

مركز الإحصاء
STATISTICS CENTRE



Industrial producer price Index

Methodology

2024

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1. Overview

1.1. Introduction

The Statistics Centre of Abu Dhabi (SCAD) is the official authority responsible for calculating and issuing the Industrial Producer Price Index (IPPI) in the Emirate of Abu Dhabi, which is issued periodically every quarter. The IPPI is a statistical economic index that measures the change in industrial production prices (manufacturing industries) over time.

The IPPI serves a variety of goals and is used by policymakers, businesses, and national account compilers, and is key building block in SCAD's system of important economic indices for prices, production, and other areas.

The methodology used by SCAD in calculating the IPPI is closely aligned with the recommendations of the International Monetary Fund (IMF) where possible. Nevertheless, SCAD is currently undertaking a major review of its approach to ensure the IPPI is consistent with latest international best practices.

1.2. Concepts and definitions

A price index is a statistical tool that allows the comparison of the prices of a common set of products or product groups over time. The IPPI measures the change in industrial production prices (manufacturing industries) between adjacent periods. The IPPI basket is a fixed basket of products that is considered representative of producers output in Abu Dhabi. As such, the IPPI published by SCAD follows the concept of an output price index, measuring the prices that are passed on to buyers. This contrasts with an input price index, which only considers the cost of inputs into the production process, but not company profits or administrative costs. The compilation of the Abu Dhabi IPPI follows the key concepts and definitions outlined in Producer price index manual, theory and practice published jointly by the ILO, IMF and other international organizations.

1.3. Abu Dhabi special considerations

It should be noted that Abu Dhabi is an emirate and one of 7 emirates in UAE, therefore certain limitations apply in collecting and obtaining data. The IPPI however is based on a survey tailored to the emirate of Abu Dhabi and administrative data are available specifically for the Abu Dhabi region, therefore the IPPI compilation can be considered as accurate as otherwise for a national entity and is not subject to particular constraints.

1.4. Classifications and standards applied

SCAD aligns its data collection and processing, where possible, with ILO standards described in Producer price index manual, theory and practice. The Abu Dhabi IPPI adheres to the International Standard Industrial Classification of All Economic Activities (ISIC4), the latest revision of the internationally used industrial classification. This ensures consistency and comparability with other countries' IPPI indices.

1.5. Available breakdown

SCAD currently only publishes the IPPI for the manufacturing categories of ISIC4, and Mining and quarrying activities. SCAD makes the 2-digit ISIC4 breakdown for selected manufacturing sectors available to all users. The following 24 industries are covered by the Abu Dhabi PPI:

- 09 Mining Support Services Activities
- 10 Manufacture of food products
- 11 Manufacture of beverages
- 13 Manufacture of textiles
- 14 Manufacture of apparel
- 15 Manufacture of leather and other related products
- 16 Manufacture of wood, wood products, and cork, except for furniture; manufacture of items from straw and plaiting materials
- 17 Manufacture of paper and paper products
- 18 Printing and reproduction of recorded media
- 19 Manufacture of coke and refined petroleum products
- 20 Manufacture of chemicals and chemical products
- 21 Manufacture of pharmaceuticals, chemical, and botanical pharmaceutical products
- 22 Manufacture of rubber tires and tubes as well as renewing and rebuilding the external surfaces of rubber tires
- 23 Manufacture of other non-metallic minerals products
- 24 Manufacture of base metals
- 25 Manufacture of formed metal products, except machinery and equipment
- 26 Manufacture of computers and electronic and optical products
- 27 Manufacture of electrical equipment
- 28 Manufacture of machinery and equipment unclassified elsewhere
- 29 Manufacture of motor vehicles, trailers, and semi-trailers
- 30 Manufacture of other transportation equipment
- 31 Manufacture of furniture
- 32 Other manufacturing industries
- 33 Repair and installation of machinery and equipment

1.6. Importance and objectives of the indicator

The IPPI provides quarterly estimates of the rates of change in the output prices of manufacturing industries. It is one of the most important statistical indicators as it influences policy and private sector decisions and is used as input into further statistical analysis.

The main objectives of the IPPI are the following:

Providing the necessary data to help decision-and policy-makers and researchers to plan and make decisions that support the industrial sector.

Providing the necessary data for processing and drafting economic policies and plans.

Providing the data required to process the time series of economic data.

Main uses of the IPPI include:

Determining the trends of the IPPI within the Emirate of Abu Dhabi to assist decision-makers, policy-makers, and researchers in planning and making decisions that support the industrial sector.

Tracking changes in industrial producer prices, to aid government to process and draft economic policies and plans.

Adjusting economic time series for price changes in national accounts to convert them into constant prices.

Price escalation in sales and purchase contracts, especially in commercial contracts where the future date (point) of payment is specified.

