

Information Paper Series

Rebasing of Telecommunication Services Price Index (Base Year 2021)

information paper
on
prices statistics

**REBASING OF
TELECOMMUNICATION SERVICES PRICE INDEX (TSPI)
(Base Year 2021)**

Singapore Department of Statistics

June 2022

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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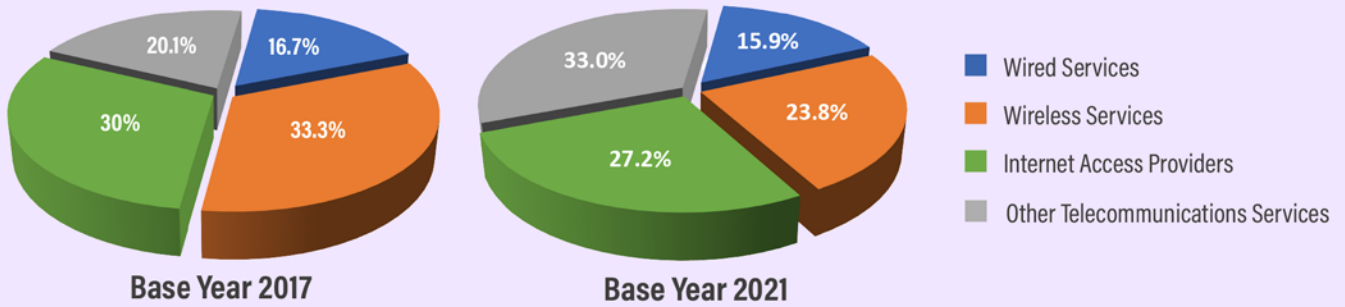
REBASING OF TELECOMMUNICATION SERVICES PRICE INDEX (TSPI)



The TSPI measures changes in the prices of services provided by Singapore-registered telecommunication services providers.

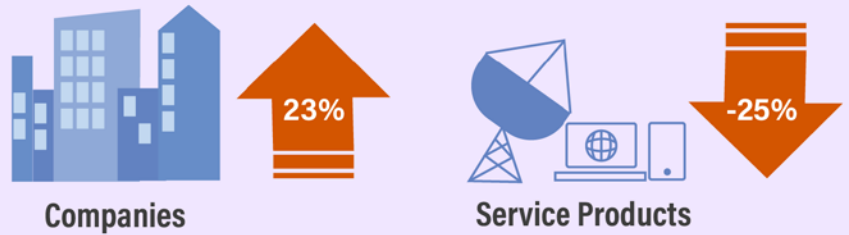
Weights Distribution

The weight shares of Wired Services and Internet Access Providers remained relatively similar across both base years. Over the four years, with the entrance of more new Service Based Operators into the industry, it boosted the weight share of Other Telecommunication Services.



Sample of Companies and Products

The sampling frame was refreshed to reflect changes in the industry. With the emergence of new telecommunication service providers, the number of companies was expanded. With improvement in sampling method, the number of service products could be reduced.



Key Trends

The price trend of the overall TSPI for both base years were generally on a downward trend, with differences in magnitude due to changes in the baskets of service products and weights.



REBASING OF TELECOMMUNICATION SERVICES PRICE INDEX (TSPI) (Base Year 2021)

I INTRODUCTION

The Department of Statistics (DOS) has rebased the Telecommunication Services Price Index (TSPI) from the base year of 2017 to 2021. The rebasing exercise is conducted periodically to ensure that the coverage of service products and the weighting structure of the index are representative of the current activities and market share of the industry.

2 The TSPI is a services producer price index that measures changes in the prices of services provided by Singapore-registered telecommunication service providers. The index is used to monitor price trends and as inputs to estimate the real growth of the telecommunication industry.

3 This information paper provides details on the 2021-based TSPI, and includes key changes from the rebasing, such as the weight comparison and price movement between the new 2021-based and the 2017-based price series.

II DESCRIPTION OF 2021-BASED TSPI

Index Coverage and Structure

4 The TSPI covers Singapore-registered telecommunication service providers which are primarily engaged in the activities of providing telecommunication-related services, under the following Singapore Standard Industrial Classification (SSIC) 2020¹ codes:

