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Singapore's Trade with China, Japan and India: Similarities and Contrasts

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Introduction

Cross-border trade within Asia as well as with the rest of the world has been instrumental behind the emergence of the Asian region as the locus of global economic activity. Within Asia, Emerging Asia, comprising the economies of China, India, Hong Kong SAR, South Korea, Singapore, Taiwan, Indonesia, Malaysia, Philippines, Thailand and Vietnam, has been the most prominent trade entity. The share of Emerging Asia's trade in world trade has increased from 21 percent in 1990 to 34 percent in 2006, with Emerging Asia contributing around 40 percent of the total increase in world trade during the period.²

The composition of Emerging Asia reveals that selected East Asian, Southeast Asian and South Asian economies have been the main drivers of Asian trade. As a result of the robust growth in trade achieved by these economies, the share of exports from East Asia and Southeast Asia in world exports rose from 14 percent in 1990 to around 27 percent in 2006 while the share of imports increased from 15 percent to 24 percent during the same period, with the region as a whole accounting for over one-fifth of the total world trade.³ At a more disaggregated level, some Emerging Asian economies have displayed noticeably sharp accelerations in trade in recent times. These include the region's largest economies, China and India, which recorded trade growth of more than 20 percent in 2007. Other mature regional economies such as Japan, South Korea, Hong Kong, Taiwan and Singapore had trade growths of more than 10 percent in the same year. China has overtaken Japan to become the largest merchandise trade economy in the region.⁴

The sharp increase in the volume of regional trade can be partially attributed to the emergence of regional and bilateral trade architectures. The Association of Southeast Asian Nations framework has been a key driver of trade in Southeast Asia. There have also been several other simultaneous trade pacts entered into by economies of East Asia, Southeast Asia

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² Asia and Pacific Regional Economic Outlook, International Monetary Fund (2007).

³ Chanda and Sasidaran (2008) accessible at <http://www.isasnus.org/events/workingpapers/47.pdf>.

⁴ The World Trade Organization's World Trade Report (2008).

and South Asia. These trade arrangements have had significant ‘trade-creating’ impacts by encouraging intra-regional trade and concomitant growth of overall trade from the region.

Intra-regional trade accounted for more than 50 percent of Asia’s total trade in 2006. This was quite close to the shares of intra-regional trade in the North American Free Trade Agreement (NAFTA) at 52.5 percent and the European Union (EU) at 59.2 percent.⁵ Within Asia, the share of intra-regional trade in total trade stood at 40.8 percent for Emerging Asia in 2006.

The high growth in intra-regional trade in Asia has been influenced by the robust growth in bilateral trade between a few economies of Emerging Asia. In this paper, we study the salient features of such bilateral trade from Singapore’s perspective. Singapore is one of Asia’s most outward-oriented economies with a trade-to-gross domestic product ratio of 386.2 in 2006. The external sector and international trade are clearly the main engines of growth for the Singapore economy.

More than three-fourth of Singapore’s trade takes place with other Asian economies. Beyond Southeast Asia, China, Japan and India are three of Singapore’s main trading partners. While China and Japan are currently its second and fourth largest merchandise trade partners respectively in Asia, India ranks at ninth position.⁶ However, Singapore’s trade with India is growing at one of the fastest rates vis-à-vis its other partners.⁷ Furthermore, China, Japan and India are three of Emerging Asia’s largest economies. Singapore’s intentions to further strengthen trade links with all the three economies are evident from the bilateral trade agreements it has with all three.⁸

This paper examines the structural features of Singapore’s bilateral merchandise trade with China, Japan and India. The analytical focus is on trade that has taken place during the period 2003-2007. The paper employs quantitative statistical techniques to identify the main features of bilateral trade on an empirical basis. Thereafter, it compares these features to identify the distinguishing aspects of Singapore’s trade with each of the three economies. The analysis is based on bilateral trade data at the 8-digit level of the ITC-HS⁹ classification as compiled and maintained by International Enterprise (IE) Singapore.

Structural Features: A Macro-economic Perspective

During 2003-2007, the period of analysis for this paper, significant changes have occurred in Singapore’s trading patterns with China, India and Japan. This is a period during which Singapore overcame the adverse impacts of the financial crisis of 1997 as well as those of the Severe Acute Respiratory Syndrome (SARS) epidemic of 2003 to record robust growth. Trade was the main engine of growth and Singapore’s expanding trade with China, India and Japan, as well as with the rest of the region, contributed significantly to its own growth and regional expansion.

⁵ The NAFTA comprises the United States, Canada and Mexico. The EU currently comprises Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom. For greater details, see Gruenwald and Hori (2008).

⁶ Malaysia and Indonesia are Singapore’s first and third largest trade partners in Asia respectively.

⁷ In 2007, Singapore’s merchandise trade with India grew by 19.8 percent, which was the highest among Singapore’s Asian trade partners. Trade with South Korea and Vietnam, both at 15.4 percent, followed that of India.

⁸ The China-Singapore Free Trade Agreement was the latest among the three and was signed in October 2008.

⁹ International Trade Classification based on the Harmonized System of Codes.

In 2003, Singapore's trade with Japan (S\$49.7 billion) was higher than its trade with China (S\$44.5 billion) and India (S\$7.9 billion) (Table 1). However, since 2004, China has overtaken Japan in terms of the size of its trade with Singapore. Since 2004, Singapore-Japan trade has been range-bound between S\$59.1 billion and S\$65.3 billion. However, Singapore-China trade has accelerated at a rapid pace. During 2004-2007, Singapore-China trade grew at an annual average rate of 27.5 percent. The corresponding growth in Singapore-Japan trade was only 6.5 percent.

Table 1: Singapore's Trade with China, Japan and India (2003-2007) (S\$ billion)

	2003	2004	2005	2006	2007
China	44.5	65.1	82.3	107.6	114.9
Japan	49.7	59.2	61.2	65.3	63.3
India	7.9	11.7	16.6	19.9	23.9
Asia	348.1	428.9	497.4	564.0	590.4
World	515.9	628.9	715.7	810.5	846.6

Source: Compiled from IE Singapore

The size of Singapore-India trade, till now, is much less than that of Singapore-China and Singapore-Japan trade. In 2003, Singapore-India trade was only 15.9 percent and 17.7 percent of Singapore-China and Singapore-Japan trade respectively. By 2007, however, Singapore-India trade has increased to occupy 20.7 percent and 37.7 percent of Singapore-China and Singapore-Japan trade respectively. It must be noted that Singapore-India trade has quantitatively become a much larger proportion of Singapore-Japan trade than Singapore-China trade. This indicates that while Singapore-China and Singapore-India trade are increasing sharply, Singapore-Japan trade is growing at a much slower pace.

