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**SINGAPORE INPUT-OUTPUT TABLES 2000**

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# SINGAPORE INPUT-OUTPUT TABLES 2000

## I. Introduction

1. Input-Output (I-O) tables provide systematic and detailed information on the production activities of an economy by recording the transactions between producers and consumers in an economic system. They are primarily related to the production account in the System of National Accounts (SNA) and are basically made up of a set of supply and use tables and a set of symmetric tables.

2. The Singapore Department of Statistics (DOS) has, to date, published 6 sets of I-O tables for the reference years 1973, 1978, 1983, 1988, 1990 and 1995. These tables have been used as the basis for reconciling the Gross Domestic Product (GDP) estimates by output, expenditure and income approaches when rebasing the Singapore System of National Accounts. This paper presents the 2000 benchmark I-O tables, the latest in the series. The paper also discusses some of the underlying concepts and examines the various applications of the I-O tables using the 2000 benchmark I-O.

## II. Basic Structure of Input-Output Tables

3. In the Singapore I-O tables, the supply and use tables consist of three basic matrices, viz. Make Matrix, Absorption Matrix and Import Matrix. These three tables bring together the production, income and expenditure measures of the GDP which when balanced provide a single measure of GDP, integrating the components of value-added (VA), output and final demand. They also form the basis from which all other symmetric tables and applications are generated.

4. The 2000 benchmark I-O tables have been compiled in terms of 152 industrial sectors and 152 commodities. The industrial classification is based on the 2000 Singapore Standard Industrial Classification (SSIC 2000) and the commodity classification follows the Standard International Trade Classifications (SITC) R3 and Harmonized System (HS) codes 1996. For the purpose of this paper, the supply and use tables are presented using 10 industrial sectors and commodities<sup>1</sup>.

### *Make Matrix*

5. The make matrix records the commodities produced by industries or the output of the domestic production account. It records the domestic output of all industries by commodity. Exhibit 1 provides a schematic representation of the make matrix. The rows of the table show, for each industry, the products it produces and the extent to which each industry specializes in the production of products primary to it. The columns of the table show how the production of each product originated from the various domestic industries.

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<sup>1</sup> The list mapping the 10 industrial sectors and commodities to the detailed I-O industries and commodities are presented in Annex 1.

6. The diagonal entries of the make matrix always show a higher value vis-à-vis the non-diagonal entries. This reflects the principal commodities produced by the establishments in that industrial sector. However, it is common for establishments to engage in the production of other secondary commodities. This explains the existence of the off-diagonal entries in the make matrix.

Exhibit 1 Schematic Representation of Make Matrix

	Commodity	Total
Industry	$X_Q$	$Q_I$
Total	$Q_C$	$Q_D$

Notation:

- $X_Q$  : Make matrix recording the values of domestically produced commodities by industry
- $Q_I$  : Column vector of total output by industry
- $Q_C$  : Row vector of total commodities produced locally
- $Q_D$  : Total domestically produced commodities

7. In 2000, the Singapore economy produced \$407.0 billion worth of goods and services (Table 1). This was a 39 per cent increase from the \$292.5 billion worth of output produced in 1995. The goods sector accounted for a slightly larger share of the total output, contributing 51 per cent while the services sector<sup>2</sup>, the remaining 49 per cent. As expected, the major industry was the manufacturing sector, which contributed \$175.6 billion or 43 per cent of the total output. This was followed by commerce, business services which contributed 12 per cent and 11 per cent of total output respectively.

### ***Absorption Matrix***

8. The second basic table, which is referred to as the absorption matrix, records the commodities purchased or used by industries as intermediate inputs to current production. A convention in I-O tables is to present other relevant information together with the absorption matrix. A schematic representation is shown in Exhibit 2.

9. To the left of the absorption matrix is the final demand matrix which comprises of the private consumption expenditure (PCE), government consumption expenditure (GCE), gross fixed capital formation (GFCF), changes in inventories and exports. Below these two matrices is a row vector that shows the imports of goods and services purchased by industries or for final demand use. The next row vector represents the taxes on products; following which is a matrix of VA components at basic prices. The reconciliation of the three approaches of GDP, viz. output, expenditure and income, are clearly illustrated in this presentation (Exhibit 3).

<sup>2</sup> The goods sector is made up of the agriculture, manufacturing, utilities and construction industries while the services sector is made up of the commerce, transport and communications, financial services, business services and other services industries.

Table 1 Make Matrix, 2000

\$Million

Industry	Commodity											
	Agriculture	Manufacturing			Utilities	Construc-tion	Commerce	Transport & Communi-cations	Financial Services	Business Services	Other Services	Total Industry Output
		Total	Non-Oil	Oil								
Agriculture	407.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	407.0
Manufacturing	0.0	171,338.6	149,271.5	22,067.1	470.3	4.9	3,220.3	7.6	0.0	486.5	64.9	175,593.1
Non-Oil	0.0	149,266.3	149,266.3	0.0	0.0	4.9	2,826.3	7.6	0.0	474.1	64.9	152,644.1
Oil	0.0	22,072.3	5.2	22,067.1	470.3	0.0	394.0	0.0	0.0	12.4	0.0	22,949.0
Utilities	0.0	0.0	0.0	0.0	9,502.2	0.0	0.0	37.7	0.0	153.1	10.1	9,703.1
Construction	0.0	2.4	2.4	0.0	0.0	19,739.2	0.0	0.0	0.0	5.6	0.0	19,747.2
Commerce	0.0	287.8	287.8	0.0	0.0	0.0	45,078.6	260.9	0.4	2,520.7	507.3	48,655.6
Transport & Communications	0.0	63.9	63.9	0.0	3.9	0.0	56.8	42,789.1	0.0	1,423.2	13.3	44,350.2
Financial Services	0.0	0.0	0.0	0.0	0.0	0.0	94.0	46.9	25,979.8	859.5	56.9	27,037.1
Business Services	0.0	48.8	48.8	0.0	0.0	4.7	260.2	102.7	0.7	44,223.9	651.6	45,292.5
Other Services	0.0	2.3	2.3	0.0	0.0	2.3	218.3	10.4	3.9	442.8	35,488.2	36,168.2
Total Commodity Output	407.0	171,743.8	149,676.7	22,067.1	9,976.4	19,751.2	48,928.1	43,255.2	25,984.7	50,115.3	36,792.2	406,954.0

Note: Figures may not add up to the total due to rounding.

