

Information Paper Series

Rebasing of Sea Freight Transport Price Index (Base Year 2022)

information paper
on
prices statistics

**REBASING OF
SEA FREIGHT TRANSPORT PRICE INDEX (SFTPI)
(Base Year 2022)**

Singapore Department of Statistics

June 2023

Papers in this Information Paper Series are intended to inform and clarify conceptual and methodological changes and improvements in official statistics. The views expressed are based on the latest methodological developments in the international statistical community. Statistical estimates presented in the papers are based on new or revised official statistics compiled from the best available data. Comments and suggestions are welcome.

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CONTENTS

I	INTRODUCTION.....	7
II	DESCRIPTION OF 2022-BASED SFTPI.....	7
	Index Coverage and Structure.....	7
	Index Computation	9
	Weights.....	9
	Pricing Method.....	9
	Data Collection	9
III	KEY CHANGES IN THE 2022-BASED SFTPI	10
	Data Collection Refinement	10
	New Sample of Companies and Service Products	10
	Comparison of Weighting Patterns	11
	Comparison of Price Trends.....	12
IV	LINKING OF HISTORICAL SERIES	13
V	DISSEMINATION OF DATA.....	13
	GLOSSARY.....	14
	APPENDICES	17
	APPENDIX I: Detailed Scope and Coverage of Activities for SFTPI.....	18
	APPENDIX II: Index Computation of SFTPI.....	19
	APPENDIX III: Weights and Sub-Indices of 2022-based SFTPI.....	20

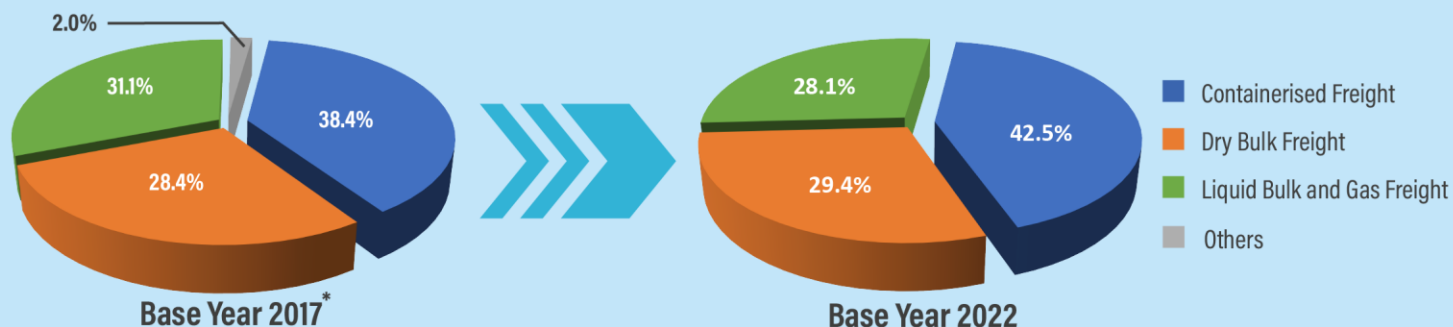
REBASING OF SEA FREIGHT TRANSPORT PRICE INDEX (SFTPI)



The SFTPI measures changes in the prices of transporting seaborne freight by Singapore-registered shipping companies.

Weighting Pattern

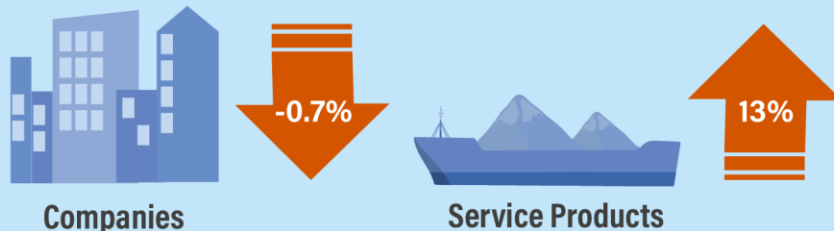
In the 2022-based SFTPI, the Containerised Freight Transport Price Index continued to be the largest weight contributor at 42.5 per cent, increasing by 4.1 per cent from the 2017-based SFTPI, attributed mainly to a surge in demand for container shipping across key trade routes. This is followed by the Dry Bulk Freight Transport Price Index (29.4 per cent) and Liquid Bulk and Gas Freight Transport Price Index (28.1 per cent).