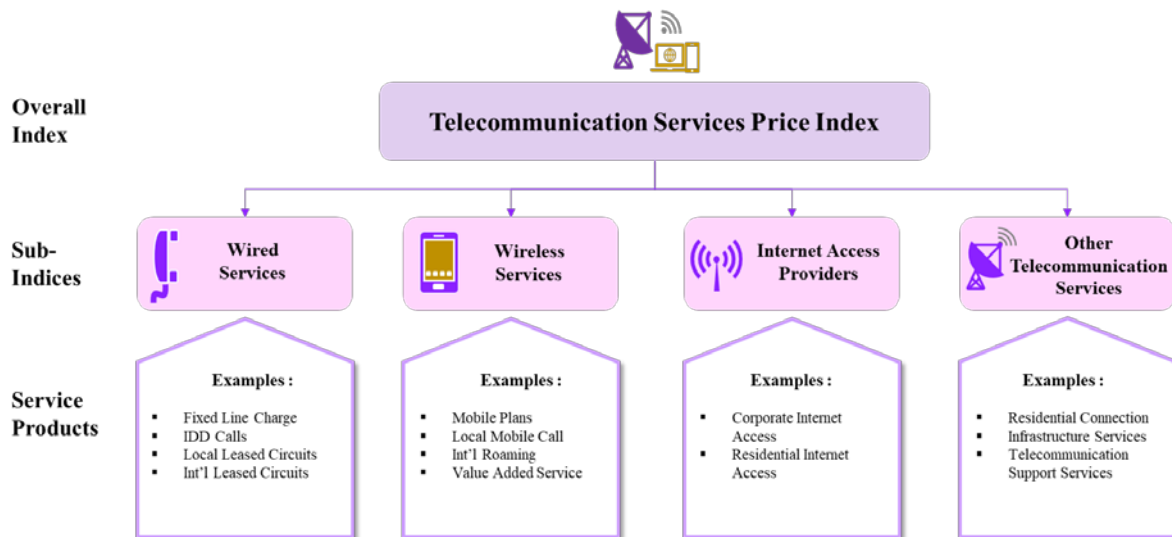
SSIC 2020 Codes	Description
61011	Wired telecommunications network operation
61012	Mobile cellular and other wireless telecommunications network operation
61092	Internet access providers, include ISPs
61099	Other telecommunications activities n.e.c.

¹ The SSIC 2020 publication is available at: <https://go.gov.sg/ssicreport>

5 Companies from SSIC 61013 (Satellite Telecommunications Network Operation) and 61091 (Telecommunications Resellers/Third Part Telecommunications Providers) are not covered in the TSPI since these sub-sectors have relative low market shares in the telecommunication industry. Services such as sales of products are also excluded from the index coverage.

6 The index structure of TSPI is presented in Figure 1. Within the TSPI, there are four sub-indices, namely Wired Telecommunication Services, Wireless Telecommunication Services, Internet Access Providers and Other Telecommunication Services not elsewhere classified, below which are the prices of individual service products.

Figure 1: Index Structure of TSPI



Index Computation

7 The TSPI uses the weighted arithmetic mean (AM) Modified Laspeyres formula where the weight reference period of 2020 preceded the price reference period of 2021. Price relatives of the service products, together with their respective weights, are aggregated to form the service type sub-indices, followed by the overall index. More details on the index computation are available in Appendix I.

Weights

8 The weights of the service index are derived from the 2020 operating revenue of the telecommunication service providers from DOS's surveys² and supplemented with administrative data. Within a service index, the weights are further distributed to the service products based on the companies' revenue contribution. If a company provides more than one service product, its assigned weight is proportionally distributed.

Pricing Method

9 The TSPI uses a combination of pricing methods comprising unit value, direct use of prices of repeated services and list prices. For items priced using the unit value method, average revenue per unit of measure is compiled for homogeneous services provided to the residential and corporate sectors.

Data Collection

10 The TSPI covers both business-to-business (B2B) and business-to-consumer (B2C) transactions. Price data for the TSPI are obtained from companies through price surveys conducted on a quarterly basis. Every quarter, companies provide the operating receipts and volume data for selected B2B and B2C service products. For services that have been terminated, companies responding to the survey are required to provide a replacement service product with similar characteristics. For the majority of B2C service products, the TSPI leverages telecommunication services data used to compile the Consumer Price Index (CPI) as inputs for its compilation.

III KEY CHANGES IN THE 2021-BASED TSPI

Improved Coverage of Services

11 As more players enter the telecommunication industry in the past years, DOS has expanded the 2021-based index coverage to include the new entrants. Based on interactions with the companies surveyed, obsolete services (e.g. asymmetric digital subscriber line services) were removed and new services (e.g. 5G) were included to keep the index coverage up-to-date and relevant. The detailed scope and coverage of activities under the service indices for TSPI are indicated in Appendix II.