## Exhibit 2 Schematic Representation of Absorption and Related Matrices

	Industry	Final Demand	Total
Commodity	$X_A$	$F_L$	$Q_C$
Imports	$R_M$	$R_{FM}$	$M$
Taxes on Products	$R_T$	$R_{FT}$	$T$
VA at Basic Prices	$X_Y$		$Y$
Total	$Q_I$	$F$	$Q$

Notation:

- $X_A$  : Absorption matrix recording the values of domestically produced commodities purchased by industry
- $F_L$  : Final demand matrix of locally produced commodities
- $Q_C$  : Column vector of total commodities produced locally
- $R_M$  : Row vector of total imports purchased by industry
- $R_{FM}$  : Row vector of imports for final demand
- $M$  : Total imports
- $R_T$  : Row vector of taxes on products by industry
- $R_{FT}$  : Row vector of taxes on products on final demand
- $T$  : Total taxes on products
- $X_Y$  : Matrix of VA components at basic prices by industry
- $Y$  : Column vector of factor income
- $Q_I$  : Row vector of total output by industry
- $F$  : Row vector of total final demand
- $Q$  : Total Output = Total Input

## Exhibit 3 Derivation of GDP at Current Market Prices from I-O table

Output Approach

$$\begin{aligned} \text{GDP} &= \text{Output} - \text{Intermediate Input} + \text{Taxes on Products} \\ &\quad \text{on Final Demand} \\ &= Q_I - X_A - R_M + R_{FT} \end{aligned}$$

Expenditure Approach

$$\begin{aligned} \text{GDP} &= \text{Final Demand} - \text{Imports} \\ &= F - M \end{aligned}$$

Income Approach

$$\begin{aligned} \text{GDP} &= \text{Sum of Factor Income} + \text{Taxes on Products} \\ &= Y + T \end{aligned}$$

10. In 2000, the total intermediate inputs supplied by domestic industries amounted to \$107.9 billion, which was 27 per cent of the total output produced (Table 2). This is slightly lower than the 28 per cent of total output produced in 1995 although in terms of absolute value, there was a 33 per cent increase over the \$81.0 billion recorded for 1995.

11. The services sector continued to account for a larger share at 64 per cent and the goods sector, the remaining 36 per cent. The single most important industry was manufacturing, which contributed 25 per cent of all domestically produced inputs and 45 per cent of these were used by the industry itself. It also contributed 42 per cent of all domestically produced inputs used by the construction industry.

12. The amount of goods and services imported by the domestic industries for use in their production process increased from \$100.7 billion in 1995 to \$150.2 billion in 2000. As a percentage of total output, this had increased from 34 per cent to 37 per cent, reflecting the generally high import content of domestically produced goods and services. In terms of sector's usage, the goods sector continued to use up the bulk of the imported inputs with the manufacturing industry alone accounting for 71 per cent of total imported inputs.

13. Final demand components (i.e. PCE, GCE, capital formation and exports) absorbed \$299.1 billion or 73 per cent of total output in 2000. As in 1995, exports of goods and services constituted the major proportion of domestic output. It accounted for \$203.2 billion or 50 per cent of total output, reflecting the economy's high dependency on external demand.

14. PCE and GCE amounted to \$46.9 billion and \$17.3 billion in 2000, respectively. The former comprised \$41.7 billion of expenditure on domestic services especially commerce, business and other services, and \$5.2 billion of expenditure on domestically produced goods. GFCF and changes in inventories accounted for \$31.6 billion.

15. Similar to intermediate inputs, the absolute value of gross VA had increased over the period 1995 to 2000. In 2000, gross VA recorded \$148.6 billion as compared to the \$110.6 billion in 1995. However, as a percentage of total output, it had come down slightly from 38 per cent in 1995 to 37 per cent in 2000.

### ***Import Matrix***

16. The third basic table is the import matrix which records the imported commodities purchased by industries and for final demand (Exhibit 4).

17. The total retained imports in 2000 were \$181.4 billion (Table 3) of which \$150.2 billion were purchased by industrial sectors as inputs for their production, with only \$31.3 billion retained for final demand. The bulk of the imported inputs were manufacturing commodities, accounting for 66 per cent of total retained imports.

Table 2 Absorption Matrix, 2000

\$Million

Sales by Commodity	Purchases by Industry											Imputed Bank Service Charges
	Agriculture	Manufacturing			Utilities	Construction	Commerce	Transport & Communications	Financial Services	Business Services	Other Services	
		Total	Non-Oil	Oil								
Domestic Production	145.6	27,463.0	26,085.7	1,377.3	4,997.1	5,993.1	19,118.1	10,633.0	6,720.9	11,694.6	12,293.6	8,843.0
Agriculture	18.3	21.8	21.8	0.0	0.3	0.3	48.5	1.8	9.5	10.2	16.6	0.0
Manufacturing	14.0	12,474.5	12,378.3	96.2	75.5	2,488.2	1,051.4	1,094.0	104.1	1,063.1	1,785.7	0.0
Non-Oil	13.5	12,103.6	12,060.1	43.4	53.6	2,474.9	1,046.7	1,054.5	103.1	1,057.2	1,779.7	0.0
Oil	0.6	370.9	318.2	52.8	21.8	13.3	4.7	39.5	1.0	5.9	6.0	0.0
Utilities	11.3	1,780.4	1,604.7	175.7	4,634.6	75.5	538.4	252.0	66.7	235.3	711.6	0.0
Construction	1.1	193.1	185.6	7.5	30.2	12.1	35.8	29.0	13.3	670.6	144.8	0.0
Commerce	46.9	4,210.4	4,056.6	153.8	21.3	1,123.8	1,861.6	498.5	185.7	937.3	1,208.8	0.0
Transport & Communications	16.5	1,688.6	1,350.7	337.9	16.3	246.0	7,191.3	5,874.3	882.7	1,373.0	925.9	0.0
Financial Services	4.4	916.7	839.4	77.3	3.8	81.1	1,566.4	193.7	3,054.0	517.8	78.5	8,843.0
Business Services	26.9	4,616.8	4,120.1	496.7	77.9	1,836.7	5,614.6	1,813.7	2,022.5	5,963.5	5,001.6	0.0
Other Services	6.1	1,560.8	1,528.6	32.2	137.3	129.4	1,210.1	875.9	382.4	923.8	2,420.1	0.0
Import of goods & services	74.2	106,735.3	86,957.0	19,778.4	2,052.9	4,734.2	4,855.3	14,765.4	2,785.8	7,087.9	7,083.7	0.0
Taxes on products	0.6	56.6	27.0	29.7	61.0	1.0	27.1	23.5	27.5	9.3	61.3	0.0
Value-added at basic prices	186.6	41,338.1	39,574.4	1,763.7	2,592.1	9,019.1	24,655.1	18,928.4	17,502.9	26,500.7	16,729.6	-8,843.0
Taxes on production	14.1	344.9	336.0	8.9	36.9	339.2	270.9	577.6	61.1	1,143.9	787.3	0.0
Compensation of employees	84.5	14,161.0	13,743.0	418.0	412.8	5,461.1	12,881.8	6,668.6	6,801.6	9,659.2	13,017.5	0.0
Gross operating surplus	88.0	26,832.2	25,495.5	1,336.8	2,142.4	3,218.8	11,502.5	11,682.2	10,640.2	15,697.6	2,924.8	-8,843.0
<b>Total Input</b>	<b>407.0</b>	<b>175,593.1</b>	<b>152,644.1</b>	<b>22,949.0</b>	<b>9,703.1</b>	<b>19,747.2</b>	<b>48,655.6</b>	<b>44,350.2</b>	<b>27,037.1</b>	<b>45,292.5</b>	<b>36,168.2</b>	<b>0.0</b>

