

Industrial Production and Capacity Utilization

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

June 2020

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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 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 2012. 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 2017

Since mid-2017, 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 [2018](#) and [2019 annual revisions](#).

The annual revision issued in March 2018 incorporated annual benchmark data for manufacturing production from the 2016 *Annual Survey of Manufactures* (ASM). The upcoming 2020 annual revision will incorporate benchmark information from the 2017 *Census of Manufactures* and the 2018 *Annual Survey of Manufactures*.

II.A. Incorporation of the Quarterly Survey of Plant Capacity into Monthly Estimates for IP Indexes Based on Production-Worker Hours

For the IP indexes based on production-worker hours, the 2018 revision incorporated information from the Quarterly Survey of Plant Capacity (QSPC) into the adjustment factor that aligns the monthly data with the annual benchmark indicator. For all IP indexes, the standard adjustment factor is calculated in two steps—first, by creating a historical ratio of the annual benchmark indicator to the annual average of the monthly (or quarterly) raw data, and second, by projecting this ratio ahead for years when benchmark data are not yet available. The annual adjustment factor is converted to a monthly frequency for use in the monthly IP indexes. For the IP indexes based on production-worker hours, the adjustment factors are effectively measures of productivity. The 2018 revision modified the standard adjustment factor formula for indexes based on production-worker hours by including data from the QSPC in the calculation.

For an IP index based on production-worker hours, the updated annual adjustment factor is constructed as the ratio of the benchmark indicator to the annual average of the production-worker hours index, as was done in the past. The principal innovation in the 2018 revision was in the projection of this annual adjustment factor past the end of the benchmark data; rather than being based solely on a time-series model, the projection was based on a model that also includes QSPC utilization rates when available. In addition, up until the 2018 revision, the annual adjustment factor was interpolated to a monthly frequency using a procedure that attempted to make the resulting monthly series as smooth as possible. With the 2018 revision, the resulting monthly adjustment factors take on some of the contour of the utilization rates from the QSPC if the annual averages of the QSPC rates were helpful in forecasting the annual adjustment factors.

II.B. COVID-19 Effects on the IP Estimates

The methods for estimating IP for March 2020 were modified to better capture production cutbacks caused by the COVID-19 pandemic. These modifications were necessary because the estimates for many IP indexes rely on data—namely, the BLS’s Current Establishment Survey (CES) measures of production-worker hours for the pay period that contains March 12—that were likely unrepresentative of the month, as a large number of establishments slowed or suspended production in late March to protect workers from the spread of COVID-19. The CES survey period for April is thought to be representative of the month, so no special adjustments

were made to the procedures for estimating April IP. The updated methods relied on weekly data by industry for initial claims for unemployment insurance. These additional data allowed for the estimation of industry-level employment in the weeks between the February and April BLS survey periods, which were then used to improve estimates for employment and production-worker hours for the month of March as a whole.

II.C. Other Changes to the Indexes

In addition to the incorporation of the QSPC data into the monthly indexes and the pandemic-related modification of the procedures for March 2020, the methods for estimating several other indexes were revised in the three years since the 2017 report to the OMB.

The following changes were instituted with the 2018 annual revision:

1. The IP index that previously combined **electricity generation** from fossil fuels with electricity generation from some other sources was broken into two published indexes—one for fossil fuels and another for “other technologies,” which are primarily based on renewable energy sources.
2. An annual benchmark index (from 1991 forward) for **drilling oil and gas wells** was introduced. This new benchmark index combines data on the amount of footage drilled from the American Petroleum Institute with data from Baker Hughes on the number of onshore and offshore drilling rigs in operation. Previously, the monthly index for this industry did not have an annual benchmark—the only source data for the IP index were the weighted onshore and offshore rig counts from Baker Hughes.
3. The benchmark price deflators for different types of **communications equipment** were updated and expanded to include 25 detailed annual price indexes that cover the full range of output in the communications equipment industry. The [price indexes](#) and additional explanatory detail are published on the Federal Reserve’s website.
4. Industry-level data for capital expenditures, capital stocks, and capital input used in the estimation of **industrial capacity** were converted to a 2012 North American Industry Classification System (NAICS) basis. Previously, these variables had been constructed on the basis of earlier NAICS systems.

The following changes were instituted with the 2019 annual revision:

1. The IP indexes for wool fabrics and for cotton and synthetic fabrics were consolidated into a single index for **broadwoven fabric mills**. The index for broadwoven fabric mills is based on production-worker hours from 2003 to the present and on other sources before 2003.