² Source: Department of Statistics' Annual Industry Survey 2020 and Survey of Telecommunication Industry 2021

New Sample of Companies and Service Products

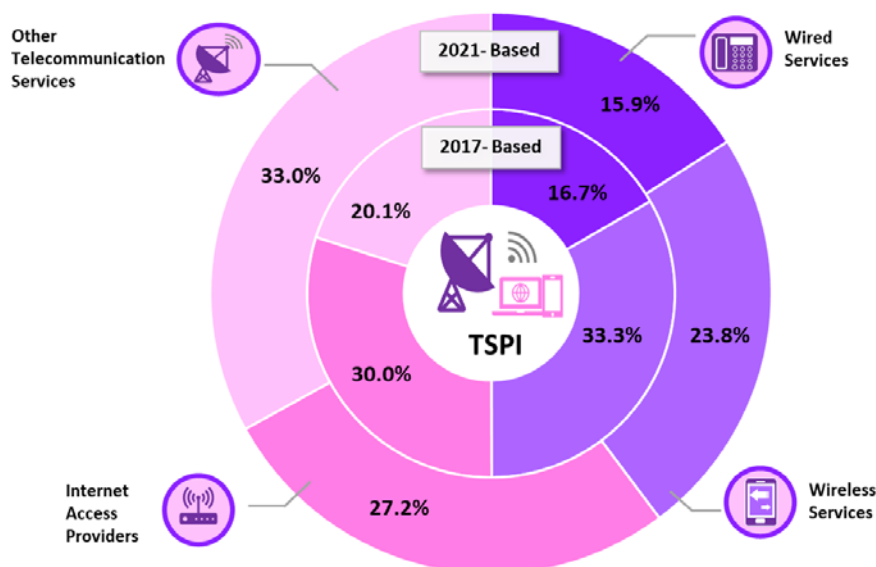
12 During the rebasing, the sampling frame for TSPI was refreshed to include new companies from DOS's business register. Based on research, a preliminary set of telecommunication service products were selected for price collection. Price surveys were then sent to companies to collect operating receipts and volume data for these service products. These data were monitored throughout the base period, and clarifications with the respondents were made where necessary to ensure that the price changes can be captured adequately.

13 Subsequently, the in-scope products were reviewed along with the existing products from the 2017-based index to determine the final frame for the rebased index. The sampling frame was reviewed to ensure that the surveyed companies and service products were representative of the current activities and market share of the telecommunication industry.

Comparison of Weighting Patterns

14 Figure 2 compares the weights of the 2017-based and 2021-based TSPI. In the 2021-based TSPI, the weight shares of Wired Services and Internet Access Providers were relatively similar across both base years, at 15.9 per cent and 27.2 per cent respectively. The weight share of Wireless Services dropped from 33.3 per cent to 23.8 per cent, due partially to a decrease in roaming revenue during Covid-19³. Over the four years, with the entry of new Service Based Operators into the industry, the weight share of Other Telecommunication Services was boosted from 20.1 per cent to 33.0 per cent.

