

Information on Producer Price Indices

1. Definitions

Producer Price Indices (PPIs) measure the rate of change in prices of products (i.e., goods and services) produced by establishments. These are basic prices that reflect the amount received by the producers exclusive of any taxes on products and transport and trade margins. PPIs provide measures of average movements of prices received by the producers of various goods and services.

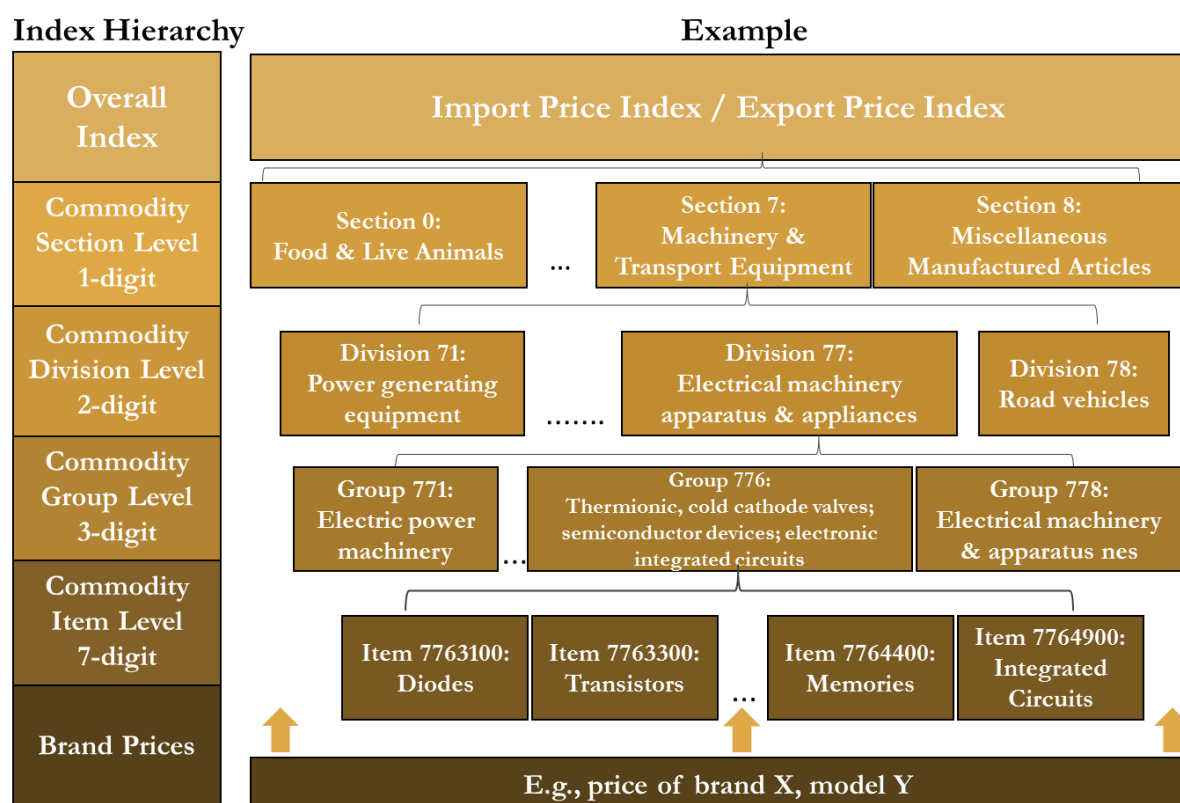
The Singapore Department of Statistics publishes the following International Trade PPIs, Goods PPIs and Services PPIs.

