CHAPTER 1

INTRODUCTION

1.1 Overview of ASEAN-China Bilateral Trade Relationship

The Association of South East Asian Nations (ASEAN) was established on the 8th August 1967 in Bangkok with five members, namely Indonesia, Malaysia, Philippines, Singapore and Thailand. Brunei joined ASEAN on 8th January 1984, Vietnam on 28th July 1995, Laos and Myanmar on 23rd July 1997 and lastly, Cambodia on 30th April 1999 to form the ten nations.

The aims and purposes of the establishment of ASEAN are:

1. To stimulate economic, social and cultural growth in the region.
2. To enhance regional peace and stability.
3. To have vigorous collaboration and mutual support on common interest.
4. To make available the assistance to each other.
5. To have effective collaboration in agriculture, industries and trade.
6. To enhance the study of Southeast Asia.
7. To have close cooperation with international organizations and to explore avenues for tighter cooperation.[1]

In line with the aims and purposes above, the ASEAN Free Trade Area (AFTA) was established in 1992. AFTA aims to improve ASEAN's competitiveness in the world market and enhance intra-regional economic integration through liberalizing trade barriers via Common Effective Preferential Tariff Scheme (CEPT) and the reduction of non-tariff barriers. Arising from AFTA, the total trade of ASEAN and intra-ASEAN

1 See http://www.aseansec.org/147.ht

trade had increased by 19.6% and 30%, respectively from 1993 to 1994. The total trade of ASEAN had further increased by 9.54% from 1995 to 1996. (ASEAN Statistical Yearbook, 2003).

The largest trading partner of ASEAN in 1990s was the United States while China's share in total trade of ASEAN remained low. ASEAN and China appeared to be competitors rather than comrades in their respective domestic markets and third countries in early 1990s (Zhang and Hock, 1996). Zhang and Hock (1996) put forward the argument that this was attributable to the similar foreign trade structure between ASEAN and China during that period.

Furthermore, China had just started her official contacts with ASEAN in early 1990s (Sheng, 2003; Tong and Lim, 2009) although China had opened up her economy and adopted progressive trade liberalization policy since 1978 (Greenaway, Mahabir and Milner, 2008; Holst and Weiss, 2004).

However, in 1997, the Asian Financial Crisis hit ASEAN economies badly, resulting in recession and significant trade contraction. Immediately after the crisis, the export of ASEAN to her largest trading partner, the United States, dropped by 7.7% in 1998. (ASEAN Statistical Yearbook, 2003). On the other hand, China was willing to assist ASEAN during the crisis (Tong and Lim, 2009). The total export of ASEAN to China surged by 0.4% from 1997 to 1998 (ASEAN Statistical Yearbook, 2003).

As such, ASEAN has changed her trade structures after the crisis (Cai, 2003; Sheng, 2003; Park, 2007, and Tong and Lim , 2009). ASEAN has established closer economic ties with Asian region, particularly China, by promoting intra-regional trade to reduce her dependency on U.S. market.

Among the members of ASEAN, ASEAN5 countries as a whole constituted 86.4% of ASEAN's total trade with China in 2009 (ASEAN Statistical Yearbook, 2010). Hence, ASEAN5 countries play the most important role in bilateral trade between ASEAN and China. The figure below shows China's trade share in respective ASEAN5 countries' total trade from 1991 to 2009.

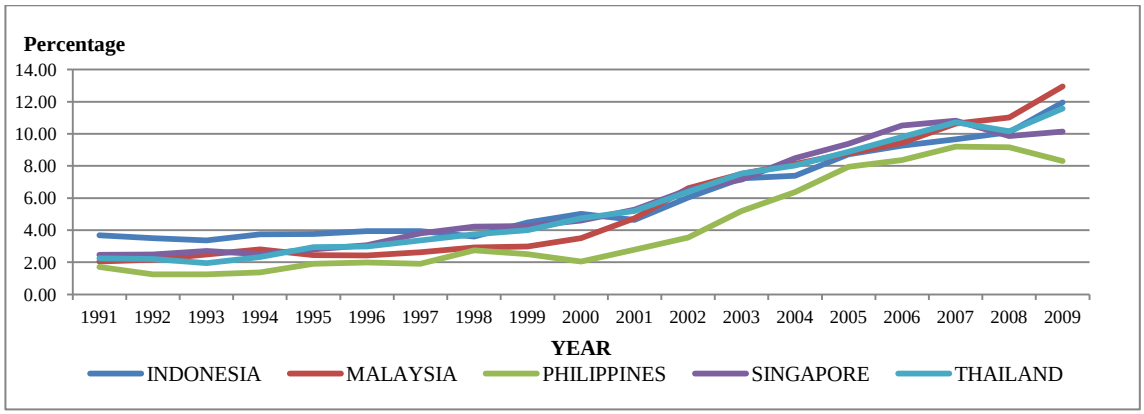


Figure 1.1: China's Trade Share in Respective ASEAN5 Countries' Total Trade during 1991-2009

Source: UN COMTRADE Database

From Figure 1.1 above, the shares of China's trade with each ASEAN5 country were not significant in 1990s. On the other hand, it shows similar and significant rising trend after 2000 as ASEAN5 countries changed their trade structures. In addition, it might also be attributable partly to China's rapid trade liberalization following her accession to World Trade Organization (WTO) in December 2001 and the implementation of tariff reductions since July 2005 under CAFTA (ASEAN Secretariat, 2010).

1.2 Trade Networking between ASEAN Countries and China

In the early 1990s, the United States, European Union and Japan were the major trading partners of ASEAN (Zhang and Hock, 1996). On the other hand, China's share in ASEAN's total trade remained insignificant and was only 2.06% and 2.15% in 1993 and 1994, respectively (ASEAN Statistical Yearbook, 2003). China was an exporter of

labour–intensive manufactured goods and competed strongly with ASEAN countries, which have similar comparative advantage in similar types of commodities (Liu and Luo, 2004). The similar comparative advantages between ASEAN and China also limit their mutual absorptive capacity for each other's goods (Zhang and Hock, 1996).

Besides, China's continuous open door policies, coupled with low labour costs, have attracted tremendous inflow of foreign direct investment (FDI) since 1990s (Eichengreen and Tong (2006b). Chantasasawat, Fung, Iizaka and Siu (2004a) put forward the argument that the inflow of FDI was at the expense of ASEAN as it might crowd out FDI in ASEAN. However, Eichengreen and Tong (2006b) argued that the inflow of investment creating type of FDI to China would complement the inflow of FDI to other Asian countries as they belong to the similar supply chain. Hence, this circumstance enhances the trade networking between ASEAN and China.

In addition, Chantasasawat *et al* (2004b) agreed that the inflow of FDI to China has increased the two-way trade of intermediate or final goods in the same industries among China and other Asian countries for the purpose of forming production networking in Asia in order to tap into global production networks. As such, the integration of China and ASEAN countries into global production networks has changed the traditional trade pattern based solely on comparative advantage.

After the accession of China to WTO in December 2001, China further liberalized her trade barriers in order to comply with WTO rules. Partly due to this, the bilateral trade between ASEAN and China increased drastically in 2000s. For instance, ASEAN-China trade grew to USD231 billion in 2008 from USD78 billion in 2003, at 24% annually (Hong Kong Trade Development Council, 2010).

Besides, Zhang (2008) revealed that the WTO membership has increased the reliability of China as a supplier to international markets as it reduced the risk premium of investment within China's border. Furthermore, China has permitted foreign firms to dominate her entire selected industries, for instance, automotive industry after her accession to WTO (The Economist, 2005). Therefore, many multinational corporations (MNCs) have been attracted and invested in China to penetrate her vast domestic market, and to utilize her competitive and abundant labour and other resources for production (The Economist, 2005). The tremendous inflow of FDI into China has further increased the demand of imports from her neighbouring countries, particularly ASEAN, for intermediate goods needed in assembling and packaging activities (Zhang, 2008).

Besides, in line with the proposed CAFTA in 2002 and the implementation of tariff reductions under CAFTA's Trade in Goods Agreement since 1 July 2005, ASEAN would be one of the good sources for China's imported goods. In fact, partly due to this, China became the largest trading partner of ASEAN in 2009 (ASEAN Statistical Yearbook, 2010).

However, the integration of China into the Asian region production networks (Athukorala and Yamashita, 2005) implies that trade networking between ASEAN and China is getting complicated as China diversifies her trade regime.

Besides ordinary trade, processing trade is becoming more and more important and plays a crucial role in China's trade. Gaulier, Lemoine and Unal-Kesenci (2007) put forward the argument that the rise of China's trade share in the world market is attributable to processing trade, which has stemmed from international production

fragmentation within Asia. As such, China relies on imports of intermediate goods from ASEAN (Shafaeddin, 2004).

Owing to the changes of trade regime, the commodities involved in ASEAN-China trade in 2000s are different from that in the previous decades (Hong Kong Trade Development Council, 2010). China's main exports to ASEAN were electrical machinery and machinery, followed by ships and boats, minerals and fuels, optical and medical instruments, vehicles, iron and steel, etc. Meanwhile, ASEAN's exports to China also consist of the similar commodities, particularly electrical machinery and machinery. Furthermore, the trade share of China's imports from ASEAN for electrical machinery and machinery increased drastically from 26% in 1997 to 60% in 2008. (Hong Kong Trade Development Council, 2010). As such, ASEAN-China trade in 2000s has been focusing more on intra-industry trade.

Besides, some MNCs located in ASEAN are actively involved in intra-industry trade. They produce and export intermediate goods to China in similar industries for reprocessing purposes. The final goods are then re-exported all over the world including ASEAN (Thorbecke and Smith, 2010). Likewise, the outflow of FDI from ASEAN's MNCs to China are mainly involving processing trade, which has stemmed from production fragmentation (Srivastava and Rajan, 2004 as cited by Sally and Sen, 2011).

In fact, processing exports has contributed 50% of China's exports since 1996 (Koopman, Wang and Wei, 2008). From 2000 to 2008, processing exports contributed 50-55% while processing imports contributed 40-45% to China's total trade, respectively (Zhang, 2008). In addition, processing trade was the main contributor of China's trade surplus in 2007 (Luo and Zhang, 2010).

Furthermore, The Economist (2009) reported that, in 2008, more than 60% of China imports were from Asian countries and half of the imported goods were components for reprocessing and assembly in China, which were subsequently sold to foreign markets.

Therefore, it is apparent that the dramatic increase in ASEAN-China trade in 2000s has been more focusing on intra-industry trade in manufactured goods, which involved processing activities.

1.3 Analysis of Bilateral Trade between ASEAN5 Countries and China

China was the largest trading partner for ASEAN countries in 2009 (ASEAN Statistical Yearbook, 2010). The total bilateral trade between ASEAN5 and China was about USD3,130.6 billion in year 2000. This had increased significantly to USD15,422.8 billion in year 2009 (UN COMTRADE database).

China was the second largest trading partner for Malaysia and Thailand, and the third largest trading partner for Singapore in 2009. Besides, China was also the second largest imports partner for Indonesia and the third largest exports partner for Philippines in 2009 (The World Factbook, 2010). Figure 1.2 to Figure 1.6 below exhibit the composition of trade between each ASEAN5 country with China in total trade of respective ASEAN5 countries during 1993-2009 based on single digit code, Standard International Trade Classification, Revision 3 (SITC Rev.3).

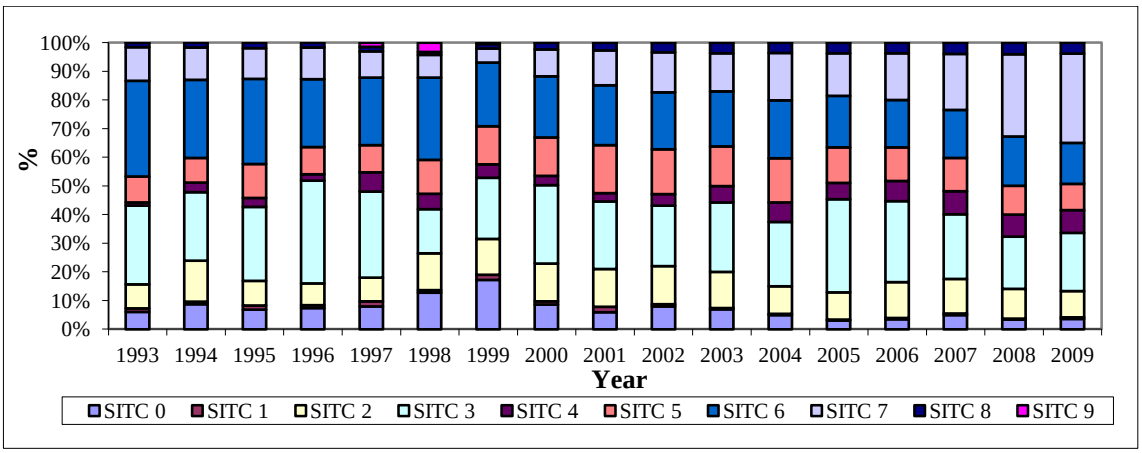


Figure 1.2: The Composition of Bilateral Trade between Indonesia and China during 1993-2009

Source:
1. Author's calculation based on data collected from UNCTAD: Handbook of International Trade and Development Statistics, various years.
2. SITC 0- Food and live animals,SITC1- Beverage and tobacco,SITC2- Crude materials, inedible, except fuels,SITC3-Mineral fuels, lubricants and related materials,SITC4-Animal and vegetable oils, fats and waxes,SITC5- Chemicals and related products, n.e.s. ,SITC 6-Manufactured goods classified chiefly by material,SITC 7-Machinery and transport equipment, SITC 8-Miscellaneous manufactured articles and SITC9-Commodities and transactions not classified elsewhere in the SITC.
3. SITC 0-4 are defined as primary goods sectors and SITC 5-8 are defined as manufacturing sectors.

Based on Figure 1.2 above, both manufacturing sectors and primary goods sectors contributed significantly to Indonesia-China bilateral trade. The largest and the third largest trade shares of Indonesia-China bilateral trade in 2009 were contributed by manufacturing sectors, i.e. SITC 7 and SITC 6, respectively. The trade share of SITC 7 increased from 11.7% to 31.1% from 1993 to 2009. On the other hand, the trade share of SITC 6 dropped from 33.5% to 14.3% during the same period. Apart from that, the trade share of SITC 5 did not exhibit large fluctuation. It increased slightly from 9.1% in 1993 to 10% in 2008 and decreased slightly to 9.1% in 2009.

Besides, SITC 3 and SITC 2 (the primary goods sectors) contributed the second largest and the fourth largest trade shares to Indonesia-China bilateral trade respectively in 2009. However, the trade shares of both sectors illustrated decreasing trend. The SITC 3 trade share decreased from 27.5% in 1993 to 20.4% in 2009, while SITC 2 dropped from 14.3% in 1993 to 9.1% in 2009. Meanwhile, the trade shares of SITC 1, SITC 4,

SITC 8 and SITC 9 were less than 10% throughout the whole study period. Hence, the composition of Indonesia-China bilateral trade was quite diverse. Both manufacturing and primary goods sectors have played important roles although the contribution of the former was slightly larger than the latter.

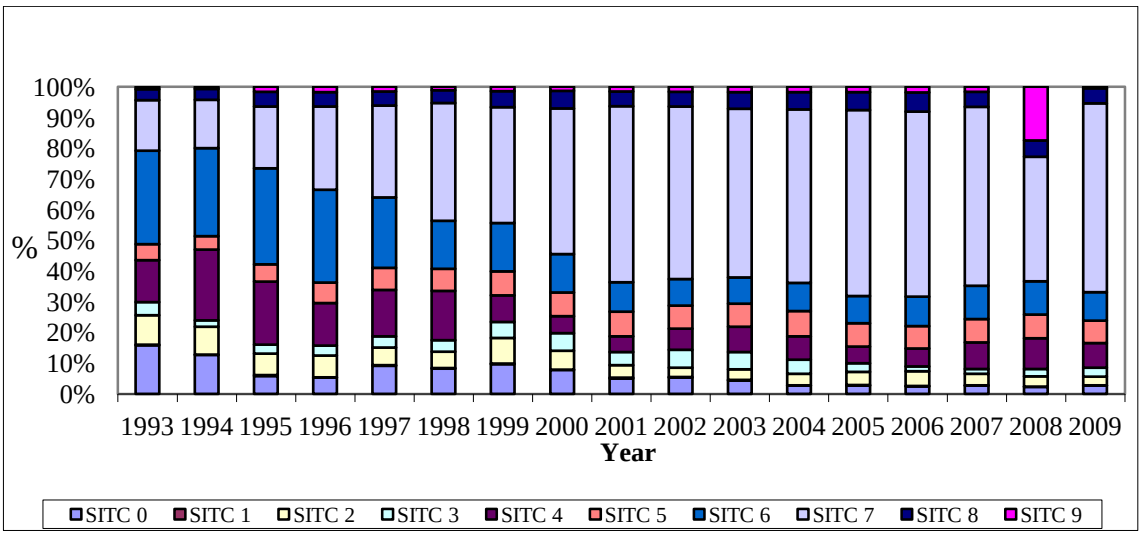


Figure 1.3: The Composition of Bilateral Trade between Malaysia and China during 1993-2009

Source: Same as Figure 1.2

Figure 1.3 shows that SITC 7 contributed the largest trade share in Malaysia-China bilateral trade since 1997. The trade share increased from 16.5% in 1993 to 61.5% in 2009 due to the fact that Malaysia has been the established and main exporter of electronic equipments in ASEAN (The World Factbook, 2010). The second largest trade share between Malaysia and China bilateral trade is in SITC 6. The shares of exports and imports in this sector were compatible; therefore, intra-industry trade played an important role in this sector. However, this sector contracted from 30.4% in 1993 to 9.2% in 2009.

Nevertheless, the trade shares of SITC 5 and SITC 8 increased marginally from 5.2% and 3.5% in 1993 to 7.4% and 4.9% in 2009, respectively. It is noticeable that Malaysia

has expanded her export share in SITC 5 as there is great demand for organic chemicals from China (The World Factbook, 2010).

Generally, the primary goods sectors showed a declining trend in Malaysia-China bilateral trade. For instance, the trade share of SITC 2 shrunk from 9.7% in 1993 to 2.8% in 2009. Nonetheless, SITC 4 still played a vital role in Malaysia-China trade in light of the abundance of natural resources in Malaysia. It was the only primary goods sector that expanded in trade share from 5.2% in 2002 to 8% in 2009.

Although Malaysia is in the midst of transforming into multi-sector economy (The World Factbook, 2010), the analysis above shows that the bilateral trade between Malaysia and China has been concentrated mainly in the manufacturing sectors, particularly SITC 7.

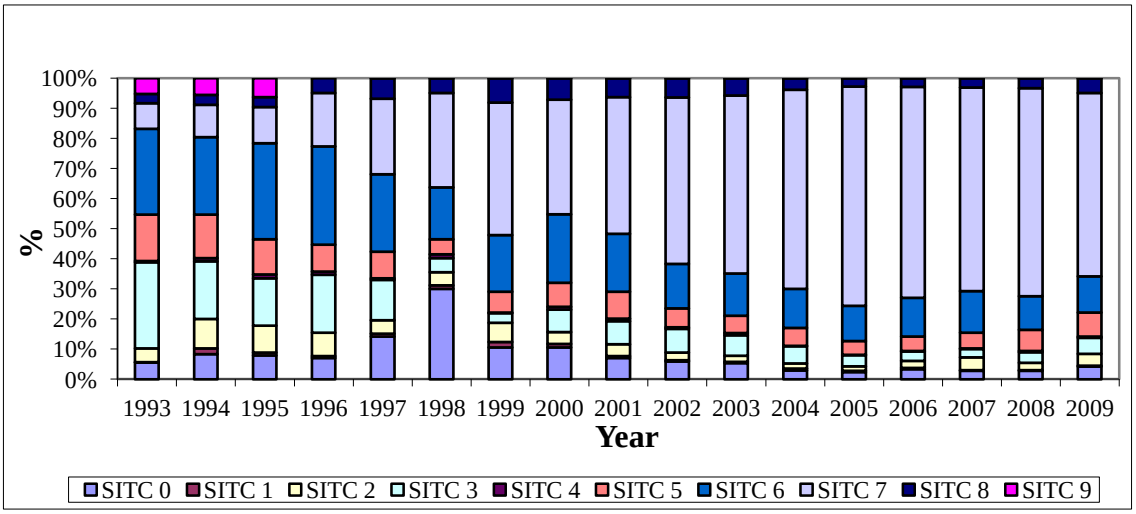


Figure 1.4: The Composition of Bilateral Trade between Philippines and China during 1993-2009

Source: Same as Figure 1.2

Based on the figure above, Philippines had the largest bilateral trade with China in SITC 7. Based on Figure 1.4, the trade share in this sector increased drastically from 8.5% in 1993 to 61.9% in 2009. Philippines also had the largest export share in SITC 7 among

ASEAN5 countries. However, the expansion of this sector has crowded out other sectors. The trade shares of other sectors exhibited significant decreasing trend. For instance, the trade shares of SITC 6 and SITC 5, which ranked second and third in Philippines-China bilateral trade declined notably from 28.5% and 15.4 % in 1993 to 12% and 8% in 2009, respectively.

Besides, the trade shares of primary goods sectors were not significant and showed a declining trend. For instance, SITC 3 played an important role in Philippine–China bilateral trade in 1990s, but its trade share has declined dramatically since 1998 following the 1997 Asian Financial Crisis. From Figure 1.4, the trade share in this sector dropped from 28.6% in 1993 to 5.4% in 2009. The contraction of this sector was mainly due to the changes in Philippines trade structure to focus on SITC 7. Likewise, Tong and Lim (2009) pointed out that Philippines has experienced the most significant changes in her trade structure. The share of exports in SITC 7 surged from less than 1% in early 1990s to more than 80% in late 2000s. Hence, Philippines-China bilateral trade was mainly concentrated in manufactured goods, particularly goods from SITC 7.

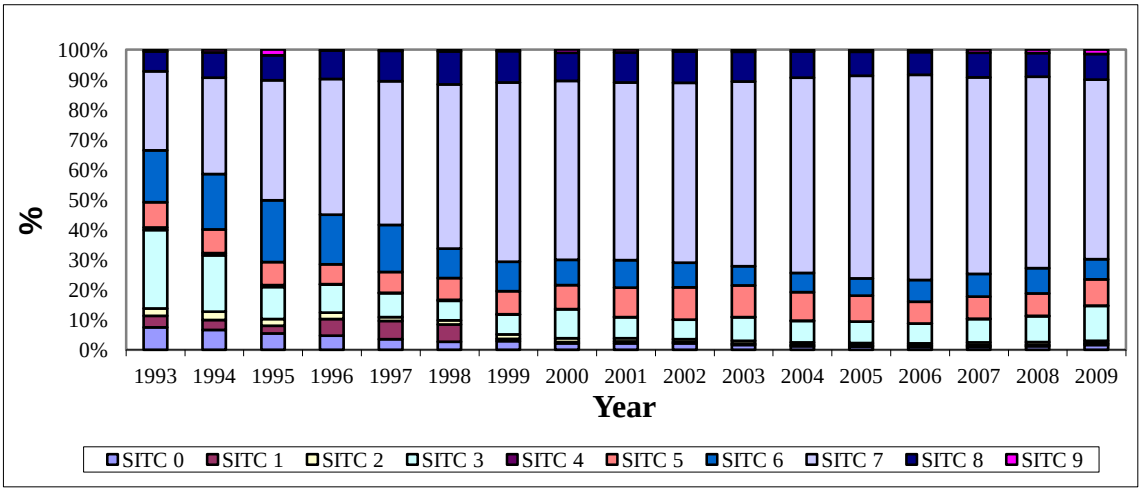


Figure 1.5: The Composition of Bilateral Trade between Singapore and China during 1993-2009

Source: Same as Figure 1.2

From Figure 1.5, the largest trade sector between Singapore and China was SITC 7. It increased significantly from 26.3% in 1993 to 59.8% in 2009. Besides, SITC 5 and SITC 6 also served as important sectors for the bilateral trade between Singapore and China. SITC 5 has emerged as the second largest exports sector as Singapore has a huge investment in the production technology that are related to pharmaceuticals (Pereira, 2006) while SITC 6 ranked second largest imports sector for Singapore. However, the trade shares in both SITC 5 and SITC 6 dropped marginally in the late 2000s.

Besides, the share of SITC 8 was stable. It did not exhibit drastic growth during 1993-2009. It increased slightly from 6.7% to 8.5% from 1993 to 2009. On the other hand, the trade shares between Singapore and China in primary goods sectors except SITC 3 dropped significantly in the same period of time.

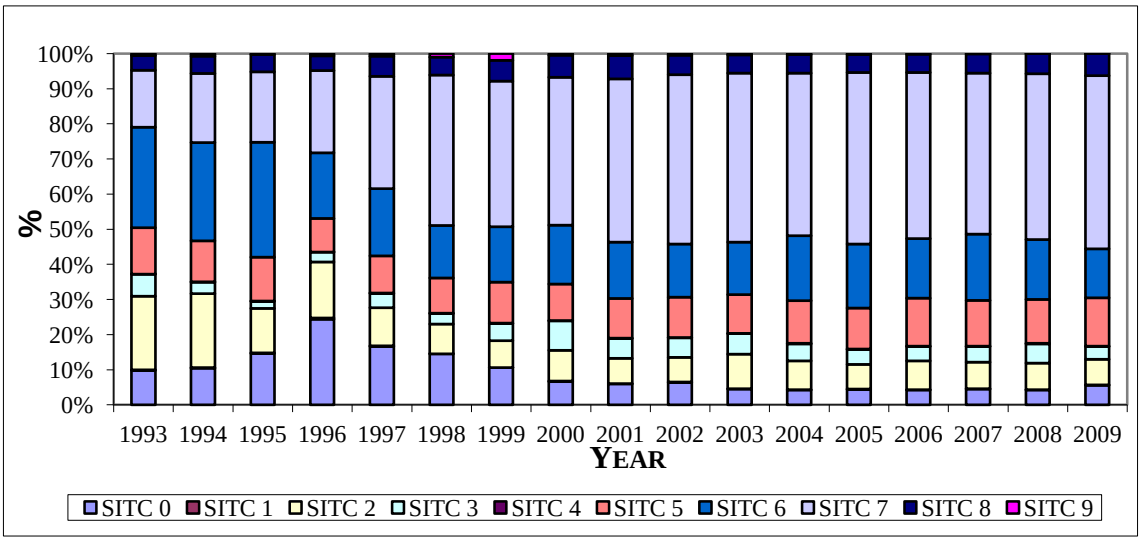


Figure 1.6: The Composition of Bilateral Trade between Thailand and China during 1993-2009

Source: Same as Figure 1.2

From Figure 1.6, the bilateral trade between Thailand and China focused mainly on manufacturing sectors. The largest trade sector between Thailand and China was SITC 7, which increased from 16.2% in 1993 to 49.3% in 2009. Apart from that, the second largest trade share was contributed by SITC 6 even though the trade share shrunk from 28.6% in 1993 to 14% in 2009. The contraction of this sector might be attributable to the expansion of SITC 7. The third largest trade share between Thailand-China bilateral trade in 2009 was contributed by SITC 5. The trade share in this manufacturing sector increased marginally from 13.2% in 1993 to 13.8% in 2009.

On the other hand, the trade shares in most of the primary goods sectors decreased significantly, particularly SITC 2. This sector ranked second in the early 1990s, but its share shrunk from 21% in 1993 to 7.4% in 2009. Apart from that, the trade shares of SITC 0 and SITC 1 also dropped from 9.8% and 0.2% to 5.6% and 0.04% in 2009, respectively.

From Figure 1.6, the trade shares of manufacturing sectors as a whole increased from 62.2% in 1993 to 83.3% in 2009 while the trade shares of primary goods sectors as a whole decreased dramatically from 37.3% in 1993 to 16.64% in 2009, implying that manufactured goods has dominated Thailand-China bilateral trade.

1.4 The Importance of Manufacturing Sectors in ASEAN5 Countries

Manufacturing sectors have contributed a large percentage of GDP in Asian countries than developed countries (The Economist, 2009). Carbaugh (2009, p.6) also reported that developing countries including Malaysia, Indonesia, Thailand and Philippines have emerged as important trading countries of manufactured goods partly due to global trade liberalization.

Table 1.1: The Shares of Manufactured Goods in Total GDP For Each ASEAN5 Country during 1991-2009

Year	Country				
	Indonesia	Malaysia	Philippines	Singapore	Thailand
1991	21.4	25.6	25.3	26.7	28.2
1992	22	25.8	24.2	25.5	27.5
1993	22.3	25.9	23.7	25.4	29.6
1994	23.3	26.6	23.3	24.3	29.5
1995	24.1	26.4	23	24.7	29.9
1996	25.6	27.8	22.8	23.6	29.7
1997	26.8	28.4	22.3	22.5	30.2
1998	25	28.8	21.9	22.9	30.9
1999	26	30.9	21.6	22.8	32.7
2000	27.7	30.9	22.2	25.8	33.6
2001	29.1	29.3	22.9	22.9	33.4
2002	28.7	29.2	23.1	24.1	33.7
2003	28.3	29.9	23.3	23.9	34.8
2004	28.1	30.4	23	26.3	34.4
2005	27.4	29.6	23.2	26.8	34.7
2006	27.5	29.4	22.8	25.6	35
2007	27.1	27.8	22	22.9	35.6
2008	27.9	26.3	22.3	19.2	34.9
2009	26.4	25.5	20.4	18.5	34.1

Source: Asian Development Bank 2006 and 2010

Table 1.1 above depicts the contribution of manufacturing sectors to each ASEAN5 country. The contribution of manufacturing sectors to ASEAN5 countries was significant. Based on the table above, the shares of manufactured goods in total GDP of Indonesia, Malaysia, Philippines and Thailand were stable and above 20% annually from 1991 to 2009. Among ASEAN5 countries, the contribution of manufacturing sectors in Thailand was the greatest. The shares of manufactured goods increased steadily from 28.2% in 1991 to 34.1% in 2009.

On the other hand, the contribution of manufactured goods in Singapore was consistent with an average of 24.3% and 24.8% annually in 1991-1999 and 2000-2007,

respectively. Partly due to the global economic crisis in 2008, the contribution of manufactured goods in Singapore dropped drastically from 22.9% in 2007 to 18.5% in 2009, which implies that the manufacturing sectors in Singapore are more vulnerable to external economic shocks.

1.5 Trade Balance between ASEAN5 Countries and China in Manufacturing Sub-sectors

Trade in manufactured goods plays a significant role in ASEAN5 countries with their different factor endowments and economic conditions. It is therefore crucial to study the trade balance between each ASEAN5 country and China in the manufacturing sub-sectors, namely SITC 5, SITC 6, SITC 7 and SITC 8.

From Figure A1a (refer to appendix), Indonesia-China bilateral trade in manufactured goods was approaching balance from 1993 to 2003. However, the trade deficit of Indonesia started to increase significantly since 2004, particularly in 2008.

Based on Figure A1b (refer to appendix), this was mainly contributed by SITC 7, followed by SITC 6 and SITC 8. Out of the three manufacturing sub-sectors, SITC 6 and SITC 7 showed similar trends from 2004 onwards. The extent of trade deficit in these manufacturing sub-sectors increased from year to year, except 2009. Indonesia's trade deficit with China surged from USD0.29 billion in 2000 to USD1.7 billion in 2005 in SITC 7. In addition, it is noticeable that the trade deficit of SITC 7 between Indonesia and China increased radically during 2007-2008. It swelled by 172% from USD2.41 billion in 2007 to USD6.55 billion in 2008. The trade deficit then reduced slightly to USD 6.44 billion in 2009. Generally, the trade deficit between Indonesia and China increased by more than twenty folds from USD0.21 billion in 2000 to USD 6.44 billion in 2009 in SITC 7.

Besides, the trade balance between Indonesia and China turned from surplus in 2003 to deficit in 2004 in SITC 6. The extent of trade deficit then increased by more than twenty-one folds from USD0.14 billion in 2004 to USD2.95 billion in 2008. Nevertheless, the trade deficit in SITC 6 between Indonesia and China reduced notably to USD1.83 billion in 2009. Apart from that, SITC 8 also contributed to the trade deficit of manufacturing sectors for Indonesia-China bilateral trade. Although Indonesia was having trade deficit with China in SITC 8 throughout the study period, the value was relatively smaller (an average of USD0.22 billion) than that of SITC 7 and SITC 6.

On the other hand, the trade balance of SITC 5 between Indonesia and China was mixed during the study period. After China accession to WTO, Indonesia was having trade surplus in SITC 5 with China from 2002 to 2004. However, the trade balance had turned to deficit since 2005 and the extent of the trade deficit had increased significantly from year to year except 2009. Among ASEAN5 countries, Indonesia had the largest trade deficit with China in SITC 5 in 2008 and 2009 with USD1.28 billion and USD0.83 billion, respectively. Now, chemicals goods have become one of the major imports for Indonesia.

Figure A2a (refer to appendix) shows that Malaysia had trade deficit with China in manufacturing sectors from 1993 to 2009 except 1994. The extent of trade deficit increased consistently since 2003.

Based on Figure A2b (refer to appendix), the trade deficit of Malaysia-China bilateral trade in manufacturing sectors during the period of study was contributed mainly by SITC 7. The trade deficit of this manufacturing sub-sector amounted to USD0.36 billion in 2000. Five years later, Malaysia had the largest trade deficit with China

among ASEAN5 countries in SITC 7, which was valued at USD4.79 billion. The trade deficit further ascended in 2008 to USD6.23 billion. However, it was reduced by 90% to USD0.62 billion in 2009. On average, the extent of trade deficit for Malaysia-China bilateral trade in SITC 7 increased by two folds from 2000 to 2009. Since Malaysia is the established and main exporter of electronics and electrical machinery in ASEAN (Liu and Luo, 2004), and many MNCs from this sector are located in Malaysia (Lall, 2000), Malaysia might import huge amount of inputs from the similar manufacturing sub-sector from China for reprocessing purposes.

Apart from that, Malaysia was having trade deficit with China in SITC 8 throughout the study period. The extent of trade deficit showed increasing trend from 2000 to 2008. It increased by more than six folds from USD0.17 billion in 2000 to USD1.15 billion in 2008 but declined to USD0.95 billion in 2009.

Although Malaysia had small trade surpluses with China in SITC 6 in 1993, 1994, 1998 and 1999, Figure A2b illustrates that the trade surplus had turned to deficit during 2000-2009. Moreover, the extent of trade deficit increased notably from 2003 with USD0.13 billion to USD1.54 billion in 2008. Nevertheless, significant improvement took place in 2009 as the trade deficit of Malaysia-China bilateral trade in SITC 6 reduced to USD0.51 billion. Based on Park (2007), China obtained comparative advantage in SITC 6 relative to Malaysia in line with their abundance of labour.

Malaysia marked trade surplus in SITC 5 in relation to China's trade from 2000 onwards. The extent of trade surplus was the largest in 2004 and 2005 which were USD0.563 billion and USD0.56 billion respectively. The Malaysian Government's 2004 budget strategy in promoting and marketing Malaysian goods and brands in international markets (National Chamber of Commerce and Industry of Malaysia, 2004)

has successfully expanded the exports of Malaysian manufactured goods to China including chemical and related products. By and large, the trade surplus for Malaysia-China bilateral trade in SITC 5 had surged by more than four folds from USD0.07 billion in 2000 to USD0.35 billion in 2009.

Figure A3a (refer to appendix) shows that Philippines-China bilateral trade in manufactured sectors was different from other ASEAN5 countries during 1993-2009. Philippines was having trade deficit in manufacturing sectors from 1993 to 2001. After China's accession to WTO and further liberalization of her trade policies, trade deficit had turned to trade surplus, and the extent of trade surplus became gradually significant since 2005. However, the trade deficit re-emerged in 2009.

From Figure A3b (refer to appendix), the trade balance of Philippines with China in SITC 7 had moved in the contradicting direction compared to the rest of manufacturing sub-sectors i.e. SITC 5, SITC 6 and SITC 8. Philippines had trade surplus with China in SITC 7, but other manufacturing sub-sectors marked a deficit in most of the years during the study period. As such, the trade surplus of Philippines was solely contributed by SITC 7.

Based on Figure A3b, Philippines had been having trade surplus with China in SITC 7 since 2000. The extent of trade surplus surged from USD0.15 billion in 2000 to USD0.65 billion in 2004. After 2004, trade surplus between Philippines and China bilateral trade uplifted to a higher level and achieved the peak in 2008 amounting to USD2.62 billion. However, in 2009, it fell below the par value of the prior 2004 trade surplus with USD0.03 billion. Therefore, it is too risky for Philippines to depend on one sector (Lall, 2000). The trade balance of Philippines would be seriously affected if

the demand from China on semiconductors or other related goods in this manufacturing sub-sector declines.

