

Information Paper Series

Benchmarking of Singapore's National Accounts to Reference Year 2015

information paper
on
economic statistics

**BENCHMARKING OF
SINGAPORE'S NATIONAL ACCOUNTS
TO REFERENCE YEAR 2015**

Singapore Department of Statistics
May 2019

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 welcomed.

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National Statistical Service of Quality, Integrity and Expertise

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We deliver Insightful Statistics and Trusted Statistical Services that
Empower Decision Making

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- | | |
|--|--|
| Professionalism
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| Relevance
& Reliability | <i>We produce statistics that users need and trust.</i> |
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BENCHMARKING OF SINGAPORE'S NATIONAL ACCOUNTS TO REFERENCE YEAR 2015

I INTRODUCTION

1 The Singapore Department of Statistics (DOS) has completed the benchmarking¹ of Singapore's national accounts from reference year² 2010 to 2015. The benchmarking exercise reconciles the three estimates of gross domestic product (GDP) from the output, expenditure and income approaches³, and provides the opportunity to introduce major conceptual and methodological improvements.

2 One significant improvement introduced in this benchmarking exercise is the adoption of the United Nations System of National Accounts (SNA) recommendation to compile annually reweighted chain volume measures⁴ (CVM) of GDP. Compared to the previous five-yearly reweighted volume measures of GDP, CVM of GDP better reflects prevailing economic conditions.

3 With the completion of the benchmarking exercise, real GDP growth rates for the period of 2015 to 2018 have been revised by -0.2 to 0.4 percentage points. Nominal GDP levels have also been revised upwards by 0.5 to 0.8 per cent over the same period.

II REAL GDP AND ANNUAL CHAIN-LINKING

4 Changes in current price or nominal GDP reflect the changes in the total value of goods and services produced in the economy. These changes result from two effects: (i) price effects or changes in prices; and (ii) quantity effects or changes in the volume of economic activity.

5 The assessment of economic growth requires the removal of price effects, or equivalently, the compilation of GDP at constant prices. Constant price or real GDP estimates are essentially volume indices, which measure changes in the volume of economic activity while maintaining relative prices constant. However, as the prices of goods and services change, the relative price weights of a particular year become less representative over time. It is, therefore, necessary to update the relative price weights to a more recent year periodically.

¹ The benchmarking exercise was previously referred to as a rebasing exercise. Details of the last rebasing exercise are presented in the publication "Rebasing of Singapore's National Accounts to Reference Year 2010".

² Reference year is the year where real GDP is set equal to nominal GDP.

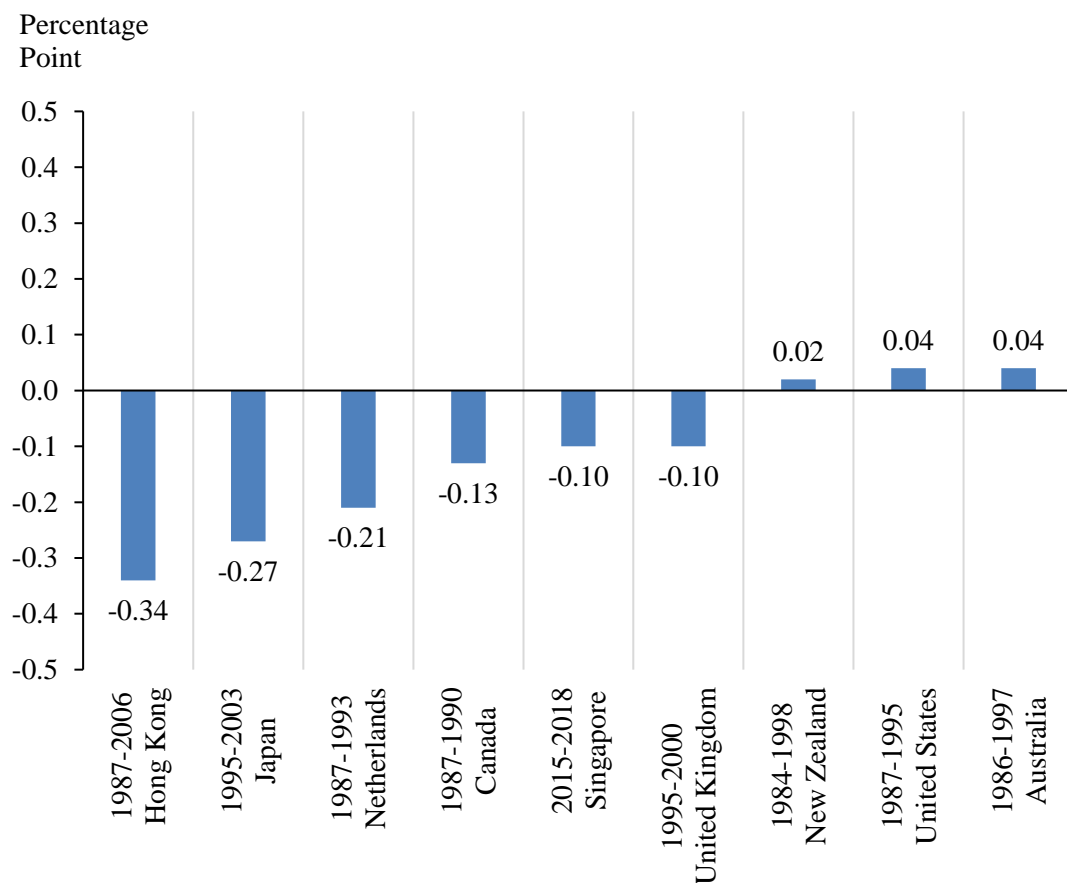
³ The technical details on the reconciliation of GDP from the output, expenditure and income approaches are presented in the publication "Rebasing of Singapore's National Accounts to Reference Year 2005".