The rapid growth in Singapore's trade with China and India vis-à-vis that with Japan is also evident from the relative share of Singapore's trade with these countries in its total trade with the world and the Asian region (Figures 1 and 2). These shares are quantitatively referred to as Singapore's *trade intensities*. These trade intensities are computed with respect to Singapore's trade with both the world as well as with Asia.¹⁰

Trade Intensity measured with respect to Singapore's World Trade

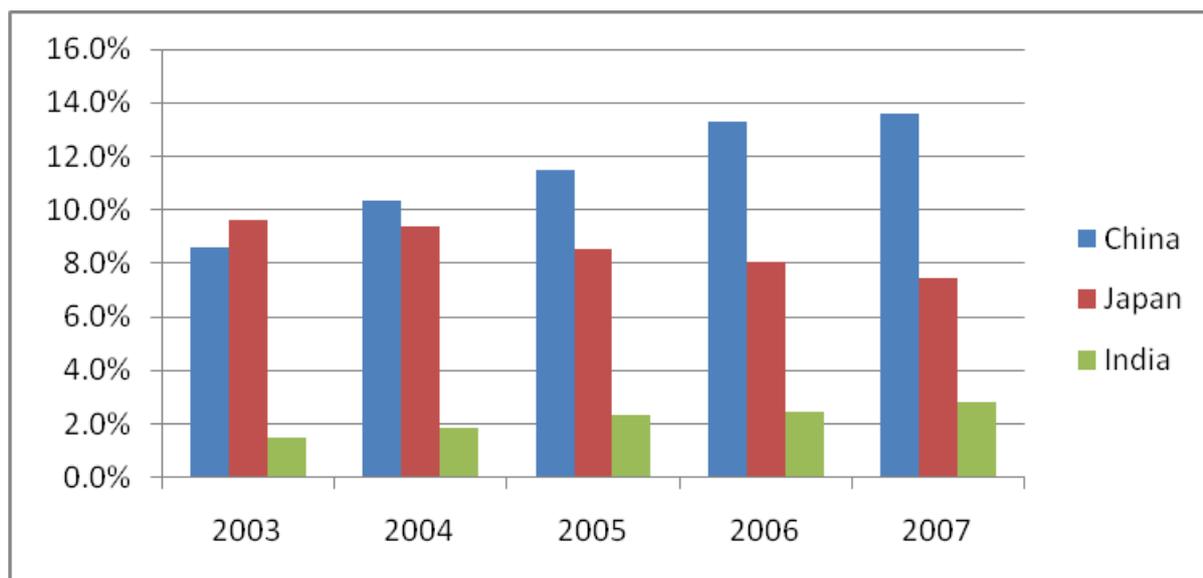
Our computations indicate that during 2003-2007, Singapore's trade intensity with China measured with respect to its total trade with the world increased from 8.6 to 13.6 (Figure 1). The increase amounts to an impressive growth of around one percentage point every year. During the same period, Singapore's trade intensity with India increased from 1.5 to 2.8 (Figure 1). Comparatively, Singapore's trade intensity with China is not only higher but has increased at a faster rate than its trade intensity with India. This shows that with respect to Singapore's trade with the world, China is a more significant trade partner than India.

While Singapore's trade intensity with India is showing an increasing trend, the same for Japan is displaying a declining trend. During 2003-2007, Singapore's trade intensity with

¹⁰ Trade intensity of country A with respect to country B, computed against country A's trade with the world, is the ratio of the values of bilateral trade between A and B and A's trade with the world. Thus, Singapore's trade intensity with China with respect to its trade with the world will be the ratio of its bilateral trade with China to its total world trade.

Japan, when viewed in terms of Singapore’s total trade with the world, reduced from 9.6 to 7.5 (Figure 1). Japan still remains a more significant trade partner for Singapore than India. However, the gap between the two countries, measured in terms of respective intensities, has reduced from 8.1 in 2003 to 5.7 in 2007. Thus, India is gradually ‘catching-up’ with Japan as a key trading partner of Singapore though the gap still remains sizeable. On the other hand, China has not only closed its gap with Japan as a major trading partner of Singapore, but has advanced rapidly. This is evident from the China-Japan trade intensity gap widening to 5.1 in 2007 from -1.0 in 2003.

Figure 1: Singapore’s trade intensities (China, India and Japan) vis-à-vis its world trade

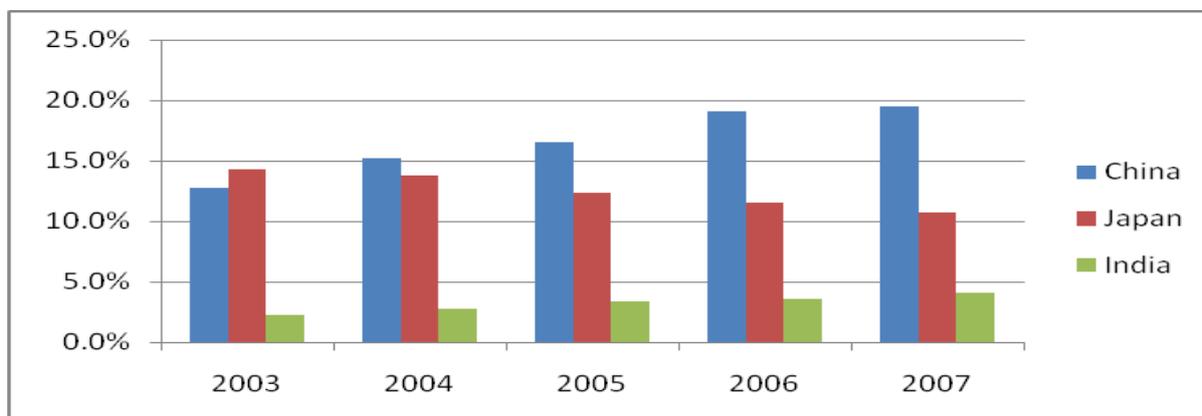


Source: Authors’ computations from data provided by IE Singapore

Trade Intensity measured with respect to Singapore’s Trade with Asia

The trends in Singapore’s trade intensities computed for China, India and Japan with respect to its trade with Asia are broadly similar to those computed vis-à-vis its trade with the world as a whole. Singapore’s trade intensities for China, India and Japan in 2007 were 19.5, 4.0 and 10.7 (Figure 2) respectively when computed with respect to Asia. The corresponding intensities for 2003 were 12.8, 2.3 and 14.3 respectively (Figure 2). Thus, even in Asian trade, the importances of China and India have gone up as Singapore’s trade partners, while that of Japan has reduced.