On the other hand, Philippines was having trade deficit with China in SITC 5, SITC 6 and SITC 8 throughout the study period, except 1993 for SITC 6. It is noticeable that the trade deficit in SITC 5 between Philippines and China increased from USD0.02 billion in 1993 to USD0.08 billion in 2000. It further increased to USD0.33 billion in 2009.

Figure A3b also shows that Philippines was having trade deficit with China in SITC 6 from 1994 onwards. The value of trade deficit increased slightly from USD0.04 billion in 1994 to USD0.15 billion in 2000 and to USD 0.31 billion in 2009. As per SITC 8, the trade deficit between Philippines and China increased marginally from USD0.01 billion in 1993 to USD0.09 billion in 2000. It then increased slightly to USD0.23 billion in 2007 and thereafter remained stagnant at USD0.23 billion until 2009.

Besides, the fluctuation of trade deficit for Philippines-China bilateral trade was the least in SITC 6 and SITC 8 in comparison with other ASEAN5 countries in the similar manufacturing sub-sectors. However, the trade share for SITC 6 and SITC 8 constituted only an average of 14.5% and 4.6% in total bilateral trade between Philippines and China in 2000s. Hence, both manufacturing sub-sectors are probably not the hub for Philippines.

Figure A4a (refer to appendix) shows that Singapore was having trade deficit with China in manufacturing sectors from 1993 to 2009, and the extent of trade deficit was getting larger since 2006. It might be attributable to the flooding of cheap Chinese goods or the imports of intermediate goods from similar industries for further processing purposes in Singapore.

Based on Figure A4b (refer to appendix), the trade deficit of Singapore was mainly contributed by SITC 7. The extent of trade deficit in this sector had been increasing significantly since 2006 although improvement was found in 2009. Among ASEAN5 countries, Singapore had the largest trade deficit with China in SITC 7 amounting to USD1.24 billion in 2000. Five years later, the trade deficit increased slightly to USD1.28 billion. On the other hand, it had reduced noticeably by 48.4% from USD3.16 billion in 2008 to USD1.63 billion in 2009. Singapore's economy is dependent on exports and one of her major exports is machinery and equipment (The World Factbook, 2010). Therefore, it is believed that the trade deficit in SITC 7 might be attributable partly to the fact that Singapore and China are engaging in production fragmentation whereby Singapore imports inputs from China for reprocessing purposes. The final goods are then re-exported to the third countries by Singapore.

Apart from that, Singapore also had trade deficit with China in SITC 6. Generally, the extent of trade deficit in SITC 6 was not as large as SITC 7. However, it started to increase significantly from 2003 onwards. The trade deficit surged by more than six folds from USD0.52 billion in 2003 to USD 3.39 billion in 2008. Similar to SITC 7, the trade deficit reduced in 2009, amounting to USD 1.23 billion.

Singapore also recorded the largest trade deficit with China in SITC 8 in 2008 as compared to other ASEAN5 countries. Her trade deficit with China in SITC 8 had surged by more than two folds from USD0.51billion in 2000 to USD1.34 billion in 2008.

On the other hand, similar to Malaysia, Singapore recorded trade surplus in SITC 5 throughout the study period (1993 to 2009) and the extent of trade surplus increased significantly since 2000. It increased by more than four folds from USD0.58 billion in

2000 to USD2.83 billion in 2009. In addition, among ASEAN5 countries, Singapore was having the largest trade surplus with China in SITC 5 during the study period. This is mainly due to Singapore being well endowed with chemical related goods (World Development Indicators Database, 2010), and hence, she has the comparative advantage in this sector.

Figure A5a (refer to appendix) shows that Thailand was having trade deficit with China from 1993 to 2009 in manufacturing sectors. The extent of trade deficit increased significantly since 2003. Based on the manufacturing sub-sectors analysis from Figure A5b (refer to appendix), the trade deficit was mainly contributed by SITC 6 and SITC 7, followed by SITC 8.

It is noticeable that Thailand was having trade deficit with China in SITC 6 throughout the study period (1993 to 2009). The extent of trade deficit increased drastically from 2003 to 2008. The expansion of trade deficit in SITC 6 for Thailand-China bilateral trade was the largest in comparison with other ASEAN5 countries. It increased by more than seven folds from USD0.54 billion in 2003 to USD3.96 billion in 2008. The trade deficit then reduced to USD1.88 billion in 2009. Owing to a large pool of low cost labour in China, Thailand did not have the comparative advantage in SITC 6. Generally, the extent of trade deficit became larger after China's accession to WTO where trade barriers between ASEAN5 and China were further reduced.

Similarly, Thailand also recorded trade deficit with China in SITC 7 throughout the period of study and the extent of trade deficit was more significant in 2000s. The trade deficit increased by more than four folds from USD0.64 billion in 2000 to USD 2.08 billion in 2005. It further increased to USD 2.37 billion in 2009. In fact, the most important exports for Thailand are machinery and electronic components. (The World

Factbook, 2010). Hence, the trade deficit might have been caused by Thailand imports intermediate goods from China to complement Thailand's domestic industries in SITC 7.

Similar to SITC 6 and SITC 7, Thailand was having trade deficit with China in SITC 8 throughout the study period. It is noticeable that the extent of trade deficit became more significant in 2000s. It increased by more than four folds from USD0.27 billion in 2000 to USD1.32 billion in 2009. However, Figure A5b shows that the amount of trade deficit in SITC 8 was smaller than that of SITC 6 and SITC 7.

On the other hand, similar to Malaysia and Singapore, Thailand was having trade surplus with China in SITC 5 in 2000s, except 2001 and 2008. Among ASEAN5 countries, the expansion of trade surplus in SITC 5 for Thailand-China bilateral trade was the largest in 2000s. However, this manufacturing sub-sector turned to deficit in 2008 due partly to the global economy downturn. The trade surplus re-emerged in 2009 after the crisis. Overall, the trade surplus in this sector increased by more than forty-two folds from USD0.022 billion in 2000 to USD0.93 billion in 2009. In fact, chemical products are major imports of China (The World Factbook, 2010). With China's aggressive trade liberalization policies, the demand of such products will further increase and therefore the exports of Thailand are augmented.

1.6 Problem Statement

The bilateral trade between ASEAN5 countries and China had grown over the past two decades, particularly since 2001 (refer to Figure 1.1). Based on Table 1.2 below, the shares of respective ASEAN5 countries with China bilateral trade in total trade of ASEAN5 countries increased marginally from 1991 to 2001 and expanded drastically in 2009.

Table 1.2: The Share of ASEAN5-China Bilateral Trade in Total Trade of ASEAN5 Countries

Country	Year		
	1991	2001	2009
Indonesia	3.7	4.7	11.9
Malaysia	2.0	4.7	13.0
Philippines	1.7	2.7	8.3
Singapore	2.5	5.3	10.1
Thailand	2.2	5.2	11.6

Source: UN Comtrade Database

However, based on Krugman, Obstfeld and Melitz (2012, p.32), international trade is dependent on the size of the country and the availability of resources. The authors have put forward the argument that countries that are large and endowed with a large variety of resources are less reliant on international trade due to economics of scale of domestic markets.

ASEAN5's external market dependency ratio, which was measured by the share of total trade in GDP were significantly higher than that of China. The external dependency ratio of ASEAN5 countries as a whole were 152.9% in 2008 and 126.8% in 2009, respectively. On the other hand, the external dependency ratio of China was 62.1% and 48.4% for the same period of time (UN Aggregates Database). As such, China is less reliant on international trade than ASEAN5 countries. This portrays that the emergence of China is being regarded as both an opportunity as well as a threat to ASEAN5 countries.

Furthermore, it is noticeable that ASEAN5-China bilateral trade has changed (refer to Figure 1.2 to Figure 1.6) . The rapid integration between ASEAN5 countries and China offers greater market share for regional trade in the manufacturing sectors as the

bilateral trade between each ASEAN5 country and China are gradually dominated by manufacutred goods (UN COMTRADE database). Besides, the bilateral trade between ASEAN5 countries and China has been focusing more on intra-industry trade in manufacturing sectors, particularly from 2000 onwards (Hong Kong Trade Development Council, 2010). It is therefore essential to analyze the new aspects of bilateral intra-industry trade relationship between ASEAN5 countries and China in manufacturing sub-sectors. This is crucial, as it would help to provide new strategy suggestions for ASEAN5 countries' policy makers, and draw new implications to domestic producers of ASEAN5 countries to enhance the sustainability of trade between ASEAN5 and China.

However, the changes of trade balance of each ASEAN5 country and China from trade surplus to deficit or vice-versa with different extent across manufacturing sub-sectors (refer to Figure A1a to A5b) have raised the concern on whether ASEAN5-China bilateral trade is dependent on the nature of inter-industry trade or intra-industry trade.[2] As such, it is vital to examine the extent of intra-industry trade between respective ASEAN5 countries and China in each manufacturing sub-sector.

Intra-industry trade is divided into two types, namely vertical intra-industry trade (VIIT) and horizontal intra-industry trade (HIIT).[3] Based on production fragmentation theory, processing trade which are attributable to production fragmentation would give rise to VIIT (Ando, 2006 and Schott, 2003) as processing trade involves international assembly operations (Lemoine and Unal Kesenci, 2002) . On the other hand, ordinary trade do not involve international production operations or reprocessing activities and are aiming

2 Inter-industry indicates resource reallocation between industry; intra-industry indicates resource reallocation within industry.
3 Based on OECD Glossary of Statistic (2007), HIIT refer to trade in similar products with differentiated varieties; VIIT refer to trade in 'vertically differentiated' products distinguished by quality and price.

for final market (Lemoine and Unal Kesenci, 2002). Therefore, HIIT, which contributes to varieties of goods for final consumers, indicates ordinary trade.

It is widely recognized that vertical intra-industry trade (VIIT) is more pronounced in bilateral trade between developed and developing countries, which is driven by differences in factor endowments. (Falm and Helpman, 1987). However, China, with her rich labour endowment, has augmented her specialization in labour-intensive production and has induced the fundamental changes in ASEAN5-China trade structure, i.e. changing from HIIT to VIIT. It is evidenced that VIIT has increased significantly for China's bilateral IIT with the rest of the world (Zhang, Witteloostuijin and Zhou, 2005; Hu and Ma, 1999). The changes of trade structures resulted from the vast development of production networks (Ando, 2006; Turkcan, 2010; Koopman, Wang and Wei, 2008) could lead to trade deficit in ASEAN5-China bilateral manufacturing trade. It is also noticeable that macroeconomic variables will provide different dynamic impacts in facilitating ASEAN5-China bilateral trade. As such, it is essential to identify the variables that strengthen the VIIT relationship between ASEAN5 countries and China.

Nevertheless, ASEAN5 countries and China are getting more dependent on western markets, particularly the United States for their exports of final goods (Gaulier, Lemoine, Kesenci and Unal-Kesenci, 2005 and 2007). Therefore, the sovereign debt crisis and the deteriorating of western economic growth tremor are easily felt by these regions. Hence, the external shock has put forward the argument on whether trading partners would pass the pain to others in regional trade.

One may notice that regional trade is performed with the initiatives to exploit the advantages of economies of scale in order to increase trade and investment among the

member countries. Indirectly, regional trade would shelter their economies from global economic slowdown. On the other hand, member countries with low value-added production are more exposed to external risks. Trade deficit in ASEAN5-China bilateral trade has raised the concern of value chains in enhancing and sustaining bilateral trade between respective ASEAN5 countries and China.

Besides, FDI in China has become the platform for technology transfer (Tran, 2010). China's government encourages foreign investors of joint ventures or joint production with domestic firms. These policies have given rise to a pool of high-skilled labours in China and the emergence of strong domestic firms (Rodrik, 2006). Furthermore, based on Lall and Albaladejo (2004), China invests greatly in advanced skills and technology, which includes training for highly educated and skilled labour. Therefore, the quality of China's exported products increases over time. Despite being the assembler, China has also emerged as the producer of high-tech intermediate goods (Lemoine and Unal-Kesenci, 2002). The comparative advantage of China has shifted gradually from labour-intensive goods towards technology-intensive and capital-intensive goods (Luo and Zhang, 2010).

However, as China moves up to the high value-added exported products, more advanced trading partners fear of potential infringement on high-end manufactured goods (Lall and Albaladejo, 2004; Greenaway, Mahabir and Milner, 2008). Also, the 'complementary effect' from China to ASEAN through the imports of parts and components would be reduced (Shafaeddin, 2004). Consequently, it may reduce the sustainability of bilateral trade between China and respective ASEAN5 countries if China's dependency on high value-added imports from ASEAN5 countries decreases over time.

As such, it is crucial for ASEAN5 countries to identify the resilient products in manufacturing sub-sectors in relation to China's trade. Resilient products are the consistent high value-added VIIT products of ASEAN5 in most of the years during the study period, particularly in recent years. Thus, the resilient products reflect the consistent quality of the exported products from each ASEAN5 countries to China. As a consequence, these products are vital for each ASEAN5 country to enhance and sustain the bilateral intra-industry trade relationship with China.

1.7 Objectives of the Study

The general objective of this study is to analyze the new aspects of bilateral intra-industry trade relationship between ASEAN5 countries and China in each manufacturing sub-sector, SITC 5, 6, 7 and 8 using advanced econometric method and the extended decomposition-type threshold method. To arrive at the general objective, the following are the specific objectives:

1. To examine the extent of intra-industry trade between respective ASEAN5 countries and China in each manufacturing sub-sector using indices based on decomposition-type threshold method.

2. To analyze the catalyst in strengthening vertical intra-industry trade relationship between ASEAN5 countries and China in each manufacturing sub-sector using advanced spatial panel econometric model.

3. To identify the resilient products in each manufacturing sub-sector for respective ASEAN5 countries in relation to China's intra-industry trade using the extended decomposition-type threshold method.

1.8 Significance of the Study

This study contributes to the current economic literature on international trade in various ways. Firstly and generally, this study analyzes the new aspects of bilateral intra-industry trade relationship between ASEAN5 countries and China in manufacturing sub-sectors to fill in the missing aspects. The comprehensiveness of this study could provide a better understanding and gauge the changing performance and the nature of trade between ASEAN5 countries and China as a whole and as individual countries.

Secondly, this study examines the bilateral intra-industry trade between ASEAN5 countries and China using decomposition-type threshold method developed by Fontagne and Freudenberg (1997). By narrowing down the nature of intra-industry trade, the outcome of this study could indicate the extent of ASEAN5 countries involved in China's production network and production fragmentation, which would complement the emerging literature of production fragmentation of ASEAN5, which is currently lacking.

Thirdly, to fill in the missing aspects, this study adopts the advanced econometric model, namely spatial panel model to analyze the catalyst in strengthening VIIT relationship between ASEAN5 countries and China. The outcome of this study would provide insights for the planning and implementation of ASEAN5 countries' trade policies and FDI. In addition, the strength of spatial panel econometric, which includes the spillover interaction effects among ASEAN5 countries would enable us to supply strategy suggestion for the economic cooperation plan of ASEAN5 countries. Such strategy suggestion is crucial but lacking for ASEAN5 countries as a whole to yield the numerous economic benefits of China's rise.

Fourthly, in light of the full implementation of CAFTA in 2010, some ASEAN5 countries such as Indonesia are worrying that the domestic manufacturing sectors will be undermined (ASEAN Secretariat, 2010). By extending the decomposition-type threshold method, this study is able to identify the resilient products for domestic producers of ASEAN5 in each manufacturing sub-sector. The identification of resilient products is vital to provide implications to domestic producers of ASEAN5 countries in making tactical decisions to enhance their competitiveness and efficiency in China's trade.

Lastly, indices method and advanced econometric models are used to undertake this study. The use of decomposition-type threshold method for computing intra-industry trade indices coupled with spatial panel model in examining the spillover interaction effects and estimating the elasticity of the explanatory variables will update the methodology of intra-industry trade.

1.9 Organization of the Study

Chapter 1 provides a background to the study for the overview of ASEAN-China bilateral trade relationship, trade networking between ASEAN countries and China, analysis of bilateral trade between ASEAN5 countries and China, the importance of manufacturing sectors in ASEAN5 countries, and trade balance between ASEAN5 countries and China in manufacturing sub-sectors, followed by the problem statement, objectives and significance of the study.

Chapter 2 contains the literature review on intra-industry trade, the determinants of intra-industry trade and the trade relationship between ASEAN and China. This chapter will close with the conclusions.

Chapter 3 consists of international trade patterns and theories, theoretical framework on intra-industry trade, the conceptual framework of this study and the econometric model adopted for this study. This chapter also provides tests and procedures for the econometric model and definition and sources of data. This chapter will close with the conclusions.

Chapter 4 provides discussion and analysis on the empirical results, and Chapter 5 contains conclusion, policy recommendations, limitations of the study and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter consists of the literature review on intra-industry trade, the determinants of intra-industry trade and the trade relationship between ASEAN and China. The literature on intra-industry trade will be presented first, followed by the determinants of intra-industry trade and closed with trade relationship between ASEAN and China.

2.2 Intra-industry Trade

According to Grubel and Lloyd (1971), the phenomenon of intra-industry trade, which is attributable to the simultaneous export and imports of products from the similar industry was increasingly important and noteworthy for further attention. Furthermore, Grubel and Lloyd (1975, p.29-36), who analyzed the intra-industry trade of ten OECD countries in 1967 using 3-digit SITC data reported that intra-industry trade registered significant expansion as the average share of intra-industry trade accounted for 63% of the total trade of these countries in 1967. In addition, the share of intra-industry trade in every industry was remarkably significant in each country.

Meanwhile, Aquino (1978) reported that the share of inter-industry trade in manufacturing industries had declined over time from 1951-1974. It is highly believed that the above phenomenon was attributed to the surge of intra-industry trade in manufacturing sectors. As pointed out by Caves (1981), intra-industry trade increased rapidly in manufacturing sectors since 1960. Furthermore, Greenaway and Milner (1983) also revealed that the value of the world exports increased by 966% from 1955 to 1976 (in US dollar at current prices). At the same time, the percentage of trade in

manufactured goods had increased from 48% to 58%; and 60% of the trade in manufactured goods involved intra-industry trade.

Besides, Hu and Ma (1999) also revealed that intra-industry trade plays an important role in China's trade in manufactured goods. It is attributable to manufactured goods involving a high degree of production differentiation that stimulated intra-industry (Zhang, Witteloostuijin and Zhou, 2005). In addition, Fontagne, Freudenberg and Gaulier (2005) pointed out that even though inter-industry trade still dominates the world trade, but its share had declined significantly due to the growth of intra-industry trade in 1990s. Nevertheless, empirical results show that international specialization had shifted towards product within similar industries (Schott, 2003).

A lot of empirical studies have shown that intra-industry trade has been expanding over time(Grubel and Lloyd, 1971; Lancaster, 1980; Falvey, 1981; Krugman, 1981; Greenaway and Milner, 1983; Balassa and Bauwens, 1987; Tharakan and Kerstens, 2005 Fontagne and Freudenberg, 1997; Hu and Watkins, 1999;; Fontagne, Freudenberg and Gaulier, 2005; Zhang, Witteloostuijn and Zhou, 2005; Turkcan, 2010; Ito and Okubo, 2011).

However, the traditional trade theories particularly Heckscher-Ohlin (HO) theory focuses mainly on inter-industry trade where each industry is assumed to produce homogeneous goods and trade takes place in accordance with comparative advantage or disadvantage (Falvey, 1981). The traditional trade theories, which included HO theory are not adequate to explain the emergence of intra-industry trade. (Grubel and Lloyd, 1971; 1975, p.3; Brander, 1981*)*. In addition, Tharakan and Kerstens (1995) also revealed that HO theory is not adequate to explain the emergence of vertical intra-industry trade.

Likewise, Lancaster (1980) revealed that modern economies are involved intensively in intra-industry trade, and it could occur between economies, which are similar in every aspect. Therefore, intra-industry trade had received attention in the literature, as the traditional trade theories can no longer accommodate new trade patterns that arose. He analyzed the emergence of intra-industry trade and concluded that the perfectly monopolistic competition market structure would result in a large scale of intra-industry trade in manufactured goods.

Falvey (1981) also agreed that modification to the traditional trade theories is essential to explain the emergence of intra-industry trade and therefore, he developed the intra-industry trade model within a multi-product industry to analyze the pattern of intra-industry trade.

Besides, Krugman (1981) who also aimed to solve the paradoxes of traditional trade theories in explaining intra-industry trade, developed another formal intra-industry trade model based on the work of Balassa (1967), Grubel (1970) and Kravis (1971). His findings show that the intra-industry trade are more intensive in similar countries where they tend to use similar factor proportions in production. Furthermore, trade liberalization would increase the welfare of owners of both abundant and scarce factors if intra-industry trade is dominant in the country. However, owing to some restrictive assumptions in his model, for instance, factors of production being perfectly mobile within the same industry but immobile between different industries, his findings should be viewed as suggestive rather than conclusive.

Nevertheless, Greenaway and Milner (1983) reported that the examination on intra-industry trade is important based on two main reasons. Firstly, the measurement of intra-industry trade provides an indication on the determinants of international

exchanges as the traditional trade theories are not able to explain intra-industry trade. Secondly, it is easier for countries to adjust the expansion of intra-industry trade as compared to inter-industry trade. Owing to these important reasons, Greenaway and Milner (1983) developed a model to measure the extent of intra-industry trade and the various form of intra-industry trade, which could be used as dependent variables in econometric models.

Apart from that, Fontagne and Freudenberg (1997) reported that similar economies should engage in horizontal intra-industry trade while different economics should involve in vertical intra-industry trade. Therefore, in order to reduce biases of total intra-industry trade, they developed a method to decompose trade into three types, namely inter-industry trade, two-way horizontal trade and two-way vertical trade based on the differences in prices as prices reflect the quality of the traded goods. Using this method for empirical study, the authors found that the growth of intra-industry trade in Europe was contributed mainly by vertical intra-industry trade.

To further analyze the importance of different types of intra-industry trade, Fontagne, Freudenberg and Gaulier (2005) extended their methodology from European countries to the world level and found that intra-industry trade became more important at world level attributable to intensive vertical intra-industry trade. Using 4-digit SITC to investigate the nature of intra-industry trade between China and her trading partners, Zhang, Witteloostuijn and Zhou (2005) pointed out that China's intra-industry trade, in particular vertical intra-industry trade had increased significantly. Besides, using an alternative indices method without threshold values, Ito and Okubo (2011) found that the intensive vertical intra-industry trade in European countries was due to the fact that Eastern European countries have climb up the quality ladder while the price of imports from China remained low.

Azhar and Elliott (2006) compared methods developed by Fontagne and Freudenberg (1997) with Greenaway, Hine and Milner (1995) in disentangling total intra-industry trade into horizontal intra-industry trade and vertical intra-industry trade. The authors found that both methods were largely identical. They developed a complementary model using geometric tool. They argued that their method is simple yet versatile and serves as comparative measurement in examining quality differentiated trade in multiple industries and years.

Instead of measuring the extent of intra-industry trade or forming intra-industry trade index, Balassa and Bauwens (1987) tested various hypotheses including country and industry characteristics on the determinants of intra-industry trade in manufactured goods within a multi-country and multi-industry framework. Their study covered 38 countries inclusive of both developed and developing countries. They found that intra-industry trade was the greatest in developed countries attributable to the similarity of their economic structures. However, due to the heterogeneity of the sample as well as a significant percentage of zero observations, the explanatory power of the independent variables in the case of developing countries, between developed and developing countries is weaker.

To be more specific, Turkcan (2010) studied the determinants of vertical intra-industry trade between Austria and her trading partner in auto-parts industry from 1996 to 2006. Using Grubel-Lloyd type trade decomposition and decomposition-type threshold method developed by Fontagne and Freudenberg (1997), the author disentangled total trade into three types and found that vertical intra-industry trade dominated trade in the auto-parts while horizontal intra-industry trade expandded in the motor vehicle sector. As such, the results show that intra-industry trade is increasingly important in Austria's auto-parts industry.

Despite the countries mentioned above, Fontagne, Freudenberg and Gaulier (2005) reported that intra-industry trade has also become crucial in Asia. For instance, the authors reported that Malaysia-Singapore and Taiwan-Singapore ranked the top two and top ten, respectively in worldwide bilateral intra-industry trade share in 2000. Besides, there was intensive horizontal intra-industry trade between Singapore-Thailand, Korea-Singapore, Korea-Philippines and Malaysia-Philippines in 2000 as well. As such, many empirical studies have been carried out recently to examine the intra-industry trade in Asia. For instances, Fukao, Ishido and Ito (2003); Hurley (2003); Kimura and Ando (2005); Ando (2006); Xing (2007) and Azhar, Elliott and Liu (2008).

Xing (2007) analyzed China's intra-industry trade with Japan and U.S. from 1980 to 2004. The author employed the method developed by Grubel and Lloyd (1975) to measure intra-industry trade index and found that the intra-industry trade between China-Japan and China-U.S. increased significantly from 5.6% and 4% in 1980 to 34% and 24% of total trade, respectively in 2004. China-Japan intra-industry trade focuses on electrical and machinery sectors while China-U.S. intra-industry trade focuses on chemical and food sectors. The growth of intra-industry trade in China shows that China has been improving on manufacturing capacity and expanding her export share via integration into global production networks. Besides, the findings also imply that China has increased the variety of products, experiencing improvement in economies of scales and technology. In a nutshell, China is experiencing dynamic changes in her comparative advantages.

Fukao, Ishido and Ito (2003) analyzed the intra-industry trade in East Asia from 1996 to 2000 by computing intra-industry trade indices. They reported that intra-industry trade was growing faster in East Asian developing countries than in advanced countries. To further examine the intra-industry trade, the total intra-industry trade was further

divided into horizontal intra-industry trade and vertical intra-industry trade. The empirical results showed that vertical intra-industry trade dominated intra-industry trade in East Asia. In addition, the percentage of vertical intra-industry trade in total trade had increased by 7.1% during the period of study. The vertical intra-industry trade was most significant in machinery sectors. Nevertheless, the percentage of intra-industry trade in some ASEAN countries, i.e. Malaysia, Singapore and the Philippines have increased drastically and were higher than other more developed countries such as Korea and Japan.

More to the point, in line with Fukao, Ishido and Ito (2003) findings, Hurley (2003) also found that intra-industry trade, particularly vertical intra-industry trade had been growing and become crucial in ASEAN.

Besides, Ando (2006) pointed out that the composition of exported and imported goods has converged in many East Asian countries. This signals that intra-industry trade is increasingly important in this region. The author analyzed the intra-industry trade of machinery sector in East Asia in 1990, 1996 and 2000, respectively using decomposition-type threshold method. The findings of Ando (2006) showed that the importance of inter-industry trade declined significantly in East Asian region as the share of inter-industry trade dropped by 50% from 1990s to 2000 in most of the East Asian countries. On the other hand, the share of vertical intra-industry trade, particularly vertical intra-industry trade in machinery intermediate goods had increased drastically over time. For instance, the shares of vertical intra-industry of machinery trade in China increased by 25%; Indonesia, 37% and Thailand, 27%. Therefore, his findings confirm that intra-industry trade is becoming more important in East Asia.

2.3 The Determinants of Intra-industry Trade

A lot of studies have been carried out to examine the determinants of intra-industry trade as intra-industry trade is becoming more significant in world trade (Lancaster, 1980; Krugman, 1979 and 1981; Helpman, 1981; Falvey, 1981; Caves, 1981; Balassa and Bauwens, 1987 and 1988; Bergstrand, 1990; Greenaway, Milner and Elliott, 1999; Hu and Ma, 1999; Kimura and Ando, 2003; Schott, 2003; Fukao, Ishido and Ito, 2003; Ando, 2006; Xing, 2007; Turkcan, 2010; and Andresen, 2010).

Lancaster (1980) pointed out that the extent of intra-industry trade between two countries was mainly determined by the tastes of consumers. According to him, if the trading partners have similar economies, the diversity of tastes in manufactured goods would give rise to monopolistic market structure. These market structures would lead to high volume of intra-industry trade in order to exchange differentiated goods between countries in the same product category. Besides, Lancaster (1980) also showed that trade protection such as tariffs on agricultural goods would increase intra-industry trade in manufactured goods.

Krugman (1979) also reported that intra-industry trade would occur under monopolistic competition market structures. However, he pointed out that, internal economies of scale rather than taste was the determinant of intra-industry trade. Based on the model of monopolistic competition developed by Krugman (1979), which was modified from Dixit-Stiglitz model, each country was able to gain from trade attributable to economies of scale even though the country has no differences in factor endowments, technology level and tastes with her trading partners.

Krugman (1981) further elaborated the importance of economies of scale in determining intra-industry trade in 1981. He pointed out that the variety of goods in each country was limited due to economies of scale and therefore each country only produced a subset of goods in each product category. Hence, there was intra-industry trade among them. Krugman (1981) used a trade model to examine intra-industry trade and found that the index of intra-industry trade was identical with the index of similarity of countries' factor endowments due to economics of scale. Therefore, he concluded that the similarity in a country's factor endowment was one of the determinants of IIT.

Since both Krugman (1979) and Lancaster (1980) stressed the importance of monopolistic competition market structures and economics of scale in determining intra-industry trade, Helpman (1981) further examined the international trade in the presence of economies of scale, product differentiation and monopolistic competition using Chamberlin-Heckscher-Ohlin approach. He found that economies of scale and differentiated goods gave rise to intra-industry trade. In addition, he also found that the extent of intra-industry trade between the two countries was positively correlated with the similarity of their income levels. According to the author, if the countries have similar income level, it could be implied that the capital-labour ratios between the two countries are similar, and they tend to produce goods in the same category and give rise to intra-industry trade. As a result, similarity in income level is also one of the determinants of intra-industry trade.

On the other hand, Falvey (1981) did not agree that economics of scale and monopolistic competition market structure gave rise to intra-industry trade. He constructed a multi-product industry trade model, where the industry's dimensions comprised a range of outputs available from a special type of capital to examine intra-industry trade. He found that intra-industry trade was the natural outcome of the

industry structure without requiring the existence of economies of scale or imperfect competitive market structures. Besides, based on Falvey's (1981) empirical observation, the extent of intra-industry trade was negatively correlated with trade restrictions. Beaulieu et al. (2004) also agreed that tariffs, which served as the most significant trade restrictions, would hinder intra-industry trade.

Apart from that, Caves (1981) in analyzing the determinants of IIT for 13 industrial countries in 1970 using 3-digit SITC data, noted that economies of scale were negatively correlated with intra-industry trade. The author argued that the extensive economies of scales would confine the production of goods into relatively fewer locations, which reduced intra-industry trade indirectly. Besides, the author also noted that the impact of foreign direct investment on trade was depending on the MNCs' motive. If FDI were in the form of intra-firm transfer for joint production, it would increase intra-industry trade. On the other hand, FDI would hamper intra-industry trade if their motive were to substitute trade.

Besides, Balassa and Bauwens (1987) examined the determinants of intra-industry trade in 152 industry categories of manufacturing sectors in 38 countries in 1979. The determinants were divided into common and specific country characteristics, and industry characteristics. The regression results show that generally, common country characteristics such as average income levels, trade orientation, the existence of common borders and average country size are positively correlated with the extent of intra-industry trade. On the other hand, inequality in income and country size and distance are negatively correlated with the extent of intra-industry trade.

The results also show that, generally, industry characteristics such as product differentiation, variability of profit shares, offshore procurement, and marketing costs are positively correlated with the extent of intra-industry trade. In contrast, product standardization and foreign investment are negatively correlated with the extent of intra-industry trade. Balassa and Bauwens (1988) also examined the determinants of intra-industry trade in manufactured goods in European countries using trade data in 1971. The empirical results revealed findings similar to Balassa and Bauwens's (1987) findings.

Bergstrand (1990) examined the determinants of intra-industry trade in SITC 7 in 14 major industrialized countries using trade data of 1976. Bergstrand's (1990) model focused on horizontal intra-industry trade as his model only involved horizontal differentiated products. His findings revealed that horizontal intra-industry trade was positively correlated with the level of similarity of income per capital between two trading countries. In contrast, horizontal intra-industry trade was negatively correlated with average capital-labour endowment ratio.

Without disentangling intra-industry trade, Lundberg (1992) examined the determinants of intra-industry trade between Sweden and 6 original members of European Common Markets in 1984. His findings showed that production differentiation and preference of variety were the significant determinants of intra-industry trade.

Besides, Greenaway, Milner and Elliott (1999) examined the UK's bilateral intra-industry trade with her neighbours in 1988 based on Balassa and Bauwens (1987) theoretical framework, which combined both country and industry characteristics. The authors disentangled UK's intra-industry trade into horizontal and vertical intra-industry trade. The authors found that vertical intra-industry trade was more important than

horizontal intra-industry trade in UK's intra-industry trade with her trading partners of EU as more than 50% of intra-industry trade between them were in the form of vertical intra-industry trade. Besides, the authors also found that the diversity of preference, which was viewed as a determinant of horizontal intra-industry trade (Krugman, 1979), was an important determinant of vertical intra-industry trade, despite differences in factor endowment and market size.

On the other hand, Hu and Ma (1999) examined the extent of China's intra-industry trade with 23 of her major trading partners in 1995 to identify the determinants of horizontal and vertical intra-industry trade. The authors portrayed that the economics of scale and product differentiation were the significant determinants of horizontal intra-industry trade. On the other hand, despite FDI, human-capital intensity was the most important determinant of vertical intra-industry trade for China. According to Hu and Ma (1999), human-capital intensity which is the proxy for the quality indicator was crucial in determining vertical intra-industry trade as vertical intra-industry trade was mainly determined by the factor's quality.

Besides, Kimura and Ando (2003), in examining the performance of corporate activities of Latin America and East Asia using micro data of Japanese multinational enterprises, pointed out that the utilization of the advantages of production fragmentation had successfully increased the intra-regional trade in East Asia. In addition, the high growth rate of intra-industry trade in machinery parts and components in East Asia in 1990s was contributed by fragmentation and agglomeration. Nevertheless, the authors revealed that the impressive growth rates of GDP and international trade of East Asia, which outperformed Latin America in 1995 were also mainly attributable to fragmentation and agglomeration. Production fragmentation in particular, which aims to develop and expand international production network is mainly accelerated by the adoption of 'FDI-

promotion packages' by East Asia countries. As such, it can be concluded that FDI, which leads to production fragmentation is crucial in determining intra-industry trade. FDI was positively correlated with vertical intra-industry trade as production fragmentation involves trading in vertical differentiated products within the same industry. Lemoine and Unal-Kesenci (2002) also agreed that foreign affiliates play an important role in stimulating production fragmentation.

Furthermore, Fukao, Ishido and Ito (2003) have consistent findings with Kimura and Ando (2003). The empirical results show that FDI plays an important role in determining the vertical intra-industry trade as FDI has a strong positive coefficient. More to the point, differences in factor endowments were positively correlated with vertical intra-industry trade if the gap in GDP per capita is more than US$10,000. Lastly, consistent with Balassa and Bauwens (1987, 1988) findings, they found the distance to have a negative impact on vertical intra-industry trade.

Nevertheless, Schott (2003) revealed that each country would export different intermediate goods within the same category if the goods from various stages of the production process were categorized as the same category. Therefore, his findings implied that production fragmentation would give rise to vertical intra-industry trade. Besides, Yi (2003) used dynamic Ricardian trade model to examine the vertical specialization in US from 1962 to 1999. The author postulated that tariff reduction would stimulate the growth of vertical specialization. In other words, trade openness was positively correlated with vertical intra-industry trade.

Hurley (2003) examined the intra-industry trade of ASEAN trade in manufactured goods from 1987 to 1996 using intra-industry trade model and found that the impact of determinants was different on different types of intra-industry trade. The author

revealed that foreign direct investment was one of the most important determinants of vertical intra-industry trade, and it was statistically significant with a positive coefficient for Malaysia, Singapore and Thailand but negatively affected vertical intra-industry trade of Indonesia. On the other hand, the FDI was found to negatively affect horizontal intra-industry trade in Indonesia, Philippines and Singapore. Besides, the author also added that market size and capital-labour intensity were the important determinants of vertical intra-industry trade, which also influenced horizontal intra-industry trade of ASEAN in different ways.