*Weights do not sum up exactly due to rounding

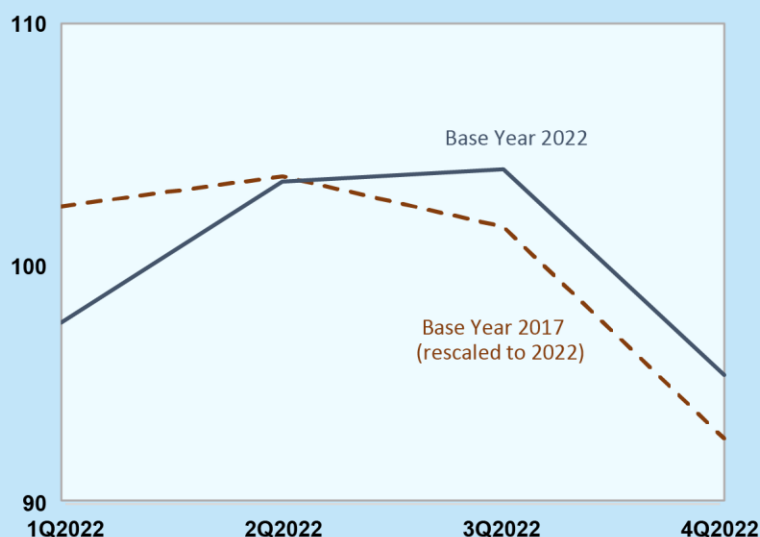
Sample of Companies and Products

The sampling frame was refreshed to improve on the coverage and representativeness of companies while reducing respondent burden on smaller firms.



Key Trends

The overall SFTPI for both base years generally trended in the same direction except in 3Q2022. The deviation in price trends was mainly attributed to the difference in composition of service products and weighing patterns of the sub-indices.



REBASING OF SEA FREIGHT TRANSPORT PRICE INDEX (SFTPI) (Base Year 2022)

I INTRODUCTION

The Department of Statistics (DOS) has rebased the Sea Freight Transport Price Index (SFTPI) from the base year of 2017 to 2022. The rebasing exercise is conducted periodically to ensure that the coverage of service products and the weighting structure of the index are representative of current activities and market share of the industry.

2 The SFTPI is a services producer price index that measures changes in the prices of transporting seaborne freight by Singapore-registered shipping companies. The index is used to monitor price trends and as inputs to estimate the real growth of the freight water transport industry.

3 This information paper provides details on the 2022-based SFTPI and includes key changes from the rebasing exercise, such as the weight comparison and price movement between the new 2022-based and the 2017-based price series.

II DESCRIPTION OF 2022-BASED SFTPI

Index Coverage and Structure

4 The SFTPI covers Singapore-registered shipping companies classified under the following Singapore Standard Industrial Classification (SSIC) 2020¹ code. It includes companies that operate or charter out ocean-going vessels with crew for the transportation of freight on either scheduled or non-scheduled services. Shipping trusts that provide ship and/or boat chartering services with crew are also included.