Figure 2: Singapore's trade intensities (China, India and Japan) vis-à-vis its Asian trade



Source: Authors' computations from data provided by IE Singapore

The results obtained also indicate that the collective importance of China and Japan has increased in Singapore's trade. The combined trade intensities (vis-à-vis Asian trade) of the two countries have increased to 30.2 in 2007 from 27.1 in 2003. However, the collective increase masks individual changes underlining a decline in Japan's relative significance. There is no doubt that the enhanced significance of China + Japan in Singapore's trade is primarily on account of the sharp increase in Singapore-China bilateral trade. Such increase has over-compensated the slow growth in Singapore-Japan bilateral trade.

Why is Japan becoming less significant as a trading partner for Singapore, while China and India are becoming more significant in this regard? The explanation can be found in the differential rates of growth in individual bilateral trade compared to the growth in Singapore's trade with the world and Asia. Singapore's trade with China and India has grown at 32.5 percent and 27.5 percent respectively during 2003-2007. During this period, the growth in its trade with the world and Asia has been 13.4 percent and 14.3 percent respectively. Thus, Singapore's bilateral trade with China and India has been growing at much higher rates than its trade with the world and the region. On the other hand, its bilateral trade with Japan grew by only 6.5 percent during 2003-2007, which is lower than the growth in Singapore's world trade and Asian trade. This explains why Japan's relative significance as a trading partner of Singapore is gradually reducing, while those of China and India are increasing.

It is important to note that a drop in Singapore's trade intensity with Japan is being more than compensated by its higher trade intensities with China and India. Singapore's trade with India has been facilitated by the enabling framework provided by the bilateral Comprehensive Economic Co-operation Agreement that came into force in 2005. At the same time, Singapore's trade with China, which is already growing at a robust pace, is likely to accelerate further on account of the Singapore-China Free Trade Agreement signed in late 2008.

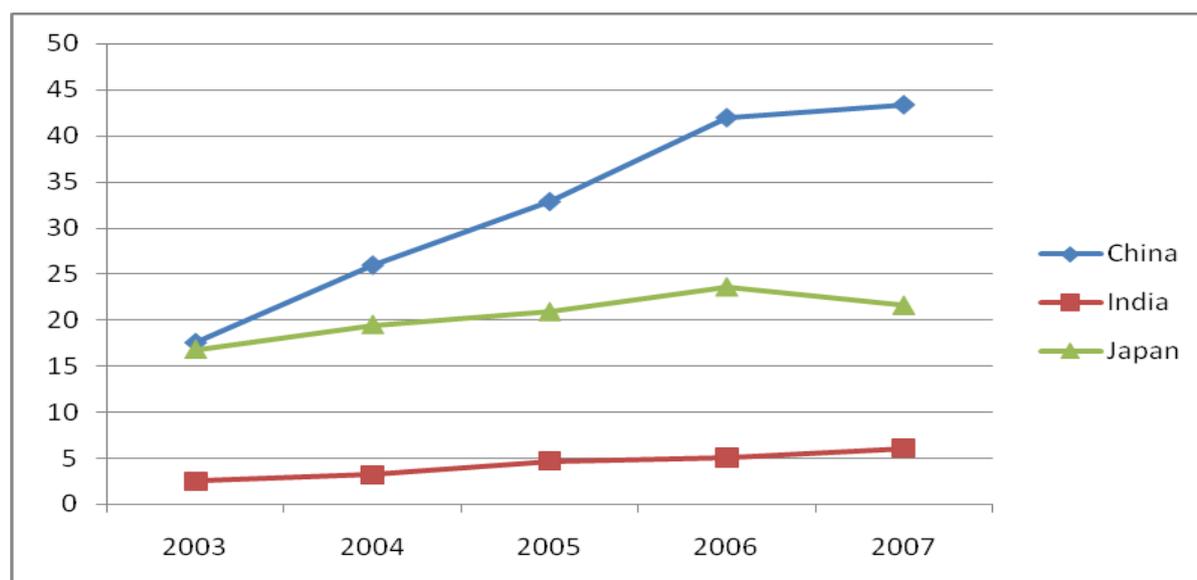
Structural Features: Commodity Composition of Trade

In this section, we look closely at the commodity composition of Singapore's bilateral trade with China, Japan and India. For analytical convenience, we develop specific clusters of the top 10 commodities in Singapore's exports, imports and re-exports with the three countries. These commodities are identified at the HS 4-digit level classification for 2003 to 2007. We also compute the trade intensities of these products in each cluster for comparative analysis.

Singapore's Exports to China, Japan and India

In 2003, Singapore's exports to China and Japan were almost equivalent at S\$17.6 billion and S\$16.8 billion respectively. By 2007, however, exports to China increased to S\$43.4 billion and were more than double the exports of S\$21.6 billion to Japan (Figure 3). On the other hand, Singapore's exports to India also increased at a pace almost similar to its exports to China. During 2003-2007, exports to India grew at an average rate of 26.3 percent while those to China grew by 25.7 percent. In contrast, Singapore's exports to Japan grew by only 6.9 percent.

Figure 3: Singapore's exports to China, India and Japan (S\$ billion)



Source: Authors' computations from data provided by IE Singapore

Integrated circuits (8542) are Singapore's main exports to China. The share of integrated circuits in total exports increased from 23.3 percent in 2003 to 35.9 percent in 2007 (Table 2). Refined petroleum products (2710) follow integrated circuits as the second most significant exports. Computer hardware (8471), which occupied 7.7 percent of total exports in 2003, has slowly declined in significance (Table 2). In recent years, printing machines (8443) have emerged as a key export category along with magnetic tapes and discs (8523).

