77.5	76.5	76.5	76.5	76.0	76.5	76.9	1.6
Finished	76.8	83.3	77.6	80.4	66.2	77.7	76.3	75.5	76.2	76.2	75.7	76.1	1.7

^r Revised.
 NOTE. The statistics in this release cover output, capacity, and capacity utilization in the U.S. industrial sector, which is defined by the Federal Reserve to comprise manufacturing, mining, and electric and gas utilities. Mining is defined as all industries in sector 21 of the North American Industry Classification System (NAICS); electric and gas utilities are those in NAICS sectors 2211 and 2212. Manufacturing comprises NAICS manufacturing industries (sector 31-33) plus the logging industry and the newspaper, periodical, book, and directory publishing industries. Logging and publishing are classified elsewhere in NAICS (under agriculture and information respectively), but historically they were considered to be manufacturing and were included in the industrial sector under the Standard Industrial Classification (SIC) system. In December 2002, the Federal Reserve reclassified all of its industrial output data from the SIC system to NAICS.

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. More detailed descriptions of industrial production and capacity utilization are available on the Board's website at www.federalreserve.gov/releases/G17. 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 from the Data Download Program on the Board's website. Instructions for searching for and downloading specific series are provided as well.

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 2017. 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 2012, the total IP index has been constructed from 296 individual series based on the 2017 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 website at www.federalreserve.gov/releases/G17/About.htm.

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 typically 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 and unit values or sales) by a corresponding Fisher price index; the most notable of these fall within the high-technology grouping and include semiconductors. When suitable data on physical product are not available, estimates of output are based on production-worker hours by industry. Data on hours worked by production workers are collected in the monthly establishment survey conducted by the Bureau of Labor Statistics. 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 U.S. 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 the *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:

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

The IP proportions (typically shown in the first column of the relevant tables in the monthly 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 5/10 percentage point ($0.05 \times 10\% = 0.5\%$). To assist users with calculations, the Federal Reserve's website 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/ipweightssa.txt).

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 five 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 77 percent of the source data (in value-added terms) are available; the fraction of available source data increases to 85 percent for estimates in the second month that the estimate is published, 94 percent in the third month, 99 percent in the fourth month, 99 percent in the fifth month, and 98 percent in the sixth month. Data availability by data type in 2023 is summarized in the table below:

Availability of Monthly IP Data in Publication Window

(Percent of value added in 2023; the numbers may not sum because of rounding.)

Type of data	Month of estimate					
	1st	2nd	3rd	4th	5th	6th
Physical product	33	41	51	54	55	55
Production-worker hours	44	44	44	44	44	44
IP data received	77	85	94	98	99	99
IP data estimated	23	15	6	2	1	1

The physical product group includes series based on either monthly or quarterly data. As can be seen in the first row of the table, in the first month, a physical product indicator is available for more than one-half of the series (in terms of value added) that ultimately are based on physical product data (33 percent out of a total of 55 percent). Of the 33 percent, about two-thirds (23 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 fourth estimate of industrial production. Specifically, quarterly data are available for the third estimate of the last month of a quarter, the fourth estimate of the second month of a quarter, and the fifth estimate of the first month of a quarter.

Seasonal adjustment. Individual series are seasonally adjusted using Census X-13 ARIMA. For series based on production-worker hours, the current seasonal factors were estimated with data through March 2024; for other series, the factors were estimated with data through March 2024, where available. 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. Additional documentation and X-13 specifications can be found on the Board's website at www.federalreserve.gov/releases/G17/About.htm.

Reliability. The average revision to the *level* of the total IP index, without regard to sign, between the first and the fourth estimates was 0.30 percent during the 1987–2023 period. The average revision to the *percent change* in total IP, without regard to sign, from the first to the fourth estimates was 0.24 percentage point during the 1987–2023

period. In most cases (about 85 percent), the direction of the 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 89 detailed industries (71 in manufacturing, 16 in mining, and 2 in utilities), which mostly correspond to industries at the three- and four-digit North American Industry Classification System, or 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 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-technology industries and manufacturing excluding high-technology 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 (for example, paper, industrial chemicals, petroleum refining, motor vehicles), as well as for electric utilities and mining; these industries represent about 26 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 *Quarterly Survey of Plant Capacity* (QSPC); these industries account for about 64 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 10 percent of total industry capacity). A detailed description of the methodology used to construct the capacity indexes is available on the Board's website (www.federalreserve.gov/releases/G17/Meth/MethCap.htm).

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 survey of large companies reported, on average, higher utilization rates than those reported by

establishments covered by the annual *Survey of Plant Capacity* (the primary source of factory operating rates through 2006, after which it was discontinued) for the fourteen years they overlapped.

Adjustments have been made to keep the industry utilization rates currently reported by the Federal Reserve (now based on the QSPC) 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 Census utilization surveys.

Perspective. Over the 1972–2023 period, the average total industry utilization rate was 79.7 percent; for manufacturing, the average factory operating rate was 78.3 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 manufacturing, utilization rates have exceeded 90 percent only in wartime. The highs and lows in capacity utilization are specific to each series and do not all occur in the same month.

REFERENCES AND RELEASE DATES

References. The release for the annual revision that was published on June 28, 2024, is available on the Board's website (www.federalreserve.gov/releases/g17/revisions/Current/DefaultRev.htm). A summary of the annual revision that incorporated back to 1972 production and capacity indexes reclassified according to the North American Industry Classification System is available in an article in the *Federal Reserve Bulletin*, vol. 89 (April 2003), pp. 151–176. 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/CapitalStockDocLatest.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, Winter 2005, March 2006, May 2007, August 2008, August 2009) or in online staff studies (www.federalreserve.gov/releases/g17/articles/rev2010/industrial10.pdf, www.federalreserve.gov/releases/g17/articles/rev2012/industrial12.pdf, www.federalreserve.gov/releases/g17/articles/rev2013/industrial13.pdf).

Release Schedule

The G.17 release on Industrial Production and Capacity Utilization will be issued on the following dates. The monthly releases are issued at 9:15 a.m. The annual revision is issued at noon.

2024: January 17, February 15, March 15, April 16, May 16, June 18, June 28 (annual revision), July 17, August 15, September 17, October 17, November 15, December 17.

This release schedule is available on the Board's website at <http://www.federalreserve.gov/releases/g17>.