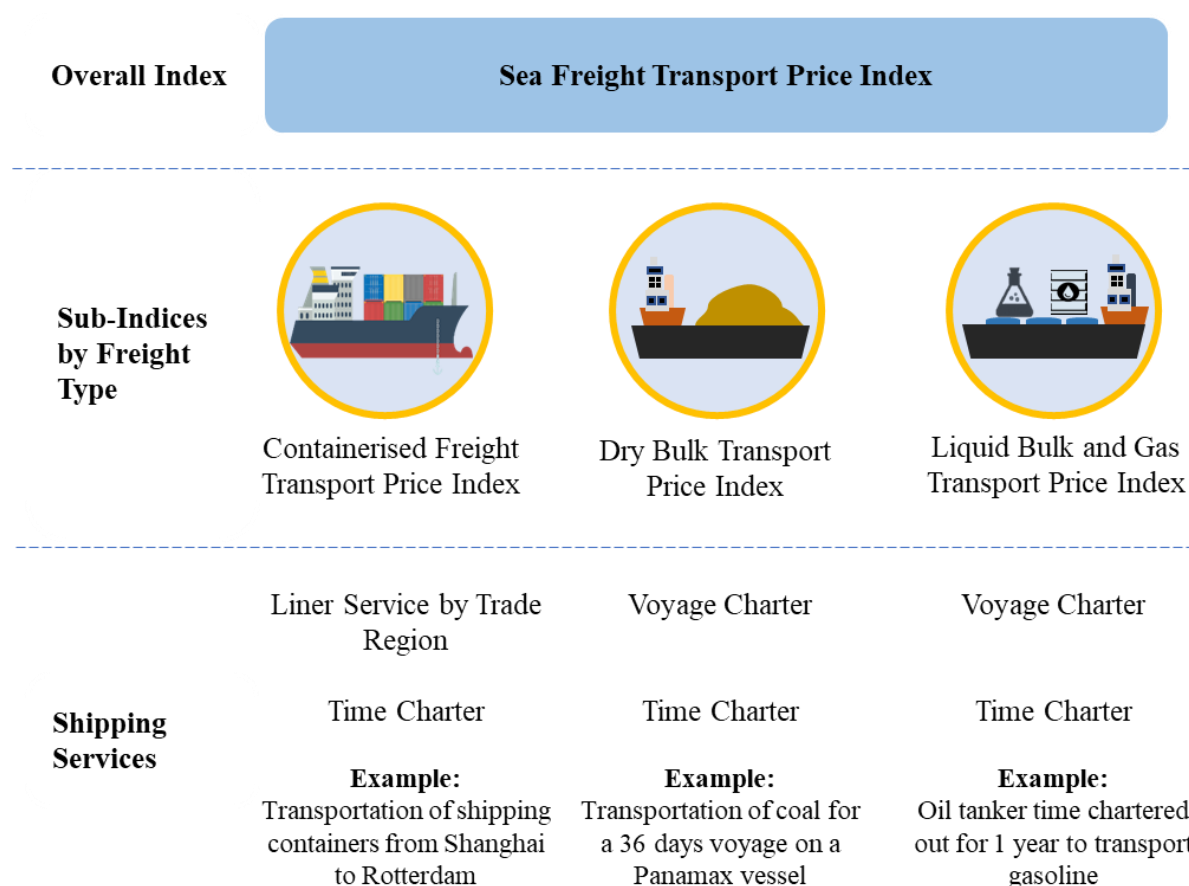
SSIC 2020 Code	Description
50021	Shipping companies, including chartering of ships and boats with crew (freight)

¹ The SSIC 2020 publication is available at: <https://www.singstat.gov.sg/standards/standards-and-classifications/ssic>

5 Exclusions from the scope of the index include branches of shipping lines, operators and charterers of barges, tugboats and bumboats (freight), Non-Vessel Operating Common Carriers (NVOCC) and bareboat chartering. The detailed scope and coverage of activities under SFTPI are indicated in **Appendix I**.

6 The index structure of SFTPI is presented in **Figure 1**. The SFTPI comprises three major sub-indices according to the type of freight transported – Containerised Freight² Transport Price Index, Dry Bulk² Transport Price Index, and Liquid Bulk and Gas³ Transport Price Index. The sub-indices are compiled and estimated based on the type of shipping service(s) provided (i.e., scheduled services and non-scheduled services such as time charter or voyage charter) to transport the specified freight type. The transport of containerised freight further takes into account the scheduled services of selected major trade regions (e.g., Intra-Asia, Asia-North America).