Next, Zhang, Witteloostuijn and Zhou (2005) examined the determinants of China's horizontal intra-industry trade and vertical intra-industry trade using Generalized Least Squares (GLS). The authors found that FDI was an important determinant of vertical intra-industry trade under the period 1992-2001. This result was mainly due to the implementation of trade-processing policy and export-oriented FDI since 1984. Besides, vertical intra-industry trade was also positively correlated with differences in consumer patterns. In contrast, horizontal intra-industry trade was negatively correlated with the above differences. Apart from that, the authors postulated that distance, economic size, trade openness as well as trade composition would affect both horizontal intra-industry trade and vertical intra-industry trade in the same direction. Distance deterred both horizontal intra-industry trade and vertical intra-industry trade, while economic size and trade openness were positively correlated with horizontal intra-industry trade and vertical intra-industry trade.

Besides, Zhang and Li (2006) also examined China's horizontal and vertical intra-industry trade with East Asia. The authors used 5-digit SITC bilateral trade data from 1990 to 2000 for all manufacturing sub-sectors. They found that the impacts of certain determinants on horizontal intra-industry trade and vertical intra-industry trade were

different due to the different nature of horizontal intra-industry trade and vertical intra-industry trade. FDI was negatively correlated with vertical intra-industry trade but positively correlated with horizontal intra-industry trade The authors noted that the motive of FDI was to target at China's domestic market, which aimed to supply parts and components to local assemblers directly. Therefore, FDI reduced vertical intra-industry trade. On the other hand, the authors revealed that FDI stimulated horizontal intra-industry trade as MNCs located in China would mainly export the horizontal differentiated products from China to their home countries due to diversity of preference. As such, FDI was positively correlated with horizontal intra-industry trade. Arising from this, the impact of FDI depended on the purpose of the MNCs.

Besides, Zhang and Li (2006) also found that the estimation of differences in per capita income were negatively correlated with horizontal intra-industry trade and positively correlated with vertical intra-industry trade. Based on their findings, the differences in per capita income served as the proxy for differences in factor endowment. Therefore, differences in per capita income would offer greater opportunity for production fragmentation and therefore stimulate vertical intra-industry trade. Apart from that, the authors' findings also revealed that the impact of other variables in the regression model was similar for both horizontal intra-industry trade and vertical intra-industry trade. For instance, average GDP, which served as the proxy for market size and trade openness has made positive impact on horizontal intra-industry trade and vertical intra-industry trade while the difference in GDP is negatively correlated with both horizontal intra-industry trade and vertical intra-industry trade.

In addition, Ando (2006) revealed that vertical intra-industry trade was more important than horizontal intra-industry trade in East Asia as vertical intra-industry trade increased significantly since 1990s, particularly trade in machinery parts and components. Based

on Ando's (2006) findings, the main determinant of vertical intra-industry trade was the back and forth transactions, where valued-added was embedded in the production fragmentation. In other words, with aggressive promotion of FDI, production fragmentation has become prevalent and resulted in explosive growth of intra-industry trade in this region.

Using feasible generalised least squares with heteroscedasticity across panels method, Okubo (2007) examined intra-industry trade between Japan and 24 trading partners from 1996 to 2000. Okubo (2007) pointed out technology transfer via FDI was the most important determinant of intra-industry trade, particularly vertical intra-industry trade between Japan and Asia. Besides, Okubo (2007) also revealed that difference in GDP is negatively correlated with horizontal intra-industry trade and vertical intra-industry trade.

Without distinguishing between horizontal and vertical intra-industry trade, Xing (2007) regression results showed that trade openness was also positively correlated with intra-industry trade between China-Japan and China-U.S while trade balance is negatively correlated with intra-industry trade between China-Japan. Besides, FDI, which was associated with production fragmentation has emerged as the key determinant of intra-industry trade between China and Japan. On the other hand, the empirical results of China-US trade show contradictory outcomes where the coefficient of FDI is not significant in China-US intra-industry trade. Xing (2007) pointed out that the insignificance of FDI in China-US bilateral trade could be attributable to the small volume of intra-industry trade and FDI between China and US, and the nature of US's FDI being mainly market seeking instead of associated with production fragmentation. Xing (2007) also further noted that difference in GDP is negative and statistically

significant for China-US bilateral trade but negative and insignificant for China-Japanese bilateral trade.

On the other hand, using panel data, Jensen and Luthje (2009) disentangled intra-industry trade into horizontal intra-industry trade and vertical intra-industry trade and carried out an econometric analysis to examine the determinants of vertical intra-industry trade in manufactured goods of EU-15 countries and four East European countries from 1996 to 2006. Trade barriers were not under their consideration as the sample countries were the members of the same common market. Their regression results revealed that production size, average income per capita, overlapping of income distribution and distance were the important determinants of vertical intra-industry trade. Among the determinants mentioned above, production size, average income per capita and overlapping of income distribution overlap are positively correlated with vertical intra-industry trade. In contrast, distance would reduce vertical intra-industry trade among trading partners. Their regression results also postulated that difference in factor endowment does not serve as the important force to drive vertical intra-industry trade in EU-15 countries.

Besides, Turkcan (2010) revealed that vertical intra-industry trade, which is attributable to the production fragmentation, dominates the auto-parts trade. The author analyzed the vertical intra-industry trade in auto-parts industry in Austria using panel econometric modelling. The empirical results reported that vertical intra-industry trade is positively correlated with FDI as the nature of FDI is complementary rather than substitution, which accelerates the exchanges of intermediates. Besides, vertical intra-industry trade was positively correlated with average market size and the difference in GDP per capita but negative and statistically insignificant with difference in GDP. On

the other hand, distance imposed negative effect on vertical intra-industry trade as distance was the proxy for service-link cost.

Besides, using logit transformation model, Turkcan and Ates (2011) examined the trade pattern of US auto-parts industry from 1989 to 2006 and found that FDI plays a prominent role in accelerating vertical intra-industry trade as FDI stimulates fragmentation, which is similar with the findings of Turkcan (2010). In addition, both GDP (proxy the market sizes) and difference in GDP between trading partners imposed positive and significant impact on vertical intra-industry trade. Furthermore, the estimation results also revealed that the differences in factor endowment were positively related with vertical intra-industry trade, which was consistent with the findings of Zhang and Li (2006). This implies that differences in factor endowment trigger production fragmentation and emerge as the powerful determinant for vertical intra-industry trade. Conversely, the authors postulated that both distance and transportation costs variables were significant but negatively correlated with vertical intra-industry trade. The authors found that auto–parts industry focuses on 'just-in time' manufacturing and therefore long distance and high transportation costs tend to hamper fragmentation among trading partners.

Lastly, Andresen (2010) pointed out that the determinants of intra-industry trade have different impact depending on whether the nature of trade is horizontal or vertical. He examined the intra-industry trade in Canada and US from 1988 to 1999 and found that although minimum efficient scale was negatively correlated with all types of intra-industry trade, product differentiation and tariff rates were negatively correlated with horizontal intra-industry trade but positively correlated with vertical intra-industry trade. In contrast with theoretical expectation, the concentration ratio was positively correlated

with horizontal intra-industry trade but negatively correlated with vertical intra-industry trade.

Based on the past studies mentioned above, FDI is the most important determinant of intra-industry trade, particularly vertical intra-industry trade (Balassa and Bauwens, 1987 and1988; Kimura and Ando, 2003; Fukao, Ishido and Ito, 2003; Hurley, 2003; Zhang and Li, 2006; Ando, 2006; Xing, 2007; Turkcan, 2010 and Turkcan and Ates, 2011). Other significant determinants of intra-industry trade include difference in market size or market size *per se*, trade openness, GDP per capita, distance, economics of scales, and product differentiation. However, the impact of the determinants varies depending on the nature of the intra-industry trade being horizontal or vertical intra-industry trade.

2.4 The Trade Relationship between ASEAN and China

Foreign trade plays an important role in boosting economic development in ASEAN and China. ASEAN5 countries have adopted an outward-looking policy since the seventies and have become a dynamic region of the world through strong export growth and large volumes of foreign direct investment (Wong and Chan, 2003). China, on the other hand, has undergone rapid trade liberalization since the second half of the nineties (Holst and Weiss, 2004). Now, China has emerged as a significant global economic force.

Liu and Luo (2004) pointed out that the bilateral trade between ASEAN-China has grown significantly. Arising from this, a growing volume of studies pertaining to ASEAN-China trade have emerged (Zhang and Hock, 1996; Ianchovichina, Martin and Fukase, 2000; Lee, 2001; Laurenceson, 2003; Chirathivat, 2002; Abeysinghe and Lu, 2003; Cai, 2003; Sheng, 2003; Wong and Chan, 2003; Chirathivat and Mallikamas, 2004; Mckibbin and Woo, 2003; Ahearne , Fernald, Loungani and Schindler, 2003; Lee,

Host and Mensbrugghe, 2004; Tongzon, 2005; Eichengreen, Rhee and Tong, 2007; Park, 2007; The Economist, 2009; Siah, Zulkornain and Law, 2009; Tong and Lim, 2009).

The export-led growth policy adopted by China in the eighties has been very successful (Abeysinghe and Lu, 2003). Liu and Luo (2004) revealed that the trade between China-ASEAN5 countries has been growing at an average of 55.3% per annum since 1987 even though the trade volume between them was relatively small in the eighties (only USD4.4 billion in 1987).

Zhang and Hock (1996) who examined the trade relationship between China and ASEAN in the seventies and eighties pointed out that although bilateral trade relationship between ASEAN and China has been longstanding, the trade volume before 1991 was very small. It was mainly attributable to the similarity of trade structures and low complementarities of goods between ASEAN and China. Liu and Luo (2004) also agreed that China has emerged as the exporter of labour-intensive goods in the eighties and implied that ASEAN who has comparative advantage in the similar goods would begin to face higher competition from China.

Eichengreen, Rhee and Tong (2007) also revealed that the main exports of China in eighties were dominated by fuels, footwear, clothing as well as other light manufactures. This has caused Asian countries, including ASEAN to compete intensively with China. Hersched (1991), as cited by Liu and Luo (2004) in examining the level of competition between ASEAN, China and NICs reported that China had comparative advantage over ASEAN in labour-intensive products. Therefore, ASEAN lost their market share of primary and manufactured goods to China in Japanese market. As such, ASEAN and China were competing against rather than complementing each

other in trade. In addition, the absence of official relationship between China and ASEAN as a whole before 1991 (Sheng, 2003; Tong and Lim, 2009) also contributed to low trade volume between ASEAN and China.

Besides, Zhang and Hock (1996) found that China was having trade surplus with ASEAN in the 1980s, and the major exports of China to ASEAN as a whole were labour-intensive products and human capital-intensive products. China imported relatively low volume of agricultural and mineral products from ASEAN. Hence, it implied that China was more trade dependent on ASEAN than the opposite way as China was the supplier of ASEAN's imports before 1991.

The authors also pointed out that among ASEAN5 countries, Singapore was the main trading partner of China as the two were more complementary to each other the demand of each other's commodities due to their different levels of industrial development. China exported labour-intensive and resource-based products such as petroleum products, foodstuffs and crude oil to, at the same time imported capital and technology-intensive products from Singapore. The trade shares between China and the remaining ASEAN5 countries were relatively low as they were competing with China in the labour-intensive manufactured goods in the eighties.

The bilateral trade between China and ASEAN started a new journey at the end of 1990. Since then, ASEAN-China trade has been increasing continuously. This is attributable in part to the growth of their mutually beneficial economic relationship and the official start of their diplomatic ties. As such, the cooperation and interaction among them were enhanced through the reciprocal countries' leaders visit (Lee, 2001).

According to Chirathivat (2002), ASEAN's share in China's merchandise trade increased from 5.8% in 1991 to 8.3% in 2000 while China's share in ASEAN's

merchandise trade also increased from 2.1% in 1994 to 3.9% in 2000. However, Tong and Lim (2009) pointed out that although the ASEAN-China trade has been growing since 1991, their trade share has remained moderate. The authors reported that the share of exports from ASEAN5 countries to China was about 3% annually from 1991 to 1996. Among ASEAN5 countries, Singapore is still the largest trading partner of China but the bilateral trade share between them had only grown on average 16% annually from 1990 to 1996. On the contrary, China-ASEAN trade share had been growing significantly after the 1997 Asian Financial Crisis. The 1997 Asian Financial Crisis had therefore appeared to facilitate greater economic integration between ASEAN and China.

Likewise, Cai (2003) reported that the 1997 Asian Financial Crisis which started in Thailand and spread to the whole East Asian region had served as a catalyst to boost bilateral trade between ASEAN and China. ASEAN was made more aware of her vulnerability to fluctuation in the world economy and APEC as a grouping was not able to deliver immediate and appropriate assistance (Sheng, 2003). Hence, ASEAN is expecting China to play an important role in Asian trade.

Besides, Park (2007) pointed out that the 1997 Asia Financial Crisis has reduced the economic momentum of the affected economies, resulted in a loss of confidence. The need to regain the competitiveness in the global economy and economic growth was crucial. ASEAN has then undergone deeper integration in trade with China. China at the same time, has emerged as the global manufacturing powerhouse. The integration with China could foster greater competition and increased ASEAN productivity and efficiency in the long-run. Furthermore, China, in her growth, would increase her imports of agricultural goods, raw materials, and capital goods from ASEAN. On the other hand, the growth of China would crowd out the exports market shares of ASEAN

as China has started to export a wider range of manufactured goods that are more advanced. The trade structure of China is similar to that of ASEAN, except for Singapore.

In analyzing regional trade data from 1995 to 2000 econometrically using 690 4-digit SITC categories of East Asia, Holst and Weiss (2004) reported that ASEAN countries were exposed to stiff competition from China due to changes in the industrial structures. The stiff competition was in the form of labour-intensive goods and relatively high-technology goods, particularly specialized goods in electronic and electrical and engineering categories. Hence, ASEAN had lost some of their market shares in US and Japan to China. ASEAN needs to restructure and reconfigure their industrial structures to avoid further losses from competing with China.

On the contrary, Liu and Luo (2004), in examining the trade relationship between ASEAN5 countries and China from 1987 to 2000 using market share simple regression (MSSR) revealed that ASEAN5 countries had competed with China in primary goods, particularly crude materials in US market during the period of study. However, the extent was very small and not severe. As per manufactured goods, the results showed that there was no competition between ASEAN5 countries and China except for Singapore and Philippines. Having said that, the extent of competition between Singapore and China was small too. Therefore, the authors concluded that the competition between ASEAN5 countries and China in third markets was small and negligible during the period of 1987 to 2000.

Besides, Ahearne et al. (2003) argued that China is the important channel of imports for goods produced in the emerging Asia. Hence, the growth of China will increase the economic growth rate of emerging Asia. Therefore, instead of focusing on the third

markets, ASEAN should focus on the bilateral trade with China. In fact, Lemoine and Unal-Kesenci (2002) have postulated that China would trade with Asian countries including ASEAN intensively in intermediate goods due to the international production fragmentation. Likewise, using "revealed competitive advantage indices" over the period of 1992 to 1998, Shafaeddin (2004) pointed out that ASEAN is one of the main sources of supply of parts and components for China although Thailand has competesd with China in light manufactured goods such as electrical machinery in the third markets. Meanwhile, Malaysia is feeling the competition pressure from China in both light manufactured goods and some capital goods.

Furthermore, Lall and Albaladejo (2004) in analyzing the share of East Asia in China's trade over 1990-2000, also revealed that Singapore was China's main source of import while the shares of imports from ASEAN4 countries, namely Indonesia, Malaysia, Philippines and Thailand were relatively small but still increasing rapidly. Therefore, the authors concluded that the relationship between ASEAN4 and China was complementary in nature. However, the authors also pointed out that this relationship may change if China moves into higher value chain as they would compete against each other for larger and more sophisticated exports. Eichengreen and Tong (2006a), in examining the impact of China's growth in exports on the exports of the rest of the world from 1990-2003, agreed that the relationship between China and East Asia countries would change from complementary to competition in nature if China moves up the quality ladder and upgrades her technology level. However, the authors believed that it would take a long period for it to eventuate.

Wong and Chan (2003) in analyzing the bilateral trade relationship between ASEAN and China postulated that the exports structure of China had changed. Machinery and electronics, which were non-traditional capital-intensive goods has started to expand

and replace labour–intensive goods since 1995. Likewise, ASEAN had also changed their exports structures. At the end of the nineties, manufactured goods, instead of primary goods, has dominated their foreign trade. For instance, among ASEAN5 countries, the most important exports of Singapore to China in 2000 were dominated by electronic valves and electrical components. Besides, 57% of Philippines exported goods to China were dominated by semi-conductors. Malaysia and Thailand also exported relatively high volume of machinery and electrical appliances to China. Arising from such changes in the trade pattern, intra-industry trade, particularly machinery and electrical equipment emerged.

However, Wong and Chan (2003) noted that China still served as the supplier of imports for ASEAN rather than an important channel for ASEAN's exports, which was contrary to the findings of Ahearne et al. (2003). It implies that China would gain more from ASEAN-China bilateral trade than ASEAN.

Eichengreen, Rhee and Tong (2007) in analyzing the effects of China's exports on the exports performance of Asian and the extent of China's imports from Asia during 1990 to 2003 using gravity model, divided the commodities into three types, namely consumer goods, intermediates and capital goods. The authors put forward the argument that the growth of China's exports would only crowd out the exports of Asian (inclusive of ASEAN) labour-intensive consumer goods. On the other hand, the exports of intermediates and capital goods of Asian were not affected by the growth of China's exports. Therefore, their findings were contradictory to the findings of Holst and Weiss (2004).

Besides, the authors also revealed that ASEAN5 countries could benefit from China's rise. The growth of China would increase her imports of capital goods from Singapore;

a combination of consumer goods, intermediates and capital goods from Malaysia and Philippines, as well as energy from Indonesia. Among ASEAN5 countries, Singapore would enjoy the largest benefits as her export of capital-goods to China might increase drastically.

In addition, Athukorala and Yamashita (2006) put forward the argument that the growing importance of component trade in China had resulted in an increase in exports of components in the original six members of ASEAN. As the share of China in world component imports increased from 2.7% to 10.7 % from 1992 to 2003, the share of the original six members of ASEAN in world component exports also increased from 6.5% to 13.3% in the same period of time.

After China's accession to WTO in 2001, Tong and Lim (2009) reported that intra-industry trade in manufactured goods between ASEAN and China had increased significantly in 2000s, particularly trade involving machinery and transport equipment. This is attributable partly to China becoming the centre of East and Southeast Asian production network, thus requiring intermediate goods and components from ASEAN. Nevertheless, the findings of Devadason (2009) also postulated that the intra-industry trade in parts and component between China and her trading partner, Malaysia had surged due to China's increasing importance in the global production network. In contrast, Tong and Lim (2009) pointed out that Indonesia had had some difficulties in integrating into China's production network as her trade in manufactured goods with China dropped significantly from 1997 to 2006.

Besides, Mckibbin and Woo (2003) in using the general equilibrium model to examine the consequences of China's WTO accession on her neighbouring countries and adopting dynamic multi-sector and multi-country models to carry the simulations from

the year 1999 to 2070, showed that China would obtain substantial benefits from her accession to WTO. However, ASEAN4 countries, namely Indonesia, Malaysia, Philippines and Thailand would be negatively affected. ASEAN4 countries might face the problem of de-industrialization if FDI, which affects the changes of domestic technology, diverts from ASEAN4 countries to China. In response to the problem of FDI diversion, the authors suggested that ASEAN4 countries should enhance the quality of their human capital by increasing the rate of diffusion of new technology to management teams and scientists, and to provide retraining programmes to the displaced workers in order to identify their resilient areas.

On the other hand, Abeysinghe and Lu (2003) pointed out that China had started to change her economic structure from export-led growth towards domestic-driven economy. Therefore, China's accession to WTO would increase imports drastically for her domestic market and provide huge benefits for her neighbours, including ASEAN. Greenaway, Mahabir and Milner (2008) also pointed out that the exports of ASEAN4 countries to China had increased over time.

Next, Liu and Luo (2004) examined the impact of China's accession to WTO using trade-exchange rate-tariff model based on 2-digit SITC historical data. The results show that ASEAN5 countries have more opportunities than challenges in light of China's accession to WTO. Among ASEAN5 countries, Singapore and Malaysia have the greatest trade opportunity in machinery and electronic goods. These countries also export substantial amount of miscellaneous, manufactured-articles to China. Likewise, Thailand also gains from exporting machinery and electronic products to China. Lastly, Philippines and Indonesia had the trade opportunities in chemicals and related products. However, recent statistics show that the main exports of Philippines to China consist mainly of electronic components (UN COMTRADE database).

On the other hand, in light of the formation of CAFTA, Chirathivat (2002) examined the implication of CAFTA on China and ASEAN5 countries using GTAP model. The simulation results revealed that CAFTA could further strengthen the economic relationship between China and ASEAN. In addition, the trade creation effect was able to offset the trade diversion effect in both China and ASEAN. Hence, the economic welfare of China and ASEAN would increase. China could save cost by increasing the imports of natural resource and intermediates goods from ASEAN. However, ASEAN's domestic competition would increase after the implementation of trade liberalization under CAFTA as the Chinese products would flood ASEAN's domestic market. In addition, ASEAN would reduce their market shares in third markets including US, EU and Japan.

Lee, Holst and Mensbrugghe (2004) in examining the impact of CAFTA on China and ASEAN using dynamic global computable general equilibrium model, spanning the time from 1997 to 2015, found that the economic welfare of ASEAN would increase more than China in light of the formation of CAFTA. The shares of ASEAN's total export to China would be larger than otherwise and the exports to output ratio would be higher for ASEAN countries.

However, Chirathivat (2002), Mckibbin and Woo (2003) and Lee, Holst and Mensbrugghe (2004) adopted general equilibrium models where plenty of assumptions were made. The assumptions might not be applicable to the real world. For instance, demand and supply are equal in all goods and factors of production. Besides, each industry only earns zero economic profit and operates at constant return to scale. Hence, their simulation results should be viewed with caution and not to be taken as conclusive.

Nevertheless, Wong and Chan (2003) did not agree that the formation of CAFTA would result in net trade creation effect in ASEAN. Given the similarity in trade structure and comparative advantage, ASEAN-China would compete instead of complement each other. In line with Mckibbin and Woo's (2003) points of view, the authors pointed out that ASEAN might face the problem of de-industrialization unless they were able to develop their niches in machinery, agricultural or services industries and upgrade their manufactured goods. In tandem with the findings of Mckibbin and Woo (2003) and Wong and Chan (2003), Gaulier et al. (2007) also argued that it is indeed crucial for Malaysia, Philippines and Thailand to improve their technology level and move up the quality ladder for their exports in order to create a mutually beneficial platform with China.

However, Cai (2003) reported that the formation of CAFTA would enhance the economic ties between ASEAN and China via the increasing exports of both parties even though there would be intense competition between ASEAN and China in low value-added sectors and labour-intensive products in the short run. This is because the challenges the countries face in the short run would help them to restructure their economies, which in turn increase their competitiveness and efficiencies, and attract larger flow of FDI in the long run.

Sheng (2003), in examining the origins, developments and strategic motivations of CAFTA, also agreed that the formation of CAFTA could bring more benefits than harm to both parties if good cooperation between the two parties were to be built. Given the fact that China's production capacities have outweighed her domestic consumption, China could emerge as the manufacturing house to serve the needs of ASEAN markets. ASEAN, on the other hand, could increase their exports of raw materials to China to

support China's processing activities. In addition, the author also found that China could dilute the potential US unilateralism in Asia through the formation of CAFTA.

Seeing from ASEAN's perspective, both Tongzon (2005), who examined the economic implication of the agreement on CAFTA by focusing on the international competitiveness, and Park (2007), who examined the economic feasibility of CAFTA using customs union theory, agreed that ASEAN would face intense competition from China in labour-intensive manufactured goods in domestic markets and third markets. Based on the authors' studies, the intense competition might be mainly attributable to the similar exports structures between ASEAN and China. However, Tongzon (2005) also revealed that the formation of CAFTA would strengthen the trade relationship between China and ASEAN and both regions would have similar understanding in any negotiation with other regions pertaining to market access or other trade issues.

Besides, using computed Revealed Comparative Advantage indices for ASEAN and China from the period 2001 to 2010, Aslam, Besanger and Tourres (2012) pointed out that there was stiff competition between ASEAN and China in consumer goods instead of capital goods. Hence, the competition was mainly felt by less advanced ASEAN countries and therefore the formation of CAFTA would be in favour of more developed ASEAN countries.

Nevertheless, Tongzon (2005) suggested a strategy to avoid competition and form a win-win situation between ASEAN and China. He revealed that ASEAN should focus on upgrading the quality of the products by improving the level of technology used and specializing in goods that China does not have the comparative advantage. For instance, ASEAN should focus on high-valued electronic products or chemicals. The suggestion of Tongzon (2005) was consistent with the findings of Mckibbin and Woo

(2003), Wong and Chan (2003) and Gaulier et al. (2007). More to the point, Aslam (2012) in examining the impact of CAFTA on ASEAN's trade revealed that ASEAN should relook at their trade strategies in order to enhance their economic growth. ASEAN should focus on specific traded goods, which would allow them to gain the comparative advantage instead of promoting manufacturing sector as a whole.

Nevertheless, the findings of Park (2007) postulated that generally, the opportunities of intra-industry trade between ASEAN and China stemmed from the similarity in their income and economic development levels. Besides, Tongzon (2005) and Park (2007) also reported that ASEAN could benefit from CAFTA by attracting FDI into the region if foreign MNCs view China and ASEAN as an integral part of production network. Likewise, Eichengreen and Tong (2006b) revealed that vertical FDI and trade would move in the same direction. As such, Asian countries, which are close to China would have cost and geographical advantages in capitalizing the supply chain relationship. Hence, Eichengreen and Tong (2006a) pointed out that if China and Asian inclusive of ASEAN were to integrate into the same global production network, the attractiveness of China as the destination of FDI would also encourage FDI flow into Asia too, which would speed up the growth of Asia indirectly. In fact, China has been importing plenty of intermediate goods from ASEAN as China has the comparative advantage in assembly operations.

Moreover, Srivastava and Rajan, (2004) as cited by Sally and Sen (2011) reported that the flow of FDI in manufacturing sectors from ASEAN to China had increased drastically since 1997-98. This type of FDI involved intra-firm trade for production fragmentation purposes. Therefore, Sally and Sen (2011) pointed out that ASEAN had been benefited from the complementary trade with China in intra-industry manufactured goods.

Finally, deriving from the research-based policy point of view, Tran (2010) put forward the argument that the formation of CAFTA was empirically supportive as the trade volume between ASEAN and China was relatively small in comparison with US, EU and Japan, but it has accelerated the growth of China profoundly.

2.5 Conclusions

Based on previous studies, the dynamic changes of economic and trade structures had caused intra-industry trade to complement rather than compete with each other in manufactured sectors between ASEAN5 and China. However, the literature on in-depth intra-industry trade analysis between ASEAN5 and China in each manufacturing sub-sector is inadequate, for instances, Shafaeddin (2004), Park (2007), and Tong and Lim (2009). Therefore, this study intends to enrich the existing literature and fill in the missing aspects of IIT by analyzing new aspects of intra-industry trade between ASEAN5 countries and China using finely disaggregated data.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter consists of international trade patterns and theories, theoretical framework of intra-industry trade, conceptual framework of this study, the econometric model, tests and procedures, and definition and sources of data. This chapter will close with conclusions.

3.2 International Trade Patterns and Theories

Under a self-sufficient economy, cross border trade is absent and exists under "autarky", the Greek term for self-sufficiency. In seventeenth century, the first trade theory emerged, mercantilism, where gold and silver served as currencies. The mercantilists believed that the amount of gold and silver obtained by a country represented the country's wealth. Hence, each country's trade policy was to promote exports and reduce imports in order to accrue gold and silver by imposing high trade barriers such as tariffs and quotas. The mercantilists also believed that the size of world's economic pie was constant. As a result, they viewed international trade as zero sum game where one country's gains from trade were at the expense of her trading partner.

However, mercantilism started to decline in the late eighteen century where David Hume highlighted two significant weaknesses of mercantilism in 1752. Firstly, the accumulation of gold would not increase the country's welfare. Secondly, based on the price-specie-flow mechanism, a country was not be able to accumulate gold or silver continuously. In addition, Adam Smith pointed out in 1776 that the assumption of zero

sum game was wrong. He argued that the economic pie of the world was expanding and a positive sum game was possible.

Adam Smith's trade theory refers to absolute advantage. According to Smith, to give rise to positive sum game, the world should have division of labour and each country should specialize and export goods that it has the absolute advantage and import other goods. Absolute advantage refers to the capability to produce the goods more efficiently than that of the trading partner. Based on Smith, a positive sum game can happen if the trade pattern of each country is based on absolute advantage as it will cause the world as a whole to use resources more efficiently, and in turn increase the world output.

David Ricardo developed a new trade theory in 1817 to show that mutually beneficial trade can exist even with the absence of absolute advantage. The Ricardo's trade theory is known as the principle of comparative advantage.

The Ricardo's trade model focuses on comparative advantage. The country that is relatively inefficient should specialize and export the good in which it is relatively less inefficient. On the other hand, the country that is efficient in all kind of goods should specialize and export goods that are relatively more efficient using the concept of opportunity cost. However, Ricardo trade theory made some unrealistic assumptions such as labour being the only input in production and it is perfectly mobile among sectors within the country, the fixed level of technology, perfect competition happens in all markets and zero transportation costs. Nevertheless, the principle of comparative advantage does not explain why the shape of production possibilities frontier is different in different countries.

Two Swedish economists, Eli Heckscher and Bertil Ohlin developed a theory to relax some of the assumptions of Ricardo's comparative advantage by incorporating neoclassical pricing to international trade. This theory focuses on an analysis of the determinants of comparative advantage and the effects of international trade on the distribution of income. It is known as Heckscher-Ohlin (HO) theory or factor endowment theory.

HO theory argues that comparative advantage is exclusively depending on differences in relative country supply condition. In other words, resource endowments are the key determinant for comparative advantage. Based on this theory, countries should export goods that use the country's abundant factor intensively and import the goods that use the country's scarce factor intensively.

Each country experiences an increase in the price of her abundant factor due to high demand and a decrease in the price of her scarce factor due to low demand. Thus, Stolper-Samuelson theorem concluded that trade increases the real income of abundant factors and reduces the real income of scarce factors. Since the process occurs simultaneously in all countries, trade would lead to equalization of the factor prices in the world and this concept is known as factor-price equalization theorem.

However, some of the assumptions in HO theory are not applicable to the real world. For instance, factors of production are perfectly mobile between sectors, constant technology level across countries and the same taste between trading partners. Therefore, it is not acceptable that trade pattern is based solely on factor endowment. The empirical problems known as Leontief paradox showed that a reversed situation would occur in the real world where U.S., a capital abundant country exports labour intensive products. In fact, Yarbrough and Yarbrough (2006, p.66) pointed out that

tastes play an important role in determining trade pattern and are able to reverse the direction of comparative advantage. They also reported that empirical studies showed that residents of any country preferred to consume relatively large amount of domestic goods than imported goods, which refer to home bias.

Nevertheless, the assumption made regarding free movement of factors of production among sectors especially capital, which is specific to some sector in the short-run does not sound realistic. Hence, the specific factor model is modified from HO theory. It aims to analyze the impact of changes in commodity prices on the factors earning when at least one factor is immobile among sectors.

Industrial-organization approach to trade, which is also known as the new trade theory was developed to explain the facts that are ignored by HO theory and the specific factor model. The new trade theory explains why there is intensive trade between trading partners that has similar factor endowments and productivity level by incorporating the principles of comparative advantage, product cycle theory and business orientation theory.

The main assumption of this theory is that one single-plant and national firms produce in only one location. As a result, the trade policy for each trading partner is supporting respective domestic champions to compete with foreign champions in the international markets. However, this theory ignores the existence of multinational enterprises, which dominate in most sectors nowadays.

The Ricardian theory of international trade is the expanded version of Ricardian model. It is expanded to include many-country and many-goods instead of two countries and two goods. The Ricardian theory of international trade is divided into two, namely Neo-Ricardian trade theory and Ricardo-Sraffa trade theory.

The previous trade theories have excluded trade for input. Thus, Neo-Ricardian trade theory included input explicitly in the analytical framework. However, this theory is applicable only to small countries, and the wages for the rest of the world are set by assumptions without proper mechanism to compute international wage differences.

Ricardo-Sraffa trade theory has included the trade of intermediate goods such as fuels, oils and technologies in most cases. Based on this theory, the intermediate goods, which also refer to capital goods, will serve as inputs to the productions and are mobile among countries. Trade in capital goods will create the benefit of technology spillover to the importing countries. Besides, this theory also provides the bases of outsourcing and intra-firm trade as the importing countries may import the capital goods from abroad via foreign firms or foreign affiliates.

The Ricardian theory of international trade presented above presumed that the state of technology in each trading country is not the key determinant of their trade pattern. However, product cycle theory originated by Raymond Vernon in 1966 postulated that technology innovation is the key determinant of international trade in manufactured goods. Based on this theory, manufactured goods will undergo a predictable 'cycle', which is divided into five stages. The first stage begins when innovator establishes new technology in the production of manufactured goods at home country and only focuses on domestic market. Next, the innovator expands the market by starting to export its goods to foreign markets. Over time, the innovator will locate its production plant nearer to the foreign markets by establishing branches abroad. Therefore, it gives rise to technology spillover across the country border. To reduce cost and to achieve larger profit, mass-production is carried out in foreign countries. Lastly, legal patents will be expired, and foreign producers will start to imitate the production process with lower

cost and cause the innovator to lose its comparative advantage and subsequently become a net importer.

Theories mentioned above such as HO theory, Ricardian theories and product cycle explained the trade pattern mainly based on factor endowment and comparative advantage. Hence, these trade theories largely focus on inter-industry trade or known as one way trade. However, international trade is a complex phenomenon. For instance, a large growing share of world trade recently, particularly trade in manufactured goods is in the form of intra-industry trade (Zhang, Witteloostuijin and Zhou, 2005).

A country may export and import goods of the same industry. Therefore, complementary models such as imperfect competition models are required to analyze the different aspects of trade (Grubel and Lloyd, 1975, p.4-10). Intra-industry trade is divided into two types, namely horizontal intra-industry trade and vertical intra-industry trade.

Horizontal intra-industry trade refers to simultaneous exports and imports of goods of the same industry with similar quality, capital/labour techniques and costs but different in technological specifications or characteristics. Therefore, horizontal intra-industry trade involves trade in similar products with differentiated varieties (OECD Glossary of Statistic, 2007). Horizontal intra-industry trade is originated mainly from 'love of variety' approaches, which stemmed from the economies of scale (Krugman, 1979, 1981 and Yarbrough and Yarbrough, 2006, p.123), and transportation costs (Carbaugh, 2009, p.88).

Economies of scale have provided a vital implication for horizontal intra-industry trade. It occurs when a firm's average total costs decrease as output increases. Therefore, to enjoy economies of scale, a country specializes in producing a few varieties of goods in

large quantities, which can be traded with other goods (Carbaugh, 2009, p.85; Yarbrough and Yarbrough, 2006, p.122). Furthermore, consumers from both trading partners are able to enjoy a greater variety of goods arising from the sale economies. In addition, Ando (2006) also reported that the model of economies of scale could explain the existence of intra-industry trade.

Besides, horizontal intra-industry trade is attributable to transportation costs. A country may export or import homogenous goods to reduce transportation costs. For instance, Malaysians who live on the border between Thailand and Malaysia may import goods from Thailand while the residents of Thailand who also live on the border may import similar goods from Malaysia to minimize transportation costs.

On the other hand, vertical intra-industry trade refers to simultaneous exports and imports of goods in the same industry with different qualities and factor intensities. As such, vertical intra-industry trade involves trade in 'vertically differentiated' products distinguished by the price and quality of the products (OECD Glossary of Statistic, 2007). Vertical intra-industry trade originates mainly from relative factor endowment differences (Greenaway, Milner and Elliott, 1999); Linder's theory of overlapping demand and production fragmentation theory (Ando, 2006, Turkcan 2010).

Relative factor endowment differences are stemmed from HO theory. Based on the trade model developed by Falvey (1981); Greenaway, Milner and Elliott (1999) pointed out that relatively capital-abundant countries specialize and export relatively high quality manufactured products while relatively labour-abundant countries specialize and export the low quality manufactured products within the same industry.

Next, Ando (2006) and Jensen and Luthje (2009) pointed out that the theoretical framework of vertical intra-industry trade is also based on the theory of overlapping

demand, which stemmed from the imperfect competition model. Based on this theory, firms within a country will specialize in producing manufactured goods that have huge domestic demand, and not be eyeing solely on export markets. Since manufactured goods are intensively traded in international markets, the similarity in demand and taste of the manufactured goods among the trading partners will form vertical intra-industry trade. Taste and demand of consumers are conditioned strongly by their income levels. The quality that the consumers demand is positively correlated with the income level. With the income distribution varied within a country, the high-income group of consumers will demand high quality manufactured goods from the trading partner and vice-versa within the similar industry and therefore give rise to vertical intra-industry trade. Within the same industry, Turkcan (2010) pointed out that high quality goods are produced mainly by the capital abundant countries while the low quality products are mainly produced by the labour abundant countries. Thereafter, the goods will be exported to other countries for consumers who share the similar incomes and tastes. Hence, the situation would lead to vertical intra-industry trade based on product quality. The theory of overlapping demand is proven in high-income countries including Japan, the United States and European Union (Carbaugh, 2009, p.87; Zhang and Witteloostuijn, 2004).