⁴ Calculated by measuring GDP using the price level of the preceding year. These annually reweighted volume change measures are then linked together to produce a time series of CVM of GDP.

6 With effect from the Economic Survey of Singapore for 1st Quarter 2019, instead of updating the relative price weights on a five-yearly basis, DOS will compile annually reweighted CVM of GDP which better reflects the prevailing economic conditions.

7 The impact of adopting annual chain-linking in Singapore’s national accounts is presented below. The revisions to annual real GDP growth rates attributable only to the adoption of annual chain-linking are moderate, ranging from -0.3 to 0.2 percentage points over the period of 2015 to 2018. The mean revision of -0.1 percentage points is comparable to the revisions in GDP growth rates experienced by economies such as the United Kingdom and Canada when they adopted annual chain-linking (Chart 1).

CHART 1 IMPACT OF THE ADOPTION OF ANNUAL CHAIN-LINKING ON REAL GDP GROWTH RATES IN SELECTED ECONOMIES



Source: Websites of national statistical offices

III RECONCILIATION, CHANGES AND IMPROVEMENTS

8 Other than the revaluation of the GDP estimates, the benchmarking exercise also reconciles the estimates of GDP compiled independently using the three approaches (output, expenditure and income). The three GDP estimates are reconciled through the cross-validation of the data sources and ensuring the coherence of the three separate measures of GDP. As such, no statistical discrepancy is recorded among the three different approaches of GDP compilation for 2015.

9 In addition, methodological improvements and conceptual changes have also been introduced during the benchmarking exercise. Changes carried out in this benchmarking exercise include a refined estimation of insurance output and a revised conceptual treatment of goods for processing, which are in line with the recommendations of the International Monetary Fund (IMF) and United Nations (UN). More information on the changes can be found in Annex A.

IV IMPACT ON MAJOR MACRO-ECONOMIC AGGREGATES

10 Revisions to the macro-economic aggregates due to the reconciliation of the GDP estimates, the adoption of CVM and other conceptual and methodological changes are elaborated in the following sections.

(A) GDP Growth Rates

11 The revisions in the real GDP growth rates are moderate, ranging from -0.2 to 0.4 percentage points for the period of 2015 to 2018 (Table 1).

TABLE 1 REAL GDP GROWTH

Year	Before Benchmarking (a)	After Benchmarking (b)	Per Cent Change [(b) – (a)]
	Per Cent		Percentage Point
2015	2.5	2.9	0.4
2016	2.8	3.0	0.2
2017	3.9	3.7	-0.2
2018	3.2	3.1	-0.1

Real GDP by Industry

12 Revisions in the real growth rates varies across industries (Table 2). Compared to other industries, the wholesale and retail trade industry recorded slightly higher revisions in annual growth rates of between -1.7 and 0.2 percentage points from 2015 to 2018.