Table 2: Singapore's main exports to China

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Exports				
			2003	2004	2005	2006	2007
1	8542	Integrated Circuits	23.3	27.2	31.6	36.9	35.9
2	2710	Refined Petroleum	8.4	8.4	6.8	7.7	8.0
3	8471	Computer Hardware	7.7	8.9	9.0	5.2	2.9
4	8473	Electronic Accessories	6.3	4.7	7.1	7.8	
5	3901	Polymers (Polyethylene Related)	2.8	2.4	2.3	1.9	1.9
6	3902	Polymers (Polypropylene Related)	2.1	1.8	1.7	1.5	1.4
7	8541	Semi-conductor Devices	2.0	1.9	1.9	2.2	2.6
8	8418	Refrigerators and Related Accessories	1.9	2.1	1.9	1.6	2.0
9	2905	Alcohols	1.9	2.0	1.7		1.4
10	2915	Chemicals (Acids Related)	1.4				
11	2902	Organic Compounds (Hydrocarbons Related)		1.5			
12	8529	Aerials, Antennae and Circuit Boards			1.9	1.4	
13	8523	Magnetic Tapes and Discs				2.3	4.0
14	8443	Printing Machines					7.7

Source: Authors' computations from data provided by IE Singapore

Integrated circuits (8542) are Singapore's main exports to Japan as well, followed by laser discs (8524) and computer hardware (8471). However, relative significances of both laser discs and computer hardware are reducing in Singapore's export basket for Japan, while those of magnetic tapes (8523) and printing machines (8443) are increasing. Refined petroleum (2710) is also a key export to Japan. These trends are broadly similar to those observed for Singapore's exports to China. However, while some chemical products (e.g. alcohol, acids and hydrocarbon related) figure among Singapore's main exports to China, they do not in exports to Japan (Table 2 and 3).

Table 3: Singapore's main exports to Japan

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Exports				
			2003	2004	2005	2006	2007
1	8542	Integrated Circuits	23.5	29.2	28.4	29.8	27.1
2	8524	Laser Discs	11.4	9.0	8.6	7.8	
3	8471	Computer Hardware	11.2	7.8	8.0	5.7	5.5
4	8473	Electronic Accessories	7.1	6.5	8.1	7.1	
5	2710	Refined Petroleum	5.1	5.0	5.5	7.8	5.6
6	8541	Semi-conductor Devices	2.0	2.0	2.0	3.0	3.4
7	3818	Chemical Compounds for Electronics	1.9	2.1			
8	8803	Parts of Airplanes, Telecom Satellite	1.2	1.2			
9	8531	Doorbells and Horns	1.1		1.2	1.1	
10	9892	Trade Samples (Unclassified)	1.1		1.9	2.7	2.6
11	2707	Oil and Petroleum		2.7	3.7	4.1	1.6
12	9013	Lasers, Liquid Crystal Devices		1.2			
13	9893	Fuel Oil for Ships and Aircrafts			1.0		
14	3811	Petroleum Additives for Lubricating Oil				1.0	
15	8523	Magnetic Tapes and Discs					7.9
16	8443	Printing Machines					6.4
17	8517	Telecommunication Equipments					2.6
18	2204	Wine					1.2

Source: Authors' computations from data provided by IE Singapore

Refined petroleum (2710) products have become Singapore's main exports to India in recent years (Table 4). While shares of such products in Singapore's exports to India have increased from 4.0 percent to 22.0 percent during the period under observation, shares of printing machines (8443), magnetic tapes (8523) and computer hardware (8471) have declined (Table 4). The latter three, along with refined petroleum products, are Singapore's main exports to India as they are for China and Japan. Integrated circuits (8542) are a much less significant export from Singapore to India, compared to China and Japan.

Appendix Tables A.1, A.2 and A.3 classify the top ten exported commodities on the basis of their trade intensities. Similarly, A.4 - A.6 and A.7 - A.9 depict trade intensities for imports and re-exports. It is to be noted that all commodities having more than 10 percent shares in total exports are denoted by a "H" indicating their relatively high trading intensity. Similarly the ones having shares between 5 to 10 percent are denoted by an "M" (moderate) and the ones below 5 percent are denoted "L" (low).

Table 4: Singapore's main exports to India

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Exports				
			2003	2004	2005	2006	2007
1	8443	Printing Machines	15.1	18.3	18.7	13.0	12.7
2	8523	Magnetic Tapes and Discs	11.4	8.6	2.8	1.8	
3	2902	Organic Compounds (Hydrocarbons Related)	9.2	9.6	10.1	11.7	9.7
4	8471	Computer Hardware	8.8	7.3	5.3	3.7	3.3
5	2710	Refined Petroleum	4.0	4.8	19.3	14.9	22.0
6	9893	Fuel Oil for Ships and Aircrafts	3.8	3.6	3.0	4.2	3.2
7	8517	Telecommunication Equipments	3.0	3.0		6.7	2.6
8	8542	Integrated Circuits	2.6	2.9	1.5	1.7	
9	3707	Materials for Photographic Uses	1.9				
10	7204	Waste and Scrap of Iron & Steel	1.8	2.4			
11	4907	Stamp Paper, Bond Certificates		2.6	3.7	4.7	3.0
12	2915	Chemicals (Acids Related)			1.8	2.9	2.7
13	3215	Printing Ink			1.7		
14	8431	Machinery Related to Elevators, Winches					2.3
15	8473	Electronic Accessories					2.0

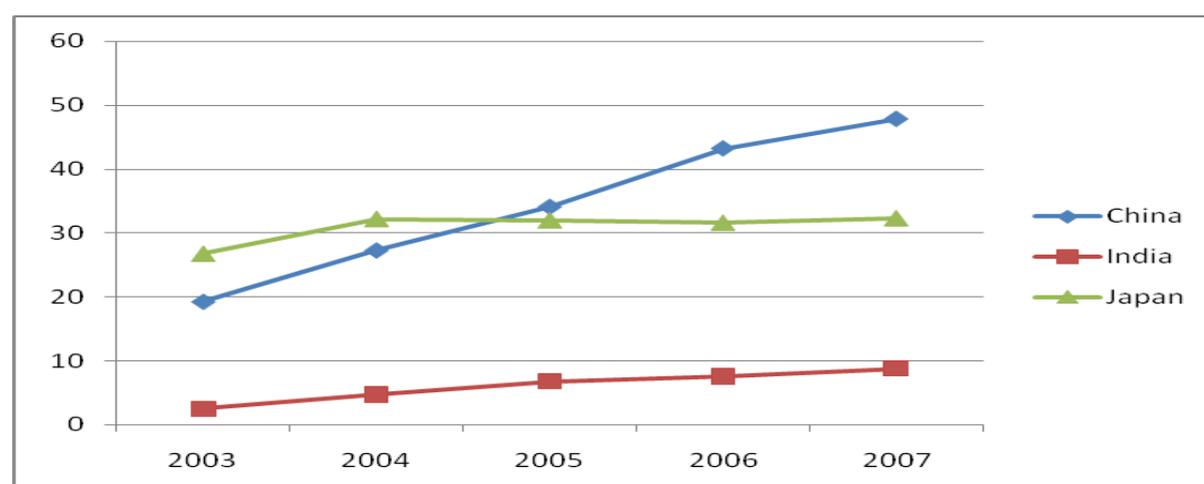
Source: Authors' computations from data provided by IE Singapore

