

ECONOMIC AND SHORT TERM INDICES DIVISION

PRODUCTION INDICES SECTION

**INFORMATION NOTE ON THE REVISION
OF INDUSTRIAL PRODUCTION INDEX (IPI)**

BASE YEAR 2015 = 100.0

PIRAEUS, JULY 2019

Revision of the Industrial Production Index (IPI) (2015=100.0)

1. General

The Industrial Production Index (IPI) in Greece is been compiled by the Hellenic Statistical Authority (ELSTAT) since 1959. Initially, the Index covered only the main industrial sectors, and at a later stage, Mining-Quarrying and Electricity-Gas were added. The full-coverage Industrial Production Index was first compiled in 1962, with base year 1959=100.0, and it has been subsequently revised and rebased with base years 1970, 1980, 1993, 1995, 2000, 2005, 2010 and the latest revision took place with base year 2015 (2015=100.0). It should be noticed that during the revision in 1980, the index was renamed "Production Index of Mining - Quarrying, Manufacturing, Electricity - Natural Gas and Water Supply", yet from the revision in 2000 onwards, the Index took again its former name, namely "Industrial Production Index".

2. Revision of the Industrial Production Index - Statistical classification

Pursuant to Article 11 of the Council Regulation (EC) No 1165/98 concerning short-term statistics, short-term indices are revised every five years, particularly in calendar years ending at 0 or 5. The purpose of the revision of the Industrial Production Index is to adjust the index for structural changes of the industrial sectors by the renewal of the sample of surveyed enterprises as well as the weighting scheme of the divisions of economic activity.

In the current revision of the Industrial Production Index, with base year 2015 (2015 = 100.0), as in the previous revisions with base years 2005 (2005 = 100.0) and 2010 (2010 = 100.0), the statistical classification of economic activities in the European Community, NACE Rev.2 is applied, pursuant to Regulation (EC) 1893/2006 of the European Parliament and of the Council, along with the Statistical Classification of Products by Activity (CPA 2008), in conformity with Regulation (EC) 451/2008 of the European Parliament and of the Council.

The revised Industrial Production Index with base year 2015 (2015 = 100.0) according to NACE Rev.2 classification covers activities listed in Sections B: Mining and quarrying, C: Manufacturing, D: Electricity, gas, steam and air conditioning supply, and E: Water supply, sewerage, waste management and remediation activities.

The revision of the Industrial Production Index with base year 2015 (2015 = 100.0) is based on the results of the annual survey of the Production and Sales of Industrial Products (PRODCOM) and the Annual Industrial Survey, of the year 2015, all carried out by ELSTAT.

3. Purpose of the Industrial Production Index

The Industrial Production Index (IPI) meets national needs as well as needs to fulfil obligations arising from the implementation of European Regulations. As a monthly indicator, it expresses the monthly change in production volume in the Mining-Quarrying, Manufacturing, Electricity and Water Supply sectors. In particular, the purpose of the IPI is to compare the volume of the current, each time, monthly production in the above-mentioned sectors with the corresponding production of a given period, which is considered as the base period. The IPI shows the evolution of value added, at factor cost, of production, at constant prices.

4. Products covered by the survey

The surveyed products for the compilation of the revised IPI with base year 2015 (2015 = 100.0) amount to 325. Their selection is based on the results of the production / sales value at 8-digit and 6-digit level of the 2015 PRODCOM survey. The surveyed products are measured either in output

quantities or in production value or sales value, according to the specific situation prevailing in each branch of economic activity.

5. Surveyed units– Coverage

The sampling unit used is the KAU (Kind of Activity Unit), and the sample of enterprises surveyed for the Industrial Production Index (2015=100.0) comprises 1,263 enterprises out of the total population of 5,788 enterprises according to the 2015 PRODCOM survey. The majority of the enterprises of the IPI sample has employment of ten persons and more, similar to the PRODCOM survey. However, in some cases, depending on the representativeness of the product and of the turnover, enterprises that employ less than 10 persons are surveyed as well. The units of the sample are selected on the basis of purposive sampling so that they a) produce the selected products and b) represents at least 40% of the total production value at the 4-digit level of economic activity and 70% of the total production value at the 2-digit level of economic activity.

The surveyed enterprises of the sample cover more than 85% of the total production value of the 2015 PRODCOM survey.

6. Compilation of the Industrial Production Index

The revised Industrial Production Index (2015=100.0) refers to Greece total and is calculated by using of the Laspeyres formula, as follows:

For every four-digit level k of economic activity, the index is calculated using the formula:

$$I_k^{(t)} = \left(\sum_{i=1}^n w_{ki}^{(0)} \cdot \frac{q_{ki}^{(t)}}{q_{ki}^{(0)}} \right) \times 100$$

where:

n : the number of surveyed products at the four-digit level k

$q_{ki}^{(t)}$: the monthly quantity of product i produced by the surveyed enterprises at the four-digit level k during the month t

$q_{ki}^{(0)}$: the average monthly quantity of product i produced by the surveyed enterprises at the four-digit level k during the base year (2015), which is computed as follows:

$$q_{ki}^{(0)} = \frac{\sum_{t=1}^{12} q_{ki}^{(t)}}{12}$$

Moreover,

$w_{ki}^{(0)}$: the weighting coefficient of the product i at the four-digit level k, calculated as follows:

$$w_{ki}^{(0)} = \frac{p_{ki}^{(0)} \cdot q_{ki}^{(0)}}{\sum_i p_{ki}^{(0)} \cdot q_{ki}^{(0)}}$$

where:

$p_{ki}^{(0)}$: the price of product i at the four-digit level k during the base year 0,

$q_{ki}^{(0)}$: the quantity of the product i of four-digit level k in the base year 0, according to the survey data PRODCOM year 2015.