Producer Price Index		Description
International Trade Producer Price Indices for Goods	Import Price Index (IPI)	Tracks changes in the prices of goods imported into Singapore over time.
	Export Price Index (EPI)	Measures changes in the prices of goods exported out of Singapore over time.
Producer Price Indices for Goods	Singapore Manufactured Products Price Index (SMPPI)	Measures the changes in the prices of goods produced by local manufacturers for sale in the local and international markets.
	Domestic Supply Price Index (DSPI)	A composite index used for monitoring the price trends of goods used in the domestic economy i.e. locally manufactured goods and imports which are retained for use in the domestic economy.
Producer Price Indices for Services (SPPIs)	Sea Freight Transport Price Index (SFTPI)	Measures changes in the prices of transporting seaborne freight by Singapore-registered shipping companies.
	Warehousing and Storage Price Index (WSPI)	Measures changes in the prices of services produced by Singapore-registered warehousing and storage companies.
	Cargo Handling Price Index (CHPI)	Measures changes in the prices of services provided by Singapore-registered cargo handling companies.
	Freight Forwarding Price Index (FFPI)	Measures changes in the prices for freight transport arrangement on behalf of a shipper, via air, sea and land transportation modes provided by Singapore-registered freight forwarding companies and non-vessel operating common carriers.
	Telecommunication Services Price Index (TSPI)	Measures changes in the prices of telecommunications services produced by Singapore-registered telecommunications services providers.
	Computer Consultancy and Information Services Price Index (CISPI)	Measures changes in the prices of services produced by Singapore-registered information technology services providers.
	Accounting Services Price Index (ASPI)	Measures changes in the prices of services provided by Singapore-registered accounting establishments.

2. Classification, Coverage and Index Structure

2.1 International Trade Producer Price Indices for Goods and Producer Price Indices for Goods

The IPI, EPI, SMPPI and DSPI are classified according to the Standard International Trade Classification (SITC), version 4.1. The chart below illustrates the index structure for the four indices. There are nine commodity sections or SITC 1-digit within each index. Each commodity section forms a sub-index of the overall price index. The index structure is further disaggregated to the SITC 2-digit, 3-digit and followed by the 7-digit, which forms the elementary aggregate indices.



The table below shows examples of product items collected for each commodity section.

Commodity Section	Examples of Product Item
Food & Live Animals	Rice, Milk powder, Pastries
Beverage & Tobacco	Wine, Liquor, Cigarettes
Crude Materials (Excl Fuels)	Rubber, Timber, Marble, Copper
Mineral Fuels Lubricants & Related Materials	Crude petroleum, Diesel fuel, LPG
Animal & Vegetable Oils Fats & Waxes	Soya bean oil, Sesame oil
Chemicals & Chemical Products	Methanol, Glues, Solder paste, Plastics
Manufactured Goods	Plain plywood, Envelopes, Diapers, Mixed concrete, Sign plates, Door frames
Machinery & Transport Equipment	Integrated circuits, Cranes, Refrigerators, Printers
Miscellaneous Manufactured Articles	Clothes, Spectacle lenses, Printed books

2.2 Producer Price Indices for Services

The SPPIs are aligned to the Singapore Standard Industrial Classification (SSIC) 2020. Each SPPI has its own unique index structure that is constructed based on the key services or activities provided by its industry.