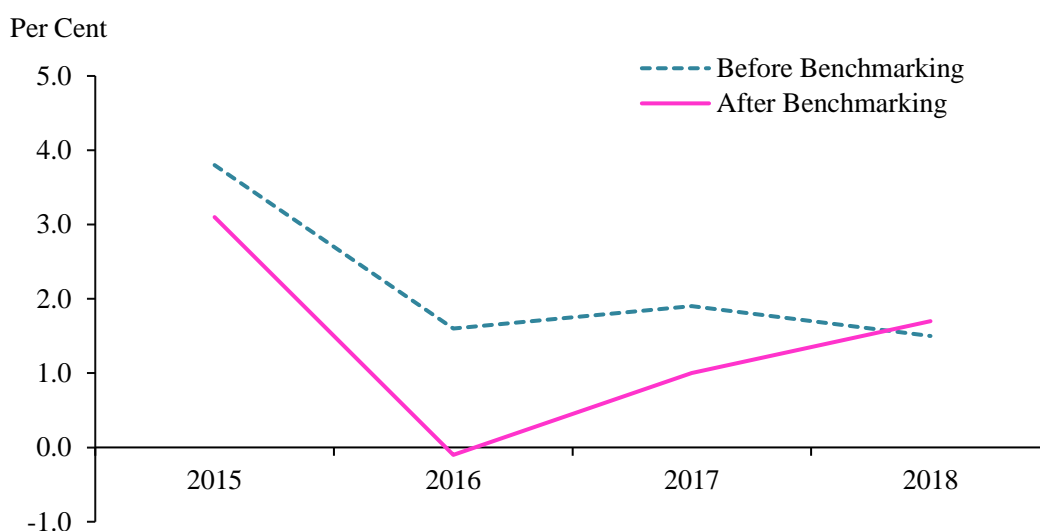
TABLE 2 REAL GDP GROWTH BY INDUSTRY

	Per Cent							
	Before Benchmarking				After Benchmarking			
	2015	2016	2017	2018	2015	2016	2017	2018
Total	2.5	2.8	3.9	3.2	2.9	3.0	3.7	3.1
Goods Producing Industries	-2.7	2.7	5.7	5.0	-2.5	2.6	5.6	5.0
Manufacturing	-5.1	3.7	10.4	7.2	-5.1	3.7	10.4	7.0
Construction	5.9	-0.8	-10.2	-3.4	6.0	-1.0	-11.5	-3.7
Utilities	1.3	1.8	0.0	-0.3	1.9	1.8	-0.1	-0.8
Other Goods Industries*	-6.8	-1.9	-12.1	0.1	-0.6	-0.5	-11.3	-1.5
Services Producing Industries	3.9	2.2	3.2	3.0	4.1	2.1	2.8	2.9
Wholesale & Retail Trade	3.8	1.6	1.9	1.5	3.1	-0.1	1.0	1.7
Transportation & Storage	2.0	1.7	5.2	1.5	2.4	1.7	4.4	1.3
Accommodation & Food Services	1.4	3.2	3.0	2.7	0.1	3.2	1.9	2.8
Information & Communications	-0.8	4.6	4.5	6.0	-0.4	4.6	5.2	5.4
Finance & Insurance	4.7	1.0	5.6	5.9	4.7	0.5	6.5	5.8
Business Services	7.6	3.0	1.8	3.0	8.3	3.9	0.8	2.8
Other Services Industries	2.0	3.6	2.9	1.7	2.7	3.8	2.7	1.6
Ownership of Dwellings	4.9	5.3	5.0	4.1	4.6	4.7	4.5	4.8
Add: Taxes on Products	8.8	10.9	4.7	-2.1	11.1	12.9	5.8	-2.2

* Comprise Agriculture, Fishing and Quarrying.

13 The higher revisions for the wholesale and retail trade industry compared to other industries was attributed to the more significant changes in its weight as prices of petroleum and petroleum products fell (Chart 2).

CHART 2 REAL GROWTH OF WHOLESALE AND RETAIL TRADE INDUSTRY



Real GDP by Expenditure Components

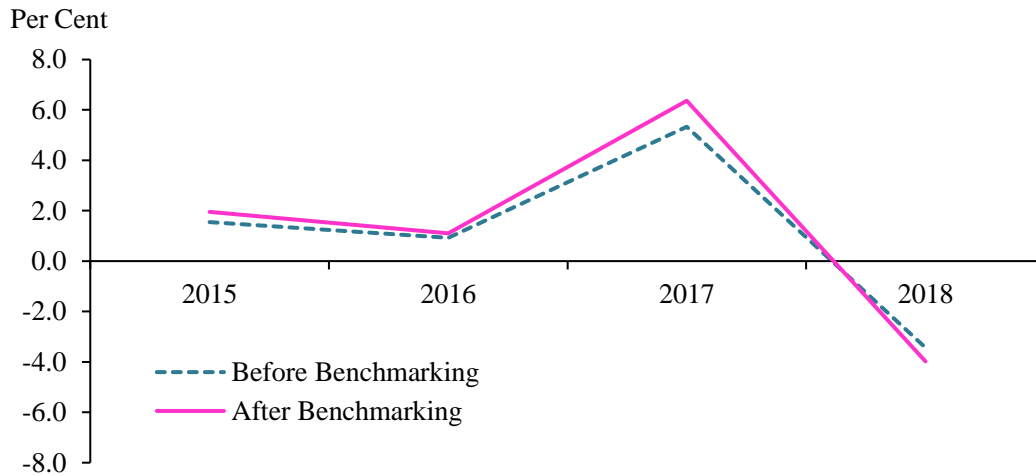
14 The growth rates of the expenditure components of GDP have also been revised following the adoption of annual chain-linking, and various methodological and data enhancements. The revisions are generally moderate, except for Gross Fixed Capital Formation (GFCF) and Government Consumption Expenditure (GCE), which recorded annual growth revisions ranging from -0.6 to 1.1 percentage points for the period of 2015 to 2018 (Table 3).

TABLE 3 REAL GDP GROWTH REVISIONS BY EXPENDITURE COMPONENTS

	Per Cent							
	Before Benchmarking				After Benchmarking			
	2015	2016	2017	2018	2015	2016	2017	2018
Total	2.5	2.8	3.9	3.2	2.9	3.0	3.7	3.1
Private Consumption Expenditure	5.0	2.2	3.2	2.4	5.2	2.7	3.4	2.7
Government Consumption Expenditure	7.8	4.3	4.2	3.6	8.9	3.7	4.5	4.1
Gross Fixed Capital Formation	1.5	0.9	5.3	-3.4	2.0	1.1	6.4	-4.0
Exports of Goods and Services	5.0	0.8	5.4	5.2	5.0	0.0	5.7	5.1
Imports of Goods and Services	3.6	0.6	7.0	4.5	3.4	0.1	7.5	4.7

15 The growth revisions in GFCF mainly reflect changes in the price structures and weights of the component series with the adoption of annually reweighted CVM. For example, in 2017, higher property transactions that results in higher property ownership transfer costs (mainly in stamp duties) contributed to the higher growth in GFCF (Chart 3).

CHART 3 REAL GROWTH OF GFCF



(B) Nominal GDP

16 Nominal GDP levels have been revised upwards, by 0.5 to 0.8 per cent, over the period of 2015 to 2018 (Table 4). While the nominal gross value-added (GVA) estimates for manufacturing, information and communications, finance and insurance, and business services have been revised upwards, these are partially offset by downward revisions in construction, wholesale and retail trade, transportation and storage, and other services industry.

TABLE 4 GDP AT CURRENT MARKET PRICES

Year	Before Benchmarking	After Benchmarking	Percentage Change
	(a)	(b)	$[(b) - (a)] / (a)$
	\$ Million		Per Cent
2015	421,046.3	423,444.1	0.6
2016	437,339.1	439,411.6	0.5
2017	464,928.3	467,305.5	0.5
2018	487,087.5	491,174.5	0.8

(C) Composition of GDP Components

Component Share by Industry

17 The relative GVA shares of the industries have been updated arising from the benchmarking exercise. Table 5 shows the industries' shares of nominal GVA before and after benchmarking for the years 2015 and 2018. For instance, while the GVA share of manufacturing in 2018 has been revised upwards to 22.0 per cent, the GVA share of wholesale and retail trade in the same year has been revised downwards to 17.6 per cent after benchmarking.

