

Industrial Production and Capacity Utilization

**Performance Evaluation of the Federal Reserve
G.17 (419) Statistical Release**

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I. Overview

The Federal Reserve statistical release “Industrial Production and Capacity Utilization” [G.17 \(419\)](#) reports monthly measures of output (IP) for major market and industry groups in the industrial sector, which the Federal Reserve defines as the manufacturing, mining, and electric and gas utilities industries. Monthly measures of capacity and capacity utilization for major industry groups are provided as well. More detailed industry data for these indicators are published concurrently in a [supplement](#) to the G.17. Data from both the G.17 and the supplement to the G.17 are currently made available online through the [Federal Reserve's Data Download Program](#). The production and capacity indexes are expressed as percentages of output relative to a base year, which currently is 2017. The component IP and capacity indexes are aggregated into market and industry groups with weights that are derived from their proportion in the total value added of all industries. The release also includes gross values of industrial products expressed in billions of chained (2012) dollars, gross-value-weighted production indexes by stage-of-process, diffusion indexes of industrial production, supplementary data on motor vehicle assemblies in millions of units, and reliability measures for total IP and the major industry aggregates. The G.17 release and the supplement to the release are published about 15 days after the reference month ends; for example, preliminary estimates for May are released in mid-June. The release is available on the Federal Reserve’s public website at the time of publication.

The production indexes and utilization rates are widely reported in the media and are used by analysts in government, businesses, and universities to follow current developments and trends in real output and operating rates in the industrial sector. The production indexes are also used by the Bureau of Labor Statistics (BLS) to estimate manufacturing productivity and by the Bureau of Economic Analysis (BEA) to estimate investment in computers for the national income and product accounts. The Federal Reserve Bank of Atlanta uses IP indexes in its GDPNow measure, a model-based “nowcast” of the BEA’s official estimate of the growth rate of gross domestic product. In addition, IP may be used by the Business Cycle Dating Committee of the National Bureau of Economic Research as one of the economic indicators that identifies peaks and troughs of business cycles.

II. Changes in Indexes since June 2020

Since mid-2020, when the Federal Reserve [most recently reported](#) to the Office of Management and Budget (OMB) on the G.17 statistical release, the methods for estimating a number of industrial production indexes and capacity series were changed in response to either the availability of new data or the discontinuance of previous data sources. Detailed descriptions of the revised IP and capacity measures and of the methodology changes for the indexes are available in the press releases for the [2021](#), [2022](#), and [2023 annual revisions](#).

The 2021 annual revision incorporated benchmark information from the 2017 *Census of Manufactures* and the 2018 and 2019 *Annual Survey of Manufactures*. The 2022 annual revision incorporated benchmark information from the 2020 *Annual Survey of Manufacturers*. The 2023 annual revision folded in benchmark information from the 2021 *Annual Survey of Manufacturers*.

II.A. Conversion to the 2017 North American Industry Classification

With the 2021 annual revision, the IP and capacity indexes were classified according to the 2017 version of the North American Industry Classification System (NAICS); previously they were classified according to the 2012 version of NAICS. For the industrial sector, the differences between the 2012 and 2017 NAICS were relatively minor. There were no individual indexes dropped or added because of the new structure, and only a few IP indexes were reclassified.

Those series that underwent some classification changes included crude petroleum and natural gas extraction; lead, zinc, copper, and nickel ore mining; and household appliance manufacturing. In the 2012 system, crude petroleum and natural gas extraction were included together in NAICS 211111; under the 2017 system, crude petroleum is its own six-digit industry (NAICS 211120) and natural gas extraction is combined with natural gas liquid extraction (NAICS 21130). Also in the mining sector, two 2012 NAICS categories (lead ore and zinc ore mining, and copper ore and nickel ore mining) were consolidated into a single 2017 NAICS category. Finally, the 2017 NAICS combined four different industries comprising major household appliance manufacturing into a single six-digit industry (NAICS 335220).

II.B. Adoption of the North American Product Classification System

The IP system utilizes data on product shipments to construct annual benchmarks and value-added weights for those IP indexes that are defined as subsets of a given six-digit NAICS industry. Previously, these benchmark and aggregation weights were based on an industry NAICS-based product shipments as defined in Census Bureau annual surveys or censuses; but, in 2017 the Census Bureau introduced the North American Product Classification System (NAPCS) and no longer publish data using the earlier classification.

