statistics f!ash

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December 2020

PRODUCTION IN CONSTRUCTION

- In December 2020, estimates for construction output decreased by 4.6% in the month-on-month series, after rising in November (+2.2%).
- In the 4th quarter of 2020, the seasonally adjusted index of production in construction fell by 3.4% when compared with the previous three months.
- Year on year, the unadjusted index for construction output grew by 1.8%, while the calendar adjusted index (21 calendar working days versus 20 in December 2019) was down 1.5%.
- Looking at annual growth rates, the whole of 2020 shows a fall of 7.5% in the unadjusted series, while the calendar adjusted index dropped by 8.2%. Following the impact of the COVID-19, this is the first annual fall in the calendar adjusted index since 2016 when it contracted by 0.1%, and the largest since 2013 when it decreased by 10.2%.

CHART 1. PRODUCTION IN CONSTRUCTION, SEASONALLY ADJUSTED INDEX AND THREE-MONTH MOVING AVERAGE
January 2015 – December 2020 (index, 2015=100)

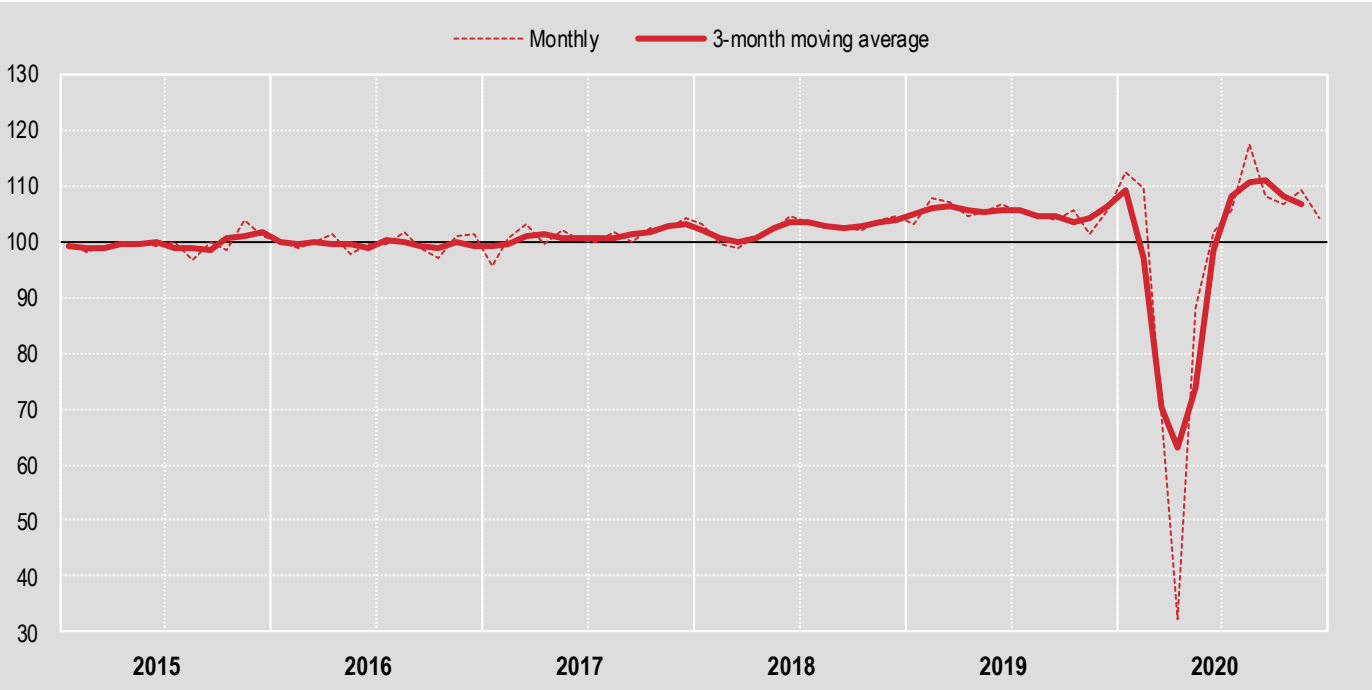

CHART 2. PRODUCTION IN CONSTRUCTION, MONTH ON SAME MONTH A YEAR AGO PERCENTAGE CHANGES

January 2016 – December 2020, calendar adjusted data (index, 2015=100)