Note: Figures may not add up to the total due to rounding.

Table 2 Absorption Matrix, 2000 (cont'd)

\$Million

Sales by Commodity	Total Intermediate Output	Final Demand						Total Output
		Private Consumption Expenditure	Government Consumption Expenditure	Gross Fixed Capital Formation	Changes in Inventories	Exports	Total	
Domestic Production	107,901.9	46,935.1	17,338.5	29,629.4	1,946.0	203,203.1	299,052.1	406,954.0
Agriculture	127.2	122.2	0.0	0.0	0.6	157.0	279.8	407.0
Manufacturing	20,150.5	3,812.5	0.0	3,855.9	1,940.5	141,984.3	151,593.2	171,743.8
Non-Oil	19,686.8	3,516.4	0.0	3,855.9	2,359.1	120,258.6	129,990.0	149,676.7
Oil	463.8	296.1	0.0	0.0	-418.5	21,725.7	21,603.3	22,067.1
Utilities	8,305.8	1,325.0	0.0	0.0	4.9	340.7	1,670.6	9,976.4
Construction	1,130.0	0.0	0.0	18,413.7	0.0	207.4	18,621.1	19,751.2
Commerce	10,094.3	11,789.2	0.0	3,446.8	0.0	23,597.9	38,833.8	48,928.1
Transport & Communications	18,214.5	4,932.5	0.0	0.0	0.0	20,108.2	25,040.8	43,255.2
Financial Services	15,259.5	3,697.7	0.0	0.0	0.0	7,027.5	10,725.2	25,984.7
Business Services	26,974.1	9,811.9	0.0	3,913.0	0.0	9,416.3	23,141.3	50,115.3
Other Services	7,645.9	11,444.2	17,338.5	0.0	0.0	363.6	29,146.3	36,792.2
Import of goods & services	150,174.6	12,390.6	0.0	16,504.9	2,377.6	0.0	31,273.1	181,447.8
Taxes on products	267.8	8,200.9	0.0	2,762.1	0.0	0.0	10,963.0	11,230.8
Value-added at basic prices	148,609.6	0.0	0.0	0.0	0.0	0.0	0.0	148,609.6
Taxes on production	3,575.8	0.0	0.0	0.0	0.0	0.0	0.0	3,575.8
Compensation of employees	69,148.1	0.0	0.0	0.0	0.0	0.0	0.0	69,148.1
Gross operating surplus	75,885.8	0.0	0.0	0.0	0.0	0.0	0.0	75,885.8
Total Input	406,954.0	67,526.5	17,338.5	48,896.4	4,323.6	203,203.1	341,288.2	748,242.2

18. The import matrix also captured the data on residents' expenditure abroad which has been recorded net of tourists' expenditure in the column of PCE under "Other Services". The negative entry means that the tourists' expenditure in Singapore exceeded residents' expenditure abroad by \$2.7 billion in 2000.

Exhibit 4 Schematic Representation of Import Matrix

	Industry	Final Demand	Total
Commodity	$X_M$	$F_M$	$Q_M$
Total	$R_M$	$R_{FM}$	$M$

Notation:

- $X_M$  : Import matrix recording the values of imported commodities by industry
- $F_M$  : Final demand matrix of imported commodities
- $R_M$  : Row vector of total imports purchased by industry
- $R_{FM}$  : Row vector of imports for final demand
- $Q_M$  : Column vector of total commodities imported
- $M$  : Total imports

### *Symmetric Tables*

19. The input-output tables discussed so far show the flows of commodities to and from industries and to final demand. In order to use these tables for analytical purposes, it is necessary that the use table (absorption matrix) be expressed in a symmetrical form. The new table will then show either the purchases of industrial output by industries and final demand or the purchases of commodities by commodity production process. These symmetrical tables are known as industry x industry tables or commodity x commodity tables.

20. In symmetric tables, for any industry or commodity, its column and row totals are always the same because total sales of industry should be equal to total purchases of industry and total usage of commodity equal to total production of commodity. Annex 2 in the Appendix shows the list of symmetrical tables compiled by DOS, which consists of both the industry x industry tables as well as the commodity x commodity tables. The symmetric tables used in the applications of I-O tables in this paper are the industry x industry tables.

### **III. Applications of Input-Output Tables**

21. This section explains and presents the findings of four applications, viz. multiplier, dependency, linkage analyses as well as analysis on net foreign exchange earnings. There is also a brief discussion on the impact of the various final demand components on the economy. In using I-O tables for analysis, it is useful to regard I-O tables as representing underlying quantities and technological relationships rather than values.

Table 3 Import Matrix, 2000

\$Million

Import by Commodity	Purchases by Industry											Total Intermediate Output
	Agriculture	Manufacturing			Utilities	Construction	Commerce	Transport & Communications	Financial Services	Business Services	Other Services	
		Total	Non-Oil	Oil								
Agriculture	23.2	375.7	375.7	0.0	0.0	0.0	374.5	3.1	0.5	0.1	60.5	837.6
Manufacturing	48.3	96,973.0	77,278.2	19,694.8	1,615.6	4,662.8	2,530.6	4,075.8	171.6	3,313.8	6,647.7	120,039.1
Non-Oil	43.6	74,626.3	73,838.5	787.8	129.8	4,168.8	2,222.4	1,020.7	128.6	3,144.7	6,383.9	91,868.7
Oil	4.7	22,346.7	3,439.7	18,906.9	1,485.8	494.0	308.2	3,055.1	43.0	169.1	263.8	28,170.4
Utilities	0.0	2.6	2.6	0.0	362.8	0.0	0.0	0.0	0.0	0.0	0.0	365.4
Construction	0.0	21.7	21.7	0.0	46.0	41.2	0.0	0.0	0.0	34.2	0.0	143.0
Commerce	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport & Communications	0.0	123.8	88.7	35.1	0.0	1.0	140.7	9,092.2	38.2	97.0	19.0	9,512.0
Financial Services	0.0	40.1	39.0	1.1	0.4	0.8	43.1	114.3	1,360.3	7.0	0.4	1,566.5
Business Services	2.7	8,987.5	8,943.5	44.0	26.9	28.3	1,241.1	702.2	1,118.5	3,361.0	33.5	15,501.7
Other Services	0.0	211.0	207.6	3.4	1.2	0.1	525.1	777.7	96.8	274.8	322.5	2,209.3
Import of Goods & Services	74.2	106,735.3	86,957.0	19,778.4	2,052.9	4,734.2	4,855.3	14,765.4	2,785.8	7,087.9	7,083.7	150,174.6

Note: Figures may not add up to the total due to rounding.