2. Four indexes (**artificial and synthetic fibers and filaments; copper refining; copper rolling, drawing, extruding, and alloying; and office furniture**) that had previously been based on physical product data were converted to a production-worker hours basis. This conversion was necessary because the physical product source data were discontinued.
3. Annual data on deliveries and prices from *Aviation Week* were incorporated into the IP index for **military aircraft**. The monthly IP index is based on production-worker hours, and it is also influenced by the value of expected and actual annual deliveries for different types of military aircraft for years when benchmark data are not yet available.
4. Data from the QSPC was incorporated as source data for the **capacity index for artificial and synthetic fibers and filaments** for the period beginning in 2017. For the period before 2017, the capacity index remains based on data for capacity in pounds from the Fiber Economics Bureau.
5. The published measures of **gross value of final products and nonindustrial supplies** were updated to be reported in billions of 2012 dollars, which is consistent with the base year used in the national income and product accounts published by the BEA.

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 0.27 percent during the period from January 1987–January 2020. The average revision to

the *percent change* in total IP, without regard to sign, from the first to the fourth estimates, was 0.22 percentage point during the January 1987–January 2020 period. In most cases (about 85 percent), the direction of change in output indicated by the first estimate for a given month is the same as that shown by the fourth estimate. 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 2016, the annual rate of change for total IP has ranged from a drop of 11.5 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 17 of those 25 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 2019, 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 0.12 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 0.21 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 21 annual revisions of industrial production and capacity utilization with their pre-revision levels. For each of the past 21 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 2019, the total industry capacity utilization rate was revised down 0.1 percentage point in the fourth quarter of 2016, up 0.5 percentage point in the fourth quarter of 2017, and up 0.8 percentage point in the fourth quarter of 2018. Over the past 21 years, the average revision to the most recent three years of total industry capacity utilization has been negative 0.1

percentage point; the average revision without regard to sign has been about 0.44 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 [March 23, 2018](#), and [March 27, 2019](#). Announcements about upcoming annual revisions to the G.17 appear at least three 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 2016 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 2016 value added in dollars and proportions for all series, as well as gross value weights in 2016 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. Since the last report to OMB, the following topics have been addressed:

- Estimates of the effects on IP from Hurricane Harvey (9/15/2017)
- Further information on the effects on IP of Hurricane Harvey plus information on the effects of Hurricane Irma (10/20/2017)
- Further information on the effects on IP of Hurricanes Harvey and Irma plus information on the effects of Hurricane Nate (11/16/2017)
- The effect of new automotive plants on the Federal Reserve’s capacity index (5/3/2018)
- A summary of procedures for estimating capacity for motor vehicles (5/3/2018)
- Information on updated price indexes for communications equipment (6/1/2018)
- Procedures for the calculation of seasonal factors for light vehicle sales (7/31/2018)
- The effect of the COVID-19 pandemic on the procedures used in making the initial estimates of IP for March 2020 (4/15/2020)
- The effect on IP from production of ventilators and personal protective equipment by unrelated industries that do not typically produce these goods (5/15/2020)
- Updated estimation procedures for the estimation of IP for March 2020 (5/15/2020)
- The effect on the growth rates of aggregate IP indexes from sharp changes in their components (6/16/2020)

IV.C. Publication Statistics

Most of the inquiries about industrial production and capacity utilization data are electronic. During 2019, the [main G.17 webpage](#) has averaged about 9,600 “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 25 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.

With the widespread availability of the G.17 release and its data in electronic form, there is no longer any demand from the public to receive releases by mail.

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 March 23, 2018, appeared in the G.17 release published mid-month from December 2017 through March 2018, with the exact publication date being first announced in February 2018. Notices of the March 27, 2019, annual revision were in the G.17 releases published in October 2018 through March 2019, with the precise date being announced in February 2019. An advance notice of the upcoming 2020 annual revision was first announced in the G.17 release published in January 2020, and the notice has been repeated in all subsequent releases; an exact publication date for the 2020 annual revision has not yet been determined.

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.

Before August 2015, on the morning of the publication of IP, the Federal Reserve provided embargoed access to the release via a secure electronic system for credentialed reporters. 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 response to COVID-19, the Federal Reserve discontinued embargoed access to reporters in March 2020. At this time (June 2020), it is unclear when embargoed access will return.

Measures are in place to ensure information is protected until its official release time. A limited number of staff directly involved in preparing 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

Since the 2017 OMB report, information from the G.17 release was disseminated to the public in advance of its scheduled publication time on one occasion. In August 2017, the G.17 was released approximately 35 minutes early; human error was the reason for the premature release.

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.