Services Producer Price Index	Coverage by SSIC 2020 ¹	Index Structure
Sea Freight Transport Price Index (2022=100)	<ul style="list-style-type: none"> • 50021-Shipping companies, including chartering of ships and boats with crew (freight) • Branches of foreign shipping lines, Non-Vessel Operating Common Carrier (NVOCC), charterers and operators of barges, tugboats and bumboats (freight) are excluded. 	Three main indices : <ol style="list-style-type: none"> Containerised freight transport, Dry bulk freight transport, and Liquid bulk and gas freight transport.
Warehousing and Storage Price Index (2021=100)	<ul style="list-style-type: none"> • 52101-General warehousing • 52102-Refrigerated warehousing and storage • 52103-Storage for dangerous goods • 52109-Specialised storage n.e.c. • Operation of self-storage facilities and renting of vacant space are excluded. 	Two main indices : <ol style="list-style-type: none"> General & refrigerated warehousing, and Dangerous goods storage.
Cargo Handling Price Index (2021=100)	<ul style="list-style-type: none"> • 52241-Container depot services • 52242-Crane services for all industries except construction • 52243-Stevedoring services • Operation of port terminal facilities is excluded. 	Three main indices : <ol style="list-style-type: none"> Container depot services, Crane services, and Stevedoring services.
Freight Forwarding Price Index (2022=100)	<ul style="list-style-type: none"> • 52292-Freight transport arrangement • Courier activities, insurance providers, travel agencies and tour operators are excluded 	Three main indices : <ol style="list-style-type: none"> Sea freight forwarding, Air freight forwarding, and Land freight forwarding.
Telecommunication Services Price Index (2021=100)	<ul style="list-style-type: none"> • 61011-Wired telecommunications network operation • 61012-Mobile cellular and other wireless telecommunications network operation • 61092-Internet access providers, include ISPs • 61099-Other telecommunications activities n.e.c. • Third party telco providers, radio and TV broadcast, sales of products are excluded. 	Two main indices : <ol style="list-style-type: none"> Wired and wireless services, and Internet access providers and other telecommunications services.

Computer Consultancy and Information Services Price Index (2021=100)	<ul style="list-style-type: none"> • 6201-Computer programming activities • 6202-Information technology consulting and computer facilities management activities • 6209-Other information technology and computer service activities • 6311-Data analytics processing, hosting and related activities • 6320-Online marketplaces • Internet search engines, software publishing and licensing, repair of computers and peripheral equipment and news agency activities are excluded. 	Two main indices : i. Computer programming & consultancy, and ii. Information services & online marketplace.
Accounting Services Price Index (2022=100)	<ul style="list-style-type: none"> • 69201-Accounting and auditing services (including tax advisory services) • 69202-Book-keeping services (excluding online marketplaces) • Accounting training services and software are excluded. 	Two main indices : i. Accounting and auditing, and ii. Book-keeping.

3. Weights

The PPIs are base weighted indices. Weights are key elements in the construction of a PPI. Within a PPI, each individual product is assigned a weight to represent its relative importance within the index's basket. The PPI is computed by multiplying the price relatives of the individual products by their weights. As price change across products is not uniform over time, the weights of a product, as well as its price development will determine the impact on the overall index.

The main sources of weights information are the establishment surveys e.g. Census of Manufacturing Activities, DOS industry surveys etc and administrative data e.g. merchandise trade statistics.

3.1 International Trade Producer Price Indices for Goods and Producer Price Indices for Goods

The table below illustrates the weights of the 2018-based IPI, EPI, SMPPI and DSPI at the SITC 1-Digit level. The weights for the IPI and EPI were compiled from the 2018 import and export values while that of the SMPPI were compiled using the 2017 production values. For the DSPI, the weights were based on the 2017 retained imports (imports less re-exports) and domestic production sales (total sales of local producers less exports values).

Commodity Section (SITC 1-Digit)	IPI	EPI	SMPPI	DSPI
Food & Live Animals	2.5%	2.4%	2.6%	3.2%
Beverage & Tobacco	1.1%	1.0%	0.3%	0.3%

Crude Materials (Excl Fuels)	0.8%	0.9%	0.6%	0.8%
Mineral Fuels Lubricants & Related Materials	25.9%	19.8%	14.1%	27.9%
Animal & Vegetable Oils, Fats & Waxes	0.3%	0.0%	0.1%	0.4%
Chemicals & Chemical Products	8.9%	15.3%	21.7%	11.4%
Manufactured Goods	5.0%	3.2%	2.8%	4.9%
Machinery & Transport Equipment	46.9%	48.4%	49.0%	43.0%
Miscellaneous Manufactured Articles	8.6%	9.1%	8.8%	8.0%

3.2 Producer Price Indices for Services

The SPPI weights are derived from operating revenues obtained mainly from the DOS surveys and supplemented by administrative data. The table below shows the base year (price reference year), weight reference year and weights breakdown at the main indices level of each SPPI.