Table 3 Import Matrix, 2000 (cont'd)

\$Million

Import by Commodity	Final Demand					Total Output
	Private Consumption Expenditure	Government Consumption Expenditure	Gross Fixed Capital Formation	Changes in Inventories	Total	
Agriculture	1,100.6	0.0	0.0	12.7	1,113.3	1,950.9
Manufacturing	12,813.6	0.0	16,475.5	2,366.0	31,655.1	151,694.2
Non-Oil	12,107.9	0.0	16,475.5	1,727.8	30,311.2	122,179.9
Oil	705.7	0.0	0.0	638.2	1,343.9	29,514.3
Utilities	0.0	0.0	0.0	-1.0	-1.0	364.4
Construction	0.0	0.0	16.9	0.0	16.9	159.9
Commerce	0.0	0.0	0.0	0.0	0.0	0.0
Transport & Communications	1,186.5	0.0	0.0	0.0	1,186.5	10,698.5
Financial Services	0.0	0.0	0.0	0.0	0.0	1,566.5
Business Services	0.0	0.0	12.5	0.0	12.5	15,514.2
Other Services	-2,710.1	0.0	0.0	0.0	-2,710.1	-500.8
Import of Goods & Services	12,390.6	0.0	16,504.9	2,377.6	31,273.1	181,447.8

## ***Multiplier Analysis***

22. An important tool for analysis is the input-output multipliers. A multiplier is a ratio that measures the impact on the total economy as a result of an initial autonomous change in any of the final demand components. The relationship between the initial autonomous change and the total effects in the entire economy generated by the change is known as the multiplier effect.

23. To illustrate the multiplier effect, consider for example, an increase in the demand for computer notebooks. To produce more notebooks, the manufacturers have to purchase more components such as liquid-crystal-display (LCD) screen and hard disks, etc. from other manufacturing industries. The manufacturers producing the LCD will in turn have to purchase more raw materials, such as micro-electronic chips etc. to increase their production.

24. This process will go on and on and subsequently, all industries supplying the components and services to the manufacturers of computer notebooks will have to purchase more goods and services from their own suppliers so as to increase production. Therefore, the increase in demand for computer notebooks does not end at the production of computer notebooks per se; it sparks off a series of events.

25. Different kinds of multipliers can be generated depending on the purpose of analysis. The most common multipliers used are output, VA, employment, import and income multipliers. For comparative purposes, multipliers are usually expressed with respect to a unit of autonomous change in final demand (Exhibit 5).

Exhibit 5 Explanation of Multipliers

Multiplier of Industry A	Per \$m of Change on Final Demand	Interpretation
Output	\$1.27m	A \$1m increase in the final demand in Industry A would: Increase output of the whole economy by \$1.27m
Value-Added	\$0.36m	Increase VA of the whole economy by \$0.36m
Income	\$0.15m	Increase income of the whole economy by \$0.15m
Import	\$0.64m	Increase import of the whole economy by \$0.64m
Employment	5 persons	Increase employment of the whole economy by 5 persons

26. Each of the above multipliers can be generated from two different models: ‘open’ and ‘closed’. The multipliers generated using the *open*<sup>3</sup> model are known as simple or Leontiff multipliers which measure the direct and indirect effects resulting from a change in final demand. In the *closed*<sup>4</sup> model, the multipliers generated are known as the total or Leontiff-Keynes multipliers, which in addition to the direct and indirect effects, also

<sup>3</sup> The model is described as ‘open’ because at each round of the multiplier process, there are leakages from the system as it is assumed that all the final demand components are exogenous. The leakages consist of payments for imports and primary inputs and the recipients are assumed to make no use of their receipts.

<sup>4</sup> In the ‘closed’ model, the household sector is treated as endogenous. This means that the household receiving income from the work done in the production process would spend some of this income on local products.

measure the induced effect brought about by consumption of the household sector as a result of a change in final demand.

**(A) Simple Multipliers (Open Model)**

27. Table 4 shows the simple multipliers of 10 major industrial sectors generated from the 2000 benchmark I-O tables.

Table 4 Simple Multipliers by Industrial Sector Per \$m of Change in Final Demand, 2000

Industrial Sectors	Output	VA	Income	Import	Employment
	\$Million				Number
Agriculture	1.527	0.695	0.308	0.303	13.7
Manufacturing (Non Oil)	1.233	0.350	0.127	0.650	3.8
Manufacturing (Oil)	1.087	0.116	0.033	0.883	0.6
Utilities	2.013	0.555	0.104	0.433	2.3
Construction	1.409	0.630	0.346	0.370	17.5
Commerce	1.543	0.765	0.368	0.234	11.6
Transport & Communications	1.327	0.571	0.208	0.428	5.7
Financial Services	1.339	0.835	0.327	0.164	5.2
Business Services	1.358	0.761	0.286	0.238	7.0
Other Services	1.483	0.685	0.458	0.313	14.7

28. The output multiplier for the utilities sector was 2.013, the highest of all sectors in 2000. In other words, an increase in the demand for the utilities sector's output would stimulate a relatively high level of domestic production in the whole economy.

29. A decomposition of the output multiplier for the utilities sector shows that the VA and import multipliers were 0.555 and 0.433, respectively; with the remaining 1.025 accrued to intermediates. This means that a dollar increase in the final demand of the utilities sector would eventually lead to 55 cents of VA being generated for the whole economy<sup>5</sup>. A further breakdown of the VA multiplier shows that 10 cents would eventually be returned to the workers as remuneration.

30. While the output multiplier measures the amount of output stimulated in the whole economy, the VA multiplier gives the corresponding VA created in the process. Services output was more dependent on the domestic industries for its input requirements. As a result, more VA was generated in the economy by the consumption of services output than that of manufactured goods.