Singapore's Imports from China, India and Japan

Singapore's imports from China have grown at a rate that is almost identical to that of its exports to China. During 2003-2007, Singapore's imports from China grew at 25.9 percent vis-à-vis the 26.3 percent growth in its exports to China. During the same period, however, Singapore's imports from India showed an even higher growth of 40.1 percent. In contrast, Singapore's imports from Japan grew by only 5.1 percent in the same period. These differential growth rates have resulted in Singapore's imports from China expanding from S\$19.3 billion in 2003 to S\$47.8 billion in 2007. Over the same period, imports from India have increased from S\$2.5 billion to S\$8.8 billion. However, imports from Japan have expanded at a much slower pace to reach S\$32.3 billion in 2007 from S\$26.8 billion in 2003. Imports from China began exceeding those from Japan from 2005 on account of the widening differential in the growth rates in imports from the two countries (Figure 4).

The commodity composition of Singapore's imports from China has undergone significant changes since 2003. The share of electronic accessories (8473) and computer hardware (8471) in overall imports have reduced, while those of transmission apparatus (8525), integrated circuits (8542) and aerials, antennae and circuit boards (8529) have increased (Table 5). Refined petroleum products (2710) are also a key import, while two product categories – telecommunication equipments (8517) and printing machines (8443), which were not major imports earlier, have emerged as top imports in 2007 (Table 5).

Figure 4: Singapore's imports from China, India and Japan (\$ billion)



Source: Authors' computations from data provided by IE Singapore

Table 5: Singapore's main imports from China

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Imports				
			2003	2004	2005	2006	2007
1	8473	Electronic Accessories	15.9	12.8	11.7	9.2	
2	8471	Computer Hardware	10.9	10.0	8.7	9.2	6.7
3	2710	Refined Petroleum	5.8	4.7	6.0	4.2	6.6
4	8525	Transmission Apparatus	5.7	11.4	7.8	11.0	
5	8542	Integrated Circuits	5.1	6.5	9.4	10.5	9.7
6	8541	Semi-conductor Devices	4.6	4.2	3.1	2.5	2.3
7	8529	Aerials, Antennae and Circuit Boards	2.1	4.0	6.8	7.0	3.8
8	8504	Electric Transformers	1.9	1.7	1.8	1.6	1.4
9	8536	Switches	1.8	1.6	1.5	1.4	
10	8534	Printed Circuits	1.4	1.4	1.4		
11	8901	Cruise Ships, Vessels, Tankers				1.5	1.4
12	8517	Telecommunication Equipments					13.6
13	8443	Printing Machines					9.7
14	8528	Video Monitors, Projectors					1.5

Source: Authors' computations from data provided by IE Singapore

Integrated circuits (8542) are Singapore's main imports from Japan, though their share in total imports is gradually reducing (Table 6). Electronic accessories (8473), semi-conductor devices (8541) and motor cars (8703) are also significant imports though their shares are reducing over time as well. Lately, printing machines (8443) have emerged as a significant category. In terms of commodities, Singapore's imports from Japan do have broad similarities with those from China. However, motor cars are a notable exception.

Table 6: Singapore's main imports from Japan

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Imports				
			2003	2004	2005	2006	2007
1	8542	Integrated Circuits	17.0	17.4	18.0	15.4	12.7
2	8473	Electronic Accessories	5.6	5.4	5.5	5.4	
3	8541	Semi-conductor Devices	4.6	3.9	3.2	3.5	3.3
4	8703	Motor Cars	4.3	3.3	3.8	4.3	3.8
5	8479	Electric Machines	2.7	4.9	2.9	3.8	3.3
6	8525	Transmission Apparatus	2.3	2.5	3.1	2.5	2.2
7	8471	Computer Hardware	2.3	2.0	1.7		
8	8532	Fixed Capacitors	2.0	2.0	2.2	2.4	2.0
9	8536	Switches	2.0	1.9	1.8	1.9	
10	8708	Accessories of Vehicles	1.7		1.6		
11	8517	Telecommunication Equipments		1.9		1.6	
12	7108	Gold and Gold Powder				2.1	2.2
13	8443	Printing Machines					6.5
14	2710	Refined Petroleum					3.5
15	3818	Silicon Discs					2.0

Source: Authors' computations from data provided by IE Singapore

Refined petroleum products (2710) are Singapore's main import from India (Table 7). These account for almost half of total imports. Apart from these and printing machines (8443), there are little similarities between Singapore's imports from India and those from Japan and China. Non-industrial diamonds (7102), jewellery (7113) and aluminium and copper alloys (7601 and 7403) figure prominently among imports from India as do organic compounds (2902).

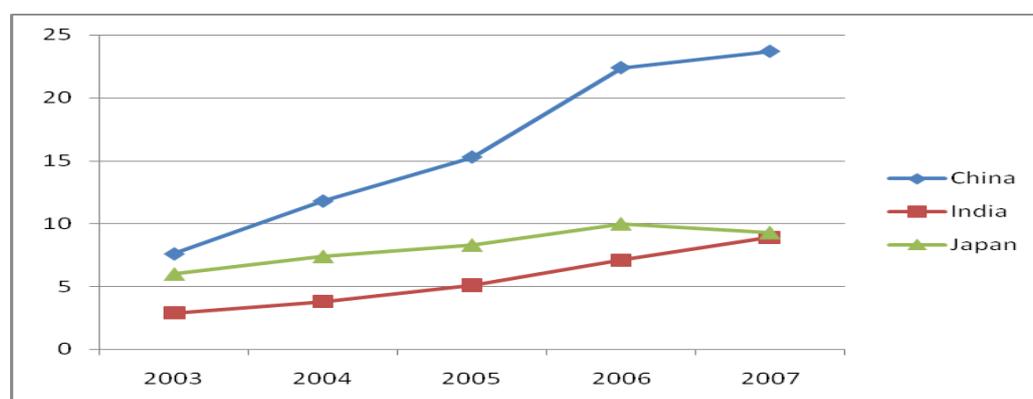
Table 7: Singapore's main imports from India