Figure 1: Index Structure of SFTPI



² Containerised freight refers to cargoes in container boxes

² Dry bulk refers to transportation of dry commodity cargoes in large unpacked quantities, e.g. coal, ore

³ Liquid bulk and gas refers to clean petroleum products, dirty petroleum products and liquified gas

Index Computation

7 A price index is compiled from the weights and prices of the service products selected in the index basket. The SFTPI uses the weighted arithmetic mean (AM) Modified Laspeyres formula where the weight reference period of 2020 preceded the price reference period of 2022. The price relative for each service product is derived 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. The weighted average of these sub-indices will form the overall SFTPI. More details on the index computation are available in **Appendix II**.

Weights

8 The weight of a service product reflects its relative importance within the basket and determines the impact that its price change will have on the overall index. The weights for the SFTPI and its sub-indices are derived based on the 2020 operating revenue of shipping companies obtained from DOS's surveys⁴ and supplemented with administrative data. Within the sub-indices, the weights are further distributed to the service products based on the revenue contribution of its company within the sample. When more than one service product is provided by a company, the assigned weight is evenly distributed.

Pricing Method

9 The main pricing method used is the direct use of prices of repeated services. Respondents are asked to provide prices of repeatable services of fixed specifications that are typical of their businesses. For scheduled containerised freight services (i.e., liner services) and non-scheduled voyage charter services, actual transacted prices of transporting freight from a named port of loading to a named port of discharge are collected. For non-scheduled time charter services, contract prices to charter out specific vessels with crew are used.

Data Collection

10 Monthly prices of the service products were collected from a representative sample of shipping companies via a quarterly survey. When a service is discontinued, the respondent is requested to provide a replacement service with similar characteristics. To facilitate timely compilation, the quarterly survey collects price information for the last month of the previous quarter and the first two months of the reference quarter (e.g., March to May, June to August).

⁴ Source: Department of Statistics' Annual Survey of Services 2020 and Survey of Shipping Services 2021

Prices for the third month of the reference quarter are imputed or estimated. The index is revised when actual prices are collected in the subsequent quarter.

11 A total of 140 companies were selected for pricing in the 2022-based SFTPI survey, covering 339 sea freight transport service products.

III KEY CHANGES IN THE 2022-BASED SFTPI

Data Collection Refinement

12 Voyage charter is a type of ship chartering whereby the charterer agrees to lease the vessel for a specific voyage. Due to the nature of the charter agreement, the pricing of voyage charter services via the direct use of prices of repeated services is challenging. To circumvent this challenge, companies that provide voyage charter services are requested to provide the Time Charter Equivalent (TCE) rates where available. The TCE is a shipping industry measure to compare spot rates on a period-to-period basis. For companies that are unable to provide TCE rates, DOS collects the gross revenue and expenses pertaining to a specific voyage to derive the average daily net income of a vessel, similar to TCE.

New Sample of Companies and Service Products

13 In business surveys, the distribution of operating revenue within the industry tends to be skewed as a small number of units typically account for a large share of the total operating revenue. To improve the coverage of respondents for the survey and reduce respondent burden on smaller companies, DOS adopted the Lavalley-Hidiroglou method for stratified sampling of the shipping companies' operating revenue under SSIC 50021 during the rebasing exercise. This resulted in a marginal reduction of sample size from the 2017-based SFTPI to the 2022-based SFTPI, while accounting for a 77 per cent share of total operating revenue in the freight water transport industry.

14 During the rebasing exercise, the sampling frame for the 2022-based SFTPI was refreshed to include new companies from DOS's business register. Companies were to provide a list of service products with detailed service specifications and actual transacted prices that were representative of their respective businesses. These service products and prices were monitored throughout the base period, and clarifications with the respondents were made where necessary to ensure that price changes were captured appropriately.