TABLE 5 SHARE OF NOMINAL GVA BY INDUSTRY

	Per Cent			
	2015		2018	
	Before Benchmarking	After Benchmarking	Before Benchmarking	After Benchmarking
Total	100.0	100.0	100.0	100.0
Goods Producing Industries	25.6	25.8	26.1	26.7
Manufacturing	19.0	19.2	21.4	22.0
Construction	5.2	5.1	3.5	3.4
Utilities	1.5	1.5	1.2	1.2
Services Producing Industries	70.0	69.7	70.4	69.6
Wholesale & Retail Trade	16.6	16.4	18.0	17.6
Transportation & Storage	7.6	7.5	6.9	6.7
Accommodation & Food Services	2.2	2.2	2.1	2.1
Information & Communications	4.0	4.0	4.1	4.1
Finance & Insurance	12.4	12.5	12.9	13.0
Business Services	15.9	15.8	14.9	14.9
Other Services Industries	11.4	11.3	11.5	11.3
Ownership of Dwellings	4.3	4.5	3.5	3.7

Component Share by Expenditure

18 In terms of the expenditure components of nominal GDP, their relative shares have also been revised (Table 6). In particular, the share of Private Consumption Expenditure (PCE) has been revised upwards by 0.5 to 0.8 percentage points over the period of 2015 to 2018, whereas the share of GFCF has been revised downwards by 0.1 to 0.5 percentage points over the same period.

TABLE 6 EXPENDITURE COMPONENTS AS A PERCENTAGE OF NOMINAL GDP

	Per Cent			
	2015		2018	
	Before Benchmarking	After Benchmarking	Before Benchmarking	After Benchmarking
Private Consumption Expenditure	36.4	37.2	34.8	35.4
Government Consumption Expenditure	10.3	10.2	10.9	10.7
Gross Fixed Capital Formation	27.3	27.2	25.0	24.5
Changes in Inventories	-1.0	-1.9	2.6	2.5
Net Exports of Goods and Services	27.0	27.3	26.7	26.9

Figures are expressed as a share of expenditure-based GDP.

Component Share by Income

19 Arising from the reconciliation of the income-based GDP, the relative shares of nominal GDP of the various income components have been revised (Table 7). For instance, the share of Compensation of Employees (CoE) in the income-based GDP in 2018 has been revised slightly downwards by 0.1 percentage points after benchmarking. Correspondingly, the share of Gross Operating Surplus (GOS) in 2018 has increased by 0.1 percentage points, to 53.1 per cent (after benchmarking) from 53.0 per cent (before benchmarking).

TABLE 7 INCOME COMPONENTS AS A PERCENTAGE OF NOMINAL GDP

	Per Cent			
	2015		2018	
	Before Benchmarking	After Benchmarking	Before Benchmarking	After Benchmarking
Compensation of Employees	42.2	42.0	39.8	39.7
Gross Operating Surplus	50.3	50.6	53.0	53.1
Taxes less Subsidies on Production & on Imports	7.5	7.4	7.2	7.2

Figures are expressed as a share of income-based GDP.

IV CONCLUSION

20 The successful completion of this benchmarking exercise improves the coherence and reliability of our GDP estimates, and enhances their relevance to the underlying and changing economic conditions. The adoption of the SNA recommendation to compile CVM of GDP, together with the improvements in methodologies and data sources, also enhances the relevance and international comparability of our GDP estimates.

21 As a result of the benchmarking exercise, nominal GDP levels have been revised upwards, by 0.5 to 0.8 per cent, over the period of 2015 to 2018. The revisions in real GDP growth rates over the same period are moderate, ranging from -0.2 to 0.4 percentage points.

SINGAPORE DEPARTMENT OF STATISTICS
21 MAY 2019

ANNEXES

ANNEX A

(i) Change in Conceptual Treatment

Goods for Processing

Goods for processing cover goods that are sent for processing (such as assembly, labelling, packing and other processing activities) overseas. The processing activity is undertaken by an entity that does not own the goods concerned. With the internationalisation of production, many companies have shifted away from processing their own goods or raw materials to outsourcing part of their production process for a processing fee. Similarly, many companies have also begun to provide processing services to other companies in return for a fee.

In this regard, the International Monetary Fund's Balance of Payments and International Investment Position Manual (BPM) and SNA recommend that the physical movement of goods across national borders to undertake processing activities *without a change in ownership* does not by itself imply an import or export of these goods. Hence, while the goods account of the balance of payments (BOP)⁵ cover goods transacted between residents and non-residents (e.g. including goods acquired for and sold after processing abroad), goods sent abroad or received from abroad for processing with no change in ownership (i.e. no transaction) between residents and non-residents *should not* be recorded as exports and imports⁶.

In accordance with the BPM and SNA, the goods account of the BOP will be adjusted to reflect inward and outward processing arrangements. Such goods for processing adjustments will be incorporated into gross exports and imports as well as net exports of goods, improving the treatment and coverage of the BOP and national accounts.

⁵ The BOP goods account covers transactions where there is a change in economic ownership of the goods between residents and non-residents, while merchandise trade statistics are compiled based on the physical movement of goods crossing economic territories. With the implementation of goods for processing, goods that cross borders for processing without a change in ownership presently in merchandise trade statistics are now identified and removed in the compilation of the goods account of the BOP.

⁶ In such cases, the cost of the processing service is recorded as manufacturing services under trade in services, i.e. as services exports and imports.

(ii) Refinements in Methodology

Insurance Service Charge

In an insurance policy, the insurance company accepts a premium from a client and holds it until a claim is made or the period of the insurance expires. In the meantime, the insurance company invests the premium, and the resulting investment income (premium supplements) is a source of extra funds from which to meet claims. The insurance company sets the premiums so that the sum of premiums and investment income less claims gives a margin which the insurance company can retain; this margin represents the output of the insurance company.