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Imports				
			2003	2004	2005	2006	2007
1	2710	Refined Petroleum	29.3	42.8	26.5	54.5	49.7
2	7102	Non Industrial Diamonds	14.0	14.0	41.1	6.4	6.4
3	7113	Jewellery	3.9	3.3	2.2	1.9	2.3
4	7601	Aluminium Alloys	3.2	4.6	3.3	4.1	5.2
5	8443	Printing Machines	1.5	0.8	0.7	1.0	0.9
6	3808	Disinfectants	1.4	1.1	0.5		
7	5512	Woven Fabrics	1.4				
8	2902	Organic Compounds (Hydrocarbons Related)	1.4	2.0	1.8	2.1	1.6
9	1701	Refined Sugar	0.9				
10	3204	Organic Dyes and Pigments	0.9				
11	7114	Articles of Base Metal		1.4			
12	7403	Refined Copper Alloys		1.0		2.9	2.3
13	9022	X-Ray Apparatus		0.9	0.6		
14	3004	Medicaments			0.7	1.6	1.0
15	8431	Machinery Related to Elevators, Winches			0.5		
16	8517	Telecommunication Equipments				1.4	4.6
17	8504	Electric Transformers				0.9	0.9

Source: Authors' computations from data provided by IE Singapore

Singapore's Re-exports to China, India and Japan

Re-exports are a significant feature of Singapore's trade with the rest of the world. With regard to China, India and Japan, such re-exports show trends similar to those observed for exports and imports. Singapore's re-exports to China and India have grown by 34.3 percent and 32.8 percent respectively during 2003-2007. In contrast, re-exports to Japan have grown by 12.2 percent during the same period. This has resulted in re-exports to China expanding from S\$7.6 billion in 2003 to S\$23.7 billion in 2007 (Figure 5). At the same time, re-exports to India have increased from S\$2.9 billion (2003) to S\$8.9 billion (2007) and have almost become equal to re-exports to Japan (S\$9.3 billion in 2007).

Figure 5: Singapore's re-exports to China, India and Japan (2003-2007)

Source: Authors' computations from data provided by IE Singapore

Integrated circuits (8542) comprise 55.9 percent of Singapore's re-exports to China (Table 8). Printing machines follow with a share of 8.1 percent. Electronic accessories (8473) are another significant re-export category whose share in total re-exports is increasing. Another leading item, computer hardware (8471), however, is showing a declining trend in significance. Refined petroleum, aeroplane parts and helicopters are re-exports gaining significance.

Table 8: Singapore's main re-exports to China

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Re-exports				
			2003	2004	2005	2006	2007
1	8542	Integrated Circuits	43.7	46.7	52.8	55.6	55.9
2	8471	Computer Hardware	6.9	8.1	6.4	5.7	2.3
3	8473	Electronic Accessories	4.5	3.7	7.6	8.8	
4	8541	Semi-conductor Devices	3.3	2.9	2.7	2.8	3.7
5	2710	Refined Petroleum	2.4	2.3	1.1	1.8	1.7
6	2905	Alcohols	2.0	2.3	2.1		
7	4001	Rubber	1.3	1.6	1.2	1.0	
8	8431	Machinery Related to Elevators, Winches	1.1	1.1	1.0		
9	8803	Parts of Airplanes, Telecom Satellite	1.0		0.9	1.3	1.2
10	8708	Accessories of Vehicles	0.9	1.1	0.9		
11	7601	Aluminium Alloys		1.1			
12	8802	Helicopters and Other Aircrafts				1.7	1.9
13	7403	Refined Copper Alloys				1.0	1.0
14	2208	Spirituous Beverages				1.0	1.3
15	8443	Printing Machines					8.1
16	8517	Telecommunication Equipments					0.9

Source: Authors' computations from data provided by IE Singapore

There are quite a few similarities between leading re-exports to China and Japan. These include integrated circuits, (which comprise 34.6 percent of total re-exports), computer hardware, printing machines and aeroplane parts (Table 9). However, some dissimilarity is noticed in terms of re-exports of wine, spirituous beverages and trade samples (unclassified) that are specific to Japan (Table 9).

Table 9: Singapore's main re-exports to Japan

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Re-exports				
			2003	2004	2005	2006	2007
1	8542	Integrated Circuits	36.1	41.4	40.8	42.4	34.6
2	8471	Computer Hardware	7.1	4.1	4.2	3.5	2.8
3	8473	Electronic Accessories	6.9	7.1	10.0	8.5	
4	8541	Semi-conductor Devices	3.8	3.7	3.2	4.7	5.6
5	8803	Parts of Aeroplanes, Telecom Satellite	3.2	3.0	1.4	1.5	2.1
6	2204	Wine	2.3	2.6	2.3	2.2	2.9
7	2208	Spirituos Beverages	2.1	1.5			
8	8001	Tin Alloys	1.8	2.1	1.5		
9	8544	Winding Wire	1.7				
10	9892	Trade Samples (Unclassified)	1.6	1.5	3.7	5.3	5.0
11	9101	Wrist Watches		1.4			
12	3304	Cosmetics and Make-up Products			1.5	1.5	2.5
13	8409	Parts of Engines (Motor Vehicles)			1.5	1.9	2.3
14	8411	Gas Turbines and Parts				1.6	
15	8443	Printing Machines					7.3
16	8517	Telecommunication Equipments					4.4

Source: Authors' computations from data provided by IE Singapore

Printing machines (8443) top the list of re-exports to India. This product has seen considerable increase in its share in total re-exports since 2003 (Table 10). Indeed, this category along with integrated circuits, computer hardware, semi-conductor devices and aeroplane parts are common re-exports to India vis-à-vis those to China and Japan. Refined petroleum (2710) has emerged as a key re-export to India in recent years comprising 10.5 percent of total re-exports in 2007. Nickel (7502) and medical apparatus (9018) re-exports, however, feature only in case of India and not for China and Japan.