31. In 2000, an increase in \$1 consumption each in the financial services and commerce would help to generate 84 cents and 77 cents of VA in the whole economy respectively, the highest among all industries. In contrast, a \$1 increase in expenditure on non-oil manufactured goods would result only 35 cents of VA in the whole economy.

32. The income and employment multipliers for the utilities and oil manufacturing sectors were lower than most other sectors. This reflects that both sectors were relatively

<sup>5</sup> Despite the fact that the output multiplier of the utilities sector was the highest among all sectors in 2000, its VA multiplier was relatively lower due to the industry's high import requirements for domestic production.

less labour intensive, the contribution of remuneration to VA as a result would be relatively lower and thus the wage share in their VA would be lower. The employment and income multipliers for the other services, construction and commerce sectors were the highest in 2000, reflecting the highly labour-intensive nature of these industries.

33. Among all the industries, the oil manufacturing sector had the highest import multiplier at 0.883. This implies that for every dollar of output produced in the oil manufacturing sector, 88 cents of imports was required. This reveals the nature of the products of this particular sector which is generally high in import content. Consequently, the VA multiplier of the oil manufacturing sector is relatively lower than those of the rest of the sectors.

34. The direct and indirect effects of the VA and import multipliers of the 10 industrial sectors are illustrated in Table 5. The VA multiplier of the transport & communications sector in 2000 was 0.571. Of the 57 cents of VA generated in the total economy from an increase in \$1 worth of transport & communication services consumed, the direct VA contribution to the transport & communications sector was 43 cents. The remaining 14 cents was the additional VA generated in some other industries which supplied goods and services to the sector, such as utilities etc.

Table 5 Direct and Indirect Effect of VA and Import Multipliers by Industrial Sector  
Per \$m of Change in Final Demand, 2000

Industrial Sectors	VA			Import		
	Multiplier	Direct	Indirect	Multiplier	Direct	Indirect
Agriculture	0.695	0.459	0.237	0.303	0.182	0.120
Manufacturing (Non Oil)	0.350	0.259	0.091	0.650	0.570	0.080
Manufacturing (Oil)	0.116	0.077	0.039	0.883	0.862	0.021
Utilities	0.555	0.267	0.288	0.433	0.212	0.221
Construction	0.630	0.457	0.173	0.370	0.240	0.130
Commerce	0.765	0.507	0.259	0.234	0.100	0.134
Transport & Communications	0.571	0.427	0.144	0.428	0.333	0.095
Financial Services	0.835	0.647	0.187	0.164	0.103	0.061
Business Services	0.761	0.585	0.176	0.238	0.157	0.082
Other Services	0.685	0.463	0.222	0.313	0.196	0.117

**(B) Total Multipliers (Closed Model)**

35. In addition to the direct and indirect effects, the multipliers generated in the *closed* model also captures the induced effect which arise as the households receiving income from the work done in the production process spend some of the income. This increase in consumption would in turn increase the level of output of the products. This accounts for the fact that the multipliers in the *closed* model are always higher than that in the *open* model. Table 6 shows the different multipliers of the 10 industrial sectors generated using the *closed* model.

36. The rankings of the multipliers can be different in the *open* and *closed* models. For example, a sector with the highest simple VA multiplier may not necessarily be the one with the highest total VA multiplier. However, the rankings of the simple and total

multipliers are correlated because the production-induced effects (direct and indirect effects) reflected by the simple multipliers are also embedded in the total multipliers.

Table 6 Total Multipliers by Industrial Sector Per \$m of Change in Final Demand, 2000

Industrial Sectors	Output	VA	Income	Import	Employment
	\$Million				Number
Agriculture	1.910	0.878	0.393	0.387	16.1
Manufacturing (Non Oil)	1.391	0.425	0.162	0.684	4.9
Manufacturing (Oil)	1.127	0.135	0.042	0.892	0.8
Utilities	2.142	0.617	0.133	0.461	3.1
Construction	1.840	0.835	0.443	0.465	20.3
Commerce	2.001	0.984	0.471	0.335	14.6
Transport & Communications	1.586	0.694	0.266	0.485	7.3
Financial Services	1.746	1.028	0.418	0.254	7.8
Business Services	1.714	0.931	0.366	0.317	9.3
Other Services	2.053	0.956	0.586	0.439	18.4

37. The difference between the multipliers generated by the closed and open model is attributed to the consumption-induced effect. Table 7 shows the consumption-induced effect of the different industrial sectors. It is observed that the more labour-intensive the industrial sector, the higher the consumption-induced effect. This is because in a labour-intensive industry, its wage share is high. As such, the increase in income as a result of generating the increase in output would in turn lead to further spending by the wage earners. This leads to additional consumption-induced effects in the production process.

Table 7 Consumption-Induced Effect by Industrial Sector Per \$m of Change in Final Demand, 2000

Industrial Sectors	Output	VA	Income	Import	Employment
	\$Million				Number
Agriculture	0.383	0.182	0.086	0.084	2.5
Manufacturing (Non Oil)	0.158	0.075	0.035	0.035	1.0
Manufacturing (Oil)	0.041	0.019	0.009	0.009	0.3
Utilities	0.129	0.062	0.029	0.029	0.8
Construction	0.431	0.205	0.097	0.095	2.8
Commerce	0.458	0.218	0.103	0.101	3.0
Transport & Communications	0.259	0.123	0.058	0.057	1.7
Financial Services	0.406	0.194	0.091	0.090	2.6
Business Services	0.356	0.170	0.080	0.079	2.3
Other Services	0.570	0.271	0.128	0.126	3.7

### *Dependency Analysis*

38. Multiplier analysis is only able to give us the impact at the overall economy. However, it is important to know not only the impact of an autonomous change on the total economy but also the impact on specific sectors. Dependency analysis is used to show how the multiplier effect is spread out among the different sectors of the economy. Table 8 shows the VA dependencies of the 10 sectors using the open model.

39. A change in final demand of the oil manufacturing sector has one of the highest impacts on the VA of other sectors. If there were a dollar increase in the final demand of

the oil manufacturing sector, other sectors would benefit from 33 per cent of the increase in the VA generated in the total economy. Conversely, if the oil manufacturing sector is affected by a decrease in final demand, the spillover to other sectors would be relatively large. On the other hand, a change in final demand of the utilities sector would have least impact on the VA of other sectors.