However, during periods where insurers experience exceptionally large or volatile claims, the estimation of insurance output could be extremely volatile and even negative. As insurance firms may take out reinsurance policies with reinsurance firms to protect themselves against losses, reinsurance firms may also face unexpectedly large and volatile claims. For example, insurers and reinsurers in Singapore were impacted by the natural disasters which occurred in Japan, New Zealand and Thailand in 2011.

The United Nations Statistics Division and European Central Bank have provided clarity and issued guidance on the implementation of the “expectations approach” in the measurement of insurance output. The “expectations approach” estimates the level of expected investment income based on the premium-setting behaviour of insurance firms, and expected claims based on the pattern of claims payable by the insurance firms.

This provides a more stable measure of insurance output and addresses the issue of volatile and negative estimates of output arising from unforeseen large claims.

METHODOLOGICAL APPENDIX

ILLUSTRATION OF THE COMPUTATION OF FIXED BASE YEAR CONSTANT PRICE ESTIMATES VS ANNUALLY-REWEIGHTED CHAIN VOLUME MEASURES (CVM)

Assume a simplified economy with only two goods, Computers and Smartphones.

The steps taken to derive the fixed-weighted constant price estimates (LHS) and chain volume measures series (RHS) are demonstrated.

Example Data

Year	Computers (Comp)		Smartphones (Phone)	
	Quantity	Price	Quantity	Price
2010	10	100	30	20
2011	12	101	32	19
2012	13	103	33	17
2013	15	106	35	16
2014	18	110	38	14
2015	20	114	40	11
2016	21	115	41	10

Constant Price Estimates

Step 1:

Fixed-weighted constant price - calculate the values for each year in their respective base year prices. In the year of a base change (2015), calculate the values for prices in both the old and new base.

Constant price values

Year	2010 prices		2015 prices	
	Comp	Comp	Phone	Phone
2010	1,000		600	
2011	1,200		640	
2012	1,300		660	
2013	1,500		700	
2014	1,800		760	
2015	2,000	2,280	800	440
2016		2,394		451

For example:

At 2010 prices

2015 value of Computers = $20 * 100 = 2,000$

2015 value of Smartphones = $40 * 20 = 800$

At 2015 prices

2015 value of Computers = $20 * 114 = 2,280$

2015 value of Smartphones = $40 * 11 = 440$

Chain Volume Measures

Step 1:

Chain Volume Measures - calculate the values for each year in current prices and previous years' prices.

Values in previous year's prices

Year	2010 prices		2011 prices		2012 prices		2013 prices		2014 prices		2015 prices	
	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	
2010	1,000											
2011	1,200		1,212									
2012			1,313		1,339							
2013					1,545		1,590					
2014							1,908		1,980			
2015									2,200	2,280		
2016											2,394	

For example:

2015 value of Computers

In current prices (2015 prices) = $20 * 114 = 2,280$

In previous years' prices (2014 prices) = $20 * 110 = 2,200$

Year	2010 prices		2011 prices		2012 prices		2013 prices		2014 prices		2015 prices	
	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	
2010	600											
2011	640	608										
2012		627	561									
2013			595	560								
2014				608	532							
2015					560	440						
2016						451						

For example:

2015 value of Smartphones

In current prices (2015 prices) = $40 * 11 = 440$

In previous years' prices (2014 prices) = $40 * 14 = 560$

ILLUSTRATION OF THE COMPUTATION OF FIXED BASE YEAR CONSTANT PRICE ESTIMATES VS ANNUALLY-REWEIGHTED CHAIN VOLUME MEASURES (CVM) (*cont'd*)

<p>Step 2: Fixed-weighted constant price - aggregate for all goods at each base year.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2010 prices</th> <th>2015 prices</th> </tr> <tr> <th>Year</th> <th>Comp + Phone</th> <th>Comp + Phone</th> </tr> </thead> <tbody> <tr><td>2010</td><td>1,600</td><td></td></tr> <tr><td>2011</td><td>1,840</td><td></td></tr> <tr><td>2012</td><td>1,960</td><td></td></tr> <tr><td>2013</td><td>2,200</td><td></td></tr> <tr><td>2014</td><td>2,560</td><td></td></tr> <tr><td>2015</td><td>2,800</td><td>2,720</td></tr> <tr><td>2016</td><td></td><td>2,845</td></tr> </tbody> </table>		2010 prices	2015 prices	Year	Comp + Phone	Comp + Phone	2010	1,600		2011	1,840		2012	1,960		2013	2,200		2014	2,560		2015	2,800	2,720	2016		2,845	<p>Step 2: Chain Volume Measures - aggregate for all goods for each year at current and previous year's prices.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2010 prices</th> <th>2011 prices</th> <th>2012 prices</th> <th>2013 prices</th> <th>2014 prices</th> <th>2015 prices</th> </tr> <tr> <th>Year</th> <th>Comp + Phone</th> <th>Comp + Phone</th> <th>Comp + Phone</th> <th>Comp + Phone</th> <th>Comp + Phone</th> <th>Comp + Phone</th> </tr> </thead> <tbody> <tr><td>2010</td><td>1,600</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2011</td><td>1,840</td><td>1,820</td><td></td><td></td><td></td><td></td></tr> <tr><td>2012</td><td></td><td>1,940</td><td>1,900</td><td></td><td></td><td></td></tr> <tr><td>2013</td><td></td><td></td><td>2,140</td><td>2,150</td><td></td><td></td></tr> <tr><td>2014</td><td></td><td></td><td></td><td>2,516</td><td>2,512</td><td></td></tr> <tr><td>2015</td><td></td><td></td><td></td><td></td><td>2,760</td><td>2,720</td></tr> <tr><td>2016</td><td></td><td></td><td></td><td></td><td></td><td>2,845</td></tr> </tbody> </table>		2010 prices	2011 prices	2012 prices	2013 prices	2014 prices	2015 prices	Year	Comp + Phone	Comp + Phone	Comp + Phone	Comp + Phone	Comp + Phone	Comp + Phone	2010	1,600						2011	1,840	1,820					2012		1,940	1,900				2013			2,140	2,150			2014				2,516	2,512		2015					2,760	2,720	2016						2,845
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ILLUSTRATION OF UPDATING OF BASE YEAR IN THE COMPILATION OF ANNUALLY-REWEIGHTED CHAIN VOLUME MEASURES (CVM)