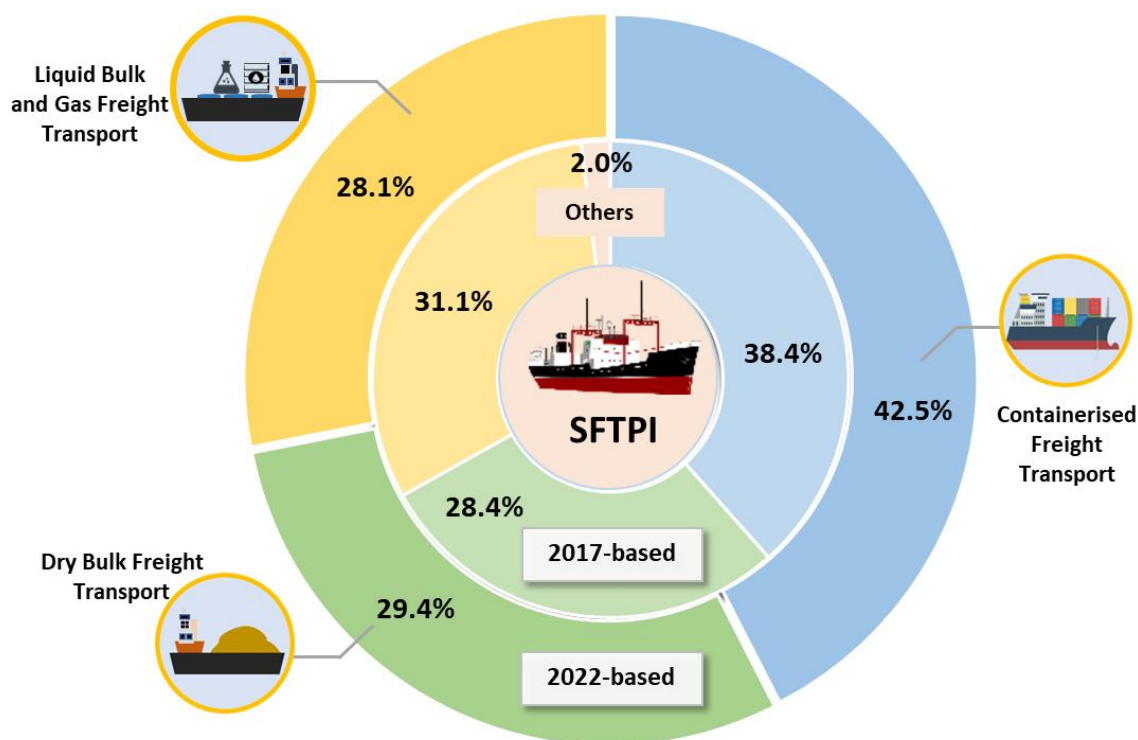
15 Subsequently, the in-scope service products were reviewed along with the existing products from the 2017-based SFTPI to determine the final frame for the 2022-based SFTPI. This was to ensure that the eventual list of surveyed companies and service products in the 2022-based SFTPI was representative of the current activities and market share of the freight water transport industry.

16 While the total number of companies decreased marginally from the 2017-based index, this was compensated by a 13 per cent increase in the number of service products to better track price changes.

Comparison of Weighting Patterns

17 **Figure 2** compares the weights distribution of the 2017-based and 2022-based SFTPI. In the 2022-based SFTPI, the Containerised Freight Transport Price Index continued to be the largest contributor to the weights at 42.5 per cent, increasing 4.1 per cent from the 2017-based SFTPI mainly due to a surge in demand for container shipping across key trade routes. This is followed by the Dry Bulk Freight Transport Price Index (29.4 per cent) and Liquid Bulk and Gas Freight Transport Price Index (28.1 per cent).