The indices at four-digit level refer to calendar months, which are unequal in terms of number of working days, and therefore these indices are not comparable. For comparability reasons, indices are adjusted on the basis of the number of working days and recalculated as typical month indices of equal duration $(I_k^{(t)})$. The adjustment is made by multiplying the indices of four-digit level k by an appropriate correction factor (a_t) which is different for each month and is calculated by dividing the mean monthly number of working days of the current year by the number of working days of month t as follows:

$$a_t = \frac{\bar{x}}{x_t}$$

where:

\bar{x} : the mean monthly number of working days of the current year,

x_t : the number of working days in the month t.

The number of working days is distinguished into the following categories according to the working hours of the production unit:

1. All the days of the year except Sundays and excludable days (e.g. holidays).
2. All the days of the year except excludable days.
3. All the days of the year and
4. Seasonal (which have production only in a few months during the year).

These weighting coefficient are reviewed annually.

At the higher levels of NACE Rev.2 (three-level, two-level, sections, Main Industrial Groupings etc), the unadjusted $(I^{(t)})$ and adjusted $(I'^{(t)})$ for working days index for the month t is compiled as follows:

$$I^{(t)} = \sum_k w_k \cdot I_k^{(t)}$$

$$I'^{(t)} = \sum_k w_k \cdot I_k'^{(t)}$$

where:

$$w_k = \frac{y_k}{y}$$

k : the four-digit level that belongs to the three-digit or two-digit and so on level,

y_k : the annual value-added of the enterprises of the four-digit level k for the base year, according to the results of the 2015 Annual Industrial Survey,

y : the annual value-added of all the four-digit levels which compose the three-digit or two-digit level etc, according to the results of the 2015 Annual Industrial Survey.

7. Adjustment

7.1 Deflation

For some products, the value rather than the volume is recorded. For these cases, the data are adjusted by removing price changes due to inflation in order to isolate the actual volume development. The deflation is carried out with base year 2015 and the deflators are calculated for the respective 8-digit or 6-digit level. The Producer Price Index in Industry is used as a deflator. Afterwards, the individual data are divided by the corresponding deflators, in order to obtain the deflated data. In total, 37% of the products surveyed for the compilation of the IPI are deflated.

7.2 Seasonal adjustment

In order to remove the impact of seasonality on the time-series and improve the comparability over time, the index is seasonally adjusted. The method used is the TRAMO-SEATS method with the use of JDemetra+ 2.0.0.

For the seasonal adjustment of the Industrial Production Index at 2-digit level of NACE Rev.2, at section level (B – Mining – Quarrying, C – Manufacturing, D – Electricity and E – Water Supply) and for the Main Industrial Groupings (MIGs), the direct approach is applied, namely each time-series is seasonally adjusted independently. For the overall Industrial Production Index, the indirect approach is applied, with the seasonally adjusted IPI being computed by aggregating the seasonally adjusted MIGs using appropriate weights.

The whole series with seasonally adjusted indices is recalculated every time a new observation is added in the time-series.

8. Backcasting of time series

The backcasted monthly and annual indices at each level k for the period January 2000 - December 2014 were calculated on the basis of the average annual indices of sections in 2015, according to the formula:

$$R_{k(2015)}^{(t)} = R_{k(2010)}^{(t)} \cdot b_k$$

where:

$$b_k = \frac{100}{\bar{R}_{k(2010)}^{(2015)}}$$

$R_{k(2015)}^{(t)}$: the index of the level k during the current period (month, year) t with base year 2015,

$R_{k(2010)}^{(t)}$: the index of the level k during the current period (month, year) t with base year 2010 and

$\bar{R}_{k(2010)}^{(2015)}$: the average annual index of the level k in the year 2015 with the base year 2010.

Indices from 2015 onwards have been calculated using the new weights and new production data of products.

9. Release and publication of data of the revised Industrial Production Index

The data of the Industrial Production Index are released on a monthly basis, 40 days after the end of the reference month t (t+40) and then are transmitted to Eurostat.

The time series and the metadata of the Industrial Production Index (base year 2015=100.0) are available on the website of ELSTAT <http://www.statistics.gr> at the link: <http://www.statistics.gr/en/statistics/-/publication/DKT21/->.