Because the NAPCS system is unrelated to the NAICS industrial structure, implementing a new system utilizing NAPCS for benchmarking and aggregation was more complicated in several ways. First, with NAPCS being independent of NAICS industry, a NAPCS-NAICS crosswalk was needed. Second, since NAPCS products can be produced across multiple industries and sectors, extra care was required to map products to the appropriate IP indexes. Finally, the non-nested structure of NAPCS and NAICS combined with numerous instances of nondisclosed data cells introduced additional hurdles for imputation work.

II.C. Other Changes to the Indexes

In addition to the incorporation of the 2017 NAICS and adoption of NAPCS product-level data, the methods for estimating several other indexes were revised in the three years since the 2020 report to the OMB.

The following changes were instituted with the 2021 annual revision:

1. The physical product data underlying two series (**mattress manufacturing** and **glass container manufacturing**) changed reporting frequency. The underlying source data for the series on mattress manufacturing, the International Sleep Products Association, converted to a quarterly frequency from a monthly frequency beginning with data for 2015. The underlying source data for glass container manufacturing, which comes from the Glass Packaging Institute, also converted to a quarterly frequency. With this revision both IP indexes were updated to reflect the new quarterly data.
2. The IP index for **electric lighting equipment** is now based on production-worker hours. For the period from 2002 through 2015, the index was based on physical product data from the National Electrical Manufacturers Association that were discontinued.
3. The annual revision consolidated the numerous individual indexes comprising **communications equipment manufacturing** into three indexes that span the NAICS industry of 3342. One index covers telephone apparatus (NAICS 33421), one index covers wireless system equipment (a portion of NAICS 33422), and one index combines radio and television broadcasting equipment and satellites (another portion of NAICS 33422) with other communications equipment manufacturing (NAICS 33429). The source data for communications equipment comes from the Quarterly Survey of Plant Capacity (QSPC).

The following changes were instituted with the 2022 annual revision:

1. Three indexes (**farm machinery**, **construction machinery**, and **engines**) that had previously been based on physical product data were converted to a production-worker hours basis. This conversion was necessary because the organization issuing the original data source discontinued the report.
2. The source data for two indexes based on physical product (**pig iron**, and **metal can, box, and other metal containers**) were modified during this annual revision. The index for pig iron is now based on data from the American Iron and Steel Institute for the period from 1972-2016, and on data from USGS beginning in 2017. The index for metal can, box, and other containers is based on production-worker hours from 1972-1976, on data from the Can Manufacturers Institute (CMI) from 1977 through 2016, and on data

from the Aluminum Association combined with data from the CMI for the period beginning in 2017.

3. The published measures that allocate **motor vehicle production** to business and consumer segments were updated to reflect new data. The 2022 annual revision incorporated data on vehicle registrations from IHS Automotive for this split, whereas previously business and consumer allocations were made using data from other sources, including the National Truck Equipment Association and Ward's Communication.
4. The **capacity index for fertilizer** is now based on QSPC data for the period beginning in 2017. For the period 1997-2016, the capacity index is based on data for capacity in thousands of short tons from the Fertilizer Institute. Prior to 1997, the capacity index is based on data from the Census Bureau's Survey of Plant Capacity.

The following changes were instituted with the 2023 annual revision:

1. The source data for three indexes for original equipment **motor vehicle parts** (engines, brakes, axles, and transmissions) were modified. Previously, the indexes reflected data on production of major vehicle components (engines, brakes, axles, and transmissions) from Stark's News Service, as well as data for production-worker hours by industry and for light vehicle production. The data on the direct production of components, however, were discontinued, so beginning in 2022 these three series are based just on production-worker hours for the industry and on light vehicle production.
2. The price indexes used to deflate the nominal output of two **semiconductor** categories were modified. Previously a "hedonic" price index was used for microprocessor units (MPUs) that took into account product characteristics through 2015, and then extended using the producer price index from the BLS thereafter. Now, this extension is achieved using an implicit price index developed by the staff based on the number of transistors used in MPUs, coming from data from SEMI. Such an approach was also applied to another semiconductor component—metal-oxide semiconductor (MOS) logic devices—beginning in 2008.

III. Analysis of Revisions

III.A. Industrial Production

The monthly indexes of industrial production are first estimated based on only a portion of their ultimate full set of monthly data; they are revised to incorporate more complete monthly data that become available over the six-month window and then again to incorporate more comprehensive information and annual data in an annual revision that may affect data for several years.

Information about revisions to the index of industrial production is presented in three ways.