Figure 2: Weights of 2017-based and 2022-based SFTPI

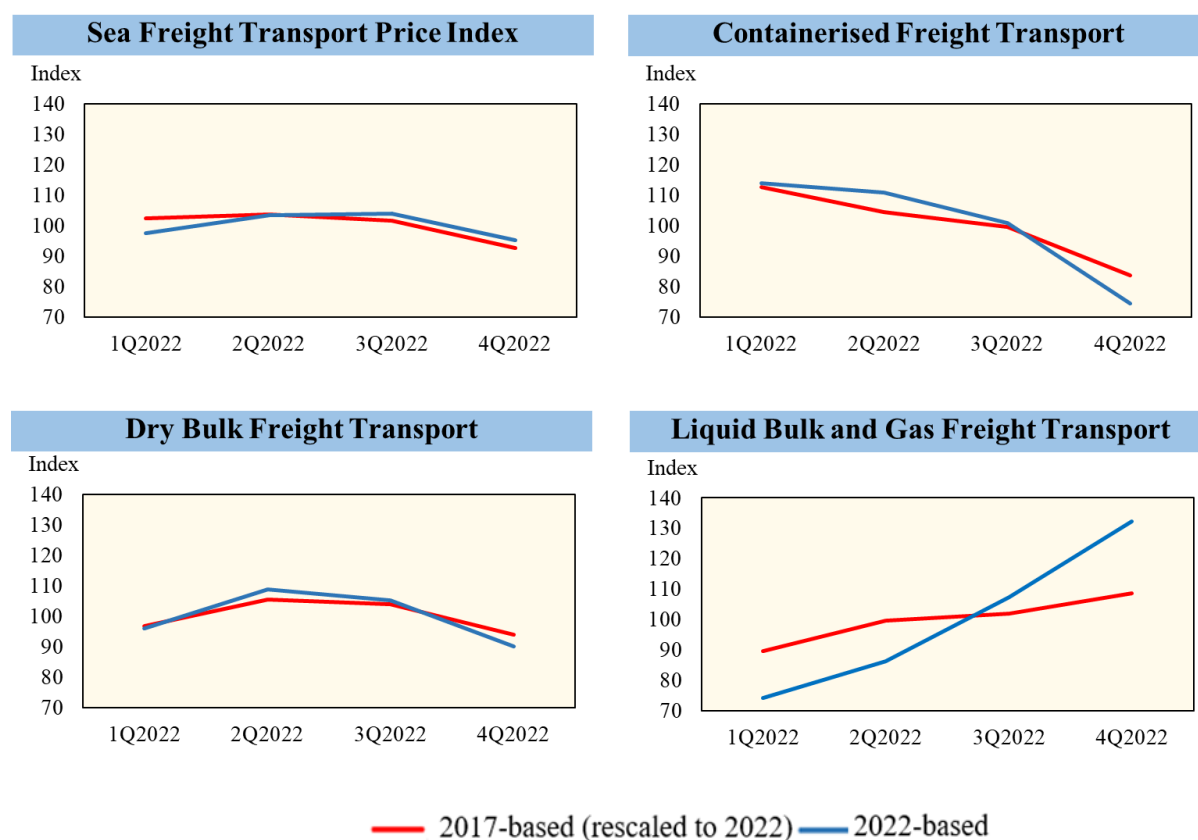


Comparison of Price Trends

18 **Figure 3** compares the price trends between the 2022-based and 2017-based SFTPI over the four quarters in 2022, which is the overlapping period between the two base years. More information on the weights and indices of the 2022-based SFTPI is available in **Appendix III**.

19 The overall SFTPI for both base years generally trended in the same direction except in 3Q2022. The deviation in price trends was mainly attributed to the different composition of service products and weighing patterns of the sub-indices.

Figure 3: 2022-based and 2017-based SFTPI (rescaled to 2022) for First to Fourth Quarter 2022



IV LINKING OF HISTORICAL SERIES

20 To facilitate comparison of price changes over time, the price indices prior to 2022 are linked to the new series by re-scaling them to the new base year 2022 level. The linking is obtained through the following mathematical procedure:

$$\text{Linked (2022-based) Index} = \text{2017-based Index} \times \text{Linked Coefficient}$$

where the Linked Coefficient is the ratio of the annual 2022-based index in 2022 to the annual 2017-based index in 2022.