Next, production fragmentation theory is becoming more important in explaining the complication of trade in manufactured goods. Production fragmentation refers to 'geographical separation of activities, which is involved in producing goods' (Athukorala and Yamashita, 2005). It is focused on intra-firm and cross-nation border fragmentation where the firms make use of differences in locational advantages (Kimura and Ando, 2005), resulting in each country from different locations exchanging intermediate goods within the same industry (Ando, 2006). More specifically, this

theory states that production processes within the same industry are divided into a few sequential stages in different countries depending on the differences of factor costs among countries within the production network. The intermediate goods are then shipped back and forth for further process purposes. Each country will specialize in a particular stage of the production sequence and provide different value-added in the production of the goods (Hummels, Ishii and Yi, 2001; Yi, 2003 and Lemoine and Unal-Kesenci, 2002). Therefore, production fragmentation give rises to vertical intra-industry trade. According to Yarbrough and Yarbrough (2006, p.119), production fragmentation has grown in importance especially in the newly industrialized economies of Asia. Athukorala and Yamashita (2006) revealed that for East Asia *per se*, AFTA members, particularly Singapore, Malaysia, Thailand and Philippines were noticeable for their heavy dependence on fragmentation. In 2003, the share of component trade was more than 50% of the total trade for Singapore, Malaysia and Philippines, respectively and exceeded 30% for the case of Thailand.

Production fragmentation requires high service link cost attributable to geographical detachment (Kimura and Ando, 2005). Telecommunications, transportation as well as various coordination tasks incur a high service link cost. Besides, trade and regulatory barriers also increase the services link cost. Therefore, recent development of world trade system which reduces trade and regulatory barriers, coupled with technological advancement, has stimulated the growth of production fragmentation across countries as the service link cost could be reduced indirectly (Ando, 2006). As such, the growth of production fragmentation further acceralates vertical intra-industry trade in manufacturing sectors. Figure 3.1 below presents the international trade patterns and theories.

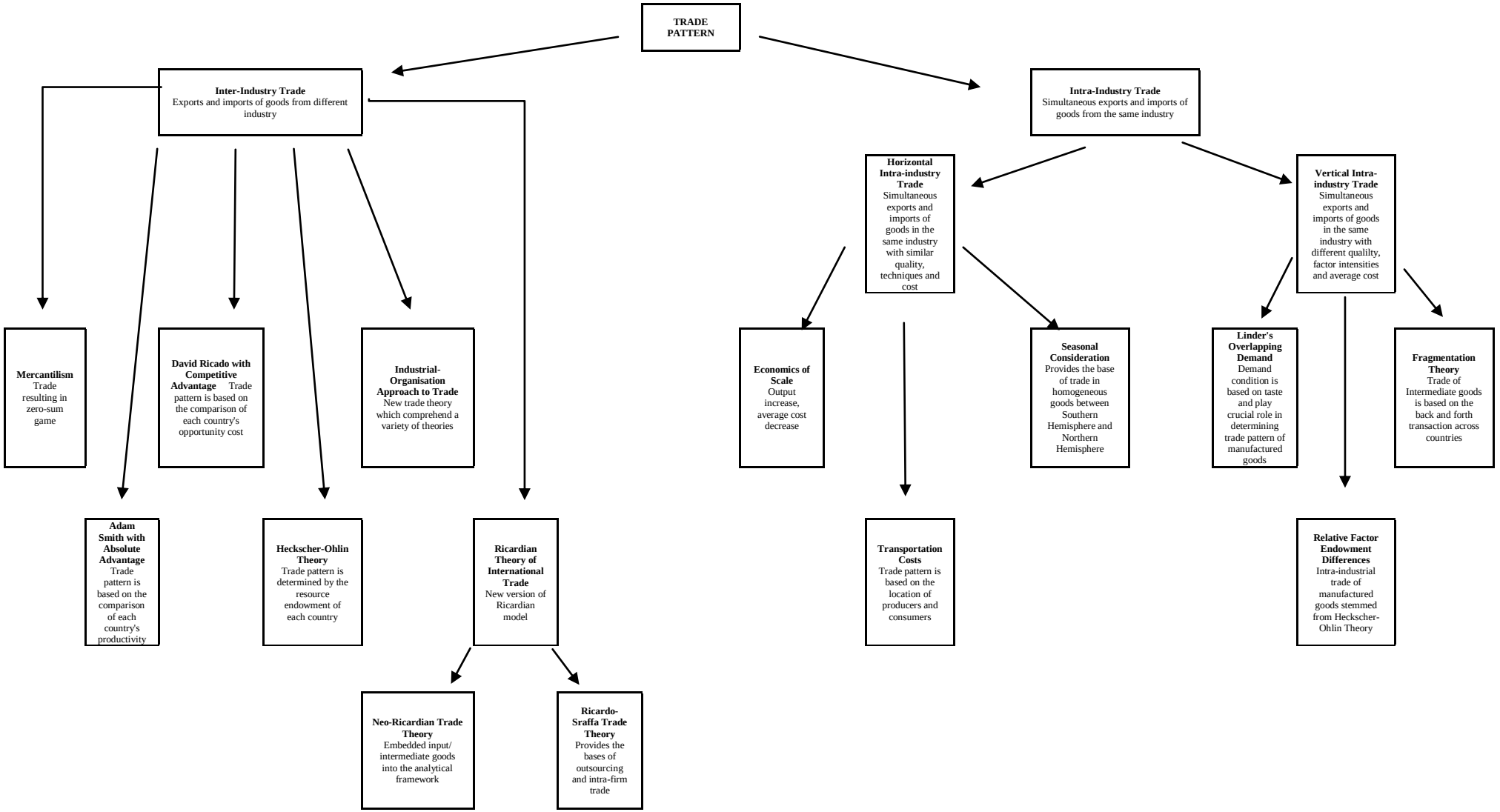


Figure 3.1: International Trade Patterns and Theories

Source: Author's compilation

3.3 Theoretical Framework of Intra-industry Trade

The theoretical trade models of Falvey (1981) and Fukao, Ishido and Ito (2003) are employed to explain the emergence and the important determinants of intra-industry trade. Falvey (1981) developed a partial-equilibrium model concentrating on a single industry, for instance, machinery parts and components industry in a perfectly competitive market structure. It was assumed that the industry could obtain a stock of capital (K) and labour (L), who could be hired in a given wage rate (W). With the labour and capital, the industry was able to produce a continuum of products, which had a different quality reflected by the index $\beta(\underline{\beta} < \beta < \overline{\beta})$ where $\underline{\beta}$ refers to the lowest quality and $\overline{\beta}$ refers to the highest quality.

The model focused on supply. There was a distinctive characteristic in each type of product based on the capital-labour ratio used. The input-output coefficient was assumed to be homogenous internationally for each type of product. It was also assumed that 'higher quality' products require more capital and are therefore higher priced, and vice-versa.

The model assumed that only two countries were involved in trade in the world, Home and Foreign, and each country was in the same industry. Capital (K and K* for Home and Foreign, respectively) was assumed to be mobile within the industry but immobile across borders. The returns on capital (R and R* for Home and Foreign, respectively) were adjusted to maintain full employment in each country. On the other hand, the wage rates (W and W* for Home and Foreign) were given where wage rate in Foreign was assumed to be lower than Home (W* < W). Therefore, the costs of producing a unit of each range of product β were as below:

$C(\beta) = W + \beta R$ at Home and $C^*(\beta) = W^* + \beta R^*$ at Foreign (1)

Based on the costs function above, there would be a range of products produced at Home with a lower cost. Likewise, Foreign would also produce another range of products with a lower cost. Besides, since C(β) and C*(β) were continuous in β, for any R*> R, 'marginal quality" (β_1) would exist when C(β) = C*(β). The 'marginal quality' was expressed as below:

$$\beta_1 = \frac{W - W^*}{R^* - R} \quad (2)$$

For other range of products:

$$C(\beta) - C^*(\beta) = \left(\frac{W - W^*}{\beta_1}\right)(\beta_1 - \beta) \quad (3)$$

From the equation above, Home, with higher-wage had cost advantage in higher quality products, which required more capital than 'marginal quality' and vice-versa. Therefore, Home would export high quality products and import low quality products from Foreign within the similar industry. As such, Falvey (1981) pointed out that the intra-industry trade was contributed by the industry-specified capital and a range of products being produced within the industry.

Besides, the demand for products from Home (D) and Foreign (D^*) would depend on relative prices of all range of products and in turn on R and R*(W and W* was given by the market). Therefore, the demand equation from Home and Foreign would determine the equilibrium values of Re and Re* and the demand and supply for capital would be equal in each country. The equation of demand at Home and Foreign were as below:

$$D_K(R_e, R_e^*) \equiv \int_{\beta 1}^{\bar{\beta}} \beta\,[\,D\,(R_e, R_e^*; \beta) + D^*(R_e, R_e^*; \beta)]d\beta = K \quad (4)$$

$$D_K^*(R_e, R_e^*) \equiv \int_{\underline{\beta}}^{\beta_1} \beta\,[\,D\,(R_e, R_e^*; \beta) + D^*(R_e, R_e^*; \beta)]d\beta = K^* \quad (5)$$

Where $\beta_1 = \beta_1 (R_e - R_e^*)$

The general assumption in this model was that, any changes that affect the price of each range of product produced in any country, *ceteris paribus*, would result in changes in the demand for capital in both countries. As a result, $E_R + E^*_R < 0$, $E_{R^*} + E^*_{R^*} < 0$ where E and E* denote excess demand. If tariff were imposed by Home, the returns on capital as well as the intra-industry trade would be affected. Assumed that tariff was *ad valorem* at rate *T* and were imposed on all types of imported product within the same industry, the tariff would enable Home to produce previously imported products with a lower cost. Therefore, it raised the demand for Home capital as domestic consumers increased demand for domestic produced products. It reduced the Foreign return on capital but increased Home return on capital. This circumstance could be best shown as below:

$$E_R dR + E_{R^*} dR^* + E_T dT = 0 \quad (6)$$

$$E_R^* dR + E_{R^*}^* dR^* + E_T^* dT = 0 \quad (7)$$

Where,

$E_T > 0$,

$E_T^* < 0$

Based on the general assumption of this model, tariff altered demands of capital from Foreign to Home. Overall, there was a net loss in demand as the overall prices have been higher. The changes of the returns to capital in Home and Foreign were as follows:

$$dR = \frac{(E_T^* E_{R^*} - E_T E_{R^*}^*)}{\Delta} dT \quad (8)$$

$$dR^* = \frac{(E_T E_{R^*} - E_T{}^* E_R)}{\Delta}\, dT \qquad (9)$$

Based on the general assumption $|E_T{}^*| > |E_T|$, $|E_{R^*}{}^*| > |E_{R^*}|$ and $|E_R| > |E^*{}_R|$ and $dR^* < 0$, the change in Home rental was unclear even though there was a fall in the foreign rental. Furthermore, the two 'marginal quality' ($\beta_1{}^T$, $\beta_2{}^T$) must be differentiated. Foreign country only produced the range of product ($\underline{\beta}$, $\beta^T{}_1$) while Home country only produced the range of product ($\beta_2{}^T$, $\overline{\beta}$). Since both countries produced ($\beta_1{}^T$,$\beta_2{}^T$) after the imposition of tariff, there is no intra-industry trade in the range of product ($\beta_1{}^T$,$\beta_2{}^T$). These non-traded products were previously exported by each country. As such, it can be concluded that trade restriction would reduce intra-industry trade. This is because the trade restriction imposition country would cause loses in the export market share, although the domestic industry could recapture certain domestic market share. On the other hand, trade openness would produce reverse effect. It would expand export market share and stimulate trade.

Fukao, Ishido and Ito (2003) modified Falvey (1981) trade model in order to examine the effect of FDI on vertical intra-industry trade. In the modified version of the trade model, the product markets were assumed to be under monopolistic competition market structure, and a continuum of merchandise (N, N+1) with different qualities, (0,1) were produced. The 'merchandise' was assumed to refer as 'one product item in most detail commodity classification of trade statistics'.

Each merchandise was subjected to Leontief-type production function with similar technology between Home and Foreign. The production function for product (N,Q), (merchandise N of quality Q) was defined as :

$$y_{N,Q} = \min[\frac{1+k_{N,Q}}{k_{N,Q}}\, K_{N,Q}\,, (1 + k_{N,Q}) L_{N,Q}\,] \qquad (10)$$

Where $K_{N,Q}$ refers to capital-labour ratio in the production and was assumed as follow:

$$K_{N,Q} = aN + b(Q-0.5) \quad (11)$$

The parameters a and b above were constant and positive. Therefore, as N approaches N+1, Q approaches 1, the merchandise would become less labour intensive. Besides, the model also assumed that there was a factor price gap between Home and Foreign in equilibrium and the factor prices of Home and Foreign were as below and were assumed constant:

$$W^* < W < R < R^* \quad (12)$$

The marginal cost of production of product (N,Q) in any country (say, country A) was as below:

$$MC_{N,Q}{}^{A} = w_A + \frac{k_{N,Q}}{1+k_{N,Q}} (R_A - w_A) \quad (13)$$

Based on equation (13), the critical value of k' (capital-labour ratio), which was similar with 'marginal quality' was as below:

$$k' = \frac{w-w^*}{R^*-R} \quad (14)$$

Based on the equation above, if the goods with a capital-labour ratio was larger than k', the marginal cost of production in the Foreign would be higher than at Home. From equation (11), Foreign had lower production cost for labour intensive merchandise [N, k' (-0.5b)/a] while Home had lower production cost for capital intensive merchandise [(k'+0.5b)/a, N+1] for all range of merchandises. Besides, Foreign had lower cost of production for low-quality products as her capital-labour ratio was lower than k' while Home had lower cost of production for high-quality products as her capital-labour ratio was higher than k'.

Besides, each firm in the industry was required to perform a fixed amount of R&D activities to obtain new technology for each merchandise. The fixed cost (FC) of R&D for each firm was assumed to be homogeneous between Home and Foreign, and the production technique for merchandise (N) was applicable for products (N, Q) of any quality (Q). It was also assumed L(N) denoted firm L producing merchandise N and the elasticity of substitution among various kinds of merchandise (N) was 1. The elasticity of substitution within each type of merchandise with different quality and level of output was 1/(1-α). Therefore, the global demand for firm L's product (N,Q) was as below:

$$\left(\frac{P_{\mathrm{N,Q,L}}}{P_N}\right)^{-\frac{1}{1-\alpha}} \frac{E_{\mathrm{N}}}{P_{\mathrm{N}} L(\mathrm{N})} \tag{15}$$

E denotes the real global expenditure on merchandise N. *E* was assumed constant and homogenous for all N and Q.

P_N was defined as below:

$$\mathrm{P_N} = \left(\frac{1}{L(N)} \int_0^1 \int_0^{L(N)} P_{\mathrm{N,Q,L}}^{-\frac{\alpha}{1-\alpha}} \, dLdQ\right)^{-\frac{1-\alpha}{\alpha}} \tag{16}$$

Multinational company was defined as the company that performed manufacturing activities at Home and Foreign, and each company incurred a fixed cost (FFC). It was also assumed that firms in Foreign had more difficulties in becoming multinationals as the fixed cost for Foreign companies (FFC^*) was higher than Home's companies (FFC). Therefore, it was assumed that all multinationals in this model were from Home.

In tandem with aggressive FDI promotion package in China, the accession of China to WTO as well as the establishment of CAFTA, it was assumed that there was low cost of FDI and trade in this region. Therefore, FFC and trade cost were very low. If

advantages from the international division of labour were greater than the FFC, the companies of Home would choose to be multinationals. They would produce high-quality products at Home and low quality products in Foreign. On the other hand, the intermediate merchandises [(k'-0.5b)/a, (k'+0.5b)/a] will be produced by multinationals and vertical intra-industry trade attributable to production fragmentation occurs. As such, FDI played a vital role in establishing manufacturing affiliates in different countries to take advantage of low labour cost. The large proportion of the output will then be re-exported to the headquarters of multinationals. As such, FDI will impose positive impact on VIIT.

Based on the above, a Home company, who produced merchandise N becomes multinational, the company can excel in profit as below:

$$\pi_{\mathrm{N}}^{\mathrm{FFC}} = \frac{1-\alpha}{\alpha} \frac{E}{P_{\mathrm{N}} L(N)} (\alpha P_{\mathrm{N}})^{\frac{1}{1-\alpha}} \left[\int_0^{0.5+\frac{k'-aN}{b}} \left(w_{\mathrm{f}} + \frac{k_{\mathrm{N,Q}}}{1+k_{\mathrm{N,Q}}} (R^* - w^*) \right)^{-\frac{\alpha}{1-\alpha}} dQ + \right.$$

$$\left. 0.5+k'-aNb1 \ (w_{\mathrm{h}}+k_{\mathrm{N,Q}}1+k_{\mathrm{N,Q}} (R-w)\text{-}\alpha 1\text{-}\alpha \ dQ- FFC-R \right.$$

(17)

Based on the theoretical analysis above, it can be concluded that FDI is the important determinant of vertical intra-industry trade since vertical intra-industry trade will increase drastically with the aggressiveness of FDI.

3.4 Conceptual Framework of This Study

The bilateral trade between ASEAN5 countries and China has been focusing more on intra-industry trade in manufacturing sectors since 2000 (Hong Kong Trade Development Council, 2010). As such, this study analyzes the new aspects of intra-industry trade between ASEAN5 and China in each manufacturing sub-sector, SITC 5, 6, 7 and 8.

Intra-industry trade refers to export and import of goods, which belong to the same industry concurrently (Grubel and Lloyd, 1975, p. 1). There are various methods available to measure the level of IIT and to compute IIT indices, which can be used to analyze the nature of intra-industry trade between ASEAN5 countries and China. The most general intra-industry trade index is Grubel-Lloyd index (GL index). Referring to Grubel and Lloyd (1971) and Grubel and Lloyd (1975, p.21), GL index is defined as follow:

$$\text{IIT} = \frac{(\text{Xi}+\text{Mi})-|\text{Xi}-\text{Mi}|}{(\text{Xi}+\text{Mi})} \text{ x } 100 \qquad (18)$$

Where:

X_i = exports of industry i

M_i= imports of industry i

The index has a value ranges from 0 to 100. If all trades are inter-industry, the index will be 0. On the other hand, if all trades are intra-industry, the index will be 100. As a result, the higher the value of the index, the country is prone to IIT and otherwise. However, GL index does not illustrate a clear-cut method to distinguish between inter-industry trade and intra-industry trade.

As such, two well-known methods had been developed by Fontagne and Freudenberg (1997) and Greenaway, Hine and Milner (1995) to analyze the extent of intra-industry trade. Both methods were largely similar to each other as they utilized the ratio of unit export value to unit import value to reflex the quality differences of the traded goods (Azhar and Elliot, 2006). However, method developed by Fontagne and Freudenberg (1997) is preferred to Greenaway, Hine and Milner (1995) as it is able to produce symmetric and unbiased results in decomposing intra-industry trade.

Therefore, this study will employ method developed by Fontagne and Freudenberg (1997), namely decomposition-type threshold method to analyze the IIT between ASEAN5 and China.

Decomposition-type threshold method has been used by a lot of studies to analyze IIT, for instances, Fukao, Ishido and Ito (2003) employed decomposition-type threshold method to measure VIIT index in East Asian; Ando (2006) employed the same method to decompose the machinery trade in East Asia; Turkcan (2010) employed the similar method to examine the VIIT in Austria's auto-parts industry, and Andresen (2010) also employed this method to analyze IIT between Canada and the United States.

The IIT index derived from decomposition-type threshold method can indicate the extent of IIT between ASEAN5 countries and China. Based on this method, the first step to compute the intra-industry trade indices in each manufacturing sub-sector between each ASEAN5 country and China is to identify the extent of trade overlap in each product of each manufacturing sub-sector. The trade of a product is classified as intra-industry if the smaller value (either exports or imports) of the product is at least 10% more than its larger value (either exports or imports), which serves as evidence of significant concurrent exports and imports. The formula used to identify the extent of trade overlap in product level is as follow:

$$\frac{\text{Min}\ (X_{ACKit}, M_{ACKit})}{\text{Max}(X_{ACKit}, M_{ACKit})} \geq 0.1 \qquad (19)$$

Where,

X_{ACKit} = Each ASEAN5 country, A, exports of product K of manufacturing sub-sector, i to China, C, at period t.

M_{ACKit} = Each ASEAN5 country, A, imports of product K of manufacturing sub-sector i, from China, C, at period t.

Based on the equation above, the trade of the product is considered intra-industry if the equation above holds and as inter-industry trade if otherwise.

Thereafter, the intra-industry trade index for each manufacturing sub-sector in each year can be derived by adding the trade value of each product, which is involved in IIT, and dividing by the total trade value of the corresponding industry. The formula is defined as follow:

$$S^{iit} = \frac{\sum_{i=1}^{n}(X_{\text{ACKit}}+M_{\text{ACKit}})^{iit}}{\sum_{i=1}^{n}(X_{\text{ACKit}}+M_{\text{ACKit}})} \quad (20)$$

Where,

S^{iit} = Intra-industry trade indices for each manufacturing sub-sector, i in year t.

$(X_{\text{ACKit}}+ M_{\text{ACKit}})^{\text{iit}}$= Intra-industry trade for each manufacturing sub-sector, i in year t.

$(X_{\text{ACKit}} + M_{\text{ACKit}})$ = Total trade for each manufacturing sub-sector, i in year t.

Besides, it is noticeable that ASEAN5-China IIT structure has changed from HIIT to VIIT. HIIT refers to trade in similar products with differentiated varieties while VIIT refers to trade in vertical differentiated products (OECD Glossary of Statistic, 2007). As such, there is no substantial gap between the unit values of exports and imports for HIIT; meanwhile VIIT is associated with substantial gap between unit values of exports and imports (Fontagne and Freudenberg, 1997 and Ito and Okubo, 2011). Hence, unit values of exports and imports for each IIT product will be calculated by dividing trade value by the trade quantity to distinguish between HIIT and VIIT. Subsequently, the following equation is used to decompose IIT products into horizontal and vertical intra-industry trade in each manufacturing sub-sector.

$$1/1.25 \leq \ UV^{X}_{\text{ACkit}}/UV^{M}_{\text{ACkit}} \ \leq 1.25 \quad (21)$$

Where,

UV^{X}_{ACkit} = Unit value of product K of manufacturing sub-sector, i exported to China, C, by each ASEAN5 country, A, at time t.

UV^{M}_{ACkit} = Unit value of product K of manufacturing sub-sector, i imported from China, C, by each ASEAN5 country, A, at time t.

The dispersion factor is 25% instead of 15% to distingusih between HIIT and VIIT in order to account for the disparity in China's exports unit value and imports unit value attributable to transportation costs (Hu and Ma, 1999). The intra-industry trade of the product K is considered as horizontal if the above equation holds and as vertical intra-industry trade if otherwise.

Based on the decomposition above, the aggregate of VIIT and HIIT indices for bilateral IIT between each ASEAN5 country and China in each manufacturing sub-sector can be calculated. The HIIT and VIIT indices for each manufacturing sub-sector in each year can be derived respectively by adding the trade value of HIIT and VIIT products respectively, and dividing by the total IIT value of the corresponding industry. The formula to compute aggregate VIIT and HIIT indices for each manufacturing sub – sector is as below:

$$S^{q} = \frac{\sum_{i=1}^{n}(X^{ACKit}+M^{ACKit})^{q}}{\sum_{i=1}^{n}(X_{ACKit}+M_{ACKit})iit} \quad (22)$$

where S^{q} refers to either VIIT or HIIT index and q indicates one of the categories depending on the corresponding type of trade.

The computation of VIIT and HIIT indicies is vital to examine whether the nature of intra-industry trade between each ASEAN5 country and China is prone to VIIT or HIIT.

VIIT is attributable to processing trade resulted from production fragmentation (Ando, 2006 and Schott, 2003). Hence, if the nature of IIT between ASEAN5 countries and China is dominated by VIIT, it implies that the country is integrated into China's production network and otherwise for HIIT as HIIT is stemmed from ordinary trade.

Besides, it is essential to identify the macroeconomic variables that strengthen the VIIT relationship between ASEAN5 countries and China as they will provide different dynamic impact in facilitating ASEAN5-China bilateral trade. As such, the computed VIIT indices will serve as the dependent variable in the econometric model while FDI and differences in GDP between each ASEAN5 country and China will serve as the explanatory variables. Based on the production fragmentation theory, FDI serves as the essential variable in determining VIIT. This is due to the fact that efficiency seeking FDI would promote production fragmentation and therefore accelerate VIIT (Ando, 2006; Schott, 2003; Zhang et al. 2005 and Fukao, Ishido and Ito, 2003). Meanwhile, the difference in GDP between trading partners also plays dominate role in influencing VIIT (Turkcan, 2010; Turckcan and Ates, 2011; Okubo, 2007). According to the production fragmentation theory, a country would like to seek a trading partner that has the similar market size to smoothen coordination work and reduce service link cost arising from the process of production fragmentation (Grossman and Helpman, 2005 and Kimura and Ando, 2005). In addition, the spatial variables will also serve as explanatory variables as spatial econometric models are used to undertake this study. The details of the econometric models will be discussed in the next section.

Nevertheless, trade deficit in ASEAN5-China bilateral trade has raised the concern of value chains in enhancing and sustaining bilateral trade between respective ASEAN5 countries and China as member countries with low value-added production are more exposed to China's external risks.

As such, the decomposition of VIIT into HVIIT and LVIIT is essential to examine whether each ASEAN5 country is vulnerable to China external shock. HVIIT refers to the exports of each ASEAN5 country to China is of higher quality in comparison with China's exports to each ASEAN5 country. On the other hand, LVIIT refers to the exports of each ASEAN5 country is of lower quality in comparison with China's exports (Azhar, Elliott and Liu, 2008). If the decomposition result reveals that HVIIT dominated VIIT in the country under study and shows a rising trend, it proves that the exports of the manufactured goods from ASEAN5 country to China are of high quality. This implies that the country is less vulnerable to China's external shock and the bilateral vertical intra-industry trade between the country concerned and China is relatively sustainable (Koopman et al., 2008).

Based on the concept of decomposition-type threshold method, VIIT can be further decomposed into HVIIT and LVIIT by comparing the quality of exports of each ASEAN5 country to that of China and the quality of imports from China for processing trade purposes using unit price differences as unit price reflects quality of the goods. The method for the decomposition of VIIT for product level is derived from equation (21), which are expressed as follows:

$$UV^{X}_{ACkit}/UV^{M}_{Ackit} > 1.25 \quad (23)$$

$$UV^{X}_{ACkit}/UV^{M}_{Ackit} < 1/1.25 \quad (24)$$

The equations (23) and (24) indicate the gap of product development. If equation (23) holds, the relative unit export price to unit import price which exceeds the value of 1.25 would imply that the value-added is embedded in the exported goods (HVIIT) from respectvie ASEAN5 countries to China. Thus, these products would provide the synergy in strengthening the trade relationship between the two countries which would in turn

propel their economic growth. On the other hand, the exported goods from ASEAN5 are of lower valued-added (LVIIT) if equation (24) holds.

Based on the analysis above, the aggregate of HVIIT and LVIIT indices for bilateral VIIT between each ASEAN5 country and China in each manufacturing sub-sector can be calculated. The HVIIT and LVIIT indices for each manufacturing sub-sector in each year can be derived respectively by adding the trade value of HVIIT and LVIIT products respectively, and dividing by the total VIIT value of the corresponding industry. The formula to compute aggregate HVIIT and HIIT indices for each manufacturing sub-sector is expressed as follow:

$$S^{q} = \frac{\sum_{i=1}^{n}(X^{ACKit}+M^{ACKit})^{q}}{\sum_{i=1}^{n}(X_{ACKit}+M_{ACKit})viit} \quad (25)$$

where S^{q} refers to either HVIIT or LVIIT index and q indicates one of the categories (HVIIT or LVIIT) depending on the corresponding type of trade.

However, the analysis of HVIIT at the aggregate level and one point in time might not reflect the value-added embedded in the exported goods of each ASEAN5 country to China. As such, this study extends the concept of decomposition-type threshold method by further analyzing HVIIT in products level. The further analysis of HVIIT products is essential to identify resilient products, which appeared as consistent HVIIT products in most of the years during the study period, particularly recent years. These products are crucial as they could generate new sources of growth for trade sustainability between ASEAN5 countries and China. More importantly, the resilient products can enhance the competitiveness of domestic producers of ASEAN5 countries.

3.5 The Econometric Model

The econometric model is formed to identify the catalyst in strengthening the VIIT relationship between ASEAN5 as a whole and China in each manufacturing sub-sector. It is also used to measure the elasticity of each explanatory variable in order to assess the impact of macroeconomic variables on ASEAN5-China VIIT in manufacturing sub-sectors. Therefore, the dependent variable of this model is the VIIT index in each manufacturing sub-sector while the selection of the explanatory variables, inclusive of FDI and difference in GDP between trading partners is taken on board in line with the theoretical and conceptual framework pertaining to IIT as well as previous empirical studies.

The econometric model adopted in this study is the spatial panel model. Panel data is also known as pooled cross-section and time series data (Ramanathan, 1995, p.12) as it involves time series data for a cross section of units. Panel data is chosen instead of time series data because ASEAN5 countries are the prominent members of AFTA, which was launched in 1993. As a regional grouping, the trade data of each ASEAN5 country can be pooled to examine the VIIT relationship between ASEAN5 as a whole and China.

In addition, due to the limitation of data availability, panel data is preferred as the time series or cross-section data *per se* is not sufficient for the estimation. It could enhance the robustness of the results as it increases the number of observations (Elhorst, 2003). Furthermore, the advantages of panel data over other types of data are that it enables us to test and relax some assumptions which are implicit in cross-section analysis *per se* (Maddala, 2001, p.573) and lesser collinearity problems among variables and therefore are more informative (Elhorst, 2011).

Nevertheless, the spatial panel econometrics literature has demonstrated an exponential growth in the specification of econometric model in recent years. According to Anselin (1988) and Porojan (2001), the conventional econometric technique may result in bias or/and inconsistent estimation if spatial effects are present. Hence, in the presence of spatial effects, which are caused by spillover effects etc., the most suitable technique would be spatial econometrics as it can capture the multidirectional nature of spatial dependence (Anselin, 1988 and Porojan, 2001). The spatial model is able to incorporate a spatial autoregressive dependent variable or spatial autoregressive in error terms (Elhorst, 2003).

The spatial econometric is appropriate in this study as the economic cooperation and integration among ASEAN5 countries have been speeding up through regional trade agreements in 1993. Intra-ASEAN trade increased substantially with the launching of AFTA whereby intra-ASEAN trade had increased by 30% from 1993 to 1994 (ASEAN Statistical Yearbook, 2003). In addition, the establishment of ASEAN Investment Region concept by ASEAN in 1996, which provides complementary advantages for both domestic and foreign investors to explore regional business and to attract FDI into ASEAN region, has further enhanced the economic integration among ASEAN countries. In 2009, ASEAN remained as the top trading partner among members and the total intra-ASEAN trade recorded USD376, 207.3 million (ASEAN Statistical Yearbook, 2010). Hence, it is believed that the spillover effects of macroeconomic variables are present among ASEAN5 countries.

Furthermore, due to the limitation of availability of data, the number of explanatory variables undertaken in this study is limited. Thus, the spatial econometric is essential to be employed. As pointed by Elhorst (2003) and Anselin(1988) cited by Porojan (2001), spatial econometric is able to test and capture the multiple sources of misspecification in

the spatial model or other forms of misspecification such as omitted relevant variables from the model.

Besides, the fixed effects are preferred to random effects as based on Xing (2007), the estimators of fixed effects are appropriate and it would produce unbiased estimation if the unobserved variables are correlated with the regressors. In addition, Elhorst (2003) also pointed out that fixed effects are more convincing than the random effects attributable to the restrictive nature of random effects whereby it assumes zero correlation between the explanatory variables and random effects. Elhorst (2003) also further revealed that another complication of random effects is its inappropriate specification when observations on spatial variable in use are irregular.

Arising from the discussion above, the econometric model used to undertake this study is spatial panel fixed effects model. This model is divided into three types, namely spatial lag, spatial error and spatial Durbin model.

Based on Elhorst (2010b), the model that involves spatially lagged dependent variable and/or spatially lagged independent variables is known as spatial lag model while spatial error model consists of spatial autoregressive process in the error term. In addition, Elhorst (2010a) also noted that the newest type of spatial model, which was advocated after 2007, is known as spatial Durbin model. Spatial Durbin model accounts for both spatially lagged and spatially autocorrelated error term. Elhorst (2010a) pointed out the spatial Durbin model is able to produce unbiased estimation and increase the significance level of the estimation even if the data consist of spatial error or spatial lag. In addition, this model is flexible as it does not impose any prior restrictions on the potential or possible spillover effects.

Prior to estimation, all of the variables except VIIT and spillover from VIIT (SVIIT) are in the form of logarithms to reduce the discrepancies among variables. The specification of the spatial lag model in each SITC 5, 6, 7 and 8 is formulated as follow:

$$Y_{it} = \delta \sum_{j=1}^{N} S_{ij} Y_{it} + \alpha + \beta X_{it} + U_i + \lambda_t + e_{it} \quad (26)$$

Where,

Y_{it} = VIIT for cross sectional unit i (each ASEAN5 country) at time t (i=1... to 5; t=1,...,17).

δ = spatial autocorrelation coefficient.

$\sum_{j=1}^{N} S_{ij} Y_{it}$ denotes the interaction effect of the dependent variable (VIIT) among ASEAN5 countries with China, captured by SVIIT.

S is the weight matrix, which measures the interaction among ASEAN5 countries and describes the arrangement of the spatial units of the sample for this study. The weight matrix can be specified in different ways. This study adopted row standardized contiguity matrix as CAFTA treats all member countries equally. In addition, Porojan (2001) pointed out that the row standardized contiguity matrix is the most well-known formulation. The row standardized contiguity matrix is expressed as follow:

$$S_{ij} = (S_{ij}^{*} / \sum_{j} S_{ij}) \quad (27)$$

Where,

$S_{ij}^{*} = 1$ if $i \neq j$

$S_{ij}^{*} = 0$ if $i = j$

S_{ij} is the i, jth element of a prespecified nonnegative NxN spatial weights matrix. The diagonal elements are set to zero as i=j while the weight in each row will be summed to one.

α = constant term parameter.

β= coefficient of $X_{it.}$

X_{it} = 1xM vector of explanatory variables in the form of X. X consists of actual capital utilization for direct investment of each ASEAN5 country in China (FDI) and difference in GDP (DGDP) between each ASEAN5 country and China.

To normalize the difference of GDP between each ASEAN5 country and China, the midpoint method such as follow is adopted:

$$\text{DGDP} = \frac{|\text{GDP}_\text{C} - \text{GDP}_\text{A}|}{(\text{GDP}_\text{C} + \text{GDP}_\text{A})/2} \quad (28)$$

Where,

GDPc is GDP of China and GDP_A is GDP of each ASEAN5 country.

U_i = The spatial specific effect, which control for each space-specific time-invariant variable.

λ_t = The time-period specific effect, which control for each time-specific spatial invariant variable.

e_{it} = potential heteroskedastic error term.

On the other hand, the specification of the spatial error model in each SITC 5 to SITC 8 is formulated as follow:

$$Y_{it} = \alpha + \beta X_{it} + U_i + \lambda_t + \gamma_{it}, \quad \gamma = \rho \sum_{j=1}^{N} S_{ij}\gamma_{it} + e_{it} \quad (29)$$

Where,

γ_{it} represents the error term of unit i, which depends on the error terms of its neighbouring unit j at time, t based on spatial weights matrix S and e_{it}.

ρ = coefficient of spatial autocorrelation.