Feeding analysis by international economic organizations, such as the IMF, where it is used as an evaluation and comparison tool.

2. Indicator information

2.1. Geographical coverage

The IPPI covers all the three geographical regions of Abu Dhabi. Emirate.

2.2. Statistical population

The Abu Dhabi IPPI reflects price changes of products sold by factories that are based in the three geographical divisions of Abu Dhabi. Price changes of products imported into Abu Dhabi or sold in Abu Dhabi by non-resident businesses are not within scope.

2.3. Periodicity

The Industrial IPPI report is issued on a quarterly basis, however given the importance of the IPPI and to better align with ILO recommendations and global best practices, SCAD is currently working on increasing the publication frequency to monthly.

2.4. Timeliness

The IPPI is issued during the following quarter after 45 days from the end of the reference quarter.

2.5. Units

The IPPI is an index that equals 100 in its base year (currently 2021).

2.6. Reference period

Price reference period: The reference period for price data collection is each calendar quarter, however as stated in the periodicity section, this is due to change to each calendar month.

Index reference period: Overall, the reference period for comparing price changes is the base year (currently 2021).

Weight reference period: the weights are based on the business survey conducted in 2019.

SCAD is currently working on updating index and weight reference periods to from 2019 to 2024.

3. Methodology

3.1. Alignment to international standards

The compilation of the IPPI broadly follows, where possible, the recommendations outlined in Producer price index manual, theory and practice published jointly by the ILO, IMF and other international organizations.¹ This means that procedures for data collection and validation, data imputation and indexation can be reconciled with the methodology outlined therein and is broadly consistent with other national statistics offices' best practices. Certain areas where SCAD falls short of international best practices are currently being addressed, such as increased periodicity, timeliness and quality adjustments of the survey data.

3.2. Data sources

SCAD relies on survey data for the IPPI.

3.2.1 Survey data

The prices of 390 products are collected from 91 establishments at the 2-digit level. The sample distribution covers 76 establishments in the Abu Dhabi region and 15 establishments in the Al Ain region.

3.2.1.1 Collection method

SCAD designed a questionnaire to specifically collect prices and quantities of industrial production based on the data required for the compilation of both the IPPI and the Industrial Production Index (IPI). The form including the questionnaire is sent to selected establishments on a monthly basis.

Price data are collected through field visits or by e-mail communication following prior coordination with the establishment and explanation of the form by trained enumerators.

3.2.1.2 Sample design

The survey uses the probability proportional to size (PPS) sampling method in which a size measure is available for each establishment unit before sampling and where the probability of selecting a unit is proportional to its size.

In the case of the IPPI, the size of the establishment is usually determined by its revenue, therefore businesses with higher revenues are more likely to be sampled. Overall, 91 establishments were drawn for the 2019 version of the IPPI.

Establishments from the Economic Surveys of 2019 were approved for use in the calculation of weights for the IPPI according to the classification ISIC4, and 390 products that represent economic activities were identified to form the IPPI basket.

The sample of establishments is distributed as follows

- Abu Dhabi: 76 establishments
- Al Ain: 15 establishments

¹ See <https://www.imf.org/en/Data/Statistics/cpi-manual>

3.2.2 Administrative data

The Abu Dhabi IPPI is full based on survey data. No administrative data has been used in the compilation of the IPPI.

3.3. Data validation and editing

3.3.1 Data validation

The data validation process begins with data entry verification. In addition, the prices collected in the current month are compared to the prices collected in the previous month at this stage to avoid entry errors and errors in collecting the prices of products that do not meet the required specifications.

The validation stages at the SCAD office can be summarized as follows:

1. The prices collected by the enumerators in the field and the data sent by e-mail are tracked and monitored before being entered and then compared to the previous months. If any unjustified difference in the prices is observed, whether in the increase or decrease, they shall be returned to the source, whether in the field or by e-mail, to avoid any errors.
2. Automated editing rules for price changes have been set that displays the good whose prices exceed the predefined limit of percentage change. The limits set are based on data from previous month of the establishments.

3.3.2 Missing data adjustments

Where value and volume data for a product exists, missing price information is replaced by the item unit value to form a price proxy (this is done by dividing the value by the volume).

Certain products or services require additional treatment, especially in the case of temporary or permanent unavailability.