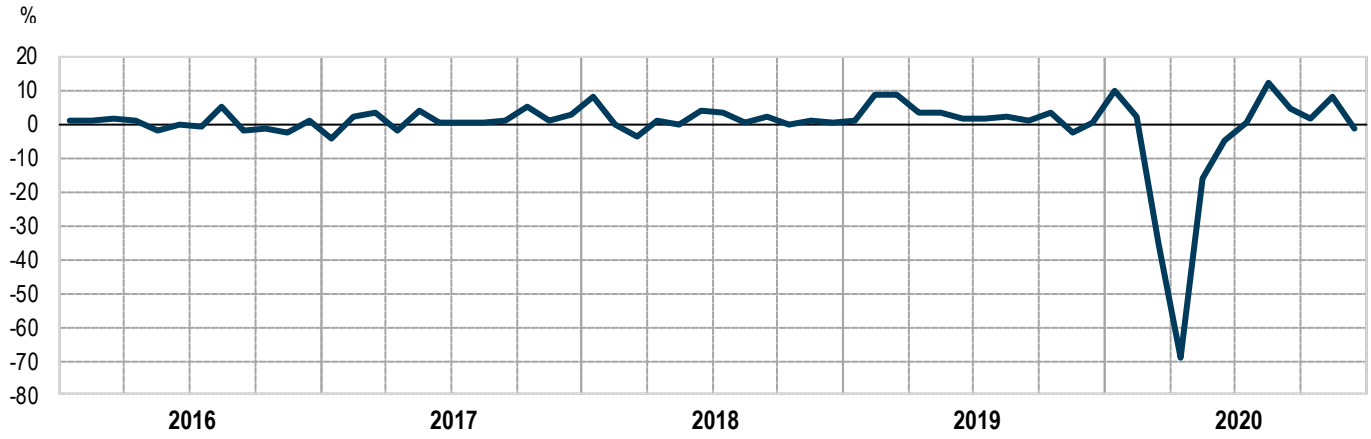

TABLE 1. PRODUCTION IN CONSTRUCTION, MONTHS ON PREVIOUS MONTHS AND ON SAME MONTHS A YEAR AGO PERCENTAGE CHANGES

December 2020 (a), seasonally adjusted, calendar adjusted and unadjusted data (index, 2015=100)

	Months on previous months		Month on same month a year ago	
	Dec 20 / Nov 20	Oct 20-Dec 20 / Jul 20-Sep 20	Dec 20 / Dec 19	Jan-Dec 20 / Jan-Dec 19
Production, seasonally adjusted	-4.6	-3.4	-	-
Production, calendar adjusted	-	-	-1.5	-8.2
Production, unadjusted	-	-	+1.8	-7.5

(a) Data are provisional and subject to revisions.

revisions

Prior month data are subject to revisions. New observations can change the seasonal factors that are applied to the whole time series. This leads to an additional monthly revision for seasonally adjusted data.

Table 2 shows revisions between the first publication and the latest estimates published in this bulletin. Revisions to year-on-year growth rate refer to not adjusted data. Updated time series are available at I.Stat data warehouse.

TABLE 2. REVISIONS TO GROWTH RATE, PERCENTAGE POINTS
November 2020 (index, 2015=100)

	Month-on-month change	Year-on-year change
	November 2020	
Production in construction	+0.5	+0.7

According to the survey revisions policy, the construction production series was revised starting from January 2017 and disseminated in this bulletin along with the release of indices for December 2020. Revisions are shown in the following table.

TABLE 3. REVISIONS TO YEAR-ON-YEAR GROWTH RATE, UNADJUSTED INDICES

	Year-on-year growth rate before 19/02/2021	Current year-on-year growth rate
2017		
January	+1.8	+2.6
February	-2.8	-2.3
March	+8.2	+8.6
April	-10.7	-10.0
May	+3.3	+4.1
June	-0.4	+0.4
July	-0.1	+0.3
August	-0.4	+0.3
September	-1.7	-2.1
October	+8.0	+8.7
November	0.0	+1.1
December	-4.8	-4.1
2018		
January	+12.2	+12.1
February	-1.1	-0.4
March	-8.9	-8.8
April	+6.9	+6.5
May	-0.4	0.0
June	+3.6	+4.1
July	+6.5	+7.0
August	0.0	+0.4
September	-0.9	-1.0
October	+2.8	+3.2
November	+0.6	+1.1
December	+2.6	+3.7
2019		
January	-0.3	+0.7
February	+8.2	+8.8
March	+6.9	+6.8
April	+4.3	+5.3
May	+2.0	+3.0
June	-2.7	-2.0
July	+4.6	+5.1
August	-1.3	-1.3
September	+4.3	+4.7
October	+2.7	+3.2
November	-6.0	-5.7
December	+2.2	+4.0

	Year-on-year growth rate before 19/02/2021	Current year-on-year growth rate
2020		
January	+4.8	+6.3
February	+2.2	+3.7
March	-33.3	-33.5
April	-67.9	-68.0
May	-21.4	-21.9
June	-2.4	-1.8
July	+0.3	+0.4
August	+13.4	+12.1
September	+8.3	+8.0
October	-2.0	-2.0

Working day adjusted data: working day adjusted data refer to the correction for calendar effect in a reference period (month or quarter) that may vary from year to year. This method allows a reconciliation of asymmetries for calendar differences such as the number of working days, the week days distribution in the reference period and the occurrence of public holidays (including moving holidays like Easter) and of a leap year. Working day adjusted data permit to better compare year-on-year growth rate and average annual growth rate.