SPPI	Base Year	Weight Reference Year	Main Indices (weights %)*
SFTPI	2022	2020	<ul style="list-style-type: none"> • Containerised freight transport (42.5%) • Dry bulk freight transport (29.4%) • Liquid bulk and gas freight transport (28.1%)
WSPI	2021	2019	<ul style="list-style-type: none"> • General & refrigerated warehousing (55.4%) • Dangerous goods storage (44.6%)
CHPI	2021	2019	<ul style="list-style-type: none"> • Container depot services (25.4%) • Crane services (43.5%) • Stevedoring services (31.2%)
FFPI	2022	2019	<ul style="list-style-type: none"> • Sea freight forwarding (54.5%) • Air freight forwarding (41.4%) • Land freight forwarding (4.1%)
TSPI	2021	2020	<ul style="list-style-type: none"> • Wired and wireless services (39.7%) • Internet access providers and other telecommunications services (60.2%)
CISPI	2021	2019	<ul style="list-style-type: none"> • Computer programming & consultancy (61.5%) • Information services & online marketplace (38.5%)
ASPI	2022	2021	<ul style="list-style-type: none"> • Accounting and auditing (89.5%) • Book-keeping (10.5%)

*Weights may not sum up exactly due to rounding

4. Price Collections

Prices are collected mainly through price surveys, online sources and administrative sources. The price surveys are conducted under the Statistics Act. Respondents are asked to provide the prices of a product with fixed specifications.

The following summarises the main pricing methods used to compile the price indices from the different types of price data for price surveys.

- Actual transaction prices or list prices
- Contract pricing: use of prices in long term contracts for the repeated delivery of the same or similar service
- Unit value method: based on observed revenue and quantity data of homogenous products
- Component pricing method: specifies a representative product and estimates a price based on the prices of identifiable components that determines the overall price
- Model pricing method: applied in cases where the service provided is unique. Respondents are asked to provide a price quote for this standardised product
- Time based methods: a service is specified in terms of the time spent providing a particular service and not necessarily in terms of the actual service provided

Non-responses are imputed for, in accordance with International Monetary Fund guidelines and aligned with overseas National Statistical Offices' best practices.

4.1 International Trade Producer Price Indices for Goods and Producer Price Indices for Goods

Each month, approximately 5,000 prices of products from 2,000 companies are collected for the compilation of the IPI, EPI and SMPPI. Main pricing methods used are actual transacted prices and contract prices. Administrative and online price data are used where relevant to minimise respondent burden.

4.2 Producer Price Indices for Services

Each quarter, approximately 3,500 prices of service products from 700 companies are collected for the compilation of these indices. The table below lists the main pricing methods used for each SPPI.

SPPI	Main Pricing Methods
SFTPI	Direct use of prices of repeated services and contract prices
WSPI	Direct use of prices of repeated services and unit value pricing
CHPI	Direct use of prices of repeated services
FFPI	Direct use of prices of repeated services
TSPI	Direct use of prices of repeated services, unit value pricing and list prices
CISPI	Direct use of prices of repeated services, time-based pricing, percentage fee pricing and contract fees pricing
ASPI	Direct use of prices of repeated services and time-based pricing

5. Index Formulae and Calculation

5.1 International Trade Producer Price Indices for Goods and Producer Price Indices for Goods

The IPI and EPI are fixed-weight Laspeyres price indices where the price and weight reference period are aligned to the same year.

$$PLas(m) = \sum w^b \left(\frac{p^t}{p^0} \right) \quad \begin{array}{l} p^t = \text{prices of period } t, \quad p^0 = \text{prices in the price reference period } 0; \\ w^b = \text{weights shares in weights reference period } 0 \end{array}$$

The SMPPI is a fixed-weight modified Laspeyres price index where the weight reference period precedes the price reference period.

$$PLas(m) = \sum w^b \left(\frac{p^t}{p^0} \right) \quad \begin{array}{l} p^t = \text{prices of period } t, \quad p^0 = \text{prices in the price reference period } 0; \\ w^b = \text{weights shares in weights reference period } b \end{array}$$

Within each PPI, homogeneous products are grouped together within the lowest index groupings or elementary aggregates. These price indices are then built progressively to the higher level indices and finally to the overall index.