Table 8 Value-Added Dependency Per \$m of Change in Final Demand, 2000

Industrial Sectors	VA Multiplier	Impact On			
		Itself	Others	Itself	Others
	\$Million	\$Million		Per Cent	
Agriculture	0.695	0.480	0.215	69	31
Manufacturing (Non Oil)	0.350	0.283	0.067	81	19
Manufacturing (Oil)	0.116	0.077	0.039	67	33
Utilities	0.555	0.512	0.043	92	8
Construction	0.630	0.458	0.172	73	27
Commerce	0.765	0.536	0.230	70	30
Transport & Communications	0.571	0.495	0.076	87	13
Financial Services	0.835	0.733	0.102	88	12
Business Services	0.761	0.673	0.088	88	12
Other Services	0.685	0.497	0.188	73	27

### *Linkage Analysis*

40. Another application of the I-O tables is linkage analysis. Linkages reflect the interdependence of industries in the economy and measure the potential stimulus that will be induced in other activities as a result of an investment on a particular activity. There are basically two types of linkages, the backward linkages and forward linkages.

41. The backward linkage traces the output increases which will occur in the industries supplying inputs to that particular industry while the forward linkage traces the output increases which might occur in industries using the inputs supplied by that particular industry.

42. A backward linkage greater (less) than one implies that the industry in question have an above (below) average dependency upon all domestic industries for its input requirements. On the other hand, a forward linkage greater (less) than one implies that overall domestic industries have an above (below) average dependency upon the industry in question for their input requirements.

43. Linkage analyses are useful for identifying key sectors in the economy and for grouping sectors into spatial clusters. To further measure whether the linkages are biased towards a few sectors, a coefficient of variation can be computed. A low coefficient of variation in a particular sector means that investment in that particular sector would stimulate other sectors in an even manner. Conversely, a high coefficient of variation means that the benefits of the investment in a particular sector are unevenly shared among all sectors.

44. Table 9 shows the backward and forward linkages as well as the coefficient of variation of the 10 industrial sectors. The utilities and the business services sectors had the highest forward linkages with lowest coefficient of variation. This reflects that the services provided by these two sectors are essential to all other domestic industries in the economy.

45. Backward linkages are proportional to output multipliers. The commerce sector had one of the highest output multiplier in 2000<sup>6</sup>, it is therefore no surprise that the sector's backward linkage was among the top in the same year. The high backward linkage of the utilities sector shows that it is highly dependent upon other domestic industries for its input requirements.

Table 9 Backward and Forward Linkages, 2000

Industrial Sectors	Backward		Forward	
	Linkage	Coefficient of Variation	Linkage	Coefficient of Variation
Agriculture	1.066	2.076	0.959	2.266
Manufacturing (Non Oil)	0.861	2.760	0.789	2.939
Manufacturing (Oil)	0.759	2.891	0.702	3.041
Utilities	1.406	2.993	1.911	2.064
Construction	0.984	2.179	0.738	2.881
Commerce	1.078	2.097	0.881	2.511
Transport & Communications	0.927	2.726	1.080	2.235
Financial Services	0.935	2.628	0.910	2.612
Business Services	0.948	2.630	1.177	1.997
Other Services	1.036	2.216	0.854	2.641

### *Net Foreign Exchange Earnings*

46. As mentioned above, Singapore has high dependency on both external demand and supply. For the year 2000, the total domestic exports accounted for 50 per cent of domestic production while the ratio of import of goods and services to domestic production was 45 per cent.

47. The I-O tables can be used to generate net foreign exchange earnings by industrial sector, which is defined as the direct foreign exchange earnings, represented by its exports, less the imported inputs required for the production of such exports. The ratio of net foreign exchange earnings to total domestic exports gives an indication of the VA generated from domestic exports.

48. Table 10 shows the net foreign exchange earnings of the different industrial sectors in 2000. The non-oil manufacturing sector contributed \$39.2 billion worth of net foreign exchange earnings, which was the highest among the 10 sectors. However, its ratio of net foreign exchange earnings to total domestic exports was relatively lower than that of the services sectors, implying that its contribution to VA was not as much as that of the latter. This is not surprising, as generally the import content of services is relatively lower hence allowing it to contribute more in terms of VA per unit of export.

<sup>6</sup> Refer to Table 4.

Table 10 Net Foreign Exchange Earnings from Exports, 2000

Industrial Sectors	Exports	Import Requirement	Net Foreign Exchange Earnings		
	\$Million		\$Million	Percentage Distribution	Ratio to Exports
Agriculture	157.0	49.6	107.4	0.1	68.4
Manufacturing (Non Oil)	121,692.3	82,533.3	39,158.9	47.8	32.2
Manufacturing (Oil)	22,177.2	20,443.0	1,734.2	2.1	7.8
Utilities	200.0	90.4	109.6	0.1	54.8
Construction	211.5	81.7	129.8	0.2	61.4
Commerce	22,367.5	5,455.6	16,911.9	20.6	75.6
Transport & Communications	20,352.3	9,099.2	11,253.0	13.7	55.3
Financial Services	7,275.6	1,246.6	6,029.0	7.4	82.9
Business Services	8,234.6	2,049.5	6,185.1	7.5	75.1
Other Services	535.3	174.9	360.3	0.4	67.3
TOTAL	203,203.1	121,223.8	81,979.3	100.0	40.3

Note: Figures may not add up to the total due to rounding.

### *Impact of Final Demand*

#### *(A) On Output*

49. Different components of final demand have different impacts on output. Output generated in the various industries as a result of a dollar change in each final demand component can be seen in Table 11. In 2000, GCE had the greatest impact on the output of the economy followed by exports -- every dollar increase of GCE and exports would generate \$1.49 and \$1.28 worth of output respectively. On the other hand, every dollar increase of PCE in 2000, would lead to \$1.01 of output being generated, of which 10 cents were from the manufacturing sector, 5 cents from the utilities sector and the rest of the 86 cents from the commerce and the other services sectors<sup>7</sup>.

Table 11 Industrial Composition of Per \$ of Change in Final Expenditure in terms of Gross Output, 2000

Industrial Sectors	Private Consumption Expenditure	Government Consumption Expenditure	Gross Capital Formation	Exports
TOTAL	1.01	1.49	0.83	1.28
Agriculture	-	-	-	-
Manufacturing (Non Oil)	0.09	0.07	0.19	0.67
Manufacturing (Oil)	0.01	-	-	0.11
Utilities	0.05	0.05	0.01	0.02
Construction	-	0.01	0.35	-
Commerce	0.20	0.06	0.10	0.14
Transport & Communications	0.14	0.05	0.03	0.16
Financial Services	0.09	0.01	0.01	0.06
Business Services	0.23	0.16	0.13	0.10
Other Services	0.19	1.08	0.01	0.02

Note: Figures may not add up to the total due to rounding.