Seasonally adjusted data: seasonally adjusted data refer to the statistical technique designed to remove fluctuations related to seasonal factors (such as weather conditions, administrative measures, etc.…) and calendar effects when relevant. Seasonal adjustment provides a clearer view for a trend analysis of a short-term index. Moreover, this method leads to a monthly revision of the previous years' series as updated time series components become available each month. Seasonal adjusted indices are therefore weighted in order to set the average of the reference year equal to 100; this method keeps the underlying pattern of the indices unchanged.

Calendar working days: days of the month other than Saturdays, Sundays and religious and secular public holidays.

Production in construction index: Production in construction index provides estimates of the construction output, measuring monthly changes in the sector. This indicator is defined in Regulation (EU) 2019/2152 of the European Parliament and of the Council on European business statistics, repealing 10 legal acts in the field of business statistics (EBS-Regulation) and the Commission Implementing Regulation 2020/1197 laying down technical specifications and arrangements pursuant to Regulation (EU) 2019/2152 (General Implementing Act).

Revisions: differences (in percentage points) between first publication and the latest estimates concerning the same reference period.

Short-term growth rate: short-term growth rate compares a period (typically a month or quarter) with the previous period, measuring the percentage change.

Year-on-year growth rate: Y-o-Y compares a period (typically a month or quarter) with the same period from the previous year, measuring the percentage change.

Introduction and regulatory framework

The monthly Index of Production in Construction (IPC) measures all construction activities, referring to both the production of new manufactured products and the maintenance of existing products (section F of the Nace Rev. 2 economic activity classification). The index is constructed on a fixed basis and uses 2015 as the reference year.

The legal basis for the STS indicators are the Regulation (EU) 2019/2152 of the European Parliament and of the Council on European business statistics, repealing 10 legal acts in the field of business statistics (EBS-Regulation) and the Commission Implementing Regulation 2020/1197 laying down technical specifications and arrangements pursuant to Regulation (EU) 2019/2152 (General Implementing Act).

The processing of the index is also provided for by the current Italian National Statistical Programme.

Calculation source and methodology

The production function

IPC is calculated applying an indirect method: the trend of the output is estimated using indices of the productive inputs (hours worked, intermediate inputs and physical capital), aggregated through the coefficients of the production function of the sector, referenced to the base year and estimated using a constant return to scale Cobb-Douglas formula.

The estimate of the production function has been obtained using elementary business data, deriving from the annual SBS data, referring to year 2015. Estimates are based on the following variables: value of production, cost for purchasing intermediate inputs (raw, subsidiary and consumer materials), total hours worked and value of tangible fixed assets that represent a proxy of the physical capital. Referring to small and medium-sized companies, data on the fixed assets have been derived from the statutory financial statements of the construction sector companies, to integrate data on firms with less than 100 employees, whose balance sheets do not report this kind of information. The Cobb-Douglas specification, linearised through the logarithmic transformation, has led to the following estimated regression model:

$$\log Y = 0.454 \log L + 0.448 \log ACQ + 0.098 \log K$$

where, in aggregated terms, Y is the value of production, L indicates the amount of hours worked, ACQ is the value of intermediate goods purchases and K approximates the volume of the physical capital used.

The parameters have been estimated adopting the ordinary least squares method.

Monthly update of input variables

For each reference month, the level of the IPC is obtained by applying the coefficients of the production function (estimated for base year 2015) to the monthly indices relating to the input.

The monthly trend of the input variables is calculated using different information sources. Data on hours worked are provided by Building Institutes Building Workers Welfare Funds (BWWF), bodies in charge, at a territorial level, of the management of several contractual terms and the resulting data collection on the ordinary hours effectively worked by workers and apprentices. Through a census survey based on the 98 provincial BWWF, Istat monthly gathers information on hours worked, the amount of workers and business to which hours are referred. The collected data are subject to revision to strength consistency. In addition, comparisons with other Istat surveys have shown that data from the BWWF sufficiently approximate the trend of the labour input of the sector.

The intermediate inputs are measured through an indicator constructed on data relating to monthly turnover of industrial products, deflated by the production price indices for the internal market. Starting from the national turnover indices at a group and class level (3 and 4 digits of the Ateco 2007 classification, derived from Nace rev.2), 7 types of economic activity have been selected, corresponding to the most used intermediate goods in the construction sector: production of cement, lime and plaster; manufacture of articles of concrete, cement and plaster; manufacture of clay building materials; manufacture of structural metal products; manufacture of builders carpentry and joinery; manufacture of builders' ware of plastic; cutting, shaping and finishing of stone.