Latest Base Year = 2018

	Base year = 2014	Base year = 2015	Base year = 2016	Base year = 2017	Latest base year = 2018
...	2015	2016	2017	2018	2019

Implementation of CVM requires the use of previous years' weights. The weights adopted are compiled using data from various annual and quarterly surveys or administrative data. These weights will be updated annually during the annual Economic Survey of Singapore and the latest base year will be moved forward annually during Economic Survey of Singapore for the 1st Quarter. This approach allows for a timely annual update of the weights used and ensures the CVM is reflective of the prevailing economic conditions.

ADVANTAGES AND DRAWBACKS OF CHAIN VOLUME MEASURES (CVM)

	Advantages	Drawbacks
Volumes at fixed base-year prices	Additivity property of sub-aggregate series holds from base year onwards.	Volume growth becomes less accurate for later periods as base year price structure becomes less relevant.
Volumes at annually updated base-year prices	Volume growth accurately reflects current economic conditions, being based on relative price weights that are updated annually.	Additivity property of sub-aggregate series do not hold.

Due to the inherent mathematical property of annual chain-linking, components of CVM aggregates, in general, do not add up to the CVM aggregates. In contrast to fixed base year constant price estimates which are additive from the base year (which is also set as the reference year) onwards, CVM are only additive in the reference year and the immediate subsequent year following the reference year. Non-additivity of CVM should not be viewed as a data quality issue.

SEASONAL ADJUSTMENT OF CHAIN VOLUME MEASURES (CVM)

With the adoption of CVM, DOS has also reviewed the seasonal adjustment methodology⁷ for national accounts. In the fixed base approach, indirect seasonal adjustment was adopted to preserve the accounting relationship of underlying non-seasonally adjusted (NSA) series where the seasonally adjusted aggregates are derived via the sum of its respective seasonally adjusted components. Since the additivity property no longer holds with the implementation of CVM, direct seasonal adjustment will be adopted for all real national accounts series with effect from Economic Survey of Singapore for 1st Quarter 2019.

⁷ More information can be found in the publication “Seasonal Adjustment of Economic Time Series”.

STATISTICAL APPENDIX

Table A1	Annual Changes in Real Gross Domestic Product
Table A2	Contribution to Growth in Real Gross Domestic Product
Table A3	Share of Gross Value-added at Current Prices
Table A4	Expenditure Components as a Percentage of Nominal Gross Domestic Product
Table A5	Income Components as a Percentage of Nominal Gross Domestic Product
Table A6	Compensation of Employees as a Percentage of Nominal Industry Gross Value-added (Wage Share)
Table A7	Gross Operating Surplus as a Percentage of Nominal Industry Gross Value-added (Profit Share)
Table A8	Other Taxes Less Subsidies on Production as a Percentage of Nominal Industry Gross Value-added

TABLE A1 ANNUAL CHANGES IN REAL GROSS DOMESTIC PRODUCT

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
TOTAL	2.5	2.8	3.9	3.2
Goods Producing Industries	-2.7	2.7	5.7	5.0
Manufacturing	-5.1	3.7	10.4	7.2
Construction	5.9	-0.8	-10.2	-3.4
Utilities	1.3	1.8	0.0	-0.3
Other Goods Industries ¹	-6.8	-1.9	-12.1	0.1
Services Producing Industries	3.9	2.2	3.2	3.0
Wholesale & Retail Trade	3.8	1.6	1.9	1.5
Transportation & Storage	2.0	1.7	5.2	1.5
Accommodation & Food Services	1.4	3.2	3.0	2.7
Information & Communications	-0.8	4.6	4.5	6.0
Finance & Insurance	4.7	1.0	5.6	5.9
Business Services	7.6	3.0	1.8	3.0
Other Services Industries	2.0	3.6	2.9	1.7
Ownership of Dwellings	4.9	5.3	5.0	4.1
Add : Taxes on Products	8.8	10.9	4.7	-2.1
	After Benchmarking			
TOTAL	2.9	3.0	3.7	3.1
Goods Producing Industries	-2.5	2.6	5.6	5.0
Manufacturing	-5.1	3.7	10.4	7.0
Construction	6.0	-1.0	-11.5	-3.7
Utilities	1.9	1.8	-0.1	-0.8
Other Goods Industries ¹	-0.6	-0.5	-11.3	-1.5
Services Producing Industries	4.1	2.1	2.8	2.9
Wholesale & Retail Trade	3.1	-0.1	1.0	1.7
Transportation & Storage	2.4	1.7	4.4	1.3
Accommodation & Food Services	0.1	3.2	1.9	2.8
Information & Communications	-0.4	4.6	5.2	5.4
Finance & Insurance	4.7	0.5	6.5	5.8
Business Services	8.3	3.9	0.8	2.8
Other Services Industries	2.7	3.8	2.7	1.6
Ownership of Dwellings	4.6	4.7	4.5	4.8
Add : Taxes on Products	11.1	12.9	5.8	-2.2

¹ Comprise Agriculture, Fishing and Quarrying.