<sup>7</sup> The other services sectors include the transport & communication, financial services, business services and other services industries.

## ***(B) On Value-Added***

50. Table 12 shows the VA generated in each industry by categories of final demand. In the case of PCE, a total of \$34.3 billion worth of VA was generated in 2000. This comprises of \$1.7 billion from the manufacturing sector, \$1.0 billion from the utilities sector, \$0.1 billion from the construction sector, \$6.9 billion from the commerce sector and \$24.6 billion from the other services sectors.

Table 12 Industrial Composition of Final Expenditure in terms of Value-Added at Basic Values, 2000

	\$Million			
	Private Consumption Expenditure	Government Consumption Expenditure	Gross Capital Formation	Exports
TOTAL	34,313.0	12,028.9	19,551.8	91,559.0
Agriculture	71.9	5.1	4.6	105.0
Manufacturing (Non Oil)	1,615.8	314.9	2,604.0	35,039.7
Manufacturing (Oil)	40.0	2.2	-24.4	1,745.9
Utilities	963.6	211.1	153.4	1,264.0
Construction	143.7	55.5	8,474.2	345.7
Commerce	6,876.2	528.1	2,598.2	14,652.7
Transport & Communications	4,104.8	400.4	773.8	13,649.5
Financial Services	5,440.1	199.2	663.9	11,199.7
Business Services	8,992.6	1,654.5	4,024.6	11,829.0
Other Services	6,064.3	8,657.8	279.7	1,727.8

Note: Figures may not add up to the total due to rounding.

## **IV. Conclusion**

51. The I-O tables provide a comprehensive and integrated framework which can serve as a basis for checking the consistency of statistics obtained from different sources. They are also used for deriving some key national accounts aggregates and for detecting data gaps in the production account of the SNA.

52. In addition, the wealth of information embodied in the I-O tables ensures its usefulness and relevance for policy evaluation and formulation. The applications presented in this paper demonstrate the powerful analytical capability of the I-O tables.

53. Multiplier analysis showed that the utilities sector had the highest simple output multiplier while the financial services sector had the highest simple VA multiplier. Although non-oil manufacturing had the highest output and VA in absolute terms, its VA multiplier was one of the lowest due to its high import content. The construction, commerce and other services sectors had the highest employment and income multipliers.

54. For total multipliers, industrial sectors which are both labour intensive and PCE oriented tend to have higher income, VA and output multipliers vis-à-vis simple multipliers. Conversely, industrial sectors which are neither labour intensive nor PCE oriented, such as oil manufacturing only reflect marginally higher total multipliers vis-à-vis simple multipliers.

55. The utilities and the business services sector had the highest forward linkages with the lowest coefficient of variation as they are essential services to all other sectors in the economy. The non-oil manufacturing sector had a relatively low forward linkage with high coefficient of variation. This reflects the high ratio of exports to domestic production and the low proportion of its output used as intermediate inputs in the domestic economy.

56. Non-oil manufacturing contributed to almost half of the net foreign exchange earnings in Singapore. However, the services sector had a higher VA per unit of export because the nature of services is such that the import content is minimal. Hence the promotion of services export would generate more VA per unit of export vis-à-vis merchandise exports.

57. The analysis of this paper had been based on aggregated tables which had been summarized into 10 industrial sectors and commodities. The softcopy of the complete set of the 2000 benchmark I-O tables at the detailed industry and commodity levels is available for sale from DOS.

SINGAPORE DEPARTMENT OF STATISTICS

18 MAY 2006

# **APPENDIX**

## Correspondence between the 10 Industrial Sectors and the 152 I-O Codes

Industrial Sector		I-O Codes	
1	Agriculture	001	Livestock
		002	Nursery Products
		003	Other Agriculture
		004	Aquarium Fish
		005	Other Fisheries
2	Manufacturing (Non-oil)	006	Meat Preparations
		007	Seafood Preparations
		008	Fruit and Vegetable Preparations
		009	Oils and Fats
		010	Dairy Products
		011	Mill and Starch Products
		012	Spices
		013	Bread, Biscuits and Confectionery
		014	Sugar, Chocolate and Related Products
		015	Noodles and Related Products
		016	Coffee and Tea
		017	Other Food Preparations
		018	Soft Drinks
		019	Alcoholic Drinks
		020	Tobacco Products
		021	Yarn and Fabrics
		022	Garments
		023	Millinery and Other Wearing Apparel
		024	Tailoring and Dressmaking
		025	Textile Articles
		026	Footwear
		027	Leather and Fur Products
		028	Wood and Wooden Products
		029	Wooden Furniture and Fixtures
		030	Paper and Paper Products
		031	Newspapers, Books and Magazines
		032	Other Printing
		034	Industrial Chemicals and Gases
		035	Petrochemicals and Petrochemical Products
		036	Polymers and Man-made Fibres
		037	Pharmaceutical Products
		038	Toiletries and Cosmetics
		039	Cleaning and Polishing Preparations
		040	Paints
		041	Food Chemicals and Additives
		042	Other Chemical Products
		043	Processing of Rubber and Natural Gums
		044	Rubber Products
		045	Plastic Precision Products
		046	Other Plastic Products
		047	Glass and Glass Products
		048	Fibreglass and Fibreglass Products
		049	Cement
		050	Concrete Products
		051	Bricks and Earth-baked Products
		052	Non-metallic Mineral Products
		053	Basic Iron and Steel
		054	Non-ferrous Basic Metals
		055	Metal Furniture

Industrial Sector		I-O Codes	
2	Manufacturing (Non-oil) (cont'd)	056	Structural Metal Products
		057	Non-insulated Cable Products
		058	Metal Containers
		059	Treatment and Coating of Metals
		060	General Hardware
		061	Metal Stampings
		062	Metal Precision Components
		063	Other Metal Products
		064	Computers and Computer Peripheral
		065	Disk Drives
		066	Audio and Video Equipment
		067	Semiconductors
		068	Electron Tubes
		069	Capacitors and Resistors
		070	Printed Circuit Boards
		071	Communication Equipment
		072	Other Electronic Products
		073	Lifting and Hoisting Machinery
		074	Refrigerators and Air-conditioners
		075	Oil Rigs and Oilfield Machinery
		076	General Engineering Works
		077	Other Industrial Machinery and Equipment
		078	Electric Motors and Generators
		079	Switchgear and Switchboard Apparatus
		080	Other Electrical Industrial Apparatus
		081	Recorded Media
		082	Household Appliances
		083	Storage and Primary Batteries
		084	Electrical Wires and Cables
		085	Lamp and Lighting Fixtures
086	Land Transport Equipment		
087	Building of Ships and Boats		
088	Repairing of Ships and Boats		
089	Marine Engines and Ship Parts		
090	Scrap		
091	Aircraft		
092	Medical and Scientific Instruments		
093	Photographic and Optical Goods		
094	Watches and Clocks		
095	Toys and Recreational Goods		
096	Mattresses		
097	Jewellery		
098	Other Manufacturing		
3	Manufacturing (Oil)	033	Petroleum and Petroleum Products
4	Utilities	099	Electricity
		100	Gas
		101	Water
5	Construction	102	Building Construction
		103	Other Construction
6	Commerce	104	Wholesale & Retail Trades
		105	Food and Beverage Services
		106	Accommodation Services
7	Transport & Communications	107	Passenger Transport by Land
		108	Freight Transport by Land
		109	Water Transport
		110	Supporting Services to Water Transport
		111	Port Operation Services
		112	Air Transport