The log-likelihood function corresponding to the demeaned equation for spatial lag and spatial error model are presented in Equation (23) and Equation (24), respectively.

$$-\frac{NT}{2} In(2\pi\sigma^2) + T\sum_{i=1}^{N} In(1-\delta S_i) - \frac{1}{2\sigma^2}\sum_{i=1}^{T} e_t e_t,\ e_t = (1-\delta S)(Y_t - \bar{Y}) - (X_t - \bar{X})\beta \quad (30)$$

$$-\frac{NT}{2} In(2\pi\sigma^2) + T\sum_{i=1}^{N} In(1-\delta S_i) - \frac{1}{2\sigma^2}\sum_{i=1}^{T} e_t e_t,\ e_t = (1-\delta S)[Y_t - \bar{Y} - (X_t - \bar{X})\beta] \quad (31)$$

With the combination of spatial lag and spatial error, the specification of the spatial Durbin model in each SITC 5, SITC 6, SITC 7 and SITC 8 is expressed as follow:

$$Y_{it} = \delta\sum_{j=1}^{N} S_{ij}Y_{it} + \alpha + \beta X_{it} + \sum_{j=1}^{N} \varphi S_{ij}X_{ijt} + U_i + \lambda_t + e_{it} \quad (32)$$

where,

φ=coefficient of $X_{ijt.}$

$\sum_{j=1}^{N} \varphi S_{ij}X_{ijt}$ denotes the interaction effect of each explanatory variable (FDI, DGDP) among ASEAN 5 countries with China, captured by SFDI and SGDP.

$\sum_{j=1}^{N} S_{ij}Y_{it}$ denotes the interaction effect of the dependent variable (VIIT) among ASEAN5 countries with Chin, captured by SVIIT.

Expected Results

Based on the theoretical framework and literature review, the sign of respective explanatory variables taken on board are expected as follows:

Foreign Direct Investment in China (FDI). Foreign direct investment plays a vital role in either promoting or destructing the vertical intra-industry trade between ASEAN5

countries and China. FDI is divided into two types. The first type of FDI is known as vertical FDI or efficiency seeking FDI where the motive of MNCs is to form production linkages and resources network between ASEAN5 countries and China. The foreign firms are assumed to combine the local factors and the firm's technology to produce outputs, which are subsequently re-exported from the host country (Zhang, Witteloostuijn and Zhou, 2005 and Yoshida and Ito, 2006). Therefore, based on production fragmentation theory, efficiency seeking FDI will promote the vertical intra-industry trade between these two regions (Chantasasawat et al, 2004b; Eichengreen and Tong, 2006b). In contrast, the second type of FDI, namely investment-diverting FDI or market seeking FDI will hamper the trade between ASEAN5 countries and China as the motive of MNCs is to expand or supply the domestic markets (Hurley, 2003 and Zhang and Li, 2006).

Arising from the arguments above, the coefficient of FDI is expected to have a positive sign if the motive of ASEAN5's FDI in China is efficiency seeking and the processing trade attributable to production fragmentation is actively taking part (Xing, 2007; Turkcan, 2010 and Thorbecke and Smith, 2010). On the other hand, if the motive of MNCs is market seeking, the coefficient of FDI would be expected to have a negative sign and this indicates that FDI will replace rather than promote vertical intra-industry trade between these two regions (Hurley, 2003 and Zhang and Li, 2006).

Difference in GDP (DGDP). Difference in GDP levels serve as the proxy for the difference in market sizes between the trading partners. The production fragmentation theory postulates that the production processes are divided into a few sequential stages in different countries. Therefore, if the market size between the two trading partners is similar and less diverge, the coordination work can be carried out more smoothly, which would reduce the service linked cost (Ando and Kimura, 2005, Grossman and Helpman,

2005). Thus, the relationship between VIIT and DGDP is expected to be negative (Grossman and Helpman, 2005).

Spillover from VIIT, FDI and DGDP (SVIIT, SFDI, SGDP). Owing to regional trade linkages among ASEAN5 countries, it is highly believed that spatial interaction effects are present among ASEAN5 countries. As such, VIIT between each ASEAN5 country and China will be affected by the vertical intra-industry trade relationship between her neighbouring ASEAN5 countries and China.

For instance, the VIIT between Malaysia and China is not solely determined by Malaysia's FDI in China and/or the difference of market size between Malaysia and China (DGDP). It is also jointly determined by the VIIT relationship between her neighbouring ASEAN5 countries (Singapore, Thailand, Indonesia and Philippines) and China; their FDI in China as well as the difference between their respective market sizes with China due to the interaction among ASEAN5 countries. As such, the value of VIIT between Malaysia and China is affected by the VIIT between Malaysia's neighbouring ASEAN5 countries and China (SVIIT), as well as their respective FDI (SFDI) and DGDP (SGDP). Hence, these give rise to spatial spillover effects and the emergence of spatial variables (SVIIT, SFDI and SGDP). However, the sign of coefficients for spatial variables could be either positive or negative. It depends on whether the nature of trade linkages among ASEAN5 countries being complements or substitutes, and the motive of respective ASEAN5 countries' FDI in China.

3.6 Tests and Procedures

3.6.1 Selection Framework to Determine Spatial Panel Model

This study adopts the spatial panel fixed effects model. As such, stationary test is not required. However, a selection framework to determine which spatial panel model, i.e.

spatial lag, spatial error or spatial Durbin best describes the data is essential. Based on Elhorst (2010b), the selection framework is divided into two approaches, namely specific to general approach and general to specific approach. Specific to general approach will be adopted to test the non-spatial model against the spatial models. Subsequently, general to specific approach will be employed to ascertain the best model by testing the spatial Durbin model against spatial lag and spatial error models.

The specific to general approach will employ LM test while the general to specific approach will employ Wald test and LR test, with reference to the chi-square distribution. If both approaches are in favour to either spatial lag or spatial error model, then the said model would best describe the data. On the other hand, if the first approach is in favour to both spatial lag and spatial error while the second approach fail to reject the Spatial Durbin model, one can conclude that the Spatial Durbin model would be best describe the data and it should be adopted for the estimation.

3.6.1.1 Specific to General Approach

The first set of the hypothesis under this approach is to examine whether the spatial lagged autoregressive dependent variable is present in the model based on equation (26) such as follow:

$$Y_{it} = \delta \sum_{j=1}^{N} S_{ij} Y_{it} + \alpha + \beta X_{it} + U_i + \lambda_t + e_{it} \quad (26)$$

The null and alternative hypotheses are:

H_0: $\delta = 0$

H_1: $\delta \neq 0$

The null hypothesis assumes the spatial lagged autoregressive dependent variable is absent in the model while the alternative hypothesis implies that the model consists of spatial lagged autoregressive dependent variable.

The second set of the hypothesis under this approach is to examine whether the spatial autoregressive process in the error term is present in the model based on equation (29) such as follow:

$$Y_{it} = \alpha + \beta X_{it} + U_i + \lambda_t + \gamma_{it}, \quad \gamma = \rho \sum_{j=1}^{N} S_{ij}\gamma_{it} + e_{it} \tag{29}$$

The null and alternative hypotheses are

H_0: $\rho = 0$

H_1: $\rho \neq 0$

The null hypothesis assumes the model does not contain the spatial autoregressive process in the error term while the alternative hypothesis implies that the spatial autoregressive process in the error term is present.

If the null hypothesis of the first test is rejected, but the second test cannot be rejected, one can conclude that the spatial lag model best describes the equation. Conversely, if the null hypothesis of the first test cannot be rejected, but the second test is rejected, the spatial error model is then best describing the equation. On the other hand, if the null hypotheses of both tests are rejected, the spatial Durbin model should be adopted. To ascertain the best model, the general to specific approach will then be adopted to test the models.

3.6.1.2 General to Specific Approach

The general to specific approach is used to test whether spatial Durbin model can be simplified into either spatial lag or spatial error model.

The first test of this hypothesis is to examine whether spatial Durbin model can be simplified into spatial lag model, based on equation (32), such as follows:

$$Y_{it} = \delta \sum_{j=1}^{N} S_{ij} Y_{it} + \alpha + \beta X_{it} + \sum_{j=1}^{N} \varphi S_{ij} X_{ijt} + \mu_i + U_i + \lambda_t + e_{it} \quad (32)$$

The null and alternative hypotheses are:

H_o: φ=0

H_1: $\varphi \neq 0$

The null hypothesis assumed spatial Durbin model can be simplified into spatial lag model while the alternative hypothesis implied that spatial Durbin model would best describe the data.

The second set of the hypothesis under this approach can be carried out using the same equation. It examines whether spatial Durbin model can be simplified into spatial error model based on the following:

H_0= $\varphi + \delta \beta = 0$

H_1= $\varphi + \delta \beta \neq 0$

The null hypothesis assumed spatial Durbin model can be simplified into spatial error model while the alternative hypothesis implied that spatial Durbin model would best describe the data.

Under general to specific approach, if the null hypothesis of the first test is rejected, but the second test cannot be rejected, one can conclude that the spatial error model would best describe the equation. Conversely, if the null hypothesis of the first test cannot be rejected, but the second test is rejected, the spatial lag model is then would best describe the equation. On the other hand, if the null hypotheses of both tests are rejected, it is confirmed that spatial Durbin model cannot be simplified into either spatial lag or spatial error model, and it is the best model to describe the data.

3.6.2 Model Estimation

This study will employ Maximum Likelihood (ML) rather than Ordinary Least Square (OLS) estimator to estimate the econometric model. Xing (2007) pointed out that time invariant variables and the unobserved variables are normally causes for heterogeneity of panel data. Hence, the OLS estimator may not be appropriate as it will result in inconsistent and biased estimation with the presence of heterogeneity. Moreover, OLS estimator is not suitable for panel models that incorporate spatial effects as it is biased and inconsistent if spatial lagged dependent variable is present in the model (Elhorst, 2003). Therefore, this study will employ maximum likelihood estimator as suggested by Anselin (1988) because this estimator is appropriate and able to produce consistent estimation when various sources of misspecification are taken into consideration. Besides, it is the recognized efficient and unbiased estimator for small sample size (Samy de Castro and Cavalcanti, 1997). In addition, Ramanathan (1995, p. 76) pointed out some of the advantages of maximum likelihood estimator which are as follows:

- Consistent.
- Asymptotic efficient with smaller variance.
- Asymptotically normal by approximate the normal distribution closely.

3.7 Definition and Sources of Data

All data used are the annual statistics covering a period of 17 years from 1993 to 2009 for each ASEAN5 country and denoted in USD. Annual data are used instead of monthly or quarterly data due to data unavailability. In addition, the increasing number of observations using quarterly or monthly data does not improve the robustness of the estimation (Hakkio and Rush, 1991).

To ensure consistency, all of the data with the exception of the trade data are extracted from the same source. GDP data and FDI data are extracted from CEIC database.

With respect to intra-industry trade indices, manufactured goods data of Standard International Trade Classification (SITC) Rev.3 with 4-digit code are extracted from United Nations Commodity Trade Statistics Database (UN COMTRADE Database). A total of 60,588 observations have been extracted from the mentioned database under the study period where the number of products available for Indonesia, Malaysia, Philippines, Singapore and Thailand are 714, 717, 708, 712 and 713 respectively.

After data screening, the number of products that are consistently available throughout the study period for respective SITC 5 to SITC 8 is 87, 164, 162 and 81 for Indonesia; 68, 123, 108 and 59 for Malaysia; 60, 120, 117 and 63 for Philippines; 99, 140, 107 and 53 for Singapore and 98, 145, 141 and 98 for Thailand. Thus, this study analyzes a total of 35,581 observations.

The classification of manufactured goods under SITC 5 to SITC 8 is as follows:

Table 3.1: SITC Rev.3 with Single Digit Code Definitions

Sectors	**Products**
SITC 5	Chemicals and related products, n.e.s.
SITC 6	Manufactured goods classified chiefly by material
SITC 7	Machinery and transport equipment
SITC 8	Miscellaneous manufactured articles

Source: UN COMTRADE Database

3.8 Conclusions

The objective of this chapter is to demonstrate the international trade patterns and theories, theoretical framework of IIT, the conceptual framework of this study, the econometric model and the source of data This chapter illustrates the concept of decomposition-type threshold method to compute and interpret the extent of IIT between each ASEAN5 country and China in each manufacturing sub-sector. Besides, this chapter also demonstrates the tests and procedures of spatial panel econometric model, which is used to identify the catalyst in strengthening VIIT relationship between ASEAN5 and China in each manufacturing sub-sector. These demonstrations are essential to justify the empirical results derived in Chapter 4.

CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the empirical findings on the new aspects of intra-industry trade between ASEAN5 and China in SITC 5, 6, 7 and 8. The analysis of intra-industry trade index and the decomposition of the intra-industry trade into horizontal and vertical intra-industry trade based on 4-digir code of manufactured products will be presented first, followed by the findings of the econometric estimation. Lastly, the results of the decomposition of the vertical intra-industry trade into HVIIT and LVIIT will then be presented. The main notion behind the decomposition of vertical intra-industry trade is to gauge the quality of the products, which are involved in bilateral vertical intra-industry trade between ASEAN5 countries and China. In addition, it is also useful for identifying the resilient products in sustaining vertical intra-industry trade between ASEAN5 countries and China.

4.2 Intra-Industry Trade Indices

The results of the intra-industry trade analysis for each manufacturing sub-sector, i.e. SITC 5, SITC 6, SITC 7 and SITC 8 are as follows:

SITC 5

The analysis shows that the percentages of products involved in IIT in SITC 5 between ASEAN5 countries and China were the broadest for Singapore with the range of 49-67%, followed by 30-46% for Malaysia, 28-46% for Thailand, 10-41% for Indonesia and 15-32% for Philippines during 1993-2009.

Table 4.1: IIT Indices between ASEAN5 Countries and China for SITC 5 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.124	0.165	0.396	0.315	0.188
1994	0.217	0.178	0.032	0.357	0.150
1995	0.209	0.212	0.084	0.288	0.113
1996	0.118	0.160	0.106	0.477	0.117
1997	0.225	0.171	0.212	0.404	0.113
1998	0.174	0.202	0.136	0.330	0.189
1999	0.113	0.241	0.208	0.455	0.189
2000	0.206	0.201	0.211	0.452	0.193
2001	0.196	0.183	0.233	0.378	0.226
2002	0.248	0.212	0.345	0.301	0.280
2003	0.314	0.185	0.173	0.277	0.315
2004	0.241	0.156	0.254	0.284	0.264
2005	0.258	0.283	0.167	0.282	0.274
2006	0.325	0.375	0.153	0.437	0.241
2007	0.353	0.494	0.151	0.350	0.266
2008	0.301	0.372	0.154	0.433	0.282
2009	0.317	0.411	0.151	0.332	0.313

Source: Author's calculation

Based on Table 4.1, the IIT indices between respective ASEAN5 countries mentioned above were below 0.5 throughout the study period, and the trend of IIT index varied among ASEAN5 countries.

The IIT index for Indonesia-China was low before 2000 with two trough found in 1996 and 1999 with 0.118 and 0.113, respectively. Since then, the IIT index for Indonesia-China has been showing a rising trend and increased from 0.113 in 1999 to 0.317 in 2009. This reveals that Indonesia has the potential to excel in this sector, which is consistent with the findings of Liu and Luo (2004). According to the authors, Indonesia has the opportunity to expand bilateral trade with China in chemicals and related products.

Besides, the IIT index for Malaysia-China in SITC 5 was low with an average of 0.247 throughout the study period. However, the low IIT index was mainly attributable to low IIT intensity between Malaysia and China before 2004. It is noticeable that the average IIT index was 0.189 from 1993 to 2004. On the other hand, it increased markedly from 0.283 in 2005 to 0.411 in 2009. As such, the IIT between Malaysia and China has been growing in the late of 2000s.

With the narrowest range of products involved in IIT with China in SITC 5 in comparison with other ASEAN5 countries, Philippines marked the lowest IIT index with China. The highest IIT index was in 1993 with 0.396. Since then, the IIT indices fluctuated from 1994 to 2004 and followed by a decreasing trend from 2005 to 2009 with IIT indices not exceeding 0.17. Hence, it clearly indicates that Philippines is less dependent on intra-industry trade with China in SITC 5.

On the other hand, with the broadest range of products involved in IIT with China for SITC 5, the IIT index for Singapore-China was significant with an average of 0.362 throughout the study period. The IIT index exhibited a decreasing trend from 1999 to 2005. Since then, it alternated from an increase in 2006 with 0.437 to a decline in 2007 with 0.35. Subsequently, IIT index increased again in 2008 with 0.433 but a decline re-emerged in 2009 with 0.332.

The case of IIT between Thailand and China was similar with that of Indonesia and Malaysia whereby the IIT index remained low before 1997 with an average of 0.136. However, it has been showing a rising trend since 1998 and achieved 0.313 in 2009.

To further analyze the extent of intra-industry trade between respective ASEAN5 countries with China in SITC 5, IIT was further decomposed. The results of the

decomposition of IIT into HIIT and VIIT for respective ASEAN5 countries with China from 1993 to 2009 in SITC 5 are shown in Figure 4. 1.

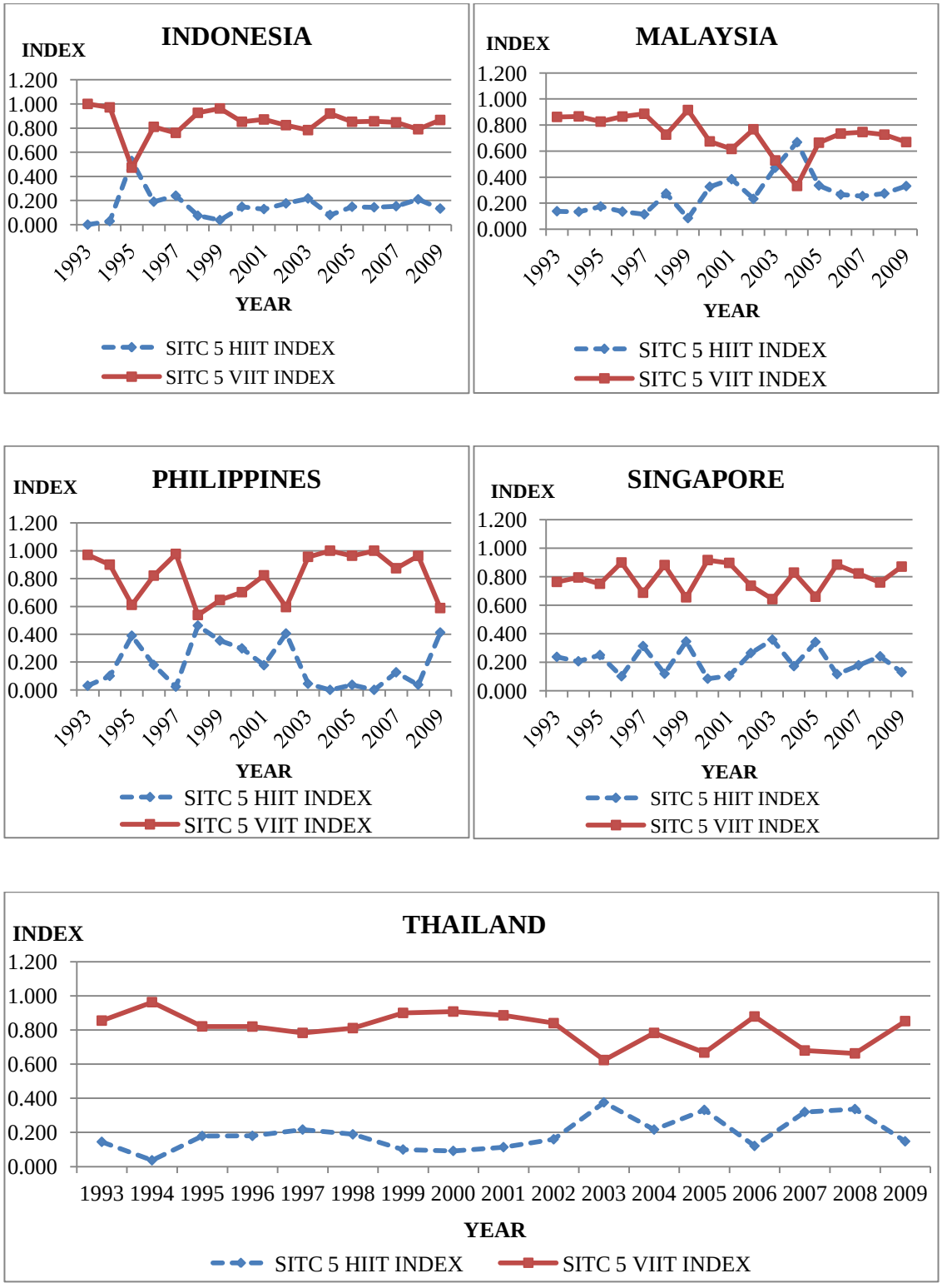


Figure 4.1: HIIT and VIIT Indices between ASEAN5 Countries and China for SITC5 (1993-2009)

Source: Author's calculation

Based on Figure 4.1 above, the VIIT indices in ASEAN5-China bilateral IIT were higher than 0.5 in SITC 5 during the study period except Malaysia in 2004 and Indonesia in 1995. The high VIIT indices signify the IIT between ASEAN5 countries and China in SITC 5 are processing trade in nature as based on production fragmentation theory, processing trade attributable to production fragmentation gives rise to VIIT (Ando, 2006 and Schott, 2003). These findings are consistent with Fukao et al. (2003) and Hurley (2003) as the authors argued that VIIT dominated IIT in Asia.

In the case of Indonesia-China, the VIIT index illustrated a stable trend with an average of 0.845 throughout the study period, except 1995. The ordinary trade, which was indicated by HIIT, outperformed processing trade in 1995 as the HIIT index was 0.528 in 1995. Apart from that, the VIIT index in Indonesia was above 0.75.

On the other hand, although the VIIT dominated IIT for Malaysia-China under the study period, Figure 4.1 shows that the VIIT index of Malaysia exhibited a decreasing trend from 1993 to 2004. The lowest VIIT index was in 2004 with 0.332, whereby ordinary trade outperformed the processing trade. However, the VIIT index showed steep ascends from 2005 onwards with 0.65 on average from 2005 to 2009. According to Tongzon (2005), China lacks of comparative advantage in high value-added chemical products. Therefore, to strengthen the ties of processing trade with China, Malaysia should continue to upgrade her products quality in this sector.

Besides, Philippines had diverse VIIT index before 2002. The divergence of VIIT is strikingly significant immediately after 1997 Asian Financial Crisis. The VIIT index slipped drastically from 0.977 in 1997 to 0.538 in 1998. Although the VIIT index increased with steep ascends in 2003 and maintaining VIIT indices approaching 1.0 from that year onwards, there was a sharp reduction in 2009 with 0.588 from 0.963 a

year earlier. The two financial crises had hampered the VIIT of Philippines significantly, implying that the VIIT of Philippines in SITC 5 is unstable.

Conversely, VIIT dominated Singapore-China IIT throughout the study period. The lowest VIIT index emerged in 2003 with 0.642 but uplifted to 0.87 in 2009. Besides, the small band fluctuation of VIIT index from 1993 to 2009 implies that Singapore-China bilateral trade are more complementary in nature. This may be due to the fact that the huge investment in the production technology that is related to pharmaceuticals (Pereira, 2006) in Singapore has resulted in intense processing trade for Singapore-China.

Besides, the VIIT index in Thailand was also high and stable from 1993 to 2002 with an average of 0.861. However, it started to exhibit mild fluctuation from 2003 onwards and achieved 0.85 in 2009. Generally, the VIIT for Thailand-China is a smooth journey.

SITC 6

The analysis reveals that the percentages of products involved in IIT in SITC 6 between ASEAN5 countries and China were in the range of 34-51% for Singapore, 23-48% for Malaysia, 29-41% for Thailand, 17-40% for Indonesia and 12-20% for Philippines during the study period.

Table 4.2: IIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.063	0.072	0.105	0.177	0.246
1994	0.107	0.065	0.103	0.305	0.167
1995	0.159	0.152	0.032	0.540	0.173
1996	0.126	0.119	0.042	0.309	0.259
1997	0.117	0.110	0.18	0.431	0.246
1998	0.097	0.205	0.074	0.353	0.298
1999	0.153	0.222	0.066	0.315	0.375

Table 4.2, continued

2000	0.233	0.271	0.089	0.381	0.336
2001	0.384	0.424	0.055	0.478	0.369
2002	0.338	0.490	0.107	0.487	0.373
2003	0.349	0.444	0.087	0.486	0.440
2004	0.284	0.438	0.104	0.621	0.370
2005	0.265	0.457	0.101	0.495	0.405
2006	0.342	0.402	0.383	0.420	0.341
2007	0.248	0.308	0.052	0.450	0.387
2008	0.221	0.306	0.097	0.331	0.288
2009	0.220	0.406	0.124	0.343	0.351

Source: Same as Figure 4.1

Based on Table 4.2 above, IIT indices of respective ASEAN5 countries illustrated a decreasing trend since 2000. The IIT index for Indonesia-China was on average of 0.22 during 1993-2009. This indicates that Indonesia is less dependent on intra-industry trade with China in SITC 6. One may notice that the IIT index for Indonesia-China showed a rising trend from 1993 to 2001, particularly from 1998 to 2001. After recovering from the 1997 Asian Financial Crisis, the IIT index increased with steep ascends from 0.097 in 1998 to 0.384 in 2001. However, it started to decline from 2001 onwards.

The IIT index for Malaysia-China illustrated a rising trend from 0.072 in 1993 to 0.490 in 2002. However, from 2003 to 2008, IIT index decreased gradually but rose again in 2009 to 0.406 from 0.306 a year earlier.

With the smallest range of products involved in IIT with China, the IIT index for Philippines-China was on average of 0.106 throughout the study period. The IIT index of SITC 6 was generally lower than that of SITC 5. It demonstrated a stable trend from 1993 to 2009 although a peak was found in 2006 where the IIT index was the highest at 0.383. Similar to Indonesia, it clearly indicates that Philippines is less dependent on

intra-industry trade with China in SITC 6. These findings are consistent with Lall (2000) where Philippines focuses more on SITC 7 while other manufacturing sub-sectors are being ignored.

On the other hand, with the broadest number of products involved in IIT with China, Singapore has had the highest intensity of IIT with China, with an average of 0.407 throughout the study period. The IIT index between Singapore and China exhibited a rising trend from 1993 to 2004 with two peaks found in 1995 and 2004, respectively. However, since 2005, the IIT index showed a decreasing trend. It decreased remarkably to 0.343 in 2009 from 0.621 in 2004.

In the case of Thailand-China, IIT index in SITC 6 showed an increasing trend from 0.246 in 1993 to 0.440 in 2003. Since then, the IIT index in Thailand started to fluctuate from year to year. Based on the cyclical trend, the intensity of IIT in Thailand was getting lower over the years as the IIT index in 2004, 2006 and 2008 were 0.370, 0.341 and 0.288 respectively while they were 0.405, 0.387 and 0.351 in 2005, 2007 and 2009.

To further analyze the extent of intra-industry trade between respective ASEAN5 countries with China in SITC 6, IIT was further decomposed. The results of the decomposition of IIT into HIIT and VIIT for respective ASEAN5 countries with China in SITC 6 during 1993-2009 are shown in Figure 4. 2.

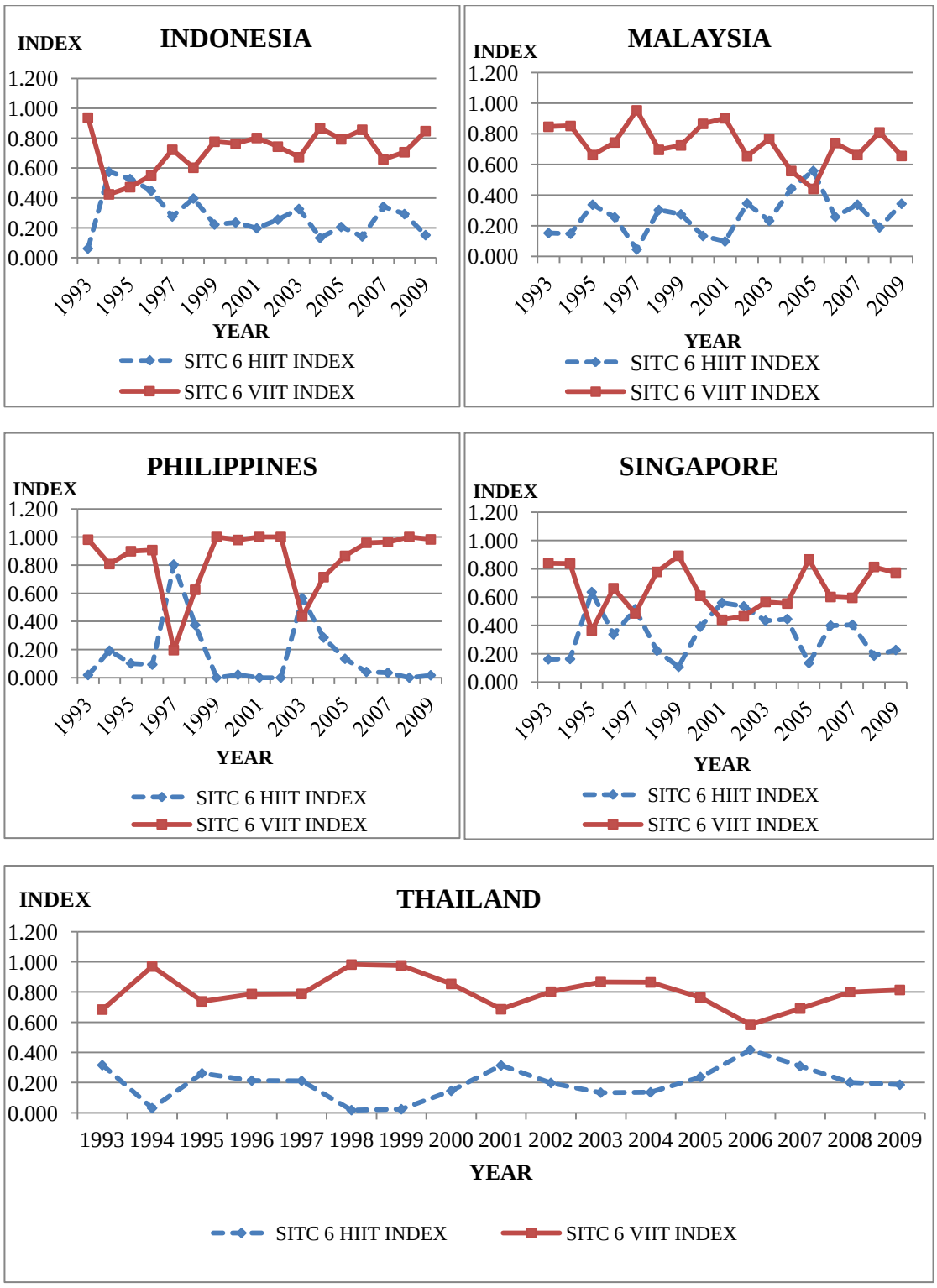


Figure 4.2: HIIT and VIIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

Source: Same as Figure 4.1

Based on Figure 4.2 above, VIIT between each ASEAN5 country and China was markedly intense in SITC 6. Based on the production fragmentation theory, this confirms that the IIT between these two regions are processing trade in nature, which is similar to SITC 5. As such, the trade deficits of ASEAN5 countries with China's trade in this manufacturing sub-sector are mainly attributable to production fragmentation, which involves backward and forward linkages within the regional production network. Hence, the trade deficit could serve as a healthy indicator as it can build investment confidence. However, HIIT and VIIT should be analyzed with caution as the extent of IIT is different for bilateral trade of respective ASEAN5 countries with China. Special attention should be paid to Indonesia and Philippines where the average IIT indices are below 0.3, respectively. Although IIT indices for both Indonesia-China and Philippines-China in SITC 6 were relatively low, their VIIT indices were extremely high, with an average of 0.718 and 0.842, respectively.

In the case of Indonesia, it is noticeable that the trend of VIIT was quite diverse relative to SITC 5 (refer to Figure 4.1 and Figure 4.2) even though her VIIT index in SITC 6 was high and showing an increasing trend since 2007.

Malaysia has also had a relatively diverse VIIT trend as compared to SITC 5. However, the average VIIT index was 0.737, and the processing trade dominated IIT for Malaysia-China throughout the study period except 2005. Based on Figure 4.2, the ordinary trade outperformed processing trade in 2005 where the HIIT index was slightly higher than VIIT index.

Meanwhile, the VIIT index for Philippines-China was approaching 1.0 particularly from 1999 to 2002 and 2005 to 2009, where the VIIT index was on average of 0.995 and 0.956 during these two periods respectively. However, two troughs were found in 1997 and 2003 when the VIIT index slipped to 0.196 and 0.435 respectively from 0.907 and

1.0 a year earlier. The sudden swing of her VIIT index implies a negative indication that the processing trade between Philippines and China is unstable, which is similar to the case of SITC 5. In addition, the range of products involved in IIT is low for Philippines-China trade. Hence, Philippines has not yet been able to integrate well into China's production network in SITC 6.

With the highest intensity in IIT with China relative to other ASEAN5 countries in SITC 6, processing trade had dominated Singapore-China IIT as the VIIT index was on average of 0.656 from 1993-2009. However, HIIT outperformed VIIT in 1995, 1997, 2001 and 2002 as the HIIT index were 0.636, 0.515, 0.56 and 0.535 respectively. In addition, the VIIT index was relatively more diverse than that of SITC 5. Hence, this implies that the performance of SITC 6 in Singapore was not as stable as SITC 5.

For Thailand-China bilateral trade *per se*, the VIIT index was very high, with an average of 0.803 in 1993-2009. The highest VIIT index was found in 1999 with 0.976 and the lowest in 2006 with 0.583. Besides, the VIIT index exhibited an increasing trend since 2006 and approaching 0.9 in 2009. It is therefore confirmed that there is intense processing trade between Thailand and China. However, since the IIT index of Thailand in SITC 6 has been getting lower, which resulted in lower trade value involved in VIIT, the intense processing trade between Thailand and China might not create a significant impact on Thailand's economy.

SITC 7

The analysis shows that the percentages of products involved in IIT in SITC 7 between ASEAN5 countries and China were in the range of 60-70% for Singapore, 40-60% for Malaysia, 40-50% for Thailand, 20-40% for Philippines and 20-30% for Indonesia during 1993-2009.

Table 4.3: IIT Indices between ASEAN5 Countries and China for SITC7 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.024	0.351	0.074	0.410	0.273
1994	0.029	0.631	0.103	0.328	0.316
1995	0.092	0.57	0.209	0.193	0.411
1996	0.232	0.736	0.466	0.542	0.321
1997	0.18	0.515	0.233	0.443	0.752
1998	0.249	0.62	0.819	0.538	0.798
1999	0.487	0.875	0.853	0.688	0.853
2000	0.493	0.91	0.575	0.687	0.793
2001	0.456	0.942	0.449	0.74	0.783
2002	0.448	0.837	0.327	0.698	0.724
2003	0.494	0.808	0.416	0.7	0.878
2004	0.455	0.752	0.796	0.575	0.861
2005	0.404	0.754	0.302	0.595	0.668
2006	0.453	0.738	0.317	0.47	0.654
2007	0.342	0.856	0.163	0.404	0.627
2008	0.313	0.698	0.736	0.387	0.482
2009	0.238	0.884	0.563	0.392	0.553

Source: Same as Table 4.1

Based on Table 4.3 above, the rise of China has benefited Malaysia, Singapore and Thailand in SITC 7 as the IIT index between the respective ASEAN5 countries mentioned above and China has been generally stable and greater than 0.5 after the 1997 Asian Financial crises. Besides, the average IIT indices for these three countries in SITC 7 throughout the study period were also higher than 0.5 with 0.734 (Malaysia), 0.517 (Singapore) and 0.632 (Thailand), respectively.

On the other hand, the IIT index for Indonesia-China was below 0.5 with an average of 0.317 during 1993-2009. This indicates that Indonesia is less dependent on intra-industry trade in SITC 7 compared with other ASEAN5 countries, which is in line with the findings of Tong and Lim (2009). Besides, the average IIT index for Philippines-China during the study period was 0.435, and the trend of IIT index was quite diverse. The cyclical trends showed three peaks in 1998, 2004 and 2008. This reflects that the rise of China is unlikely to be a smooth journey for Philippines. It is noticeable that the period of upward swing of the cyclical trends happened to be during the post crises periods except 2009.

Stemming from the findings of Ando (2006), Schott (2003) and Lemoine and Unal Kesenci, (2002), VIIT indicates processing trade while HIIT indicates ordinary trade. As such, IIT was further decomposed into HIIT and VIIT to determine whether IIT was dominated by ordinary trade or processing trade. The results of the decomposition of IIT for respective ASEAN countries with China from 1993 to 2009 are shown in Figure 4.3.