First, since the G.17 released on April 18, 2017, the Federal Reserve has published reliability estimates of the recent levels and rates of change for the total index and for major industry aggregates. These estimates are published in [table 15](#) of the G.17 release, and real-time estimates for these reliability measures are included in [a file](#) that contains the history of the real-time estimates for the aggregate IP indexes.

Second, the discussion of the reliability of the total IP index in the Explanatory Note section of the G.17 highlights the revisions over the four-month reporting window that was used before the introduction of a six-month reporting window in April 2008. 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 period from January 1987–January 2022. 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 January 1987–January 2022 period. In most cases (about 86 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. The monthly [revision history](#) for total IP back to 1972 (as well as shorter revision histories for manufacturing, mining, and utilities) is available on the Federal Reserve's public website.

Third, the annual revision press releases and subsequent addenda discuss the effects of incorporating the benchmark data on the industrial production indexes. The incorporation of benchmark data has the potential to noticeably change the interpretation of activity in the industrial sector in the years covered by these data. For the period from 1992 through 2021, the annual rate of change for total IP has ranged from a drop of 11.4 percent (in 2009) to a gain of 7.2 percent (in 1997). Over that period, the index prior to the incorporation of manufacturing benchmark data has been essentially unbiased; the average revision to the annual rates of change upon inclusion of the benchmarks for those years is negative 0.3 percentage point. In 21 of those 30 years, the absolute value of the revision was less than 1 percentage point; the mean absolute revision for the entire period was 0.8 percentage point, with the maximum upward revision being 1.6 percentage points (in 1995) and the maximum downward revision being 1.9 percentage points (in 2009).

III.B. Capacity Utilization

On a monthly basis, utilization rates are updated to reflect revisions to the underlying production series during the usual reporting window of the production index. From 1983 to 2022, the average revision between the first and second estimates of total industry capacity utilization (except where the second estimate is the publication of an annual revision) was 0.02 percentage point, and the average revision without regard to sign was 0.15 percentage point. Between the second and third estimates, the average revisions with and without regard to sign were 0.02 percentage point and 0.13 percentage point, respectively. And, between the third and fourth estimates, the average revisions with and without regard to sign were 0.01 percentage point and 0.07 percentage point, respectively. The average cumulative revision

over a four-month reporting window, if no annual revision occurred during the window, was 0.04 percentage point, and without regard to sign, the average cumulative revision was 0.22 percentage point.

On a longer-term basis, the revisions to the measures of capacity utilization were examined by comparing the capacity utilization rates published in the past 24 annual revisions of industrial production and capacity utilization with their pre-revision levels. For each of the past 24 annual revisions, the revisions to the operating rates for total industry were calculated for the final quarters of the three most recent years: For example, in the annual revision published in March 2023, the total industry capacity utilization rate was revised up 0.2 percentage point in the fourth quarter of 2020, up 0.5 percentage point in the fourth quarter of 2021, and up 1.0 percentage point in the fourth quarter of 2022. Over the past 24 years, the average revision to the most recent three years of total industry capacity utilization has been negative 0.004 percentage point; the average revision without regard to sign has been about 0.5 percentage point.

IV. Data Publication and Availability

IV.A. Description of the Statistical Release, G.17 (419)

The statistical release “Industrial Production and Capacity Utilization” is usually 18 to 20 pages. It provides timely monthly data on industrial production and capacity utilization on a regular schedule. The release includes a text summary of the latest changes in output and utilization by market group (IP) and by industry group (IP and utilization), special announcements, a summary table and related charts, and more detailed tables showing seasonally adjusted industrial production classified by market and industry groups. In addition, special analytical aggregates, such as for high technology, energy, and motor vehicles, are shown; industries grouped into stage of processing are reported as well. IP indexes for more detailed industries and market groups are available in the supplement to the G.17. Indexes of capacity and capacity utilization also are presented, as is supplementary information on motor vehicle assemblies, the gross value of products, and diffusion indexes of IP. Finally, a table displaying reliability measures for the major aggregates is also presented.

Detailed explanations of the annual revisions to IP and capacity were described in the press releases issued on [May 28, 2021](#), [June 28, 2022](#), and [March 28, 2023](#). Announcements about upcoming annual revisions to the G.17 appear at least two months before the publication of the revised data in each year. Besides the regular annual revisions, users are notified in the G.17 of any significant interim changes, such as any midyear updating of seasonal factors or capacity indexes; notifications are also provided online via RSS feeds and on Twitter. For each annual revision, the new data and updated documentation were available at the time of issue on the website of the Federal Reserve Board.