Table 10: Singapore's main re-exports to India

S/No	Product (HS 4 Digit)	Product Description	Percentage Share in Total Imports				
			2003	2004	2005	2006	2007
1	8443	Printing Machines	10.8	11.9	13.0	18.1	16.1
2	8542	Integrated Circuits	8.0	7.8	6.5	7.8	6.9
3	8471	Computer Hardware	5.8	5.7	4.6	4.6	3.0
4	8517	Telecommunication Equipments	5.4	7.6	6.1	6.1	9.0
5	8482	Ball/Roller Bearings	4.0	3.9	3.1	2.3	2.2
6	8431	Machinery Related to Elevators, Winches	4.0	5.0	3.1	3.0	3.2
7	8452	Sewing Machines	2.9	1.7			
8	8541	Semi-conductor Devices	2.7	2.6	2.2	2.2	2.4
9	7502	Nickel	2.3	1.5		2.1	2.1
10	9018	Medical Apparatus	2.2	2.3	2.3	2.0	
11	2710	Refined Petroleum			6.1	8.8	10.5
12	8467	Tools, Pneumatic Machines, Hand Drills			3.1		
13	8803	Parts of Airplanes, Telecom Satellite					1.8

Source: Authors' computations from data provided by IE Singapore

Summary Conclusions

During the period of this study, Singapore's bilateral trade with China and India accelerated rapidly. In contrast, its trade with Japan grew at a much slower pace. As a result, though Japan remains a major trading partner, its relative significance in Singapore's overall trade with the world as well as in the Asian region has reduced. The lower trade intensity with Japan has been more than compensated by higher trade intensities achieved with China and India. Indeed, trade with China and India has been the key driver of Singapore's greater trade with Asia as well as with the rest of the world.

The commodity compositions of Singapore's trade with the three countries possess certain commonalities. Integrated circuits (8542), printing machines (8443), magnetic tapes (8523), computer hardware (8471) and refined petroleum products (2710) are Singapore's common exports to all three. However, trade intensities for these product categories vary between countries (Appendices A.1-A.3) leading to differences in relative significances of these products in bilateral export baskets. Refined petroleum, printing machines and electronic accessories (8473) are some of Singapore's leading imports from these countries as well. Printing machines, computer hardware, and airplane parts (8803) are some of the major re-exports also. Again, though relative significances differ in country-specific import and re-export baskets (Appendices A.4-A.6 and A.7-A.9), underlying commonalities are easily noticeable. These similarities indicate prevalence of machinery, mechanical appliances, electrical equipment and allied products in Singapore's merchandise trade with all three countries. The only resource-intensive commodity to feature prominently is refined petroleum products (particularly in bilateral trade with India).

The interesting aspect of Singapore's bilateral trade with all three countries is the presence of certain identical items in both exports (including re-exports) as well as imports. Integrated circuits (8542), refined petroleum (2710), computer hardware (8471), electronic accessories (8473), semi-conductor devices (8541) and aerials, antennae and circuit boards (8529) are some leading product categories in both directions of Singapore-China trade. All these products, except refined petroleum and aerials, antennae and circuit boards, feature prominently in Singapore's trade with Japan. On the other hand, products being exported as well as imported between Singapore and India include printing machines (8443), refined petroleum (2710), telecommunication equipments (8517) and machinery related to elevators and winches (8431). While there are more common products being traded both ways between Singapore-China and Singapore-Japan, Singapore-India trade also shows examples of same products moving both ways.

The apparently paradoxical phenomenon of the same products being exported as well as imported suggests the presence of considerable intra-industry trade in the observed categories. Indeed, Singapore's trade with China, India and Japan is dominated by machinery and appliances where intra-industry trade is a global phenomenon.

Intra-industry trade implies trade between distinct production levels within the same industry. In a vertical sense, such trade may imply the import of products in semi-processed forms from China, Japan or India by Singapore (or vice-versa) and the export of the same in more advanced forms by Singapore to the respective source countries (or vice-versa). Otherwise, in a horizontal sense, the products in identically processed forms might be traded between industries located in Singapore and in China, Japan and India. This could be on the account of cost differences between locations as well as other industry-specific factors. An example of

the latter are the peculiar features of India's domestic refined petroleum market that creates incentive structures encouraging exports rather than domestic sales.

It is difficult to obtain clearer insights on the precise nature of intra-industry trade in the identified categories due to data limitations. However, the evidence of such trade on account of the dispersion of production networks between Singapore and its three key trade partners – China, Japan and India – is distinctly visible. This can be identified as the key structural feature governing Singapore's trade with these countries.

APPENDICES

A.1 Singapore's exports to China – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Exp	Class								
1	8542	23.33	H	27.19	H	31.57	H	36.9	H	35.86	H
2	2710	8.37	M	8.44	M	6.84	M	7.68	M	7.97	M
3	8471	7.65	M	8.94	M	8.99	M	5.15	M	2.92	L
4	8473	6.34	M	4.71	L	7.08	M	7.79	M		
5	3901	2.76	L	2.39	L	2.26	L	1.88	L	1.93	L
6	3902	2.06	L	1.81	L	1.73	L	1.48	L	1.45	L
7	8541	2.01	L	1.88	L	1.88	L	2.2	L	2.59	L
8	8418	1.92	L	2.1	L	1.89	L	1.62	L	1.97	L
9	2905	1.91	L	1.99	L	1.74	L			1.45	L
10	2915	1.41	L								
11	2902			1.48	L						
12	8529					1.86	L	1.43	L		
13	8523							2.27	L	4.03	L
14	8443									7.69	M

A.2 Singapore's exports to Japan – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Exp	Class								
1	8542	23.52	H	29.24	H	28.42	H	29.8	H	27.1	H
2	8524	11.42	H	8.99	M	8.57	M	7.83	M		
3	8471	11.23	H	7.77	M	8.03	M	5.66	M	5.47	M
4	8473	7.12	M	6.51	M	8.1	M	7.12	M		
5	2710	5.08	M	5.05	M	5.54	M	7.77	M	5.64	M
6	8541	2.01	L	2.03	L	1.97	L	3.05	L	3.37	L
7	3818	1.91	L	2.09	L						
8	8803	1.16	L	1.17	L						
9	8531	1.15	L			1.25	L	1.08	L		
10	9892	1.09	L			1.87	L	2.67	L	2.62	L
11	2707			2.67	L	3.73	L	4.08	L	1.61	L
12	9013			1.19	L						
13	9893					0.96	L				
14	3811							1.03	L		
15	8523									7.88	M
16	8443									6.38	M
17	8517									2.57	L
18	2204									1.23	L

A.3 Singapore's exports to India – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Exp	Class								
1	8443	15.08	H	18.27	H	18.69	H	13.05	H	12.67	H
2	8523	11.4	H	8.58	M	2.78	L	1.76	L		
3	2902	9.18	M	9.64	M	10.09	H	11.69	H	9.73	M
4	8471	8.8	M	7.28	M	5.35	M	3.73	L	3.27	L
5	2710	3.97	L	4.77	L	19.28	H	14.94	H	22.02	H
6	9893	3.82	L	3.56	L	3.01	L	4.24	L	3.24	L
7	8517	2.98	L	3.03	L			6.7	L	2.56	L
8	8542	2.64	L	2.92	L	1.52	L	1.68	L		
9	3707	1.93	L								
10	7204	1.84	L	2.36	L						
11	4907			2.63	L	3.69	L	4.72	L	3.05	L
12	2915					1.83	L	2.87	L	2.75	L
13	3215					1.69	L				
14	8431									2.27	L
15	8473									1.97	L