TABLE A2 CONTRIBUTION TO GROWTH IN REAL GROSS DOMESTIC PRODUCT

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
TOTAL	2.5	2.8	3.9	3.2
Goods Producing Industries	-0.7	0.6	1.3	1.2
Manufacturing	-1.0	0.6	1.8	1.3
Construction	0.3	0.0	-0.5	-0.1
Utilities	0.0	0.0	0.0	0.0
Other Goods Industries ¹	0.0	0.0	0.0	0.0
Services Producing Industries	2.6	1.5	2.2	2.0
Wholesale & Retail Trade	0.7	0.3	0.4	0.3
Transportation & Storage	0.2	0.1	0.4	0.1
Accommodation & Food Services	0.0	0.1	0.1	0.0
Information & Communications	0.0	0.2	0.2	0.2
Finance & Insurance	0.6	0.1	0.7	0.8
Business Services	1.0	0.4	0.2	0.4
Other Services Industries	0.2	0.3	0.3	0.2
Ownership of Dwellings	0.2	0.2	0.2	0.1
Add : Taxes on Products	0.4	0.5	0.2	-0.1
	After Benchmarking			
TOTAL	2.9	3.0	3.7	3.1
Goods Producing Industries	-0.6	0.6	1.3	1.2
Manufacturing	-0.9	0.7	1.8	1.3
Construction	0.3	0.0	-0.5	-0.1
Utilities	0.0	0.0	0.0	0.0
Other Goods Industries ¹	0.0	0.0	0.0	0.0
Services Producing Industries	2.7	1.4	1.9	1.9
Wholesale & Retail Trade	0.5	0.0	0.2	0.3
Transportation & Storage	0.2	0.1	0.3	0.1
Accommodation & Food Services	0.0	0.1	0.0	0.1
Information & Communications	0.0	0.2	0.2	0.2
Finance & Insurance	0.5	0.1	0.8	0.7
Business Services	1.2	0.6	0.1	0.4
Other Services Industries	0.3	0.4	0.3	0.2
Ownership of Dwellings	0.2	0.2	0.2	0.2
Add : Taxes on Products	0.6	0.7	0.3	-0.1

¹ Comprise Agriculture, Fishing and Quarrying.

TABLE A3 SHARE OF GROSS VALUE-ADDED AT CURRENT PRICES

	Per Cent			
	2015	2016	2017	2018
Before Benchmarking				
Goods Producing Industries	25.6	24.8	24.8	26.1
Manufacturing	19.0	18.6	19.6	21.4
Construction	5.2	4.8	3.9	3.5
Utilities	1.5	1.4	1.3	1.2
Other Goods Industries ¹	0.0	0.0	0.0	0.0
Services Producing Industries	70.0	71.1	71.4	70.4
Wholesale & Retail Trade	16.6	18.1	18.5	18.0
Transportation & Storage	7.6	6.8	7.2	6.9
Accommodation & Food Services	2.2	2.2	2.1	2.1
Information & Communications	4.0	4.1	4.1	4.1
Finance & Insurance	12.4	12.3	12.7	12.9
Business Services	15.9	15.9	15.1	14.9
Other Services Industries	11.4	11.7	11.6	11.5
Ownership of Dwellings	4.3	4.1	3.8	3.5
After Benchmarking				
Goods Producing Industries	25.8	24.9	25.2	26.7
Manufacturing	19.2	18.7	20.1	22.0
Construction	5.1	4.8	3.8	3.4
Utilities	1.5	1.4	1.2	1.2
Other Goods Industries ¹	0.0	0.0	0.0	0.0
Services Producing Industries	69.7	70.8	70.8	69.6
Wholesale & Retail Trade	16.4	17.9	18.2	17.6
Transportation & Storage	7.5	6.7	7.1	6.7
Accommodation & Food Services	2.2	2.2	2.1	2.1
Information & Communications	4.0	4.1	4.1	4.1
Finance & Insurance	12.5	12.4	12.7	13.0
Business Services	15.8	15.9	15.1	14.9
Other Services Industries	11.3	11.6	11.5	11.3
Ownership of Dwellings	4.5	4.3	4.0	3.7

¹ Comprise Agriculture, Fishing and Quarrying.

TABLE A4 EXPENDITURE COMPONENTS AS A PERCENTAGE OF
NOMINAL GROSS DOMESTIC PRODUCT

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
Private Consumption Expenditure	36.4	35.8	35.4	34.8
Government Consumption Expenditure	10.3	10.6	10.8	10.9
Gross Fixed Capital Formation	27.3	26.6	26.9	25.0
Changes in Inventories	-1.0	0.5	2.1	2.6
Net Exports of Goods & Services	27.0	26.5	24.8	26.7
	After Benchmarking			
Private Consumption Expenditure	37.2	36.4	35.9	35.4
Government Consumption Expenditure	10.2	10.3	10.5	10.7
Gross Fixed Capital Formation	27.2	26.2	26.4	24.5
Changes in Inventories	-1.9	0.5	2.0	2.5
Net Exports of Goods & Services	27.3	26.6	25.2	26.9

Figures are expressed as a share of expenditure-based GDP.

TABLE A5 INCOME COMPONENTS AS A PERCENTAGE OF
NOMINAL GROSS DOMESTIC PRODUCT

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
Compensation of Employees	42.2	41.8	40.4	39.8
Gross Operating Surplus	50.3	50.3	51.6	53.0
Taxes less Subsidies on Production & on Imports	7.5	7.9	8.0	7.2
	After Benchmarking			
Compensation of Employees	42.0	41.7	40.3	39.7
Gross Operating Surplus	50.6	50.5	51.7	53.1
Taxes less Subsidies on Production & on Imports	7.4	7.9	8.0	7.2

Figures are expressed as a share of income-based GDP.