- **Temporary unavailability:** when the price is not available from a specific source during the monthly or quarterly collection process, the values of these prices are estimated by reflecting the change in the prices for the similar establishment's prices.
- **Permanent unavailability of product:** if a product or material is missing for 3 consecutive collection periods or more, it is considered as permanently unavailable and is replaced by a quality of comparable price and specifications. An adjustment factor is derived by generating overlapping price series for the old and new item.
- **Permanent unavailability of establishment:** In the event of closure of the establishment, depending on the reasons for shutdown (e.g. internal or external reasons) the closed establishment is either replaced by an alternative establishment from the same ISIC4 industry, or the prices collected from the closed establishment are projected forward in line with price movements in the closest subgroup (only if no suitable alternative establishment can be found).
- **Special complexity of product:** Sometimes it is difficult for the establishment to clearly define a price for the product or service offered (e.g. the maintenance of ships, which depends on the volume of maintenance). In this case, the expert in the establishment is directly asked about the rate of change in prices

3.4. Data processing

The IPPI is compiled from the validated survey data, with no other data sources used. SCAD applies weights to each ISIC4 manufacturing industry (as well as corresponding sub-groups and products), reflecting their relative importance versus other industries and product, and compares the outcome to the historical IPPI series (including the reference year data) to construct the index and relevant growth rates.

3.4.1. Linking different datasets

Linking different datasets is not applicable to this publication.

3.4.2. Sample weighting

The IPPI basket weights are important variables in the index calculation process. The index weights are based on the results of an economic survey implemented by the Industry and Business Statistics unit at SCAD, using a sample representative of the Emirate of Abu Dhabi. The following main points were considered during the weight calculation process:

- The weight of the economic activity according to the second level of ISIC4 is based on the total revenues per industry relative to the total revenue across all industries.
- Following the first visit to the sample establishments and determination of the main important goods and services produced within each establishment, the establishment's weight was distributed over its main commodities based on the production value of each product.
- The following equation was used to calculate the weight based on revenue: Establishment's Weight = Establishment's total revenues / Grand total of revenues for all establishments * 100
- Weights are updated whenever the necessary data are available. SCAD has last updated its IPPI index weights in 2019 in line with the base year, however SCAD seeks to increase the update frequency to 2-5 years, as per ILO recommendations and international best practices.

3.4.3. Statistical calculation method

The index calculation follows the initial data editing and processing, which includes the following steps:

- data classification and coding process
- application of editing and validation rules
- approval of raw data
- imputation of missing values

Once the data is approved for statistical processing, indices

The quarterly average product price is obtained by calculating the average of the product price during the three months. Then the price relative is calculated at the product level within each establishment.

The IPPI is calculated according to the Laspeyres formula:

$$PPI_L = \sum \frac{P_{1i}}{P_{0i}} \times W_{0i}$$

PPI = Industrial Producer Price Index

P_1 = Current price

P_0 = Base year price

W_0 = Weight for the base year

Finally, the growth rates (relative change or IPPI inflation) is calculated by comparing the reference quarter with the previous quarter, according to the following equation:

$$R = \frac{PPI_c}{PPI_p} * 100 - 100$$

R = Quarterly or annual rate of change

PPI_c = Index for the current quarter

PPI_p = Index for the previous quarter / the same quarter of the previous year

3.4.4. Seasonal adjustment

SCAD does not disseminate a seasonally adjusted IPPI index. PPIs are not normally erratic and international best practices do not strictly involve the publication of a seasonally adjusted IPPI. SCAD includes the annual change in the IPPI which should eradicate most seasonal effects. Changing seasonal patterns and their impact on prices, such as Ramadan, are explicitly highlighted by SCAD in the IPPI publication. SCAD is in the process of developing a monthly IPPI publication which may require a seasonally adjusted version of the headline index, depending on the monthly volatility of producer prices.

3.4.5. Chain linking

SCAD does not currently produce a chain-linked IPPI.

4. Special cases

The APPI follows a similar concept as the industrial IPPI but is published separately and currently not related to the IPPI publication covered by this methodology document. Like the industrial IPPI, it follows an output price concept whereby prices of agricultural products faced by buyers are analyzed. A key difference is the data source: The APPI is fully based on administrative data from ADAFSA, whereas the IPPI is mostly survey based. A separate document exists for the APPI, detailing its methodology and classification – see APPI methodology documentation.

In general, both indices try to follow similar PPI compilation guidelines set out by the ILO.

5. Outputs and quality

5.1 Dissemination and accessibility

Data for the IPPI are published in excel and pdf format on the SCAD website. The pdf document highlights some key points with regard to the latest data and contains a chart of overall IPPI performance over the recent past. The excel file contains the full dataset for ISIC4 2-digit manufacturing industries for the reference period and a comparison to the previous year.

A brief methodology overview is included in each pdf publication. SCAD is also currently rolling out a metadata table for each indicator including key information on various indicator dimensions.

5.2. Length of available dataset

The IPPI dataset consists of a time series at the 2-digit ISIC4 detail for selected manufacturing industries, starting in 2012.

5.3. Methodology changes

No changes have been made to the Abu Dhabi IPPI since its inception in 2012.

A methodological reviewed in 2022, which updated the index and weight reference years to 2019 and the base year to 2021.