Calculating the aggregate index of intermediate goods (or purchase index) results in implementing a two level weighting structure: the single elementary indices, corresponding to the previously mentioned economic activities, are multiplied by the weights of the turnover index and provide the branch indices; these latter are then aggregated with the coefficients derived from the intermediate cost matrix of the symmetrical table of the resources and uses of year 2014, the latest available among those produced by the National Accounting at the time of the 2015 rebasing.

With regard to the index referring to capital, the monthly estimate of the evolution of the capital stock is obtained from the annual estimates of National Accounting relating to the capital stock by ownership branch. Also taking into account the substantial inactivity of this aggregate, the monthly transformation of the annual data is performed hypothesizing uniform growth of the aggregate between one month and another, and then extrapolating the trend registered in the last year for which data are available. However, given the relatively reduced weight that the capital stock assumes in the production function, these approximations are expected to have a very limited influence on the estimation of the IPC pattern.

Seasonal adjustment

The Production in construction index is transmitted to Eurostat on a monthly basis, and it is issued in three versions: the “raw” index, which results from the calculation performed on original data, the calendar adjusted index and the seasonally adjusted index, both calculated through the TRAMO-SEATS software program.

In order to issue a set of indices with a common base and to allow Eurostat to carry out the necessary operations to construct the European aggregates more easily, the monthly indices, corrected for the calendar effect, are recalculated so as to take on a value of 100 in the base year and leave the series profile unaltered. The seasonal adjustment method used by TRAMO-SEATS is founded on the assumption that a monthly or quarterly time series may be represented as a combination (sum or product) of different, not directly observable components: a long term component, called ‘trend-cycle’, a seasonal component that captures periodic movements of the observed phenomenon, and an irregular component due to erratic factors. The IPC is seasonally adjusted using a multiplicative decomposition.

The seasonal adjustment parameters are reviewed annually and at the time of base recalculation, along with the annual IPC revision. The model currently in use provides for the presence of four outliers (three additive and one temporary change), the ‘leap year’ effect and the “Easter effect”.

Finally, since the addition of new monthly information allows a better evaluation of the different components of the series, each month seasonally adjusted series are recalculated.

Timeliness

Istat processes a provisional estimate of the monthly value of the IPC 45 days past the end of the reference month and transmits it confidentially to Eurostat, which uses the indices for the calculation of the European aggregates. Provisional estimates are then issued at national level approximately 48-50 days past the end of the reference month and reviewed 30 days later.

Coverage and territorial detail

Data are available at national level only.

Revisions

The production of statistics related to the IPC must take into account the availability of sources used for the measurement of the inputs. In fact, the monthly turnover indices are available at approximately 40 days past the reference month (production prices approximately 30 days past the reference month), while the measure of the hours worked is updated monthly and made definitive only at the closure of the annual financial statement of the BWWF. Moreover, the National Accounting releases estimates of the gross fixed capital and the capital stock once a year, usually 10-12 months past the reference year.

In addition to the periodic update of the reference base, the value of the IPC is periodically reviewed to keep inputs measures updated. The first revision, carried out in the month following the month of first issue, incorporates the belatedly received information on hours worked. With the second revision, definitive information concerning hours worked, industrial turnover and producer price indices are acquired.

Issue

Indices on construction output are issued on a monthly basis through the "Production in construction" press releases, available on the Istat website at http://www.istat.it/en.

The series of the updated indices are published on the Istat data warehouse (http://dati.istat.it/?lang=en) within the theme of Industry and Construction - Production, sub-theme – Production in Construction Index.

Measures adopted to handle the impact of pandemic emergency on the index of production in construction

In July, the COVID-19 pandemic emergency partially affected the data collection causing minor issues both in the survey on Building Workers Welfare Funds and in the industrial turnover survey. Overall, the majority of the units involved in both surveys provided the information required.

With reference to the seasonally adjustment procedure used to treat the indicators disseminated, the seasonal adjustment models were reviewed to manage the exceptional decreases recorded taking into consideration the Eurostat guidelines, available at the URL:

https://ec.europa.eu/eurostat/documents/10186/10693286/Time_series_treatment_guidance.pdf

Therefore, since March, the unusual size of the changes of the unadjusted time series were taken into account. For this purpose, additional regressors (the so-called additive outliers) were introduced in models for seasonal adjustment when statistically significant. This procedure, which aims at minimizing the revisions of past values of the seasonally adjusted series, was carried out also in December. As soon as the available information will allow an overall evaluation of the great volatility phase, models will be revised/modified if necessary. In that case, revisions of seasonally adjusted data may be larger than usual.

For technical and methodological information

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