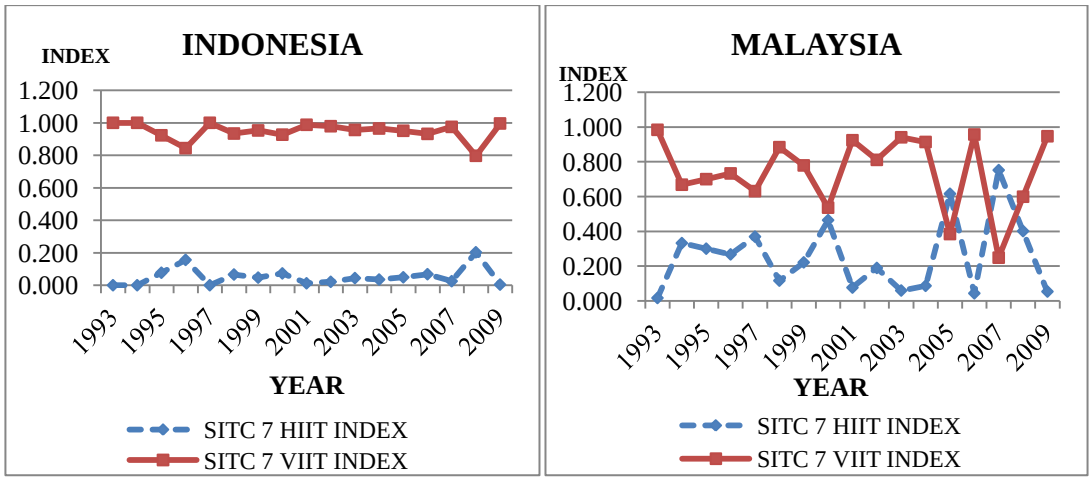


Figure 4.3: HIIT and VIIT Indices between ASEAN5 and China for SITC7 (1993-2009)

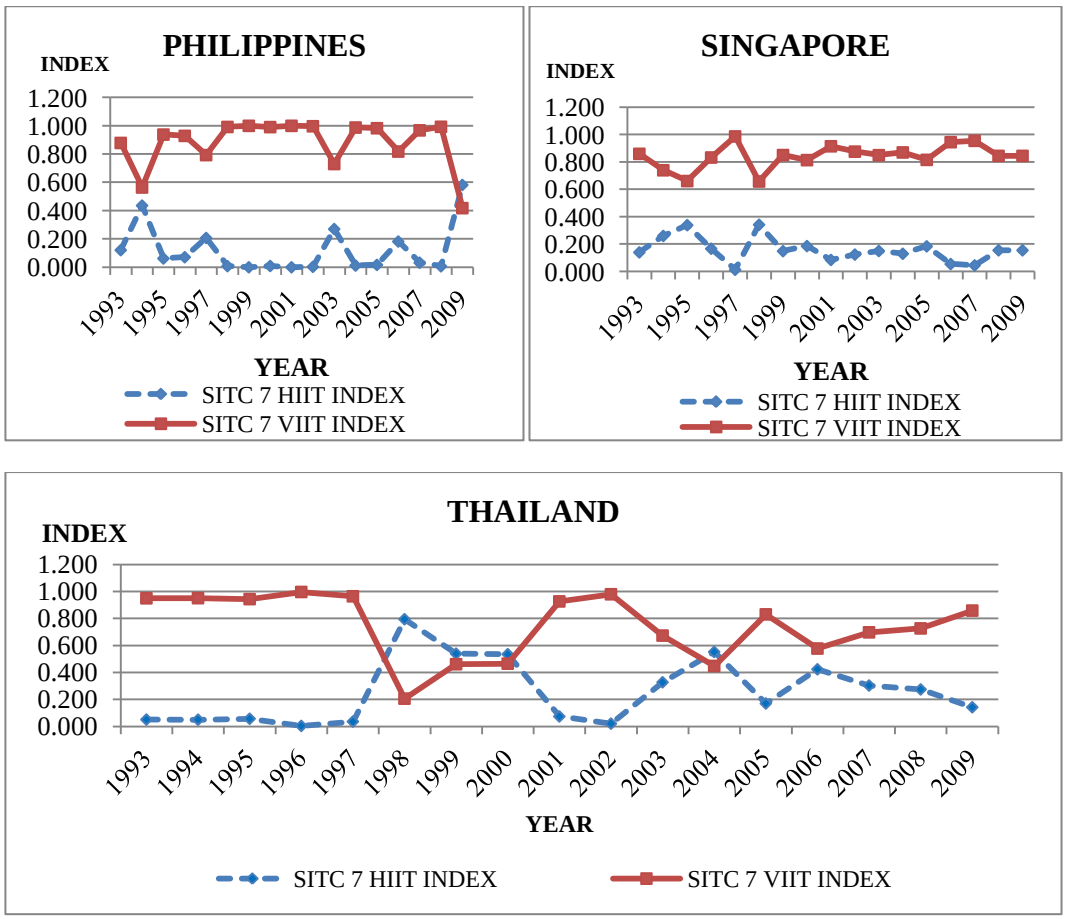


Figure 4.3, continued

Source: Same as Figure 4.1

Based on Figure 4.3 above, the VIIT indices in ASEAN5-China bilateral IIT in SITC 7 were relatively high with an average of 0.832 during the period of study. These are in line with the findings of Fukao et al. (2003) and Hurley (2003), where IIT in East Asian countries and ASEAN were dominated by VIIT, respectively. Besides, these findings are also consistent with the findings of Ando (2006), whereby machinery intermediate products are mainly involved in VIIT. VIIT dominating IIT in respective ASEAN5 countries signifies that the nature of IIT between ASEAN5 countries and China in SITC 7 are processing trade.

In the case of Indonesia, the high VIIT index reflects that Indonesia is highly involved in processing trade with China although the products involved in IIT is relatively less in comparison with other ASEAN5 countries.

Likewise, the VIIT index of Malaysia was above 0.5 annually during the period of study except 2005 and 2007. The VIIT index slipped markedly to 0.38 and 0.25 in 2005 and 2007 respectively from 0.91 and 0.96 a year earlier. Besides, Philippines was having VIIT index approaching 1.0 from 2000 onwards. However, there was a sharp reduction in VIIT index from 0.993 in 2008 to 0.418 in 2009. This implies that VIIT of Philippines in SITC 7 is unstable, similar to that of SITC 5 and SITC 6.

On the other hand, VIIT index for Singapore-China bilateral IIT was stable and exceeding 0.8 from 2000 onwards. This is in part attributable to the complement bilateral trade between Singapore and China due to their different levels of industrial development (Zhang and Hock, 1996).

The VIIT index of Thailand had also exceeded 0.9 before 1997 Asian Financial Crisis. However, the VIIT index drastically dropped to 0.21 in 1998. A year later, VIIT index increased to 0.461 and reached more than 0.55 from 2000 onwards except 2004. In general, the trend of VIIT index for Thailand was relatively more stable than that of Malaysia.

SITC 8

The analysis reveals that the percentages of products involved in IIT in SITC 8 between ASEAN5 countries and China were in the range of 30-44% for Thailand, 19-42% for Malaysia, 11-38% for Indonesia, 13-30% for Philippines and 6-19% for Singapore during the study period, i.e. 1993 to 2009.

Table 4.4: IIT Indices between ASEAN5 Countries and China for SITC 8 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.253	0.243	0.256	0.059	0.255
1994	0.076	0.263	0.194	0.083	0.311
1995	0.080	0.127	0.089	0.115	0.290
1996	0.115	0.486	0.157	0.087	0.491
1997	0.102	0.291	0.223	0.186	0.242
1998	0.235	0.472	0.149	0.164	0.391
1999	0.288	0.371	0.083	0.155	0.238
2000	0.234	0.468	0.153	0.160	0.204
2001	0.318	0.467	0.171	0.084	0.470
2002	0.266	0.501	0.182	0.067	0.503
2003	0.337	0.562	0.19	0.056	0.516
2004	0.344	0.524	0.233	0.256	0.556
2005	0.449	0.691	0.250	0.232	0.544
2006	0.355	0.691	0.373	0.217	0.609
2007	0.438	0.584	0.366	0.231	0.568
2008	0.330	0.521	0.399	0.274	0.539
2009	0.368	0.570	0.442	0.168	0.503

Source: Same As Table 4.1

Based on Table 4.4, it is noticeable that the trend of IIT in SITC 8 was the opposite with that of SITC 6. The IIT indices for ASEAN5 countries and China except Singapore exhibited a rising trend in 2000s, which reflects that the intensity of IIT between ASEAN5 as a whole and China was increasing gradually in SITC 8. As such, ASEAN5 countries are able to enhance bilateral trade with China in SITC 8 although this sector is relatively general which is consisting of miscellaneous manufacturing articles.

The IIT index in Indonesia exhibited mild fluctuation from year to year with an increasing trend. Although the nature of trade for Indonesia-China was not prone to intra-industry trade as the IIT index was on average of 0.27 throughout the study period, it was evidenced that the intra-industry trade had gradually become significant in 2000s.

The IIT indices were on average of 0.163 in 1993-1999, but it increased noticeably to 0.343 in 2000-2009.

Besides, IIT index for Malaysia-China topped the list and generally demonstrated a rising trend, with an average of 0.464 throughout the study period. Similar to Indonesia, the IIT between Malaysia and China became more intense in 2000s. The analysis shows that the IIT index was quite volatile from 1993 to 1999. Nevertheless, it started to increase from 1999 to 2006 with a stable trend. Although the IIT index declined gradually from 2006 to 2008, it rose again in 2009 to 0.570 from 0.521 in 2008. Hence, Malaysia has the opportunity to expand intra-industry trade with China in this manufacturing sub-sector.

Besides, the IIT index for Philippines in SITC 8 was relatively low as she was too focusing on SITC 7 (Lall, 2000). However, based on Table 4.4, the IIT index exhibited a rising trend from 2000 onwards. The IIT index has been increasing each year in 2000s and therefore it achieved 0.442 in 2009 from 0.153 in 2000. Hence, this is a positive indicator that Philippines can expand IIT with China in SITC 8 rather than focusing solely on SITC 7.

Among ASEAN5 countries, Singapore has the greatest intensity of intra-industry trade with China in all manufacturing sub-sectors, except SITC 8. With the narrowest range of products involved in IIT with China, the nature of trade for Singapore-China in this manufacturing sub-sector is not dominated by intra-industry trade. The IIT index was 0.153 on average throughout the study period. Although the IIT index rose drastically to 0.256 in 2004 from 0.056 in 2003 and thereafter demonstrated a stable trend in 2004-2008 with an average of 0.242, it slipped to 0.168 in 2009 from 0.274 a year earlier. Therefore, this confirms that there is relatively more opportunity for Singapore to expand IIT with China in other manufacturing sub-sectors relative to SITC 8.

Thailand on the other hand had the broadest range of products involved in IIT compared to other ASEAN5 countries in SITC 8. Meanwhile, the IIT index for Thailand-China was the second highest amongst ASEAN5 countries. However, based on Table 4.4, the IIT index for Thailand-China was quite diverse during the period of study. The IIT index achieved the first height in 1996 with 0.491 from 0.290 a year earlier. However, it declined drastically to 0.242 in 1997. This pattern re-emerged again with a smaller fluctuation from 1998 to 2000. Since then, the IIT index exhibited a stable and gradually increasing trend. Hence, the analysis notes that similar to Malaysia, the nature of trade for Thailand-China was inclined towards intra-industry in 2000 onwards and the IIT index exceeded 0.5 on average from 2001 to 2009.

To further analyze whether IIT between each ASEAN5 country and China was ordinary or processing trade in nature, the IIT was further decomposed into HIIT and VIIT, and the results are presented in the following figure.

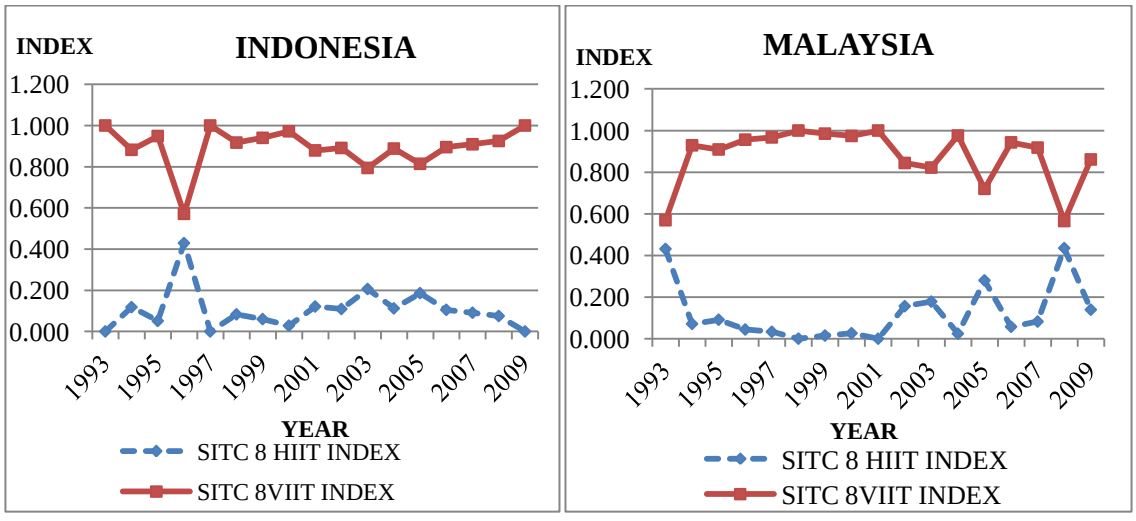
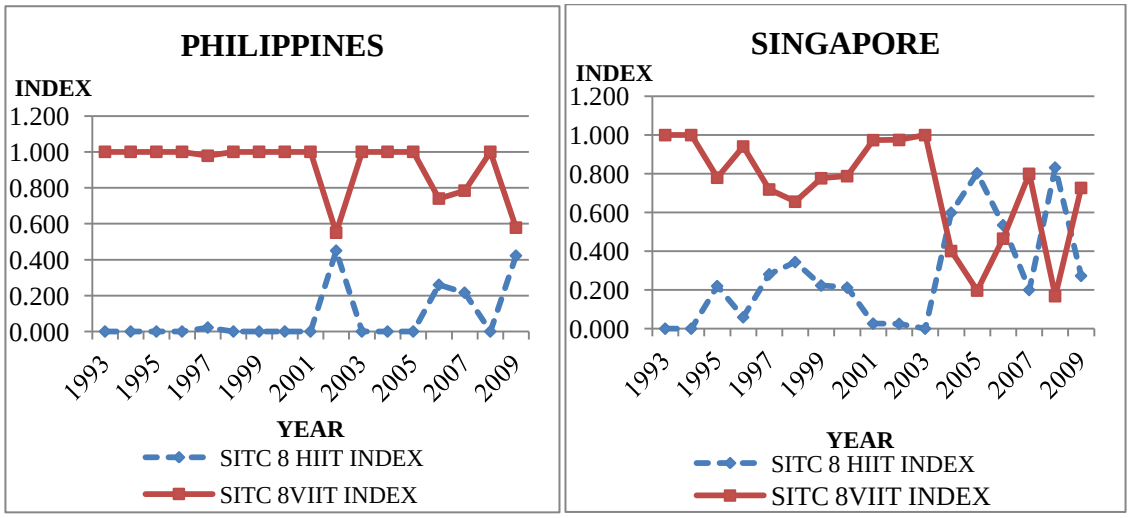


Figure 4.4: HIIT and VIIT Indices between ASEAN5 and China for SITC 8 (1993-2009)



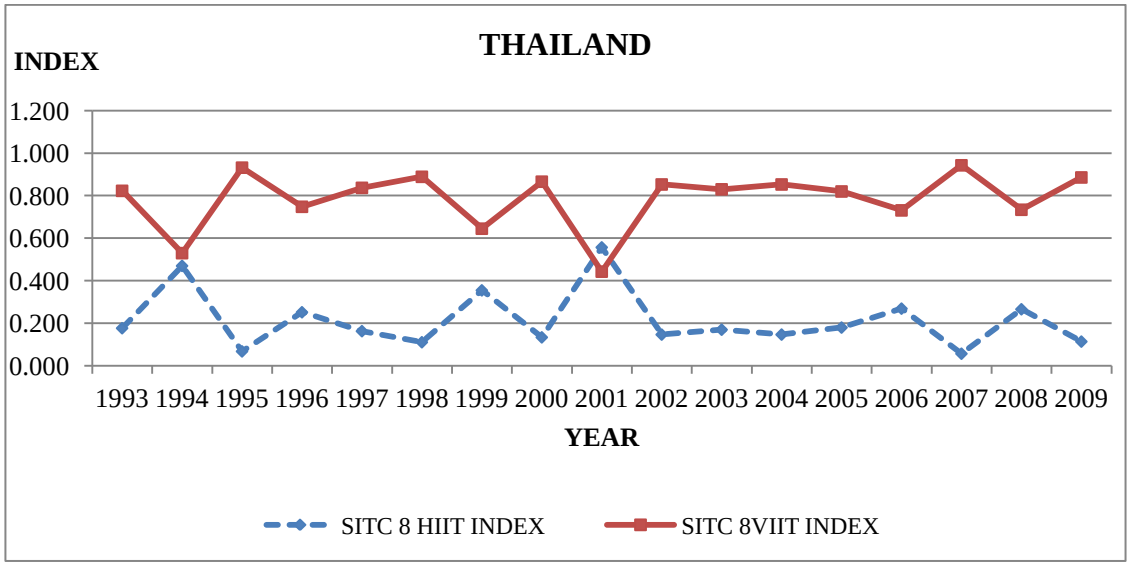


Figure 4.4, continued

Source: Same As Figure 4.1

Based on Figure 4.4, although IIT index of Indonesia was relatively low, the decomposition results revealed that the VIIT index exhibited a stable trend with an average of 0.896 throughout the study period. Indonesia's VIIT index was at the minimum in 1996 with 0.571. Since then, the VIIT indices was stable from 1997 to 2004 and thereafter increased steadily from 2005 to 2009. Hence, this confirms that the IIT for Indonesia-China is prone to processing trade.

Besides, the VIIT index of Malaysia remained high throughout the study period with an average of 0.879. In addition, the trend of VIIT was found to be extremely stable with index above 0.9 from 1994 to 2001. Although it illustrated a small swing from 2001 to 2009 and two troughs were found in 2005 and 2008 with 0.72 and 0.565 respectively, it rose markedly to 0.861 in 2009. Hence, this confirms that the IIT for Malaysia-China is also processing trade in nature.

As per Philippines, the VIIT index was extraordinary high with an average of 0.919 throughout the study period. Besides, the VIIT index was above 0.98 in each year except 2002, 2006 2007 and 2009. This confirms that Philippines only focuses on processing trade in which production fragmentation is involved. However, since the number of IIT products was relatively less for Philippines and the nature of SITC 8 is relatively general, it is therefore difficult for Philippines to focus and to expand the processing trade with China in SITC 8.

On the other hand, the performance of Singapore in SITC 8 was relatively poorer than in other manufacturing sub-sectors. Although the VIIT index for Singapore-China remained high with 0.728 on average throughout the study period and exhibited a stable trend from 1993 to 2002 with an average of 0.861, it started to swing drastically from 2003 onwards. From 2004 to 2009, it is noticeable that VIIT outperformed HIIT in 2007 and 2009 only. HIIT led IIT for Singapore-China from 2004 to 2006 and 2008. Thus, these findings confirm that although processing trade was still leading IIT for Singapore-China during the period of study, the leading position gradually deteriorated in the late 2000s in SITC 8.

Having the second highest IIT index among ASEAN5 countries in SITC 8 throughout the study period, the VIIT index for Thailand-China remained high with 0.791 on average throughout the period of study. However, the VIIT index was diverse from

1993 to 2001. In addition, the trough of VIIT index was found in 2001 whereby the HIIT index was higher than VIIT index, which implied that ordinary trade outperformed processing trade. Since then, the performance of VIIT was similar with the trend of IIT. Generally, it was more stable in 2000s particularly from 2002 onwards and the VIIT index was 0.831 on average from 2002-2009. Hence, similar to other ASEAN5 countries, processing trade dominated IIT for Thailand-China in SITC 8.

Based on the aforementioned analysis, ASEAN5 countries are having the most intense IIT with China in SITC 7 relative to other manufacturing sub-sectors, which is consistent with the findings of Tong and Lim (2009) and Ando (2006). However, the pattern and the intensity of IIT for each manufacturing sub-sector vary among ASEAN5 countries. With the exception of SITC 8 for Singapore, Thailand, Malaysia and Singapore are in general prone to IIT in all manufacturing sub-sectors. Meanwhile, the intensity of IIT for Indonesia and Philippines are relatively low.

Besides, the above findings reveal that VIIT, which stemmed from VIIT played a dominant role in IIT in each manufacturing sub-sector for all ASEAN5 countries as the average VIIT indices for SITC 5, 6, 7 and 8 were 0.799, 0.750, 0.832 and 0.841 respectively. This finding also indicates that production fragmentation plays a vital role in IIT between ASEAN5 countries and China. Hence, the trade deficit or surplus in bilateral trade between ASEAN5 countries and China in each manufacturing sub-sector (refer to Figure A1a to A5b) would be attributable to the production fragmentation, where the production platform could be reshuffled from one country to another.

Since VIIT dominates IIT, it is noteworthy to examine the bilateral VIIT between ASEAN5 countries and China in each manufacturing sub-sector (SITC 5 – SITC 8) in order to identify the catalyst that would strengthen the VIIT between the two regions. The results of econometric estimation will then be presented in the following section.

4.3 Panel Estimation

Spatial panel econometric model is adopted in this study due to regional trade linkages among ASEAN5 countries. The VIIT between each ASEAN5 country and China might be jointly affected by the spatial variables, i.e. SVIIT (VIIT between her respective neighbouring ASEAN5 countries and China), SFDI (actual capital utilization for direct investment by her neighbouring ASESAN5 countries in China) as well as SDGDP (the difference of GDP between her neighbouring ASEAN5 countries and China).

The panel estimation is divided into two approaches, namely specific to general approach and general to specific approach. The results from specific to general approach will be first presented and followed by general to specific approach for each manufacturing sub-sector, SITC 5, 6, 7 and 8.

SITC 5

Specific to General Approach

Specific to general approach is applied to examine whether non-spatial model or spatial model best describes the data. For this purpose, the classic Lagrange Multiplier (LM) tests are employed. The tests are based on the residual of non-spatial model, which are divided into four types, namely pooled OLS, panel model with spatial fixed effects, panel model with time period fixed effects as well as panel model with both spatial and time period fixed effects. They are following a chi-squared distribution with one degree of freedom. The results of the estimation for SITC 5 are as follows:

Table 4.5: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 5 Using Panel Data Models without Spatial Interaction Effects

Determinants	Pool OLS	Spatial Fixed Effects	Time-period Fixed Effects	Spatial and Time-period Fixed Effects
DGDP	-0.052(-0.492)	1.408(1.968)*	-0.057(-0.540)	0.476(1.122)
FDI	-0.004(-0.098)	-0.002(-0.013)	0.007(0.169)	0.134(1.934)*
intercept	-0.070(-0.152)			
R^2	0.004	0.104	0.259	0.315
Adjusted R^2	-0.020	0.025	0.057	0.054
LogL	33.21	29.724	41.281	91.221
LM spatial lag	0.369	7.793	20.794	22.022
LM spatial error	7854.421	3770.734	2478.522	25.732

Note: Number of observations = 85
t-values are provided in parentheses.
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively
The critical value for LM test at 5% significance level is 5.991

Based on Table 4.5, the R^2 and the adjusted R^2 value are gradually increased from pool OLS to spatial and time period fixed effects specification. The R^2 value, 0.315 is the highest for spatial and time-period fixed effects in comparison with the rest of the three models. Besides, this model also has the highest value of LogL, which is 91.221. Therefore, model with spatial and time-period fixed effects specification is preferred to the other three models.

Nonetheless, R^2 value is below 0.5 for all the models including the model with spatial and time-period fixed effects. This is due to the fact that the spatial interaction effects are not embedded explicitly in the models as they are not being captured by the explanatory variables.

To examine the existence of the spatial interaction effects, both LM spatial lag and LM spatial error tests have been carried out. The critical value at 5% significance level is 5.991. Therefore, based on Table 4.6, the null hypothesis that no spatial lagged autoregressive dependent variable for pool OLS cannot be rejected while it significantly

rejects the null hypothesis of no spatial lagged autoregressive dependent variable for spatial fixed effect; time period fixed effects as well as spatial and time period fixed effects. On the other hand, the existence of spatial lagged autoregressive process in the error terms is significant for the four models mentioned in Table 4.6. Hence, the null hypothesis of no spatial lagged autoregressive process in error terms for all the four models must be rejected.

For spatial and time period fixed effect *per se*, the rejections of both null hypotheses of no spatial lag and no spatial error imply the presence of spatial interaction effects in the model due to the close economic integration and cooperation among ASEAN5 countries. As such, spatial Durbin has emerged as the model that best describes the data. Hence, spatial Durbin model specification with spatial and time-period fixed effects would be adopted to carry the tests based on general to specific approach to test whether spatial Durbin model best describes the data or it can be simplified to either spatial lag model or spatial error model.

General to Specific Approach

Table 4.6: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 5: Spatial Durbin model Specification with Spatial and Time-period Fixed Effects

Determinants	Spatial and Time-period Fixed Effects
DGDP	1.077(1.298)
SGDP	3.282(1.346)
FDI	-0.1183(-1.8687)*
SFDI(-2)	0.161(0.075)*
SVIIT	-2.701(-14.638)***
R^2	0.884
Adjusted R^2	0.832
LogL	106.404
Wald test spatial lag	3.615(p=0.1641)
LR test spatial lag	5.136(p=0.0767)*
Wald test spatial error	257.200(p=0.000)***
LR test spatial error	134.919(p=0.000)***

Note: Number of observations = 85
t-values are provided in parentheses
Lags are chosen based on AIC and SC
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively

Wald test and LR test are adopted to test whether spatial Durbin model can be simplified to spatial lag model or spatial error model. Based on Table 4.6 above, although the Wald test infers that the null hypothesis where spatial Durbin model can be simplified to spatial lag model cannot be rejected (3.614, p=0.164), but the LR test shows that the null hypothesis can be rejected at 10% significance level (5.136, p=0.078). According to Elhorst (2010a and 2010b), the spatial Durbin model is more flexible than spatial lag model. There are no prior restrictions imposed on the potential spatial effects. Since the LR test shows that the null hypothesis of spatial Durbin model can be simplified to spatial lag model must be rejected, this infers that spatial Durbin model is more appropriate to use in treating the data.

Besides, both Wald test and LR test show that the null hypothesis of spatial Durbin model can be simplified to spatial error model must be rejected at 1% significance level

(Wald test:257.2, p=0.000; LR test:134.919, p=0.000). Hence, the results confirm that the spatial Durbin model is more appropriate for the estimation.

Based on the estimation results of spatial Durbin model, two explanatory variables, the differences in GDP (DGDP), which serve as the proxy of the difference in market size between respective ASEAN5 countries and China, as well as the spillover effects form DGDP (SGDP), are insignificant for SITC 5. According to Xing (2007), the insignificance of DGDP, which is contrary to the theoretical expectation implies that DGDP is not the essential condition for trading partners to engage in intra-industry trade. Besides, the insignificance of SGDP also implies that the spillover effects from DGDP are not present significantly. In a nutshell, the VIIT between any ASEAN5 country with China is not affected significantly by changes in DGDP of her neighbouring ASEAN5 countries.

On the other hand, FDI from respective ASEAN5 countries to China (FDI), spillover effects from FDI (SFDI) and spillover effects from VIIT (SVIIT) are all statistically significant.

The estimated coefficient of FDI is -0.1183 and statistically significant at 10%. The negative coefficient of FDI is contrary to the expectation of the production fragmentation theory. This indicates that the motive of ASEAN5's MNCs is market seeking rather than efficiency seeking. The aim of the FDI is to serve China's domestic market. Therefore, FDI would crowd out VIIT between the two regions. The result is consistent with the findings of Hurley (2003) where foreign direct investment was negative and significant for VIIT between Indonesia with other ASEAN countries; and Zhang and Li (2006) where foreign direct investment crowded out VIIT between China and her East Asia trading partners. In order to strengthen the bilateral VIIT with China, ASEAN5 countries should explore efficiency seeking type of FDI.

More to the point, the coefficient of SVIIT and SFDI are -2.701 and 0.161; and statistically significant at 1% and 10% significance level, respectively. The significance of SFDI and SVIIT confirms the presence of spatial spillover interaction effects among ASEAN5 countries.

Positive coefficient of SFDI indicates that the VIIT between each ASEAN5 country will increase by 0.161% if the FDI from her neighbouring ASEAN5 countries to China increases by 1%. As such, SFDI serves as the catalyst in stimulating the VIIT between ASEAN5 countries and China in SITC 5. This also implies that the inflow of FDI to China from any ASEAN5 country will complement the VIIT between her neighbouring ASEAN5 countries and China. For instance, TOA Paints Company Limited is one of the Thailand's MNC, which specializes in paints (products under SITC 5 with product code: 5334. These products appeared as VIIT products for Thailand in most of the years under the study period). This company owns manufacturing plants in its home country, China and Malaysia. Based on the above analysis, the outflow of capital from Thailand to its affiliates in China will reduce VIIT between Thailand and China. On the other hand, the VIIT between Malaysia and China would be stimulated. This reveals that the heighten FDI inflow to China from respective ASEAN5 countries will expand China's production capacity, which in turn stimulate production fragmentation. Consequently, this imposes positive spillover effects to her neighbouring ASEAN5 countries.

Besides, the econometric results reveal that SVIIT has emerged as the most powerful determinant for VIIT between ASEAN5 countries and China in SITC 5. The negative coefficient indicates that the VIIT between respective ASEAN5 countries and China will decrease by 2.701% if the VIIT between her neighbouring ASEAN5 countries and

China increases by 1%. This implies that ASEAN5 countries are competing in a markedly intense approach among each other in VIIT with China in SITC 5.

SITC 6

Specific to General Approach

Table 4.7: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 6 Using Panel Data Models without Spatial Interaction Effects

Determinants	Pool OLS	Spatial Fixed Effects	Time-period Fixed Effects	Spatial and Time-period Fixed Effects
DGDP	-0.088(-1.120)	-0.210(-0.487)	-0.088(-1.105)	-0.348(-0.672)
FDI	-0.021(-0.699)	0.179(2.252)	-0.038(-1.191)	0.168(1.756)
intercept	0.112(0.324)			
R^2	0.038	0.169	0.235	0.333
Adjusted R^2	0.013	0.101	0.024	0.086
LogL	58.108	64.003	61.443	68.579
LM spatial lag	6.658	7.877	15.529	24.963
LM spatial error	280.921	137.149	91.18	86.724

Note: Number of observations = 85
t-values are provided in parentheses
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively
The critical value for LM test at 5% significance level is 5.991

Based on Table 4.7 above, among the four models, model with spatial and time-period fixed effect has the highest R^2 value, which is 0.333. In addition, the value of LogL had also gradually increased from 58.108 under pool OLS to 68.579 for spatial and time-period fixed effect. As such, the test results indicate that the spatial and time-period fixed effect is preferred in describing the data. However, the low R^2 value reflects the omission of spatial interaction effects in the model specification. To confirm the existence of such effects, the results of LM tests are presented.

The critical value at 5% significance level is 5.991 for both LM spatial lag and LM spatial error test. Based on Table 4.7, the results obtained for SITC 6 infer that the null

hypotheses of no spatially lag and no spatially autocorrelated error term must be rejected for all specifications.

The rejections of both null hypotheses for non spatial lag and non spatial error imply the presence of spatial interaction effects in SITC 6 are attributable to the close economic integration and cooperation among ASEAN5 countries in all aspects. Arising from this, spatial Durbin model has emerged as the model that best describes the data. Hence, spatial Durbin model with spatial and time-period fixed effects would be adopted to carry the tests based on general to specific approach, which is presented in the following section.

General to Specific Approach

Table 4.8: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 6: Spatial Durbin model Specification with Spatial and Time-period Fixed Effect

Determinants	Spatial and Time-period Fixed Effects
DGDP	-3.862(-4.804)***
SGDP(-4)	-3.254(-2.442)**
FDI(-1)	0.359(3.952)***
SFDI(-2)	0.357(2.223)**
SVIIT(-1)	-0.250(-1.183)
R^2	0.658
Adjusted R^2	0.492
LogL	81.844
Wald test spatial lag	11.605(p=0.003)**
LR test spatial lag	15.531(p=0.0004)***
Wald test spatial error	51.355(p=0.000)***
LR test spatial error	51.081(p=0.000)***

Note : Number of observation = 85
t-values are provided in parentheses
Lags are chosen based on AIC and SC
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively

Wald test and LR test are adopted to test whether spatial Durbin model can be simplified to spatial lag model or spatial error model. Based on Table 4.8, both Wald test and LR test infer that the null hypothesis where spatial Durbin model can be simplified to spatial lag must be rejected at 5% and 1% significance level, respectively (11.605, p=0.003 for Wald test and 15.531, p=0.0004 for LR test).

Besides, both results of Wald test and LR test also infer that the spatial Durbin model cannot be simplified to spatial error model is significant at 1% significance level (Wald test: 51.355, p=0.000; LR test:51.081, p=0.000), and the null hypothesis must be rejected. Hence, the results confirm that the spatial Durbin model is appropriate for the estimation.

Based on the estimation results of spatial Durbin model, all of the explanatory variables except SVIIT are significant. Out of the variables, the most prominent determinant of VIIT between ASEAN5 countries and China in SITC 6 is DGDP. It is negative and statistically significant at 1% significance level. The result is consistent with theoretical expectation. This notes that reduction in difference in market size would encourage greater production fragmentation, which in turn stimulates VIIT as Grossman and Helpman (2005) mentioned that firms prefer to trade with trading partners that have similar skills which would match their requirements. In addition, the findings of Kimura and Ando (2005) revealed that coordination work resulted from production fragmentation can be carried out smoother if the market sizes between the two trading partners are similar. Therefore, DGDP possesses a negative impact on VIIT. The estimation results are consistent with the findings of Okubo (2007) and Zhang and Li (2006) in examining the determinants of VIIT between Japan and her trading partners, and between China and East Asia countries, respectively.

As the estimated coefficient of DGDP is -3.862, this shows that the VIIT will increase by 3.862% if the difference in market size between respective ASEAN5 countries with China decreases by 1%. As such, ASEAN5 countries should enlarge their market size for products under SITC 6 to accelerate the bilateral VIIT with China.

In addition, the negative and statistically significant of SGDP infer the presence of spillover effects of DGDP. This implies that the VIIT between respective ASEAN5 countries and China will increase by 3.254% if the difference in GDP between her neighbouring ASEAN5 countries and China reduces by 1%. Hence, SGDP plays an important role in stimulating VIIT between these two regions in SITC 6.

Besides, both FDI and SFDI are having positive and statistically significant effects on VIIT between ASEAN5 countries and China. The positive and significant coefficient of FDI in relation to VIIT is consistent with the expectation of production fragmentation theory. The results confirm that the motive of FDI from ASEAN5 countries to China in SITC 6 is efficiency seeking in nature, which aims to form production linkages and resources network. The empirical results are in line with the findings of Turkcan and Ates (2011); Turkcan (2010); Okubo (2007); Hurley (2003) for VIIT between Malaysia, Singapore and Thailand with their respective ASEAN's trading partners; Ando (2006); Zhang, Witteloostuijn and Zhou (2005); Fukao, Ishito and Ito (2003); Kimura and Ando (2003); Hu and Ma (1999) and Greenaway, Milner and Elliot (1999).

The coefficient for FDI is 0.359. This shows that the VIIT between each ASEAN5 country and China will increase by 0.359% if FDI increases by 1%. More to the point, the significance of SFDI signifies the importance of positive spillover effects of FDI. The VIIT between respective ASEAN5 countries with China will increase by 0.357% if FDI from her neighbouring ASEAN5 countries to China increases by 1%. For instance, Hexagon Holdings Berhad is Malaysian owned MNC. It owns manufacturing plants

across Asian region including China, Malaysia, Thailand and Philippines. One of the major products supplied by this company is stamped lead frame (products under SITC 6 with product code: 6852.These products appeared to be VIIT products for Malaysia in most of the years under the study period). Since the estimated coefficient for both FDI and SFDI are positive and significant, the heightened capital outflow from Malaysia to its affiliates in China not only stimulates VIIT between Malaysia and China but also provides positive spillover effects to her neighbouring ASEAN5 countries. They can shift lead; lead alloys and lead frame backward and forward across manufacturing plants. In light of the importance of ASEAN5's FDI, ASEAN5 countries should integrate and collaborate in planning their FDI policy for SITC 6 in order to reap numerous benefits from China's rise.