For IPI, EPI, and SMPPI, the price indices for elementary aggregates are calculated using geometric means while the higher level price indices are computed using weighted arithmetic means.

The illustration below shows the index computation for the IPI and EPI.

Price Index at Commodity Brand Level: $I_{it} = P_{it}/P_{i0} \times 100$

Where, I_{it} = price relative of i-th commodity brand in period t relative to base period
 P_{it} = price of i-th commodity brand in period t
 P_{i0} = price of i-th commodity brand in the base period

Price Index at Commodity Item Level: $I_{jt} = \prod (I_{ijt})^{1/N}$

Where, I_{jt} = the price relative of the j-th commodity item in period t
 N = the number of commodity brands within the j-th commodity item

Price Index at Commodity Group Level: $I_{kt} = \sum W_j \times I_{jt}$

Where, I_{kt} = the price relative of the k-th commodity group in period t
 W_j = the relative weight of the j-th commodity item
 $\sum W_j = 1$

Price Index at Commodity Division Level: $I_{mt} = \sum W_k \times I_{kt}$

Where, I_{mt} = price relative of the m-th commodity division in period t
 W_k = the relative weight of the k-th commodity group
 $\sum W_k = 1$

Price Index at Commodity Section Level: $I_{rt} = \sum W_m \times I_{mt}$

Where, I_{rt} = price relative of the r-th commodity section in period t

W_m = the relative weight of the m-th commodity division
 $\sum W_m = 1$

Price Index at Overall Level: $I_t = \sum W_r \times I_{rt}$

Where, I_t = price index in period t

W_r = the relative weight of the r-th commodity section

$\sum W_r = 1$

5.1 Domestic Supply Price Index

The DSPI, a composite index, is computed from the 7-digit SITC level (also known as commodity item), which is the lowest level grouping of the SMPPI and IPI. The price index for a commodity item D_{it} , in the DSPI is computed as follows:

$$D_{it} = K_i S_{it} + (1 - K_i) M_{it}$$

Where, K_i = proportion of supply of the i^{th} item from local source

S_{it} = price index of the i^{th} item from the SMPPI (local component) for period t

M_{it} = price index of the i^{th} item from the IPI (imported component) for period t

Once the commodity item price index for the DSPI is computed, the various price indices at the higher aggregated levels can be calculated similar to the other PPIs.

5.2 Producer Price Indices for Services

The SPPIs use the weighted arithmetic mean Modified Laspeyres formula where the weight reference period preceded the price reference period.

At the most detailed level, a price relative is derived for each service product by taking the ratio of the current quarter's price to its corresponding base period price. The price relatives of the service products together with their respective weights are aggregated to form the sub-indices, and consequently the overall SPPI. The formula used for index computation is presented below:

Price Index at Overall Level: $I_t = \sum W_k \times I_{kt}$

Where, I_t = price index in period t

W_k = the relative weight of the k^{th} service type

$\sum W_k = 1$

Price Index at Service Type Level: $I_{kt} = \sum_{j=1}^{n_k} w_j \times PR_{jt}$

Where, I_{kt} = price index of the k^{th} service type in period t

PR_{jt} = price relative of j^{th} service product in period t

n_k = number of service products within k^{th} service type

w_j = relative weight of the j^{th} service product

$\sum w_j = W_k$

Price Relative at Service Product Level: $PR_{jt} = \frac{P_{jt}}{P_{j0}} \times 100$

Where, PR_{jt} = price relative of j^{th} service product in period t relative to base period