5.4. Data coherence and comparability.

When comparing the Abu Dhabi IPPI to other countries or regions' price indices, users should be aware of potential differences in concepts (such as input price vs output price measurement) as well as differences in compilation methods. In general, SCAD follows internationally recommended classification and indexation methodologies to facilitate cross-country comparisons. One key difference is the industry coverage – Abu Dhabi only publishes an IPPI for manufacturing industries but no whole-economy IPPI like most countries (i.e. based on a full set of ISIC4 industries including services). SCAD is working on expanding its industry coverage to obtain a more broad-based PPI in line with other countries.

5.5. Data accuracy and potential sources of errors

Data accuracy describes how closely the statistical indicator resembles the true value of the concept it measures; in this case the producer price changes in the Abu Dhabi economy. It is important to recognize that some items in the IPPI basket are more important than others. Therefore, SCAD makes use of the business survey to derive relative weights that determine how certain products impact the overall IPPI. The business survey is periodically used to update IPPI weights, to ensure the relative importance in the IPPI calculation remain relevant and reflective of real-world developments.

A number of sampling and non-sampling errors can arise along the design, collection, and calculation stages. SCAD takes several measures to mitigate errors as follows:

- **Sampling:** SCAD is planning to increase its sample size to be more representative of the emirate of Abu Dhabi. While a certain degree of sampling error cannot be avoided when taking a sample of observations as opposed to recording all quantities or all items in Abu Dhabi, raising the sample size can mitigate the bias substantially.

- **Data collection:** SCAD tries to minimize collection errors by periodically following up with establishments to ensure clarity on filling out the questionnaires. Well-trained enumerators and statisticians follow a strict validation procedure that requires passing several data checks before the data is submitted for data processing by the statistical office.
- **Data processing:** SCAD is continuously aligning the methodology with international standards and best practices, but certain scope for errors remains as it is difficult to perfectly account for quality changes in certain product groups, and available index formulas may slightly over or understate the true amount of quantity changes.

Accuracy tends to increase at higher levels of geographic and product aggregation due to the larger sample sizes of price data. Moreover, any distortions that can arise at elementary product indices (e.g. during price/quantity collection and editing, or in making quality adjustments) are more likely to cancel out on the aggregate level.

5.6. Revision policy

As per global standards, the original, non-seasonally adjusted IPPI series are revised only in special circumstances, such as correction of significant errors. However, the index reference/base period (i.e. the period in which the index equals 100) is changed periodically, resulting in a fully revised time series. Seasonally adjusted indexes, which may be added to the new monthly IPPI in the future, may be revised as extra quarters are included in the series that provide additional information on seasonal patterns.

5.7. Limitations of dataset

The industrial IPPI expresses price changes of a large number of commodities in a single index number, and the composite price movement of the index is dependent on its approach, in this case the fixed quantities of the IPPI basket that are proportional to the revenues of manufacturing establishments in Abu Dhabi. Consequently, considerations about the quality of the IPPI relate to the chosen concepts of IPPI compilation.

The IPPI focuses on tracking aggregate producer price developments and does therefore not accurately reflect price changes by different types of businesses, or by businesses that sell products in Abu Dhabi but are located elsewhere. It also exclusively focuses on manufacturing industries and cannot be used to draw conclusions about producer prices in other economic sectors.

Finally, the IPPI uses fixed weights based on base year quantities and therefore may omit some of the changes that have taken place in the production process since then, such as changing importance of the recorded products or new emerging services and materials.

6. Institutional environment

Statistics Centre – Abu Dhabi (SCAD), as the competent government entity in charge of organizing statistical activities in the emirate, plays a pivotal role in supporting decision-makers, and policymakers in Abu Dhabi. The statistical activities in the emirate are organized by SCAD, with its strategic partners

in the Statistical System of Abu Dhabi. The Law entrusts SCAD with the task of developing and organizing statistical in Abu Dhabi Emirate.

7. Glossary

Industrial producer price index:

A statistical tool for measuring the relative change in the prices of the basket of goods and services of industrial producers.

Price:

The market value of a unit of material or service, expressed in monetary terms. It can be defined as the value paid for a particular material or service.

Quarterly relative price change:

The increase or decrease rate in the basket items average prices of the current quarter compared to the basket items average prices of the previous quarter or the same quarter of the previous year.

Source:

is a productive economic establishment from which the prices of goods/ services of the IPPI basket are collected.

Base Period:

The year in which the IPPI equals 100. The base period serves as a benchmark for future periods, allowing economists to judge rates of increase and decrease in prices compared to that year.

Comparison Period:

The "current" or most recent period for which the index was calculated. However, the term is used to refer to any period that is being compared to the base period.

Base period prices: the prices of goods and services in the period designated as the base period, with which current prices are compared.

Base period prices:

The prices of goods and services in the period designated as the base period, with which current prices are compared.

Laspeyres Equation:

A mathematical equation developed by statistician Laspeyres to calculate price index numbers.



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