On the other hand, although the coefficient of SVIIT is negative, it is statistically insignificant. This implies that there is no significant spillover effects from VIIT. In a nutshell, the VIIT between any ASEAN5 country and China is not affected significantly by the changes of VIIT between her neighbouring ASEAN5 countries and China.

SITC 7

Specific to General Approach

Table 4.9: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 7 Using Panel Data Models without Spatial Interaction Effects

Determinants	Pool OLS	Spatial Fixed Effects	Time-period Fixed Effects	Spatial and Time-period Fixed Effects
DGDP	-0.190(-1430)	0.896(1.170)	-0.197(-1.546)	1.224(1.482)
FDI	0.074(1.442)	0.177(1.260)	0.078(1.566)	0.289(1.839)*
Intercept	-0.940(-1.620)			
R^2	0.036	0.0768	0.286	0.34
Adjusted R^2	0.011	0.001	0.091	0.102
LogL	16.474	18.206	28.505	31.652
LM spatial lag	2.874	6.143	22.91	27.228
LM spatial error	2042.704	2020.474	491.028	440.34

Note: Number of observations = 85
t-values are provided in parentheses
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively
The critical value for LM test at 5% significance level is 5.991

Based on Table 4.9, the test results are in favour of spatial and time period fixed effects specification as the value of R^2 of 0.34, adjusted R^2 of 0.102 and LogL of 31.652 are the highest in comparison with the other three models. However, both R^2 and adjusted R^2 are below 0.5 indicating that the spatial effects are not spelled out explicitly in the model. To examine the spillover effects, both LM spatial lag and LM spatial error test have been carried out. The critical value at 5% significance level is 5.991.

Based on Table 4.9, the null hypothesis of no spatial lag cannot be rejected for pool OLS while it is statistically significant at 5% significance level to reject the null hypothesis of no spatial lag for non spatial models with spatial fixed effects; time-period fixed effects; and spatial and time period fixed effect.

On the other hand, consistent with the previous manufacturing sub-sectors, the existence of spatial error is significant at 5% significance level for the four models and therefore the null hypothesis of no spatial error must be rejected.

Based on the above analysis, it is proven that the spatial Durbin model would best describe the data and the presence of spillover interaction effects is confirmed in SITC 7. Estimations using spatial Durbin model based on general to specific approach are then presented in the following section.

General to Specific Approach

Table 4.10: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 7: Spatial Durbin model Specification with Spatial and Time-period Fixed Effects

Determinant	Spatial and Time-period Fixed Effects
DGDP	-1.407(-2.562)**
SGDP(-1)	-5.595(-3.512)***
FDI(-2)	0.117(1.964)*
SFDI	-0.082(-1.043)
SVIIT	-2.552(-20.291)***
R^2	0.935
Adjusted R^2	0.907
LogL	115.044
Wald test spatial lag	12.416(p=0.002)***
LR test spatial lag	16.342(p=0.003)***
Wald test spatial error	500.493(p=0.000)***
LR test spatial error	178.560(p=0.000)***

Note: Number of observations = 85
t-values are provided in parentheses
Lags are chosen based on AIC and SC
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively

Based on Table 4.10 above, the high value of R^2 and adjusted R^2 indicate that spatial Durbin model is appropriate in describing the data. To further examine whether spatial Durbin model can be simplified to either spatial lag model or spatial error model, both Wald test and LR test are adopted. The estimation results show that both Wald test and

LR test infer that the null hypothesis where spatial Durbin model can be simplified to spatial lag must be rejected at 1% significance level (12.416, p=0.002 for Wald test and 16.342, p=0.003 for LR test).

Besides, both results of Wald test and LR test also infer that spatial Durbin model cannot be simplified to spatial error model is significant at 1% significance level (Wald test: 500.493, p=0.000; LR test:178.560, p=0.000), and the null hypothesis must be rejected. Hence, the results ascertain that the spatial Durbin model is appropriate for the estimation.

Based on the estimation results of spatial Durbin model, all of the explanatory variables except SFDI are significant. The most influential determinant of VIIT between ASEAN5 countries and China in SITC 7 is SGDP. It is negative and statistically significant at 1% significance level. This infers the presence of spillover effects of DGDP. The result reveals that the VIIT between each ASEAN5 country and China will be stimulated by 5.595% if the DGDP between her neighbouring ASEAN5 countries and China reduce by 1%. As such, SGDP also emerges as the most important catalyst that stimulates and strengthens the bilateral VIIT between ASEAN5 countries and China in SITC 7.

Besides, the coefficient of DGDP is negative and statistically significant at 5% significance level, which is in line with the theoretical expectation. Similar to SITC 6, this notes that the reduction in difference in market size would encourage greater production fragmentation, which in turn stimulates VIIT. This finding is consistent with Okubo (2007) and Zhang and Li (2006). As the estimated coefficient is -1.407, this shows that the VIIT will increase by 1.407% if the difference in market size between respective ASEAN5 countries with China decreases by 1%.

Besides, consistent with theoretical expectation, the coefficient of FDI in SITC 7 is positive and statistically significant at 10% significance level. Similar to SITC 6, the results confirm that the motive of FDI from ASEAN5 countries to China in SITC 7 is efficiency seeking rather than market seeking. Hence, the FDI from ASEAN5 countries to China is eying to form production linkages and resources network.

The finding above is consistent with the findings of Turkcan and Ates (2011); Turkcan (2010); Okubo (2007); Ando (2006); Zhang, Witteloostuijn and Zhou (2005); Fukao, Ishito and Ito (2003); Kimura and Ando (2003); Hu and Ma (1999) and Greenaway, Milner and Elliot (1999) in examining VIIT in various countries and Hurley (2003) for VIIT between Malaysia, Singapore and Thailand with their respective ASEAN's trading partners.

Since FDI serves as a good platform for ASEAN5-China to enhance the bilateral VIIT in SITC 7, it should be further encouraged. For instance, C&W Electronics Pte Ltd is one of Singapore's MNC. This company manufactures wires and cables (products under SITC 7 with product code: 7731. These products appeared as VIIT for Singapore in most of the years under the study period). The manufacturing plants of C&W Electronics Pte Ltd are located in many Asian countries including Singapore, China, Malaysia and Thailand. Since the estimated coefficient of FDI is positive and significant, increase in capital outflow from Singapore to its affiliates in China would stimulate the VIIT between Singapore and China. Therefore, it should be encouraged. However, with the estimated coefficient less than 1.0, the VIIT is relatively less responsive to changes in FDI for SITC 7.

On the other hand, the coefficient of SFDI is statistically insignificant. Hence, the results revealed that there are no significant spillover effects from FDI. The VIIT between any ASEAN5 country and China is not affected significantly by changes in FDI between her neighbouring ASEAN5 countries and China.

Nevertheless, the coefficient of SVIIT is -2.552 and statistically significant at 1% significance level. Similar to SITC 5, the significance of SVIIT in SITC 7 confirms the presence of spatial interaction effects among ASEAN5 countries in relation to China's bilateral VIIT. The negative coefficient indicates that the VIIT between each ASEAN5 country and China will be reduced by 2.552% if the VIIT between her neighbouring ASEAN5 countries with China increases by 1%. This implies that ASEAN5 countries are competing intensely against rather than complementing each other in relation to VIIT with China in SITC 7.

SITC 8

Specific to General Approach

Table 4.11.1: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 8 Using Panel Data Models without Spatial Interaction Effects

Determinants	Pool OLS	Spatial Fixed Effects	Time-period Fixed Effects	Spatial and Time-period Fixed Effects
DGDP	-0.071(-0.781)	0.128(0.246)	-0.059(-0.655)	0.691(1.197)
FDI	-0.095(-2.735) ***	-0.152(-1.162)	-0.095(-2.722) ***	-0.119(-1.124)
Intercept	0.995(0.535)			
R^2	0.129	0.147	0.305	0.335
Adjusted R^2	0.108	0.077	0.116	0.099
LogL	45.574	46.267	55.196	57.057
LM spatial lag	10.947	12.495	25.95	28.48
LM spatial error	249.713	263.44	76.047	81.729

Note: Number of observations = 85

t-values are provided in parentheses

Asterisk * **, ** and * denotes level of significance at 1%, 5% and 10% respectively

The critical value for LM test at 5% significance level is 5.991

Based on the table above, the alternative hypothesis for the existence of both spatial lag and spatial error are all significant for the four models as the critical value is 5.991 at 5% significant level. Hence, the null hypotheses of no spatial lag and no spatial error must be rejected. It is evidence that spatial Durbin best describes the data.

Besides, R^2 and LogL value are improving from pool OLS to spatial and time-period fixed effect implying that spatial and time-period fixed effect is preferred to the other three specifications. However, the coefficient for all explanatory variables turns out to be insignificant under this specification as compared to pool OLS and time-period fixed effects specifications. Therefore, the contradictory results infer that the model specification is inappropriate for SITC 8. Since SITC 8 is made up of miscellaneous manufacturing articles, which are relatively general in comparison with SITC 5, SITC 6 and SITC 7, the explanatory variables chosen for the model may be slightly different from that of SITC 5 to SITC 7. FDI and DGDP may not be the essential determinants for the VIIT between ASEAN5 countries and China in SITC 8.

Taking both the analysis above and the theoretical framework into consideration, trade openness in log form is taken on board as one of the explanatory variables for SITC 8 *per se*. Carbaugh (2009, p.9) pointed out that trade openness serves as an indicator on how important international trade is on a country's economy while Xing (2007) revealed that trade openness is the proxy of trade liberalization. Based on Carbaugh (2009, p.9), the formula to compute the trade openness (TO) is as follow:

$TO=[Exports_c + Imports_c]/GDP_A$

Where $Exports_c$ and $Imports_c$ refer to each ASEAN5 country's exports to China and imports from China in SITC 8, respectively. GDP_A refers to the GDP of each ASEAN5 country. Based on Falvey (1981) theoretical trade model, it is expected that VIIT can be stimulated if the trade between ASEAN5 countries and China is more liberalized.

Table 4.11.2: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 8 Using Panel Data Models without Spatial Interaction Effects

Determinants	Pool OLS	Spatial Fixed Efects	Time-period Fixed Effects	Spatial and Time-period Fixed Effects
DGDP	-0.044(-0.519)	0.500(0.990)	-0.040(-0.468)	0.902
FDI	-0.061(-1.802)	-0.073(-0.791)	-0.059(-1.692) *	-0.022(-0.210)
TO	0.071(4.722) ***	0.072(4.703) ***	0.071(4.025) ***	0.071(3.980) ***
Intercept	-0.018(-0.042)			
R^2	0.327	0.342	0.45	0.481
Adjusted R^2	0.3	0.278	0.287	0.28
LogL	51.839	52.761	59.909	62.24
LM spatial lag	26.134	27.361	35.975	38.467
LM spatial error	463.774	535.255	135.295	141.964

Note: Number of observations = 85
t-values are provided in parentheses
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively
The critical value for LM test at 5% significance level is 7.815

After taking trade openness on board, the critical value is 7.815 at 5% significance level. The results from the above table show that the null hypothesis of no spatial lag and no spatial autoregressive process in the error term must be rejected. This implies the presence of spatial interaction effects in the model and therefore spatial Durbin model is still best describes the data. Besides, trade openness is significant at 1% significance level for all of the non-spatial models, which reveals that it is the prominent variable for SITC 8. In addition, similar to the previous manufacturing sub-sectors, the test results also point to spatial and time-period fixed effects as the two determinants, R^2 of 0.481 and LogL of 62.64 are of the highest value in comparison with the other three specifications.

To reconfirm whether spatial Durbin model with spatial and time period fixed effects would best describe the data or that it can be simplified to either spatial lag model or spatial error model for SITC 8, estimation using spatial Durbin model with spatial and time period fixed effects will be carried out. The estimations are based on general to specific approach. The results for the estimation are presented in the following section.

General to Specific Approach

Table 4.12.1: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 8: Spatial Durbin model Specification with Spatial and Time-period Fixed Effects

Determinants	Spatial and time-period fixed effects
DGDP	-0.011(-0.0219)
FDI(-1)	0.014(0.433)
TO	0.020(3.423)***
SVIIT	-2.250(-28.2598)***
SGDP	0.111(0.112)
SFDI	0.013(0.253)
R^2	0.969
Adjusted R^2	0.954
LogL	174.465
Wald test spatial lag (independent variables)	0.0335 (p=0.967)

Note: Number of observations = 85
t-values are provided in parentheses
Lags are chosen based on AIC and SC
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively

Based on the table above, the value of both R^2 and adjusted R^2 are approaching 1.0 and SVIIT is statistically significant at 1% significance level. However, both SGDP and SFDI are highly insignificant. Hence, the results reveal that the spatial lag only consists of lag dependent variable rather than both lag dependent and independent (explanatory) variables in light of the nature of SITC 8, which are relatively general. For this purpose, Wald test for spatial lag independent (explanatory) variables has been carried out and the insignificance of Wald test confirms the absence of spillover effects from

independent (explanatory) variables. Arising from this, both SGDP and SFDI are dropped from the model to obtain the parsimonious model, and the results are presented in the table below.

Table 4.12.2: Estimation Results of VIIT between ASEAN5 Countries and China in SITC 8: Spatial Durbin model Specification with Spatial and Time-period Fixed Effects

Determinants	Spatial and Time-period Fixed Effects
DGDP	-0.046(-0.331)
FDI(-1)	0.011(0.694)
SVIIT	-2.251(-29.478)***
TO	0.021(4.338)***
R^2	0.969
Adjusted R^2	0.956
LogL	174.416
Wald test spatial error	1178.27(p=0.000)***
LR test spatial error	247.431(p=0.000)***

Note: Number of observations = 85
t-values are provided in parentheses
Lags are chosen based on AIC and SC
Asterisk ***, ** and * denotes level of significance at 1%, 5% and 10% respectively

Based on Table 4.12.2, the value of R^2 and adjusted R^2, which are 0.969 and 0.956 respectively, remain high after dropping the two said variables. This indicates the appropriateness of model specification. To further examine whether spatial Durbin model can be simplified to spatial error model, both Wald test and LR test are adopted. Both results of Wald test and LR test simultaneously infer that the spatial Durbin model cannot be simplified to spatial error model is significant at 1% significance level (Wald test: 1178.27, p=0.000; LR test:247.431, p=0.000). Hence, the null hypothesis of spatial Durbin model can be simplified to spatial error model must be rejected. As such, the results ascertain that the spatial Durbin model is appropriate for the estimation. For SITC 8, spatial Durbin generalizes both spatially lagged dependent variable and spatially autocorrelated error terms.

Based on the estimation results of spatial Durbin model, SVIIT is the most prominent determinant of VIIT between ASEAN5 countries and China in SITC 8. It is negative and statistically significant at 1% significance level. This infers the presence of spillover effects of VIIT, and there is intense competition among ASEAN5 countries in relation to VIIT with China in SITC 8. The result implies that the VIIT between each ASEAN5 country and China will reduce by 2.251% if the VIIT between her neighbouring ASEAN5 countries with China increases by 1%.

Besides, the coefficient of TO has the theoretical expected sign and is significant at 1% significance level. Trade openness reduces trading costs and service costs that were needed to link up various locations. Therefore, trade openness provides greater opportunity for production fragmentation and results in greater intensity of VIIT between ASEAN5 countries and China. This finding is consistent with Zhang and Li (2006) and Yi (2003).

With the estimated coefficient TO of 0.021, this infers that if trade is liberalized by 1%, the VIIT between ASEAN5 countries and China will be stimulated by 0.021%. As a result, the formation of CAFTA might provide a platform to expand the VIIT between ASEAN5 countries and China in SITC 8.

Contrary to the theoretical expectation and the findings of other manufacturing sub-sectors, the results reveal that both DGDP and FDI are not significant. These findings imply that both variables are not important in determining the VIIT between ASEAN5 countries and China in SITC 8. This might be attributable to the nature of SITC 8, which is relatively general.

4.4 Decomposition of VIIT into HVIIT and LVIIT

Further analysis on VIIT is required to examine the sustainability of bilateral IIT between respective ASEAN5 countries and China. It is worth mentioning as the sustainability of bilateral IIT between China and respective ASEAN5 countries will be reduced if China's dependency on high value-added imports from ASEAN5 countries decreases over time.

As such, VIIT is further decomposed into HVIIT and LVIIT in each manufacturing sub-sector, SITC 5 to SITC 8. HVIIT implies that the exported goods from ASEAN5 countries to China are of high value-added than the corresponding imported goods from China. These products enhance price determination power of ASEAN5 countries and therefore provide synergy in strengthening the bilateral VIIT between ASEAN5 countries and China. On the other hand, in the case of LVIIT, the exported goods from ASEAN5 countries to China are of lower value-added than the corresponding imported goods from China. As such, the price determination power of China is stronger than that of ASEAN5 countries. The decomposition results are presented in the following section for each manufacturing sub-sector, SITC 5 to SITC 8.

SITC 5

Table 4.13: Percentage of SITC 5 Products for Each VIIT Category in Respective ASEAN5 Bilateral VIIT with China in Year 1993, 1996, 1999, 2002, 2005, 2009

Year /Type of VIIT	Country/Number of products (percentage)				
1993	**Indonesia**	**Malaysia**	**Philippines**	**Singapore**	**Thailand**
HVIIT	4(44)	11(57.9)	5(50)	32(80)	10(43.5)
LVIIT	5(56)	8(42.1)	5(50)	8(20)	13(56.5)
Total VIIT products	**9**	**19**	**10**	**40**	**23**

Table 4.12, continued

1996					
HVIIT	9(64.3)	8(47)	6(66.7)	38(69.1)	14(58.3)
LVIIT	5(35.7)	9(53)	3(33.3)	17(30.9)	10(41.7)
Total VIIT products	**14**	**17**	**9**	**55**	**24**
1999					
HVIIT	19(73.1)	16(61.5)	5(50)	26(66.7)	14(48.3)
LVIIT	7(26.9)	10(38.5)	5(50)	13(33.3)	15(51.7)
Total VIIT products	**26**	**26**	**10**	**39**	**29**
2002					
HVIIT	17(65.4)	8(36.4)	8(61.5)	35(77.8)	16(42.1)
LVIIT	9(34.6)	14(63.6)	5(38.5)	10(22.2)	22(57.9)
Total VIIT products	**26**	**22**	**13**	**45**	**38**
2005					
HVIIT	13(50)	9(47.4)	8(88.9)	35(79.5)	14(50)
LVIIT	13(50)	10(52.6)	1(11.1)	9(20.5)	14(50)
Total VIIT products	**26**	**19**	**9**	**44**	**28**
2009					
HVIIT	7(30.4)	13(52)	4(57.1)	40(70.2)	19(55.9)
LVIIT	16(69.6)	12(48)	3(42.9)	17(29.8)	15(44.1)
Total VIIT products	**23**	**25**	**7**	**57**	**34**

Source: Author's calculation
Note: The percentage of products for each VIIT category is provided in parentheses

Table 4.13 reveals that the percentages of VIIT products involved in HVIIT between ASEAN5 countries and China in SITC 5 were in the range of 66.7-80% for Singapore, 50-88.9% for Philippines, 42.1-58.3% for Thailand, 36.4-61.5% for Malaysia and 30-73.1% for Indonesia during the study period. The VIIT products are mainly dominated by HVIIT products in Singapore, Philippines and Indonesia. Based on Devadason (2009), this is a positive indication as products exported to China are of higher value-added than the corresponding imports. However, the analysis also indicates that although the percentage of products involved in HVIIT remained high for Philippines, but the number of products involved in VIIT and the trade value for VIIT were the least as compared to other ASEAN5 countries. The number of products involved in VIIT

between Philippines and China was on average of 11 types annually from 2001 to 2009. Furthermore, calculations based on UN COMTRADE Database, the trade value for VIIT between Philippines and China was less than USD60 million annually throughout the period of study. Arising from this, the high percentage of HVIIT does not benefit Philippines significantly. However, it also implies that Philippines is less vulnerable to China's external shock in SITC 5 since Philippines is yet to integrate into China's production network.

For Malaysia and Thailand, the percentages of HVIIT products were quite similar to the percentage of LVIIT products. This indicates that both countries should improve the product quality in order to gain price determination power. This is vital to enhance their respective bilateral VIIT with China.

To examine the importance of HVIIT and LVIIT with respect to the value of VIIT in SITC 5, the indices of HVIIT and LVIIT have been computed and presented in Figure 4.5.

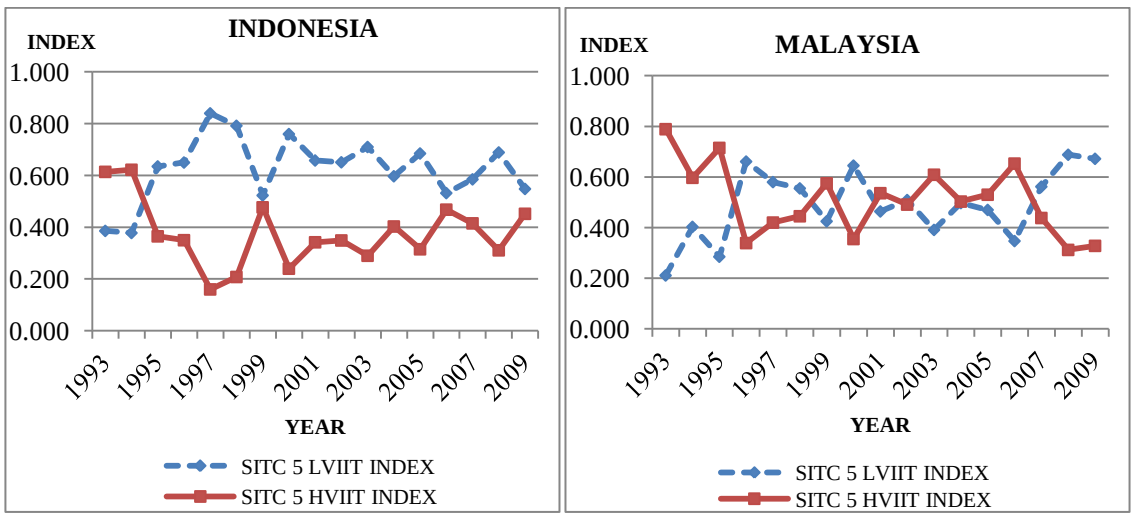


Figure 4.5: HVIIT and LVIIT Indices between ASEAN5 Countries and China for SITC 5 (1993-2009)

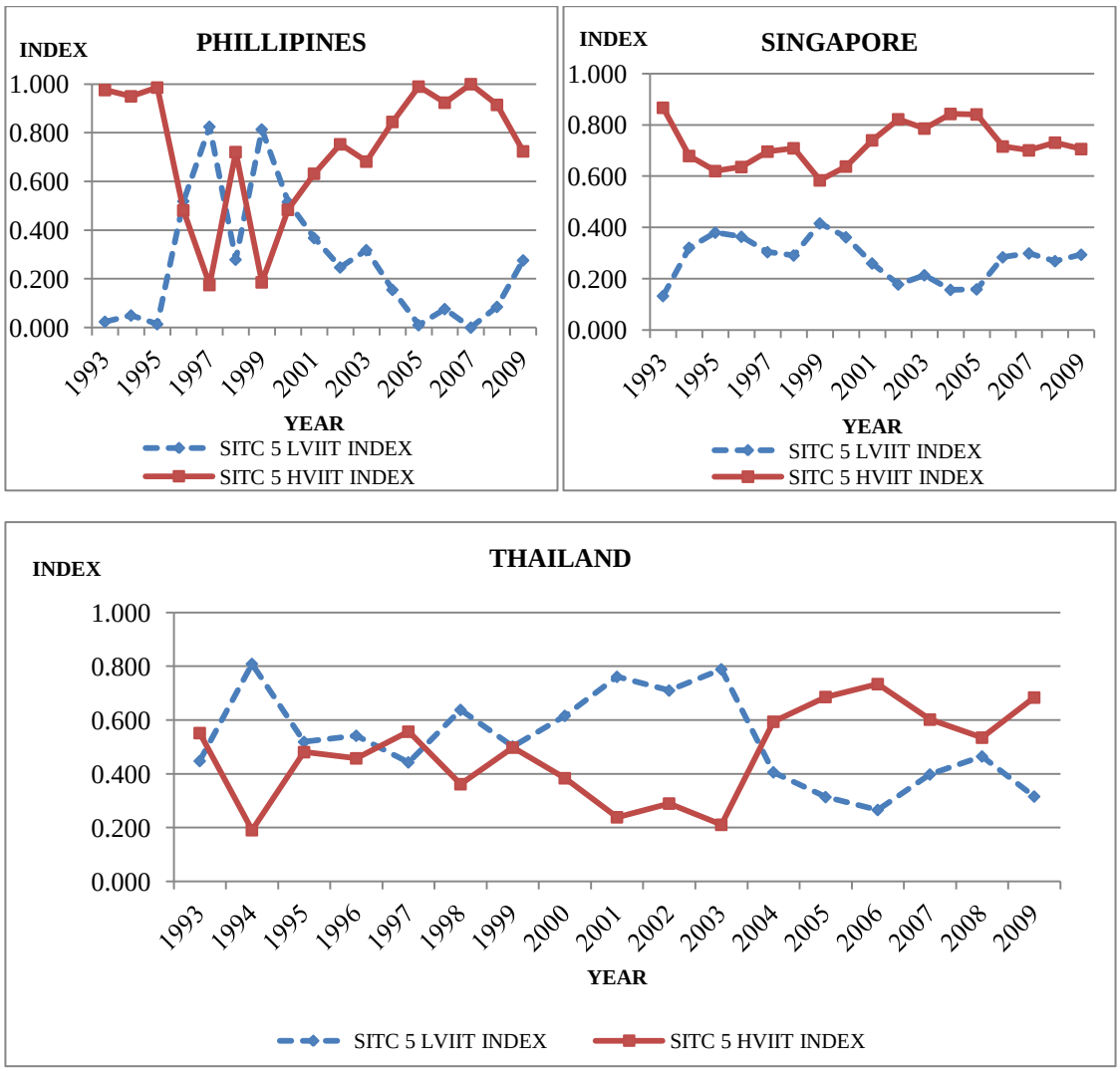


Figure 4.5, continued

Source: Author's calculation

Figure 4.5 illustrates the HVIIT and LVIIT indices between ASEAN5 countries and China for SITC 5 during 1993-2009. Although the percentage of HVIIT products was relatively high in Indonesia, the results reveal that HVIIT index was lower than LVIIT index since 1995. This implies that the value of VIIT between Indonesia and China is mainly contributed by Indonesia's LVIIT products. As such, China gains the price determination power and is eying Indonesia's low value-added products.

For Malaysia, the HVIIT and LVIIT indices in SITC 5 are quite volatile while LVIIT has been dominating VIIT since 2007. This finding reveals that Malaysia should climb up the quality ladder (Devadason, 2009) in order to regain price determination power.

On the other hand, the HVIIT dominated VIIT between Philippines and China throughout the period of study except 1997 and 1999. Similarly, the results reveal that HVIIT plays an important role in VIIT between Singapore and China in SITC 5 as the HVIIT index dominated the VIIT throughout the study period.

Besides, although the percentage of HVIIT products was lower than LVIIT products in Thailand for most of the years, the HVIIT index remained high. This implies that HVIIT dominated VIIT, particularly from 2004 onwards. This is a good indication for Thailand. These findings reveal that the trade volume of VIIT between Thailand and China is mainly contributed by Thailand's HVIIT products. Thus, this signifies the importance of HVIIT products in Thailand.

To examine whether the emergence of HVIIT plays an important role in stimulating VIIT between respective ASEAN5 countries and China, and to study whether each ASEAN5 country is vulnerable to China's external shock, it is vital to scrutinize the relationship between HVIIT and VIIT by referring to Figure 4.1 and Figure 4.5.

Figure 4.1 illustrates HIIT and VIIT indices between ASEAN5 countries and China for SITC 5, and Figure 4.5 exhibits the HVIIT and LVIIT indices between ASEAN5 countries and China for SITC 5 during 1993-2009. Based on these figures, the VIIT indices were moving closely with HVIIT indices during the study period for all ASEAN5 countries with China. This portrays the importance of high value-added products (HVIIT) which has contributed in strengthening bilateral processing trade between ASEAN5 countries and China in SITC 5.

The HVIIT index and VIIT index for Indonesia-China trade (refer to Figure 4.1 and Figure 4.5) exhibited analogous trend in the same time since 2003 onwards. This reveals that HVIIT in Indonesia-China is depending highly on VIIT. This would make processing trade collaboration between Indonesia and China relatively weak. This implies that the emergence of HVIIT can only enhance the bilateral VIIT between Indonesia and China at present but would not play an important role in sustaining the bilateral VIIT with China in the future. The emergence of HVIIT could not stimulate processing trade. Hence, Indonesia is vulnerable to China's external shock in SITC 5.

On the other hand, in the case of Malaysia (refer to Figure 4.1 and Figure 4.5), it is noticeable that an increase in HVIIT index in 2001, 2005 and 2006 corresponded with an increase in VIIT index for the respective subsequent year. The HVIIT index increased from 2000 with 0.355 to 0.536 in 2001; 0.503 in 2004 to 0.530 in 2005 and 0.530 in 2005 to 0.653 in 2006. Meanwhile, the VIIT index increased from 0.616 in 2001 to 0.767 in 2002; 0.664 in 2005 to 0.734 in 2006 and 0.734 in 2006 to 0.746 in 2007. In addition, a decline in HVIIT index in 2000 with 0.355 from 0.575 in 1999 and 2002 with 0.491 from 0.536 in 2001 also corresponded with a tandem trend in VIIT index for the subsequent year. The VIIT index had slipped in 2001 with 0.616 from 0.674 in 2000, and 0.528 in 2003 from 0.767 in 2002. Hence, this evidenced that the high quality products will lead to processing trade. This finding supports the argument of McKibbin and Woo (2003) where the country should improve the quality of the traded goods. This finding also confirms that Malaysia will be less vulnerable to China's external shock as long as Malaysia manages to improve and develop more high value-added products, which fit the requirements of China.

Besides, since Philippines is not prone to IIT in SITC 5 and the number of products involved in VIIT in this manufacturing sub-sector is relatively less, she is not vulnerable to China's external risk. Nevertheless, the emergence of HVIIT products can enhance Philippines price determination power.

Conversely, both HVIIT indices and VIIT indices in Singapore-China exceeded the value of 0.55 throughout the study period. This confirms that Singapore-China bilateral trade are complementary in nature, which is consistent with the findings of Zhang and Hock (1996). In addition, in view of the fact that Singapore is having abundance of HVIIT products, it is believed that Singapore has stronger price determination power than China. Hence, Singapore will be less vulnerable to China's external shock and this translates into sustainable IIT between Singapore and China in SITC 5.

On the other hand, in the case of Thailand (refer to Figure 4.1 and Figure 4.5), the VIIT index slipped in 2001 with 0.886 form 0.908 in 2000; 2002 with 0.84 from 0.886 in 2001, 2003 with 0.624 from 0.84 in 2002, 2007 with 0.68 from 0.879 in 2006 and 2008 with 0.663 from 0.680 in 2007. Meanwhile, the HVIIT also demonstrated a similar trend in the years mentioned above. Besides, the VIIT index increased in 1999 with 0.900 from 0.811 in 1998; 2004 with 0.783 from 0.624 in 2003; and 2009 with 0.852 from 0.663 in 2008 while HVIIT index also increased in the same time. This reveals that HVIIT in Thailand-China is highly depending on VIIT. This translates into heighten vulnerability of Thailand to China's external shock in SITC 5.

SITC 6

Table 4.14: Percentage of SITC 6 Products for Each VIIT Category in Respective ASEAN5 Countries Bilateral VIIT with China in Year 1993, 1996, 1999, 2002, 2005, 2009

Year/Types of products	Country/ Number of products (percentage)				
1993	**Indonesia**	**Malaysia**	**Philippines**	**Singapore**	**Thailand**
HVIIT	14(63.6)	13(59.1)	8(57.1)	33(86.8)	24(66.7)
LVIIT	8(36.4)	9(40.9)	6(42.9)	5(13.2)	12(33.3)
Total VIIT products	**22**	**22**	**14**	**38**	**36**
1996					
HVIIT	24(72.7)	13(50)	10(66.7)	45(81.8)	29(58)
LVIIT	9(27.3)	13(50)	5(33.3)	10(18.2)	21(42)
Total VIIT products	**33**	**26**	**15**	**55**	**50**
1999					
HVIIT	34(72.3)	28(63.6)	16(84.2)	49(86)	33(66)
LVIIT	13(27.7)	16(36.4)	3(15.8)	8(14)	17(44)
Total VIIT products	**47**	**44**	**19**	**57**	**50**
2002					
HVIIT	29(64)	20(52.6)	12(66.7)	48(88.9)	24(66.7)
LVIIT	16(36)	18(47.4)	6(33.3)	6(11.1)	12(33.3)
Total VIIT products	**55**	**38**	**18**	**54**	**36**
2005					
HVIIT	35(74.5)	26(76.5)	12(75)	44(84.6)	28(60.9)
LVIIT	12(25.5)	8(23.5)	4(25)	8(15.4)	18(39.1)
Total VIIT products	**47**	**34**	**16**	**52**	**46**
2009					
HVIIT	22(56.4)	28(71.8)	21(87.5)	46(95.8)	33(62.3)
LVIIT	17(43.6)	11(28.2)	3(12.5)	2(4.2)	20 (37.7)
Total VIIT products	**39**	**39**	**24**	**48**	**53**

Source: Same as Table 4.13

The table above reveals that the percentages of VIIT products involved in HVIIT between ASEAN5 countries and China in SITC 6 were the broadest for Singapore in the range of 81.8-95.8%, followed by 57.1-87.5% for Philippines, 58-66.7% for Thailand, 50-76.5% for Malaysia and 56.4-74.51% for Indonesia during the period of study.

Arising from this, the VIIT in all ASEAN5 countries were dominated by the HVIIT products. Although the previous section has revealed that VIIT indices showed a declining trend in most of the ASEAN5 countries with China in SITC 6 in 2000s, the analysis from the table above indicates that, generally, the number of VIIT products and the percentage of HVIIT products for all ASEAN5 countries were remarkably better than that of SITC 5 throughout the study period.

Indonesia, in particular, has greater products involved in VIIT with China in comparison with Malaysia and Philippines. In addition, the number of VIIT products for Philippines in SITC 6 was on average of 50% more than that of SITC 5. Stemming from the higher percentage of HVIIT products, it is believed that ASEAN5 countries are able to identify a larger number of resilient products in SITC 6.

To examine the importance of HVIIT and LVIIT with respect to the value of VIIT, the indices of HVIIT and LVIIT in SITC 6 for SITC 6 have been computed and presented in the figure below.