Figure 2: TSPI Weightage Comparison

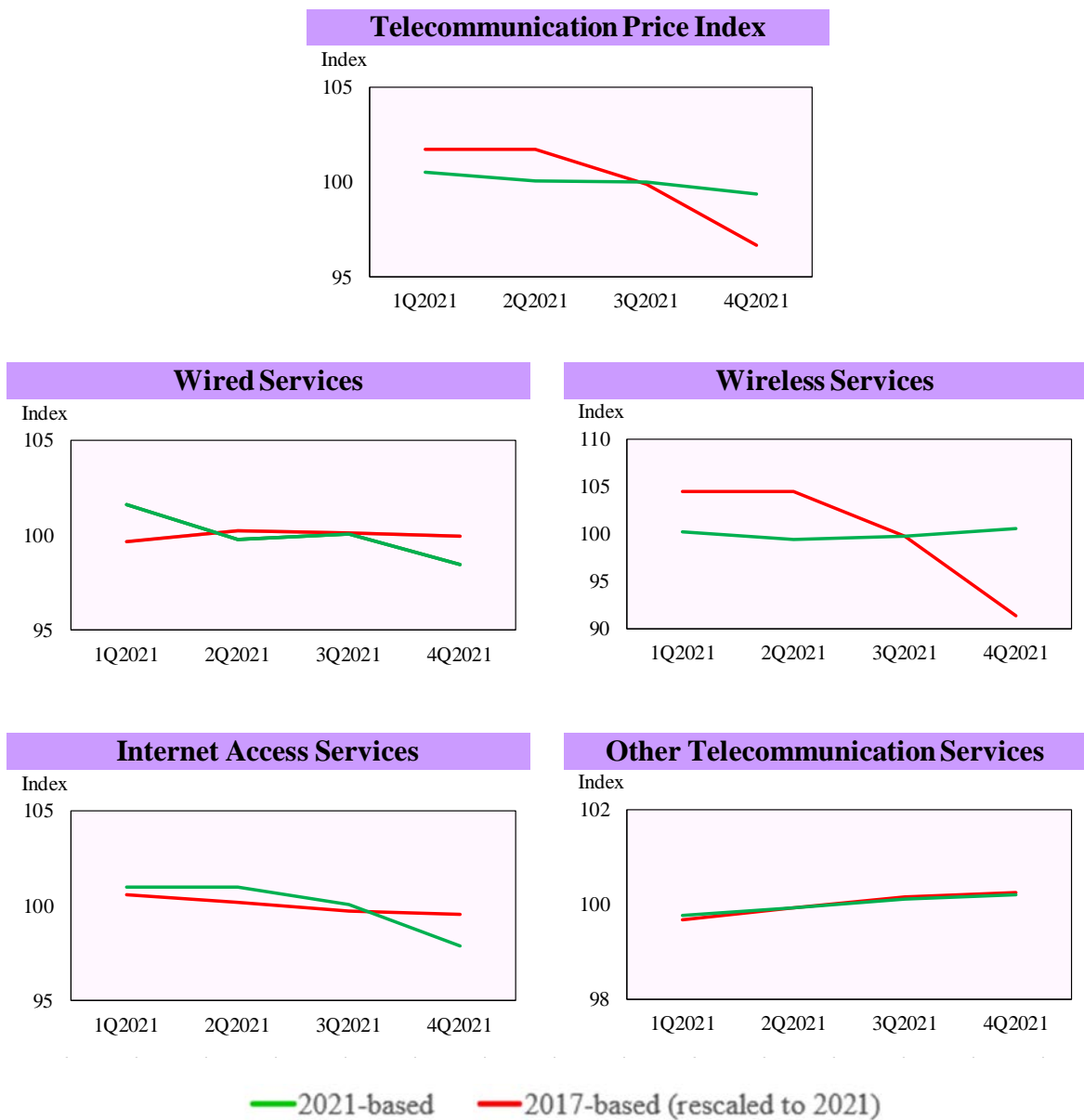


³ Source: The Straits Times, <https://www.straitstimes.com/business/companies-markets/telco-shares-are-surprise-losers-as-coronavirus-lockdown-drives-internet>

Comparison of Price Trends

15 Figure 3 compares the trends observed in the 2017-based and 2021-based indices over the overlapped period covering the four quarters of 2021. The overall TSPI for both base years were generally trending downward. Changes in the weightage and coverage of service products (such as the removal of non-fibre broadband products from internet access services) were largely responsible for the differences in the price trends. More information on the weightage and quarterly values of the 2021-based series are available in Appendix III.

Figure 3: 2021-based vs 2017-based TSPI for First to Fourth Quarter 2021



IV LINKING OF HISTORICAL SERIES

16 To facilitate comparison of price changes over time, the price indices prior to 2021 are linked to the new series by re-scaling them to the new base year 2021 level. The linking is obtained through the following mathematical procedure:

$$\text{Linked (2021-based) Index} = \text{2017-based Index} \times \text{Linked Coefficient}$$

where the Linked Coefficient is the ratio of the annual 2021-based index in 2021 to the annual 2017-based index in 2021.

V DISSEMINATION OF DATA

17 Data on the overall TSPI 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>).



<https://go.gov.sg/report-sppi>

Singapore Department of Statistics
June 2022

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.

Unit Value Method:

The unit value method constructs a price index based on data pertaining to observed revenue and quantity.

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 ~~to~~ 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.

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: Index Computation of TSPI

The TSPI uses the weighted arithmetic mean Modified Laspeyres formula where the weight reference period of 2020 preceded the price reference period of 2021.

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 price indices at service type level, and consequently the overall index. 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 II: Detailed Scope and Coverage of Activities for TSPI:

Wired Telecommunications Network Operation

Operating, maintaining or providing access to facilities for the transmission of voice, data, text, sound and video using wired telecommunications infrastructure (including fixed line and leased circuits).

Mobile Cellular and Other Wireless Telecommunications Network Operation

Operating, maintaining or providing access to facilities for the transmission of voice, data, text, sound, and video using wireless telecommunications infrastructure.

Internet Access Providers

Operating, maintaining or providing internet access over networks between the client and the service provider. Also commonly known as Internet Service Provider (ISP). The ISP serves as the access point or the gateway that provides a user access to everything available on the Internet. Internet services provided by ISPs typically include Internet access and Internet transit.

Other Telecommunications Activities N.E.C.

Includes other telecommunications activities not elsewhere classified. Examples include the provision of telecommunication-related infrastructure and telecommunication support services.

Excludes:

- Telecommunications resellers
- Satellite communication network operations

APPENDIX III: Weights and Sub-Indices of 2021-based TSPI

Price Index	Weights	2021			
		1Q	2Q	3Q	4Q
Telecommunication	10,000	100.5	100.1	100.0	99.4
Wired Services	1,593	101.6	99.8	100.1	98.4
Wireless Services	2,382	100.2	99.4	99.8	100.6
Internet Access Services	2,722	101.0	101.0	100.1	97.9
Other Telecommunication Services	3,303	99.8	99.9	100.1	100.2

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