V DISSEMINATION OF DATA

21 Data on the SFTPI are released in the quarterly Services Producer Price Indices (SPPI) report, on the 25th day of the 3rd month after the reference quarter, or the next working day if it falls on a Saturday, Sunday or Public Holiday. The report can be accessed on the SingStat Website (<https://go.gov.sg/report-sppi>) or through the QR code appended below. The indices can also be downloaded via the SingStat Table Builder (<https://www.singstat.gov.sg/tablebuilder>).



Singapore Department of Statistics
June 2023

GLOSSARY

GLOSSARY OF TERMS AND DEFINITIONS

Base Year:

Also known as the price reference year, that is, the period whose prices appear in the denominators of the price relatives used to calculate the index. It is also understood to be the year which the index is set equal to 100.

Direct Use of Prices of Repeated Services:

A pricing method that represents the ideal of using real transacted prices, or less preferably list prices, of the same service product in successive survey periods.

Laspeyres Price Index:

A price index defined as a fixed-weight index that uses the basket of products of the base year.

Linked Coefficient:

A ratio that is applied to a new index series to form a continuous series with an old index series (or vice versa).

Linking:

The technique used to join two consecutive sequences of price indices that overlap in one or more periods to form one continuous series.

Pricing Method:

A procedure solely concerned with data relating to prices that is put in place by index compilers to make price data suitable for use in index compilation. Carried out prior to compiling the lowest level indices, the selection of the appropriate pricing method for a service product or industry is largely determined by the pricing mechanism employed for that product or industry.

Price Relative:

The ratio of the price of an individual service product in one period to the price of that same service product in another period.

Rebasing Exercise:

A series of activities undertaken to update the weighting structure and basket of products in an index to a new base year. It involves studying the industry changes, obtaining the latest available weighting information (either from administrative sources and/or survey data), and sampling new companies on top of the routine price surveys to determine the final basket of products that is representative of the current market structure. The rebasing exercise starts before the base year and typically requires at least fifteen months to complete.

Services Producer Price Indices:

The services producer price indices (SPPIs) are designed to trace price movements that reflect the supply and demand conditions in the service markets, with a view to facilitate the analyses of macro-economic conditions and monitor inflationary pressures. SPPIs are also used as deflators in national accounts.

Service Specifications:

A detailed list of the characteristics that identify an individual sampled service product. Its purpose is to ensure that a consistent price is collected from period to period relating to a consistent service product with the same terms of sale in each period.

Weights:

A set of numbers used to weight price relatives. Weights and price relatives are averaged to obtain higher level price indices.

Weight Reference Period:

The period in which the detailed weights were determined for the index.

APPENDICES

APPENDIX I: Detailed Scope and Coverage of Activities for SFTPI

Shipping companies, including chartering of ships and boats with crew (freight)

Includes:

- transport of freight on ships and/or boats with crew designed for operating on sea and/or coastal waters
- shipping trusts that provide ship and/or boat chartering services with crew

Excludes:

- branches of foreign shipping lines
- operators and charterers of barges, tugboats and bumboats (freight)
- Non-Vessel Operating Common Carrier (NVOCC)
- bareboat chartering
- renting of water transport equipment without operator
- chartering of oil rigs
- chartering of offshore accommodation

APPENDIX II: Index Computation of SFTPI

SFTPI uses the weighted arithmetic mean Modified Laspeyres formula where the weight reference period of 2020 preceded the price reference period of 2022.

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 SFTPI. 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

APPENDIX III: Weights and Sub-Indices of 2022-based SFTPI

Price Index	Weights	2022			
		1Q	2Q	3Q	4Q
SEA FREIGHT TRANSPORT	10,000	97.5	103.4	103.9	95.3
Containerised Freight Transport	4,247	113.9	111.0	100.7	74.4
Dry Bulk Freight Transport	2,944	96.0	108.7	105.2	90.1
Liquid Bulk and Gas Freight Transport	2,809	74.1	86.3	107.3	132.2

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