Finally, guidelines for the compilation of short-term statistics are available in the manual of Eurostat “Methodology of short-term business statistics - Interpretation and Guidelines”, which is available at: <http://ec.europa.eu/eurostat/web/short-term-business-statistics/methodology>.

The tables below present the two digit level divisions of economic activity according to NACE Rev.2 which include the products used for the compilation of the index (Table 1), the weighting coefficients of the two-digit divisions for the overall index (Table 2), the weighting coefficients by division within each section (Table 3), the aggregated weighting coefficients of the sections for the overall index (Table 4) and the weighting coefficients of main industrial groupings (Table 5).

TABLE 1. SECTIONS AND DIVISIONS OF ECONOMIC ACTIVITY OF NACE Rev. 2 CLASSIFICATION

B.	MINING AND QUARRYING
05	Mining of coal and lignite
06	Extraction of crude petroleum and natural gas
07	Mining of metal ores
08	Other mining and quarrying
09	Mining support service activities
C.	MANUFACTURING
10	Food
11	Beverages
12	Tobacco products
13	Textiles
14	Wearing apparel
15	Leather and related products
16	Wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Paper and paper products
18	Printing and reproduction of recorded media
19	Coke and refined petroleum products
20	Chemicals and chemical products
21	Basic pharmaceutical products and pharmaceutical preparations
22	Rubber and plastic products
23	Other non-metallic mineral products
24	Basic metals
25	Fabricated metal products, except machinery and equipment
26	Computers, electronic and optical products
27	Electrical equipment
28	Machinery and equipment n.e.c.
29	Motor vehicles, trailers and semi-trailers
30	Other transport equipment
31	Furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment
D.	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY
35	Electricity, gas, steam and air conditioning supply
E.	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES
36	Water collection, treatment and supply

**TABLE 2. WEIGHTING COEFFICIENTS BY DIVISIONS OF NACE Rev. 2
(2015 = 100.0)**

NACE Rev.2 code	Divisions of economic activity	Weighting coefficient (%)
05	Mining of coal and lignite	0.1188
06	Extraction of crude petroleum and natural gas	0.0003
07	Mining of metal ores	0.5685
08	Other mining and quarrying	1.6521
09	Mining support service activities	0.1238
10	Food	17.6977
11	Beverages	3.2560
12	Tobacco products	1.5593
13	Textiles	1.1904
14	Wearing apparel	1.2860
15	Leather and related products	0.3078
16	Wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.3673
17	Paper and paper products	1.9034
18	Printing and reproduction of recorded media	1.3561
19	Coke and refined petroleum products	11.6012
20	Chemicals and chemical products	3.8307
21	Basic pharmaceutical products and pharmaceutical preparations	3.8280
22	Rubber and plastic products	3.2588
23	Other non-metallic mineral products	3.7935
24	Basic metals	3.4377
25	Fabricated metal products, except machinery and equipment	4.7829
26	Computers, electronic and optical products	0.8583
27	Electrical equipment	1.8083
28	Machinery and equipment n.e.c.	1.8906
29	Motor vehicles, trailers and semi-trailers	0.2349
30	Other transport equipment	0.8909
31	Furniture	0.7991
32	Other manufacturing	0.6713
33	Repair and installation of machinery and equipment	2.0278
35	Electricity, gas, steam and air conditioning supply	21.2859
36	Water collection, treatment and supply	3.6126
		100.0000

**TABLE 3. WEIGHTING COEFFICIENTS BY DIVISION OF NACE Rev. 2 WITHIN EACH SECTION
(2015 = 100.0)**

NACE Rev.2 code	Weighting coefficient (%)
<u>MINING AND QUARRYING</u>	
05	4.82
06	0.01
07	23.08
08	67.07
09	5.02
	100.00
<u>MANUFACTURING</u>	
10	24.37
11	4.48
12	2.15
13	1.64
14	1.77
15	0.42
16	0.51
17	2.62
18	1.87
19	15.97
20	5.27
21	5.27
22	4.49
23	5.22
24	4.73
25	6.59
26	1.18
27	2.49
28	2.60
29	0.32
30	1.23
31	1.10
32	0.92
33	2.79
	100.00
<u>ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY</u>	
35	100.00
<u>WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES</u>	
36	100.00

**TABLE 4. WEIGHTING COEFFICIENTS OF NACE Rev. 2 SECTIONS FOR THE OVERALL INDUSTRIAL PRODUCTION INDEX
(2015 = 100.0)**

Section	Weighting coefficient (%)
B. MINING AND QUARRYING	2.46
C. MANUFACTURING	72.64
D. ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	21.29
E. WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDICATION ACTIVITIES	3.61
	100.00

**TABLE 5. WEIGHTING COEFFICIENTS OF MAIN INDUSTRIAL GROUPINGS
(2015 = 100.0)**

MAIN INDUSTRIAL GROUPINGS	Weighting coefficient (%)
1. ENERGY	36.62
2. INTERMEDIATE GOODS	23.53
3. CAPITAL GOODS	7.97
4. CONSUMER DURABLES	1.54
5. CONSUMER NON-DURABLES	30.34
	100.00