A.4 Singapore's imports from China – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Imp	Class								
1	8473	15.88	H	12.8	H	11.74	H	9.19	M		
2	8471	10.94	H	10.04	H	8.75	M	9.19	M	6.67	M
3	2710	5.85	M	4.75	L	6.04	M	4.19	L	6.56	M
4	8525	5.71	M	11.45	H	7.77	M	11.04	H		
5	8542	5.13	M	6.54	M	9.36	M	10.54	H	9.68	M
6	8541	4.6	L	4.23	L	3.13	L	2.55	L	2.35	L
7	8529	2.12	L	3.99	L	6.78	M	7.05	M	3.76	L
8	8504	1.94	L	1.68	L	1.81	L	1.59	L	1.39	L
9	8536	1.8	L	1.61	L	1.51	L	1.45	L		
10	8534	1.38	L	1.41	L	1.38	L				
11	8901							1.48	L	1.42	L
12	8517									13.62	H
13	8443									9.75	M
14	8528									1.53	L

A.5 Singapore's imports from Japan – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Imp	Class								
1	8542	17.03	H	17.42	H	17.98	H	15.41	H	12.74	H
2	8473	5.56	M	5.38	M	5.51	M	5.39	M		
3	8541	4.61	L	3.93	L	3.24	L	3.53	L	3.33	L
4	8703	4.32	L	3.32	L	3.84	L	4.29	L	3.81	L
5	8479	2.72	L	4.86	L	2.88	L	3.85	L	3.33	L
6	8525	2.34	L	2.52	L	3.11	L	2.52	L	2.25	L
7	8471	2.26	L	1.96	L	1.73	L				
8	8532	2.01	L	1.98	L	2.25	L	2.39	L	2.06	L
9	8536	1.97	L	1.86	L	1.76	L	1.86	L		
10	8708	1.71	L			1.57	L				
11	8517			1.94	L			1.56	L		
12	7108							2.1	L	2.17	L
13	8443									6.49	M
14	2710									3.49	L
15	3818									1.96	L

A.6 Singapore's imports from India – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Imp	Class								
1	2710	29.27	H	42.82	H	26.54	H	54.53	H	49.71	H
2	7102	14.09	H	13.98	H	41.09	H	6.39	M	6.44	M
3	7113	3.92	L	3.26	L	2.2	L	1.87	L	2.33	L
4	7601	3.21	L	4.58	L	3.27	L	4.11	L	5.22	M
5	8443	1.54	L	0.83	L	0.7	L	0.98	L	0.88	L
6	3808	1.45	L	1.1	L	0.55	L				
7	5512	1.38	L								
8	2902	1.38	L	1.97	L	1.85	L	2.14	L	1.61	L
9	1701	0.93	L								
10	3204	0.92	L								
11	7114			1.36	L						
12	7403			1.06	L			2.91	L	2.31	L
13	9022			0.93	L	0.62	L				
14	3004					0.71	L	1.6	L	0.96	L
15	8431					0.48	L				
16	8517							1.39	L	4.58	L
17	8504							0.91	L	0.89	L

A.7 Singapore's re-exports to China – Trade intensity classification

S./No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Re-Exp	Class								
1	8542	43.67	H	46.7	H	52.82	H	55.65	H	55.86	H
2	8471	6.89	M	8.09	M	6.45	M	5.71	M	2.29	L
3	8473	4.96	L	3.71	L	7.65	M	8.78	M		
4	8541	3.28	L	2.93	L	2.75	L	2.82	L	3.75	L
5	2710	2.38	L	2.26	L	1.11	L	1.17	L	1.71	L
6	2905	2.07	L	2.27	L	2.06	L				
7	4001	1.28	L	1.6	L	1.22	L	0.97	L		
8	8431	1.11	L	1.07	L	1.05	L				
9	8803	1.01	L			0.95	L	1.29	L	1.19	L
10	8708	0.95	L	1.08	L	0.95	L				
11	7601			1.08	L						
12	8802							1.71	L	1.93	L
13	7403							1.02	L	1.08	L
14	2208							1.01	L	1.35	L
15	8443									8.13	M
16	8517									0.94	L

A.8 Singapore's re-exports to Japan – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Re-Exp	Class								
1	8542	36.07	H	41.41	H	40.81	H	42.45	H	34.64	H
2	8471	7.08	M	4.15	L	4.17	L	3.47	L	2.85	L
3	8473	6.93	M	7.13	M	9.99	M	8.48	M		
4	8541	3.77	L	3.69	L	3.17	L	4.7	L	5.64	M
5	8803	3.21	L	2.98	L	1.41	L	1.55	L	2.08	L
6	2204	2.29	L	2.57	L	2.32	L	2.22	L	2.86	L
7	2208	2.08	L	1.52	L						
8	8001	1.79	L	2.11	L	1.47	L				
9	8544	1.73	L								
10	9892	1.65	L	1.51	L	3.69	L	5.27	M	5.01	M
11	9101			1.37	L						
12	3304					1.55	L	1.55	L	2.48	L
13	8409					1.49	L	1.92	L	2.26	L
14	8411							1.58	L		
15	8443									7.34	M
16	8517									4.45	L

A.9 Singapore's re-exports to India – Trade intensity classification

S/No	HS Code	2003		2004		2005		2006		2007	
		Share Tot Re-Exp	Class								
1	8443	10.78	H	11.91	H	12.99	H	18.11	H	16.08	H
2	8542	7.96	M	7.81	M	6.49	M	7.85	M	6.94	M
3	8471	5.79	M	5.72	M	4.6	L	4.61	L	3.04	L
4	8517	5.41	M	7.63	M	6.13	M	6.09	M	9.02	M
5	8482	3.97	L	3.94	L	3.14	L	2.34	L	2.16	L
6	8431	3.96	L	5.04	M	3.12	L	2.97	L	3.24	L
7	8452	2.88	L	1.71	L						
8	8541	2.66	L	2.62	L	2.26	L	2.21	L	2.41	L
9	7502	2.33	L	1.52	L			2.1	L	2.15	L
10	9018	2.16	L	2.31	L	2.32	L	2.03	L		
11	2710					6.1	M	8.78	M	10.51	H
12	8467					3.11	L				
13	8803									1.81	L