P_{jt} = price of j^{th} service product in period t

P_{j0} = price of j^{th} service product in the base period

6. Rebasing

Rebasing exercises are conducted periodically to update the weights and ensure that the 'baskets' of products remain representative of the changing trade, production, domestic supply and service industry patterns. This ranges from 4 to 6 years depending on the market conditions. Information on the rebasing of the IPI, EPI, SMPPI, DSPI and selected SPPIs is available from the following articles:

- [Rebasing of Import and Export Price Indices \(Base Year 2018=100\)](#)
- [Rebasing of Singapore Manufactured Products and Domestic Supply Price Indices \(Base Year 2018=100\)](#)
- [Rebasing of Cargo Handling Price Index and Warehousing & Storage Price Index \(Base Year 2021\)](#)
- [Rebasing of Computer Consultancy & Information Services Price Index \(Base Year 2021\)](#)
- [Rebasing of Telecommunication Services Price Index \(Base Year 2021\)](#)
- [Rebasing of Accounting Services Price Index \(Base Year 2022\)](#)
- [Rebasing of Freight Forwarding Price Index \(Base Year 2022\)](#)
- [Rebasing of Sea Freight Transport Price Index \(Base Year 2022\)](#)

7. Rescaling

The price indices prior to the new base year can be linked to the new series to facilitate comparison across base years, via a Linked Coefficient that is calculated from the overlapping year.

7.1 Linking the Old Based Price Index Series to the New Based Price Index Series

Example : Linking the old Iron & Steel Index series for IPI prior to 2018, to the 2018-based Iron & Steel Index (2018=100)

1) Calculate the linked coefficient

Year	Iron & Steel Index (2012=100)	Iron & Steel Index (2018=100)	Linked Coefficient
2018	93.4	100.0	$100.0 \div 93.4 = 1.071$

2) Re-scaling the old series to the 2018-based series using the Linked Coefficient

Year	Month	Iron & Steel Index (2012=100)	Iron & Steel Index (2018=100)
2016	Dec	84.0	$84.0 \times 1.071 = 90.0$
2017	Jan	85.6	$85.6 \times 1.071 = 91.7$

7.2 Maintaining the Old Index Reference Period

Example : Linking the new 2018-based Iron & Steel Index series for IPI to the 2012-based Iron & Steel Index (2012=100)

1) Calculate the linked coefficient

Year	Iron & Steel Index (2018=100)	Iron & Steel Index (2012=100)	Linked Coefficient
2018	100.0	93.4	$93.4 \div 100.0 = 0.934$

2) Re-scaling the new series to the 2012-based series using the Linked Coefficient

Year	Month	Iron & Steel Index (2018=100)	Iron & Steel Index (2012=100)
2019	Jan	98.6	$98.6 \times 0.934 = 92.1$
2019	Feb	102.4	$102.4 \times 0.934 = 95.6$

8. Uses of Price Indices

The producer price indices are important in supporting policy making and in calculating the real growth and productivity figures of the Singapore economy. They facilitate the analysis of macro-economic conditions and in monitoring the inflationary situation, are often seen as advanced indicators of price changes throughout the economy.

8.1 Price Deflators

SMPPI is a price deflator of manufacturing output and is used in the compilation of the Index of Industrial Production. IPI and EPI are used to deflate external trade values to obtain trade volume or real trade adjusted for inflation. DSPI and EPI are used as price deflators of wholesale trade.

The SPPIs are used to deflate nominal values of services industries for the compilation of disaggregated real value added. They are also used by agencies to monitor short term inflationary trends of the services industries.

8.2 Research and Monitoring of Price Trends

PPIs are used extensively by Government policy users, international organisations and research firms to monitor the macro-economic conditions and inflationary situation. For example, they can be used to analyse drivers behind consumer price developments.

PPIs can be used by companies to track the movements of selling prices in their field and evaluate their competitiveness.

8.3 Index Escalation

PPIs are official indices published by DOS and may be used in contracts to agree on price increases/decreases over time.