IV.B. G.17 Webpage

The Federal Reserve Board's public website meets the requirements of section 508 of the Rehabilitation Act of 1973 (amended). Section 508 requires federal agencies to provide comparable access to persons with disabilities (both employees and members of the public) to electronic and information technology developed, procured, maintained, or used by the agency unless an undue burden would be imposed on the agency. Electronic and information technology is broadly defined and covers web pages.

The webpage for the G.17 displays a [release schedule](#) for the current year with a link to the current release, a link to a page showing historical release dates back to 1947, and links to historical releases. In addition, below the heading near the top of this page that says "Industrial Production and Capacity Utilization - G.17" are links to other main sections (or pages): the current release, the supplement to the G.17 with additional detail, a brief history celebrating 100 years of industrial production data, the latest annual revision release, options for downloading industrial production and related data, other data not directly related to the G.17 release, documentation, and technical questions and answers.

Monthly IP releases are available starting in December 1997. Annual revision releases are available starting in January 1997. In addition to the current format of the G.17, which was introduced in February 2001, a supplemental release, which provides more detailed industry data, for each month is available. All of these releases are available in ASCII and PDF formats. "Screen reader" versions (compliant with section 508 of the Rehabilitation Act of 1973, amended) are available for releases, beginning with the one issued September 14, 2001.

The [Data Download](#) page provides links to current and historical data through the [Data Download Program](#) (DDP) and on the [Text Files](#) page. The DDP allows data users to selectively download any of the statistics published in the G.17 using a variety of formats, including a comma-separated-value file (.csv), an Excel 2003 spreadsheet (.xls), or an Extensible Markup Language file (.xml) based on the Statistical Data and Metadata Exchange (SDMX) schema. Data users can also download predetermined packages, including one that includes all new or revised data in the latest G.17.

The Text Files page provides links to text files of data, documentation on how to access the data, and information on file format and directions for loading the data into an Excel spreadsheet. Relative importance weights also are provided; an example of their use is provided in the "Aggregation Methodology and Weights" subsection of the [Explanatory Note](#) section of the release.

Seasonal factors for motor vehicle production also are available, as are past and prospective IP publication dates. Data and documentation relating to revisions to IP from initial to final (after five rounds of monthly updates and revisions) estimates are provided as well.

The [About](#) page provides links to the articles related to most annual revisions since 1995. In addition, documentation on the methods and source data used to compile the industrial production and capacity utilization statistics are found on this page.

For each monthly production and capacity series, the series source and pertinent metadata are detailed in tables listed under “Detailed source and structure information.” This material is updated with each annual revision.

The Source and Description tables are as follows: [Table 1](#) covers the “Industry structure of industrial production: classification, value-added weights, and description of series.” For each series and NAICS industry group, the following attributes are shown: the industry name, the market and industry classifications, the value-added weights in 2021 dollars and as proportions of the total index, the type of data (physical product or production-worker hours), and the units of measure, source for the series, and the beginning date. [Table 2](#), “Market structure of industrial production: classification, weights, and descriptions of series” shows the individual production series arranged by major market group. It includes 2021 value added in dollars and proportions for all series, as well as gross value weights in 2021 dollars for product series. [Table 3](#), “Industry structure of capacity and capacity utilization: classification, value-added proportions, and description of series” shows sources used to compile each individual capacity index. Stage-of-processing classifications and starting dates for each capacity and utilization series are shown as well.

The [explanatory note](#) published as part of the release is also provided on the G.17 [About](#) page in the “Summary of Methods” section. Moreover, its section on [capacity and capacity utilization](#) contains an expanded description of the methods used to construct the capacity indexes. [Documentation regarding capital stock estimates](#), used in constructing the capacity figures, is available as well.

The [Technical Q&As](#) page provides in-depth information on technical aspects of the estimation procedures for IP and capacity.

IV.C. Publication Statistics

Most of the inquiries about industrial production and capacity utilization data are electronic. During 2022, the [main G.17 webpage](#) has averaged about 12,310 “page views” per month. The page views count represents only a fraction of overall data users, as G.17 data are often accessed from other sources, including the Federal Reserve Bank of St. Louis’s Federal Reserve Economic Data (FRED) website and a variety of private-sector data providers.

In addition, data for selected IP series (typically unpublished series) are sent via email to about 50 users each month. The G.17 website also makes data available for the United Nations (UN) and the International Monetary Fund (IMF). The data for the UN include not seasonally adjusted and seasonally adjusted IP indexes on an International Standard Industrial Classification (ISIC) basis. The data for the IMF include not seasonally adjusted and seasonally

adjusted data for Total IP and Manufacturing IP as part of their Special Data Dissemination Standard Plus (SDDS+) program. The data files for the UN and the IMF are available on the Data Download page in the [International Data Submissions](#) section.