TABLE A6 COMPENSATION OF EMPLOYEES AS A PERCENTAGE OF
NOMINAL INDUSTRY GROSS VALUE-ADDED (WAGE SHARE)

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
Manufacturing	32.6	31.6	28.5	24.7
Construction	63.5	65.3	67.8	67.2
Utilities	25.0	26.8	28.3	28.4
Other Goods Industries ¹	48.3	49.0	48.2	49.6
Wholesale & Retail Trade	39.8	36.1	33.7	34.1
Transportation & Storage	40.5	44.6	41.4	42.4
Accommodation & Food Services	56.3	55.2	55.3	54.2
Information & Communications	60.2	58.9	59.7	60.8
Finance & Insurance	48.1	46.3	45.6	44.8
Business Services	42.3	42.7	43.0	43.2
Other Services Industries	79.6	80.4	80.2	80.7
	After Benchmarking			
Manufacturing	32.5	31.8	28.3	24.5
Construction	63.9	65.7	68.2	67.9
Utilities	25.0	26.7	28.5	28.7
Other Goods Industries ¹	48.0	49.0	48.2	48.6
Wholesale & Retail Trade	39.4	36.3	34.1	34.5
Transportation & Storage	40.6	45.1	42.1	43.1
Accommodation & Food Services	57.7	56.5	56.5	55.3
Information & Communications	60.2	58.3	59.1	60.2
Finance & Insurance	46.8	45.6	45.0	44.1
Business Services	42.3	42.6	42.9	43.0
Other Services Industries	79.4	80.0	80.0	80.5

¹ Comprise Agriculture, Fishing and Quarrying.

Figures are expressed as a share of income-based Gross Value-added.

TABLE A7 GROSS OPERATING SURPLUS AS A PERCENTAGE OF
NOMINAL INDUSTRY GROSS VALUE-ADDED (PROFIT SHARE)

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
Manufacturing	66.2	67.1	70.3	74.2
Construction	26.2	23.7	20.4	21.4
Utilities	71.4	69.2	67.6	67.4
Other Goods Industries ¹	42.1	40.3	40.7	39.1
Wholesale & Retail Trade	60.1	63.5	65.8	65.3
Transportation & Storage	58.2	53.7	56.5	55.5
Accommodation & Food Services	41.4	41.5	40.8	41.7
Information & Communications	39.1	40.2	39.2	37.9
Finance & Insurance	51.9	53.6	54.2	54.9
Business Services	55.0	54.3	53.8	53.6
Other Services Industries	19.6	18.5	18.6	17.9
Ownership of Dwellings	94.3	94.2	94.2	93.9
	After Benchmarking			
Manufacturing	66.3	67.0	70.5	74.4
Construction	25.7	23.2	19.9	20.8
Utilities	71.5	69.6	67.7	67.6
Other Goods Industries ¹	44.6	42.7	43.2	43.0
Wholesale & Retail Trade	60.5	63.3	65.4	64.9
Transportation & Storage	58.0	52.9	55.7	54.5
Accommodation & Food Services	39.9	40.0	39.4	40.4
Information & Communications	38.7	40.5	39.7	38.4
Finance & Insurance	53.1	54.3	54.8	55.6
Business Services	55.2	54.9	54.3	54.1
Other Services Industries	19.7	18.6	18.6	17.9
Ownership of Dwellings	94.5	94.5	94.6	94.4

¹ Comprise Agriculture, Fishing and Quarrying.

Figures are expressed as a share of income-based Gross Value-added.

TABLE A8 OTHER TAXES LESS SUBSIDIES ON PRODUCTION AS A
PERCENTAGE OF NOMINAL INDUSTRY GROSS VALUE-ADDED

	Per Cent			
	2015	2016	2017	2018
	Before Benchmarking			
Manufacturing	1.2	1.3	1.2	1.1
Construction	10.3	11.1	11.8	11.4
Utilities	3.6	4.0	4.2	4.2
Other Goods Industries ¹	9.7	10.7	11.1	11.3
Wholesale & Retail Trade	0.1	0.4	0.5	0.6
Transportation & Storage	1.3	1.7	2.0	2.1
Accommodation & Food Services	2.4	3.4	3.9	4.1
Information & Communications	0.8	0.9	1.1	1.3
Finance & Insurance	0.0	0.1	0.2	0.3
Business Services	2.7	3.0	3.2	3.3
Other Services Industries	0.8	1.1	1.3	1.4
Ownership of Dwellings	5.7	5.8	5.8	6.1
	After Benchmarking			
Manufacturing	1.2	1.3	1.2	1.1
Construction	10.3	11.1	11.9	11.4
Utilities	3.5	3.8	3.8	3.8
Other Goods Industries ¹	7.4	8.3	8.6	8.4
Wholesale & Retail Trade	0.1	0.4	0.5	0.7
Transportation & Storage	1.3	2.0	2.2	2.3
Accommodation & Food Services	2.4	3.6	4.1	4.3
Information & Communications	1.1	1.1	1.3	1.4
Finance & Insurance	0.1	0.1	0.2	0.3
Business Services	2.5	2.6	2.8	2.9
Other Services Industries	0.9	1.4	1.4	1.6
Ownership of Dwellings	5.5	5.5	5.4	5.6

¹ Comprise Agriculture, Fishing and Quarrying.

Figures are expressed as a share of income-based Gross Value-added

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