Industrial Sector		I-O Codes	
7	Transport & Communications (cont'd)	113	Supporting Services to Air Transport
		114	Airport Operation Services
		115	Warehousing Services
		116	Other Freight Transport
		117	Sight-seeing and Tourism
		118	Other Transport Services
		119	Crane and Container Services
		120	Communications
8	Financial Services	121	Life Insurance
		122	General and Other Insurance
		123	Banks and Finance Companies
		124	Other Financial Services
9	Business Services	125	Real Estate
		126	Legal Services
		127	Accounting and Secretarial Services
		128	Information Technology
		129	Publishing
		130	Architectural and Engineering Services
		131	Industrial Design Services
		132	Petroleum and Mining Consultants
		133	Employment and Labour Contracting
		134	Advertising and Exhibitions
		135	Leasing of Machinery and Equipment
		136	Management Consultants
		137	Hotel Management Services
		138	Other Business and Technical Services
		140	Security Services
		152	Ownership of Dwellings
10	Other Services	139	Producers of Government Services
		141	Education
		142	Medical and Health Services
		143	Environmental Health Services
		144	Cinema Services
		145	Broadcasting and Entertainment Services
		146	Other Recreational Services
		147	Personal and Household Services
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## **SINGAPORE DEPARTMENT OF STATISTICS INFORMATION DISSEMINATION SERVICES**

### **Statistics Singapore Website**

The Statistics Singapore Website was launched by the Singapore Department of Statistics in January 1995. Internet users can access the website by connecting to:

**<http://www.singstat.gov.sg>**

Key Singapore statistics are available:

- ◆ Latest Data / KeyStats  
which provide key data on Singapore's economy and population.
- ◆ Media Releases  
which cover the Performance of Singapore Economy, the Consumer Price Index, the Wholesale Trade Index, Business Receipts Index for Service Industries, Retail Sales and Catering Trade Indices, Manufacturing Performance, Singapore External Trade, Tourism Sector Performance, Real Estate Information and Employment Situation.
- ◆ Papers and Analyses  
which provide papers on economic and social topics.

An advance release calendar for key Singapore economic indicators is available.

The Website provides a convenient gateway to international statistical websites:

- ◆ Guide to International Statistics  
which covers international databases, classifications and links, and statistical terms and definitions.
- ◆ IMF Dissemination Standards Bulletin Board  
which provides metadata about Singapore's key indicators in the real, fiscal, financial and external sectors, including dissemination practices and information about pre-release access of current indicators.

The latest editions of our Department's publications are available in SingStat website at <http://www.singstat.gov.sg/pdtsvc/catalog.html>.

### **SingStat Express**

SingStat Express is a personalised data delivery service which sends the latest press releases, notices of publication, newsletter, occasional and information papers to subscribers via email. The Monthly Digest of Statistics (softcopy) and more than 50 key indicators and statistical indices are included for subscription at a nominal fee.

Subscription details are available from the Statistics Singapore Website (<http://www.singstat.gov.sg/express/express.html>).

### **Key Singapore Data on Palm OS Devices**

The pdf version of "Singapore in Brief 2006" for Palm OS devices is available for downloading from the Statistics Singapore Website.

## SINGAPORE DEPARTMENT OF STATISTICS INFORMATION DISSEMINATION SERVICES (continued)

### **SingStat Time Series (STS) Online System**

The SingStat Time Series (STS) Online System is an internet-accessible time series retrieval system. The STS includes some 5,000 historical data series on Singapore society and economy from several domains, including national accounts, balance of payments, investments, finance, labour, prices, business expectations, trade, manufacturing, tourism, demography, health and education.

Besides the usual monthly, quarterly and annual data, STS includes also seasonally adjusted data series for key economic indicators providing for a better analysis and understanding of current economic trends. The STS also offers:

- Web-based search engine that is easy to use;
- “Bookmark” features that enable users to save and organise links in their personalised portals.

Subscription to STS is opened to local and overseas users. More information on STS are available via Statistics Singapore Website. For enquiries, please contact our Department at **Tel : 6332-7119**.

### **SingStat DataShop**

The SingStat DataShop is the virtual shopfront for official statistics on Singapore. Users can purchase softcopies of statistical reports online using credit card. Statistical reports available include:

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|--|--|
| ◆ Monthly Digest of Statistics         | ◆ Singapore’s Corporate Sector           |
| ◆ Singapore Statistical Highlights     | ◆ Singapore’s Investment Abroad          |
| ◆ Yearbook of Statistics               | ◆ Foreign Equity Investment in Singapore |
| ◆ Population Census 2000 Releases      | ◆ Economic Surveys Series                |
| ◆ Household Expenditure Survey         | ◆ Statistical Indices                    |
| ◆ Statistics on Marriages and Divorces |  |

The SingStat Datashop can be accessed via the Statistics Singapore Website.

### **E-survey**

The E-survey enables business organisations to complete and submit their survey forms through the internet. Using secured encryption protocols, the E-survey ensures that the information transmitted through the net is secured and protected. The system features online helps and validation checks to assist respondents in completing their survey forms. With the E-survey, respondents do away with the tedious paper work and manual tasks of mailing or faxing their survey returns to the Department.

#### ***Statistical Enquiries and Feedback***

If you have any statistical enquiries or comment or suggestions on our statistical publications and electronic services, you are welcomed to :

- ◆ E-mail us at **info@singstat.gov.sg**
- ◆ Fax to us at **Tel: (65) 6332-7689**
- ◆ Call us at **Tel: 1800-3238118\* (local callers)**  
**(65) 6332-7738 (overseas callers)**

\* Calls from mobile telephone lines to 1800 local toll free number may be subject to mobile airtime charges as imposed by the relevant mobile service provider.