IV.D. Release Schedule

The industrial production index is released in mid-month, typically at 9:15 a.m. A schedule is included in the explanatory note in the G.17 and on the [Release Dates](#) page.

Advance notices of the revision issued on May 28, 2021, appeared in the G.17 release published mid-month from January 2020 through April 2021, with the exact publication date being announced on May 14, 2021. Notices of the June 28, 2022, annual revision were in the G.17 releases published in December 2021 through April 2022, with the precise date being first announced on May 17, 2022. Notices of the March 28, 2023, annual revision were in the G.17 releases published in January 2023 and February 2023, with the precise date being announced on March 17, 2023.

IV.E. Inquiries about IP or Capacity Utilization

The Industrial Output Section receives outside requests for information about the index of industrial production or the rate of capacity utilization. Most requests come by email or phone. These requests are generally for data, for methodological descriptions, for interpretation of the data, or for information regarding other related statistics.

The requests for data frequently involve data availability and access. In a typical month, a few emails and outside phone calls are received on or near the day of release. Outside inquiries are often received between release dates from users wanting to know more about the structure and detail of the index; many of these requests are satisfied by directing users to information available on the G.17 website. Owing to the widespread availability of the data in public and private databases, these users typically have not seen the explanatory notes to the G.17 or the methodologies in previously published detailed material, such as *Industrial Production—1986 Edition, with a Description of the Methodology* or various relevant [Federal Reserve Bulletin articles](#). For most questions, Industrial Output Section staff email a response within a day. If a question is likely to be of broad interest, or if answering it requires use of information not yet made public, then the answer may be posted using the [Technical Q&A](#) section of the website.

V. Security of Data and Release Procedures

The G.17 is continuously monitored for compliance with the Federal Information Security Management Act and the Federal Reserve Board's Information Security Program. In addition, the operations involved in producing the G.17 were reviewed by the Office of the Inspector

General of the Federal Reserve Board in the summer of 2005. Once the compilation of current IP has begun, internal access to the IP data files is limited to a pre-determined group of individuals within the Industrial Output Section. Individual user access of the division's systems requires two-factor authentication; that is, access to the user's account requires inserting the user's government-issued personal identity verification card into the user's computer and also requires the user to enter a passcode.

V.A. Standard Security and Release Procedures

During the monthly IP process, interim reports may be provided to division officers, the Chair of the Federal Reserve, and a few select others. Once IP is finalized, senior division staff members are briefed—usually the day before the publication day—and the Chair is provided with summary tables. All of these updates are classified as “Internal FR” within the Federal Reserve. The press release text and summary tables are provided to a member of the Economic Editing Section and to the Office of Public Affairs for review on the day before publication. In the early afternoon on the day before the release day, encrypted tables are sent to the Council of Economic Advisers through www.MAX.gov; later that day, an encrypted copy of the final release is sent to them through www.MAX.gov.

Beginning in August 2015, the Federal Reserve provided credentialed reporters embargoed access to the release in a secure facility where reporters are prevented from transmitting information before the release time. Reporters that receive embargoed access are physically sequestered and have no access to the internet or telephones before the release time. In March 2020, the Federal Reserve discontinued embargoed access to reporters.

Measures are in place to ensure information is protected until its official release time. A limited number of staff directly involved in preparing and reviewing the release for publication have access before its release. In the event information were inadvertently released before the scheduled publication time, the Federal Reserve has a procedure where the release would be published on its website as soon as possible.

V.B. Off-Schedule Releases

As part of a special agreement between the Federal Reserve and the Council of Economic Advisers (CEA), the Federal Reserve shares an embargoed G.17 release with a small group of employees at the CEA on the day before publication. About 40 minutes before the official publication of the release in February 2021, a CEA staff member inadvertently disseminated a summary of it to a broad group of colleagues and also to a handful of people at other government organizations. It does not appear that pre-release G.17 information was shared with the public, and this inadvertent release took place at a time when several other statistical releases were being distributed.

VI. Supplemental Information

A [bibliography of articles](#) generated by Federal Reserve staff and featuring industrial production and capacity utilization can be found on the Federal Reserve's website. Likewise, a [history of the development of the index](#) and a [detailed methodology for the statistics in the G.17](#) are available on the website.