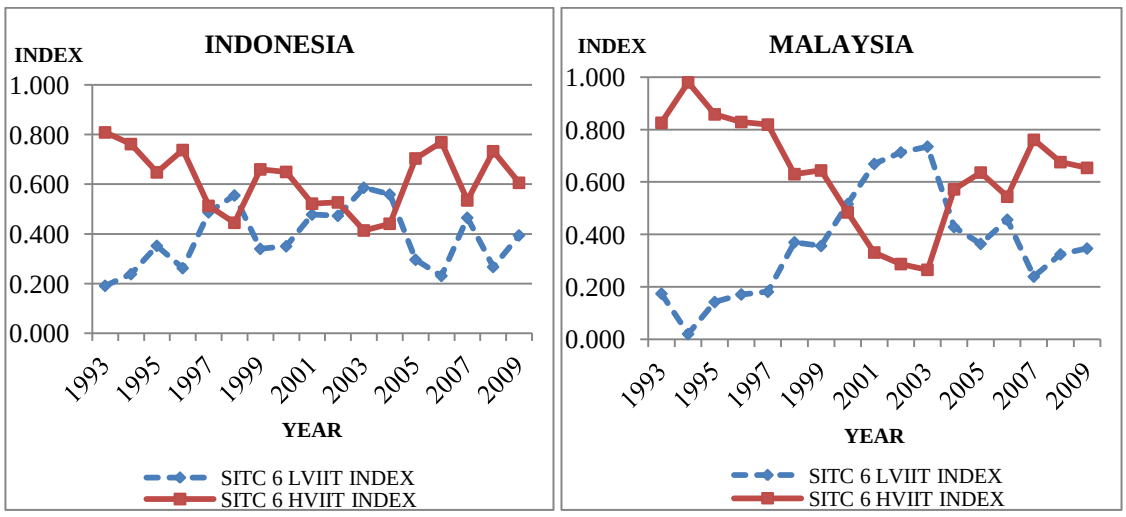


Figure 4.6: HVIIT and LVIIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

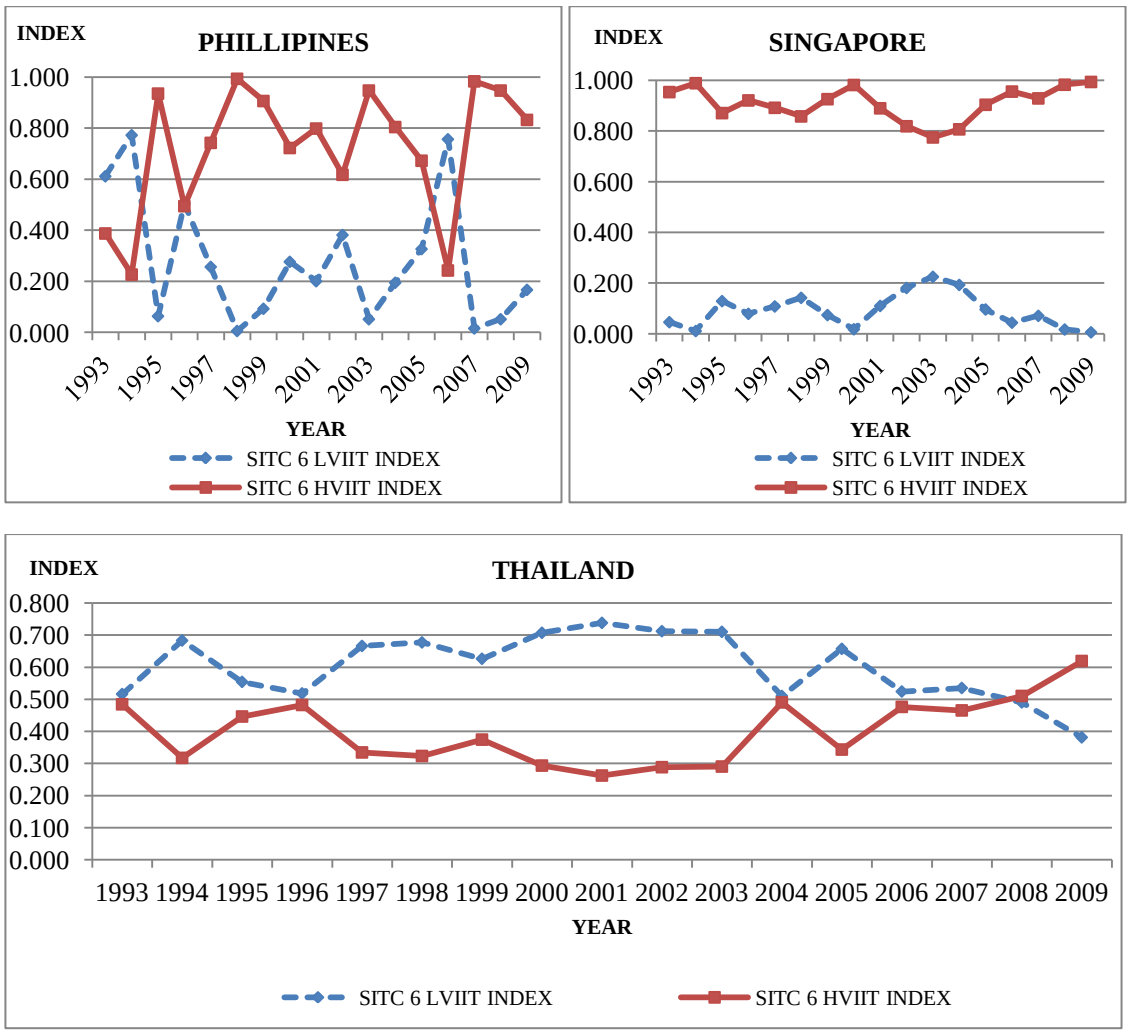


Figure 4.6, continued

Source: Same as Figure 4.5

Based on Figure 4.6, HVIIT outperformed LVIIT for Indonesia-China trade throughout the study period except 1998, 2003 and 2004, where HVIIT index was 0.445, 0.414 and 0.441, respectively. Therefore, it is a positive indicator that Indonesia is having greater price determination power than China in most of the VIIT products.

For Malaysia, the HVIIT index exhibited a decreasing trend since 1994 and alternated with an increasing trend from 2003 to 2006. However, the decreasing trend re-emerged from 2007 onwards although the VIIT was still dominated by HVIIT. Therefore, Malaysia should expedite the development of high value-added products in SITC 6 in

order to enhance the bilateral VIIT with China and to gain the price determination power.

The trend of HVIIT index for Philippines is similar to that of SITC 5, which was quite volatile during the study period. Based on Figure 4.6, the HVIIT index demonstrated steep descends from 2003-2006 with 0.948 in 2003 to 0.243 in 2006. It was then followed by steep ascends from 2006 to 2007 with 0.248 in 2006 to 0.984 in 2007. This indicates that the trade ties between Philippines and China is rocky whereby Philippines does not integrate well in China's production network in SITC 6.

On the other hand, HVIIT index between Singapore-China remained high and stable throughout the study period, which confirms that HVIIT plays an important role for Singapore-China trade in SITC 6.

Besides, although the percentage of HVIIT products was relatively higher than LVIIT products in Thailand, the HVIIT index was below LVIIT index in all years except 2008 and 2009 with HVIIT index 0.510 and 0.619, respectively. This is a negative indication for Thailand. The high LVIIT index shows that the trade value between Thailand and China is mainly contributed by Thailand's LVIIT products. In a nutshell, the high value-added products of Thailand do not really meet the requirements of China. Nevertheless, Thailand is catching up as her HVIIT index has been increasing since 2008; this situation is expected to be reversed in the future.

To examine whether the emergence of HVIIT products plays an important role in stimulating VIIT between respective ASEAN5 countries and China in SITC 6, and to study whether respective ASEAN5 country is vulnerable to China's external shock , it is worth mentioning the relationship between HVIIT and VIIT by referring to Figure 4.2 and Figure 4.6.

Figure 4.2 exhibits the HIIT and VIIT Indices between ASEAN5 countries and China for SITC 6 while Figure 4.6 illustrates the HVIIT and LVIIT Indices between ASEAN5 countries and China for SITC 6 during 1993-2009.

Based on these figures, both HVIIT and VIIT indices moved closely for Indonesia-China trade since 1997. It is noticeable that the VIIT index of Indonesia slipped in 2000 with 0.764, 2003 with 0.673 and 2007 with 0.658 compared to 0.777, 0.744 and 0.857 in 1999, 2002 and 2006 respectively. Meanwhile, the HVIIT also demonstrated the similar trend in the years mentioned above. The HVIIT index slipped in 2000 with 0.650, 2003 with 0.414 and 2007 with 0.535 compared to 0.660, 0.527 and 0.769 in 1999, 2002 and 2006 respectively. Besides, Figure 4.2 also shows that the VIIT index increased in 1999, 2004, 2006 and 2008 while HVIIT index (refer to Figure 4.6) also increased in the same year. This reveals that HVIIT in Indonesia-China is highly depending on VIIT. This would cause relatively weak processing trade collaboration between Indonesia and China. This implies that the emergence of HVIIT products is unable to sustain the bilateral VIIT between Indonesia and China in the long-run and translates into heighten vulnerability of Indonesia to China's external shock in SITC 6.

In the case of Malaysia, both HVIIT and VIIT indices have been moved closely since 2004. In addition, a decrease on HVIIT in 2005 and 2007 corresponded with an increase in VIIT index for the subsequent years respectively. It is evidenced that HVIIT index increased from 0.572 in 2004 to 0.636 in 2005 and 0.544 in 2006 to 0.761 in 2007 while VIIT index increased from 0.441 in 2005 to 0.741 in 2006 and 0.662 in 2007 to 0.810 in 2008. Meanwhile, an increase in HVIIT index in 2006 and 2008 was also corresponding with a tandem trend in VIIT index for the subsequent year. Based on the two figures mentioned above, the HVIIT index decreased from 0.636 in 2005 to 0.544 in 2006 and 0.761 in 2007 to 0.676 in 2008. Similarly, the VIIT index also decreased

from 0.741 in 2006 to 0.662 in 2007, 0.810 in 2008 to 0.656 in 2009. Hence, the results are similar with that of SITC 5. The high quality products (HVIIT) for which Malaysia has the price determination power, will lead the processing trade between Malaysia and China. This finding supports the argument of McKibbin and Woo (2003) whereby each country should improve the quality of her trade goods to enhance the sustainability of trade. This finding also confirms that Malaysia will be less vulnerable to China's external shock in SITC 6 as long as Malaysia manages to improve continuously and develop high value-added products.

Nonetheless, the HVIIT and VIIT indices for Philippines-China did not move in the same trend (Figure 4.2 and Figure 4.6). Since Philippines is not focusing on IIT in SITC 6, China's external shock will not give rise to significance impact on Philippines's economy even though HVIIT could not stimulate processing trade between the two countries. However, to enhance the trade linkages with China, it is crucial for Philippines to identify the resilient products in SITC 6, which stemmed from HVIIT.

In the case of Singapore, high value of both HVIIT and VIIT indices, coupled with abundance of capital, have made Singapore less vulnerable to China's external shock. However, the performance of SITC 6 in Singapore is relatively poor compared with that of SITC 5.

As for Thailand generally, VIIT index did not move in tandem with HVIIT index during the period of study except from 2006 onwards. Moreover, with the VIIT mainly dominated by LVIIT during the study period (refer to Figure 4.6), it is believed that Thailand is vulnerable to China's external shock in SITC 6 and the intensity of trade between Thailand and China is not focusing on Thailand's HVIIT products. However, this situation could be reversed as both VIIT and HVIIT indices are improving in the late 2000s (refer to Figure 4.2 and Figure 4.6).

SITC 7

Table 4.15: Percentage of SITC 7 Products for Each VIIT Category in Respective ASEAN5 Countries Bilateral VIIT with China in Year 1993, 1996, 1999, 2002, 2005, 2009

Year/ Type of Product	Country				
1993	**Indonesia**	**Malaysia**	**Philippines**	**Singapore**	**Thailand**
HVIIT	3(60)	29(78.4)	7(87.5)	61(91)	30(76.9)
LVIIT	2(40)	8(21.6)	1(12.5)	6(9)	9(23.1)
Total VIIT products	**5**	**37**	**8**	**67**	**39**
1996					
HVIIT	17(80.9)	40(81.6)	25(92.6)	55(91.7)	35(72.9)
LVIIT	4(19.1)	9(18.4)	2(7.4)	5(8.3)	13(27.1)
Total VIIT products	**21**	**49**	**27**	**60**	**48**
1999					
HVIIT	36(90)	44(72.1)	25(80.6)	50(83.3)	45 (77.6)
LVIIT	4(10)	17(27.9)	6(19.4)	10(16.7)	13(22.4)
Total VIIT products	**40**	**61**	**31**	**60**	**58**
2002					
HVIIT	34(89.5)	45(78.9)	39(92.9)	56(91.8)	40(80)
LVIIT	4(10.5)	12(21.1)	3(7.1)	5 (8.2)	10 (20)
Total VIIT products	**38**	**57**	**42**	**61**	**50**
2005					
HVIIT	32(86.5)	36(78.3)	29(93.5)	47(87)	43(84.3)
LVIIT	5(13.5)	10(21.7)	2(6.5)	7(13)	8(15.7)
Total VIIT products	**37**	**46**	**31**	**54**	**51**
2009					
HVIIT	24(100)	26(66.7)	22(95.7)	47(90.4)	45(78.9)
LVIIT	0	13(33.3)	1(4.3)	5(9.6)	12(21.1)
Total VIIT products	**24**	**39**	**23**	**52**	**57**

Source: Same as Table 4.13

Table 4.15 above reveals that the percentages of VIIT products involved in HVIIT between ASEAN5 countries and China in SITC 7 were in the range of 83.3-91.8% for Singapore, 87.5-95.7% for Philippines, 72.9-84.3% for Thailand, 66.7-81.6% for Malaysia and 60-100% for Indonesia during the study period. Arising from this, the

VIIT in all of the ASEAN5 countries are obviously dominated by the HVIIT products. As such, ASEAN5 countries have greater price determination power than China in relation to VIIT in SITC 7.

The analysis from the above table also indicates that the number of VIIT products and the percentages of VIIT products involved in HVIIT for all ASEAN5 countries are remarkably better than SITC 5 and SITC 6 given that the trade volume from SITC 7 is the largest for respective ASEAN5 countries. Philippines, in particular, has the greatest number of products involving in VIIT with China in SITC 7 as compared to other manufacturing sub-sectors. However, it is noticeable that the number of HVIIT products for ASEAN5 countries (excluding Thailand) exhibited a decreasing trend in 2000s.

To further examine the importance of HVIIT and LVIIT with respect to the value of VIIT, the indices of HVIIT and LVIIT for SITC 7 have been computed and presented in the figure below.

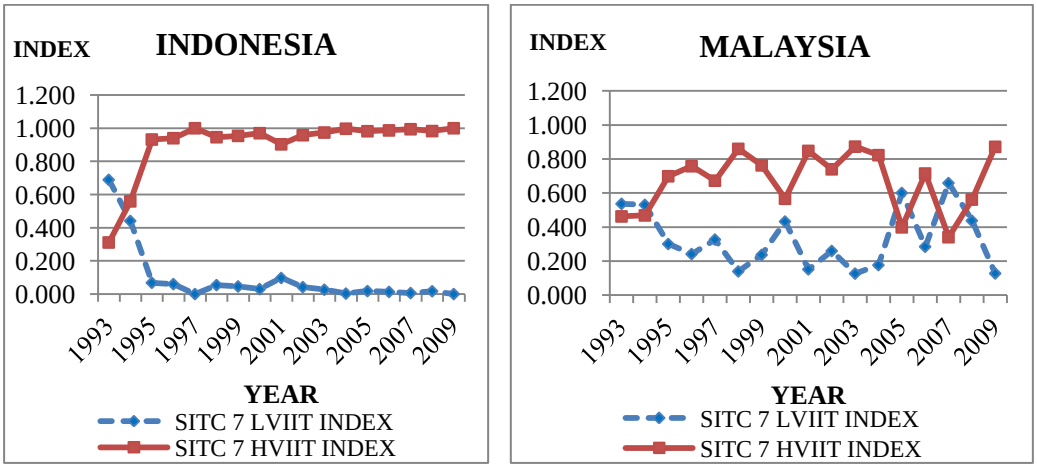


Figure 4.7: HVIIT and LVIIT Indices between ASEAN5 Countries and China for SITC 7 (1993-2009)

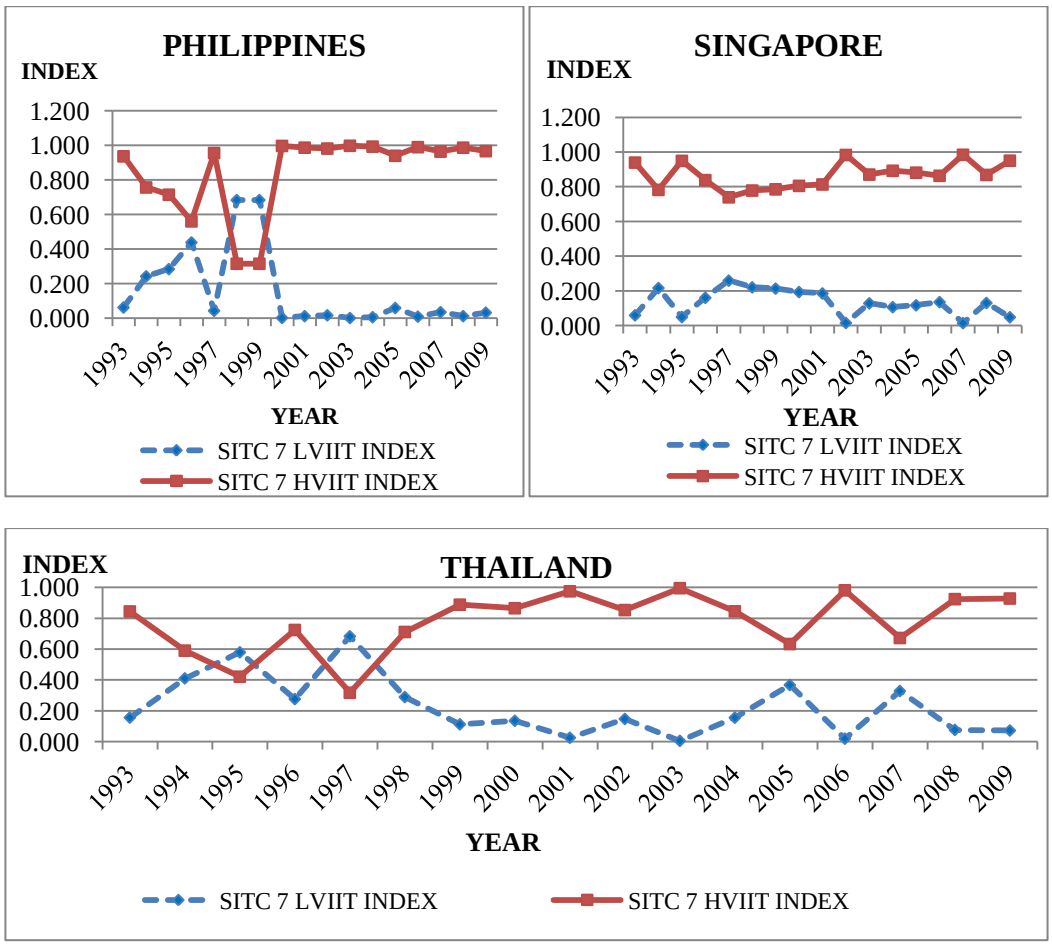


Figure 4.7, continued

Source: Same as Figure 4.5

Based on Figure 4.7 above, generally, the HVIIT indices between respective ASEAN5 countries with China were higher than LVIIT indices. This finding confirms that HVIIT plays a prominent role in SITC 7 for all ASEAN5 countries in relation to China's trade. However, Figure 4.7 also illustrates that the HVIIT index of Philippines was very volatile before 2000s while HVIIT index of Malaysia was quite volatile particularly from 2004 onwards. This could be a negative indicator to Malaysia as it implies that Malaysia's price determination power is inconsistent.

In order to identify whether the emergence of HVIIT plays an important role in stimulating VIIT between respective ASEAN5 countries and China, and to study whether each ASEAN5 country is vulnerable to China's external shock, it is vital to examine the relationship between HVIIT and VIIT.

Figure 4.3 exhibits the HIIT and VIIT indices between ASEAN5 countries and China for SITC 7 while Figure 4.7 illustrates the HVIIT and LVIIT indices between ASEAN5 countries and China for SITC 7. Based on these figures, generally, VIIT index was having the similar trend with HVIIT index. This portrays the importance of HVIIT, which has contributed in strengthening bilateral VIIT between ASEAN5 countries and China in SITC 7.

In the case of Indonesia, she was having consistently high VIIT and HVIIT indices with China in most of the years during the period of study. This causes Indonesia to be less vulnerable to China's external shock. However, since Indonesia involved only small range of IIT products in relation to China's trade, she is less engaging in intra-industry trade with China. To integrate well into China's production network, Indonesia has to identify the resilient products and thereafter expand IIT with China.

In the case of Malaysia, the VIIT index slipped to 0.38 and 0.25 in 2005 and 2007 respectively from 0.91 and 0.96 a year earlier. Meanwhile, the HVIIT fell to 0.4 and 0.34 in 2005 and 2007 respectively from 0.82 and 0.72 a year earlier. This reveals that value-added constituted in bilateral VIIT for Malaysia and China is highly dependent on processing activities. This would make the processing trade collaboration between Malaysia and China relatively weak, as a consequence of the fast pace of technology development in China that has narrowed the gap in product development between the two countries. In light of the weak processing trade collaboration, Malaysia is vulnerable to China's external shock in SITC 7.

In the case of Philippines, both VIIT and HVIIT indices remained high during the period of study. However, Philippines is vulnerable to China's external shock in SITC 7 as HVIIT is not able to lead the processing trade. This is attributable to the fact that VIIT index did not follow the trend of HVIIT index (refer to Figure 4.3 and Figure 4.7). For instance, as VIIT index decreased to 0.73 in 2003 from 0.997 a year earlier, HVIIT index increased to 0.998 in 2003 from 0.982 a year earlier. Besides, as VIIT index decreased drastically to 0.418 in 2009 from a year earlier, HVIIT index remained stable with value above 0.95.

On the other hand, both HVIIT and VIIT indices in Singapore-China bilateral IIT exceeded the value of 0.8 from 2000 onwards. Owing to the different levels of industrial development between the two countries, Singapore-China bilateral trade is more complementary in nature (Zhang and Hock, 1996), which makes Singapore less vulnerable to China's external shock.

In the case of Thailand, it is noticeable that an increase of HVIIT index in 1998, 1999, 2006 and 2008 corresponded with an increase in VIIT index for the subsequent years. Based on Figure 4.3 and Figure 4.7, it is evidenced that the HVIIT index increased to 0.711, 0.888, 0.981 and 0.924 in 1998, 1999, 2006 and 2008 respectively from 0.317, 0.711, 0.633 and 0.672 a year earlier. Meanwhile, the VIIT index also increased from 0.206 in 1998 to 0.461 in 1999 and further increased to 0.465 in 2000, 0.577 in 2006 to 0.697 in 2007 and 0.726 in 2008 to 0.858 in 2009. It is therefore believed that the crisis has provided valuable lessons for Thailand to rethink their value-added supply chain that has led the processing trade activities to get back on track. Cai (2003) reported that the 1997 Asian Financial Crisis which started in Thailand and spread to East Asian region had served as the catalyst to boost bilateral trade between ASEAN and China.

As a result, Thailand is less vulnerable to China's external shock as long as they are able to develop and upgrade their HVIIT products in SITC 7.

SITC 8

Table 4.16: Percentage of SITC 8 Products for Each VIIT Category in Respective ASEAN5 Countries Bilateral VIIT with China in Year 1993, 1996, 1999, 2002, 2005, 2009

Year/ Types of products	Country				
1993	**Indonesia**	**Malaysia**	**Philippines**	**Singapore**	**Thailand**
HVIIT	7(70)	18(78.3)	9(100)	4(80)	14(60.9)
LVIIT	3(30)	5(21.7)	0(0)	1(20)	9(39.1)
Total VIIT products	**10**	**23**	**9**	**5**	**23**
1996					
HVIIT	10(83.3)	18(85.7)	13(100)	3(100)	24(64.9)
LVIIT	2(16.7)	3(14.3)	0(0)	0(0)	13(35.1)
Total VIIT products	**12**	**21**	**13**	**3**	**37**
1999					
HVIIT	29(96.7)	11(68.8)	10(90.9)	6(100)	18(51.4)
LVIIT	1(3)	5(31.2)	1(9.1)	0(0)	17(48.6)
Total VIIT products	**30**	**16**	**11**	**6**	**35**
2002					
HVIIT	21(84)	15(88.2)	15(100)	2(100)	14(50)
LVIIT	4(16)	2(11.8)	0(0)	0(0)	14(50)
Total VIIT products	**25**	**17**	**15**	**2**	**28**
2005					
HVIIT	21(77.8)	11(84.6)	17(100)	3(100)	20(76.9)
LVIIT	6(22.2)	2(15.4)	0(0)	0(0)	6(23.1)
Total VIIT products	**27**	**13**	**17**	**3**	**26**
2009					
HVIIT	16(80)	10(83.3)	12(100)	6(100)	29(87.9)
LVIIT	4(20)	2(16.7)	0(0)	0(0)	4(12.1)
Total VIIT products	**20**	**12**	**12**	**6**	**33**

Source: Same as Table 4.13

The table above reveals that the percentages of VIIT products involved in HVIIT between ASEAN5 countries and China in SITC 8 were in the range of 90.9-100% for Philippines, 80-100% for Singapore, 70-96.7% for Indonesia, 50-87.9% for Thailand, and 68.8-88.25% for Malaysia during the period of study. Thus, HVIIT products dominated VIIT in all of the ASEAN5 countries in SITC 8. This is a positive indication for ASEAN5 countries as the results imply that ASEAN5 countries are having price determination power in most of the products in relation to VIIT with China.

It is noticeable that Indonesia has been outperforming Malaysia in terms of the number of VIIT and HVIIT products since 1999. Besides, the number of HVIIT products in Indonesia has been relatively stable since 2002 onwards. On the other hand, the number of both VIIT and HVIIT products for Malaysia exhibited a declining rate in 2000s implying that Malaysia focuses more on other manufacturing sub-sectors attributable to the nature of SITC 8, which is relatively general.

Next, the number of VIIT products for Philippines-China and Singapore-China was less than 20 types and 10 types respectively, throughout the period of study. This indicates that both Philippines and Singapore are not inclined to have VIIT with China in SITC 8. Singapore, in particular, has the poorest performance in SITC 8 comparing to other manufacturing sub-sectors.

Besides, the table above reveals that Thailand had the largest number of VIIT products with China as compared to other ASEAN5 countries in most of the years. In addition, the analysis indicates that the percentage of HVIIT products in Thailand has been increasing since 2002.

To examine the importance of HVIIT and LVIIT with respect to the value of VIIT, the indices of HVIIT and LVIIT for SITC 8 have been computed and presented in the figure below.

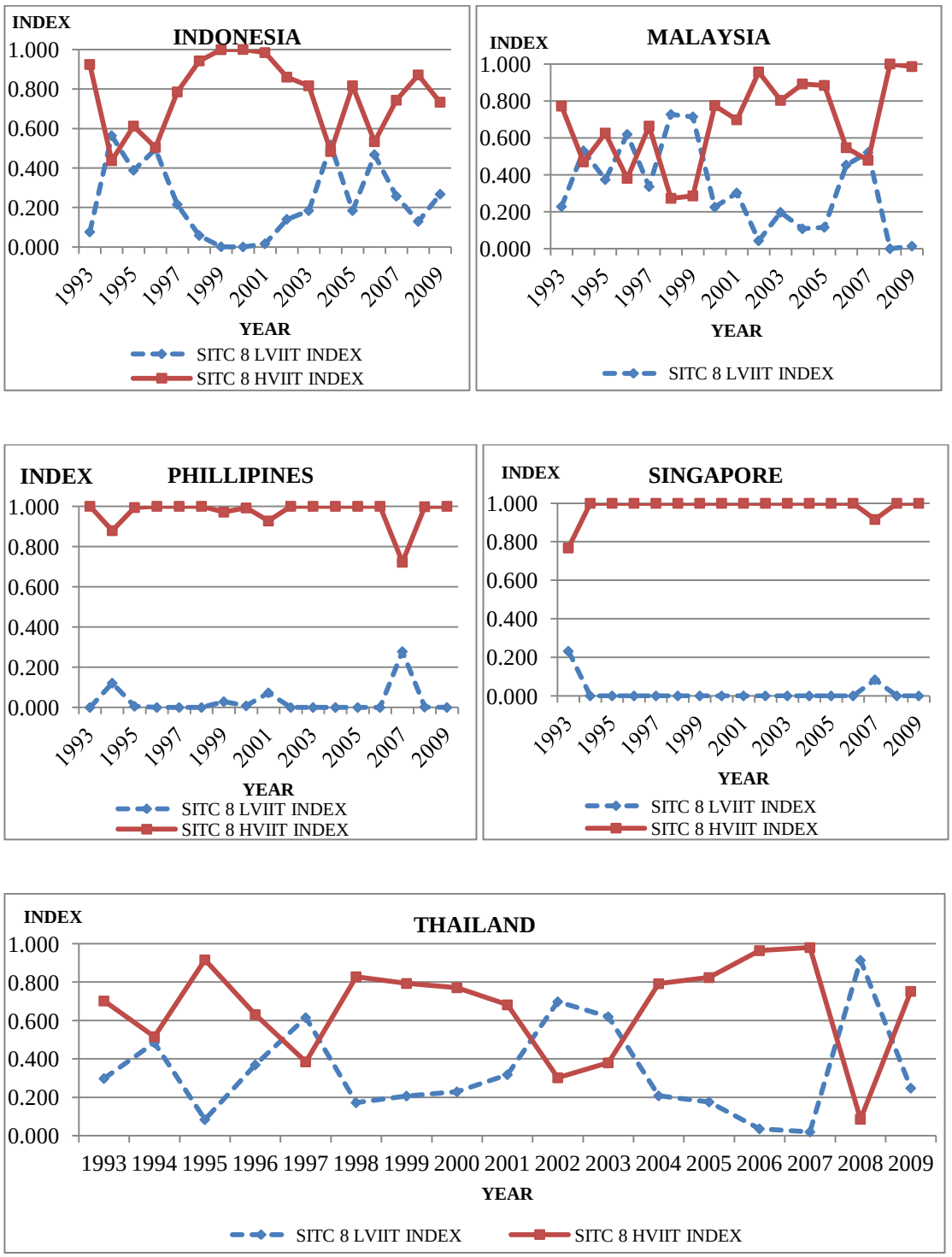


Figure 4.8: HVIIT and LVIIT Indices between ASEAN5 Countries and China for SITC 8 (1993-2009)

Source: Same as Figure 4.5

Based on Figure 4.8 above, with the exception of Philippines and Singapore, the HVIIT indices were quite volatile. For Philippines and Singapore, the extremely high and stable HVIIT indices were attributable to the high percentage of VIIT products involved in HVIIT.

Table 4.16 reveals that Indonesia was having greater HVIIT products relative to Malaysia since 1999 onwards. In addition, the analysis shows that HVIIT dominated VIIT for Indonesia-China throughout the study period except 1994 and 2004. This is a good sign as the finding implies that the trade value for Indonesia-China VIIT was mainly contributed by Indonesia's HVIIT products. However, one may need to analyze with caution as the HVIIT index started to fluctuate intensively in the late 2000s, which implies that the HVIIT between Indonesia and China was rocky.

Conversely, in the case of Malaysia, the HVIIT index was quite volatile before 2000s but it was high and stable in 2000s except 2006 and 2007. However, with the small number of IIT as well as VIIT products, it is believed that it is difficult for Malaysia to expand resilient products in SITC 8 relative to other manufacturing sub-sectors.

Besides, Thailand had the greatest number of VIIT products among ASEAN5 countries and relatively more products involved in HVIIT with China in SITC 8 throughout the study period. However, the trend of HVIIT index of Thailand was unstable. LVIIT outperformed HVIIT in 1997, 2002, 2003 and 2008 respectively with the index above 0.5. The result implies that Thailand is vulnerable to the financial crisis as the HVIIT index would decline markedly once the financial crisis happened in SITC 8. However, with the immediate rise of HVIIT index after the crisis, the result also reveals that Thailand is able to get back on track in a short period of time. Thus, further investigation is required to examine whether Thailand is vulnerable to China's external shock in SITC 8.

To examine whether the emergence of HVIIT plays an important role in stimulating VIIT between respective ASEAN5 countries and China and to study whether each ASEAN5 country is vulnerable to China's external shock in SITC 8, it is noteworthy to analyze the connection between VIIT and HVIIT indices. Figure 4.4 shows HIIT and VIIT indices between ASEAN5 countries and China while Figure 4.8 exhibits the LVIIT and HVIIT indices between ASEAN5 countries and China for SITC 8 during 1993-2009. Based on these figures, the relationship between VIIT and HVIIT indices are different for each ASEAN5 country.

The analysis reveals that both VIIT and HVIIT indices for Indonesia show a similar trend during the period of study except 1998, 2002, 2004, 2005, 2006 and 2009. It is noticeable that both VIIT and HVIIT indices of Indonesia-China trade exhibited a decreasing trend in 1994, 1996, 2001 and 2003 and exhibited an increasing trend in 1995, 1997, 1999, 2000, 2007 and 2008 simultaneously. As such, there is a weak processing trade collaboration between Indonesia and China as HVIIT is unable to stimulate processing trade. Hence, Indonesia is vulnerable to China's external shock.

Besides, the high value-added products are less influential in accelerating the growth of VIIT between Malaysia and China. This is due to the fact that the trend of VIIT index did not follow the movement of HVIIT index in most of the years during the period of study. For instance, the trend of HVIIT index was quite volatile from 1993 to 2001, but VIIT index was relatively stable from 1994 to 2001. In addition, as HVIIT index decreased from 0.884 in 2005 to 0.547 in 2006, VIIT increased from 0.720 to 0.943 in the same period of time. Conversely, as HVIIT index increased from 0.479 in 2007 to 1.0 in 2008, VIIT decreased from 0.918 to 0.565. (Refer to Figure 4.4 and Figure 4.8).

The analysis reveals that both HVIIT and VIIT indices in Philippines were moving towards the similar trend closely except 2002 and 2009. Furthermore, both HVIIT and

VIIT indices were remarkably high with an average of 0.919 and 0.97 respectively during the period of study. Hence, she is not vulnerable to China's external shock. However, SITC 8 is not Philippines's hub in view of the small percentage of IIT and VIIT products.

In the case of Singapore, HVIIT index was approaching 1.0 throughout the study period although her VIIT index was relatively volatile. This implies that Singapore only focuses on having trade with China in high value-added products. However, with the less number of HVIIT and VIIT products compared to other manufacturing sub-sector, SITC 8 is not Singapore's focal point. Singapore is less vulnerable to China's external shocks.

In the case of Thailand, VIIT index was moving closely with HVIIT index before 1997 and after 2004. Figure 4.4 and Figure 4.8 show that VIIT index slipped in1994 with 0.53, 1996 with 0.748, 1999 with 0.645, 2000 with 0.866, and 2001 with 0.443 from a year earlier with 0.823, 0.932, 0.889, 0.645 and 0.866 respectively. Meanwhile, HVIIT index also fell at the same time. Similarly, VIIT index surged in 1995 with 0.932, 1998 with 0.889, 2004 with 0.853 and 2007 with 0.943 from a year earlier with 0.53, 0.837, 0.83 and 0.731 respectively while HVIIT index also increased at the same time. The analysis above that value-added constituted in Thailand-China trade is highly dependent on processing activities, which is similar to the case of Indonesia-China. This would cause relatively weak processing trade collaboration between Thailand and China. Hence, Thailand is vulnerable to China's external shock although the number of VIIT and HVIIT products for Thailand is relatively high in comparison with other ASEAN5 countries.

4.5 Resilient Products for each Manufacturing Sub-sector

Since the nature of HVIIT was different and fluctuated for each ASEAN5 country across manufacturing sub-sectors throughout the period of study, the analysis of HVIIT at the aggregate level and one point in time might not be able to reflect thoroughly the value-added embedded in the exported products in sustaining the trade ties between respective ASEAN5 countries and China. Hence, this study further identifies the products that appeared as HVIIT in most of the years during the study period, particularly during 2000s in each manufacturing sub-sector. The consistently high unit export price over import price reflects the quality of the exported products from each ASEAN5 country to China. Therefore, ASEAN5 countries have consistent price determination power on these products. As such, these products would emerge as the resilient products for each ASEAN5 country.

With the emergence of resilient products, intensive trade in these products could generate new sources of growth for trade sustainability between ASEAN5 countries and China. In addition, the implementation of reengineering process would become possible for ASEAN5 countries. ASEAN5 countries may import low value-added products from China and subsequently re-exported high value-added products to China for similar product code. With the lower price of intermediate goods imported from China, domestic producers of each ASEAN5 country are able to reduce their cost of production and further enhance their competitiveness. The lists of resilient products in each manufacturing sub-sector, SITC 5, 6, 7 and 8 are presented below.

SITC 5

Table 4.17: List of Resilient Products between Each ASEAN5 Country and China Bilateral Trade in SITC 5

Country	Product code	Description
Indonesia	5414	Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives, not put up as medicaments of group 542
	5513	Essential oils (terpeneless or not), including concretes and absolutes; resinoids; concentrates of essential oils in fats, in fixed oils, in waxes or the like, obtained by enfleurage or maceration; terpenic by-products of the deterpenation of essential oils; aqueous distillates and aqueous solutions of essential oils
	5812	Tubes, pipes and hoses, rigid
Malaysia	5334	Paints and varnishes (including enamels, lacquers and distempers); plastics in solution; prepared water pigments of a kind used for finishing leather; pigments (including metal powders and flakes) dispersed in non-aqueous media, in liquid or paste form, of a kind used in the manufacture of paints (including enamels); stamping foils; dyes and other colouring matter put up in forms or packings for retail sale
	5754	Amino resins, phenolic resins and polyurethanes
	5972	Anti-knock preparations, oxidation inhibitors, gum inhibitors, viscosity improvers, anti-corrosive preparations and other prepared additives for mineral oils (including gasoline) or for other liquids used for the same purposes as mineral oils
Philippines	5121	Acyclic monohydric alcohols
	5986	Organic chemical products, n.e.s.
Singapore	5123	Cyclic alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives
	5139	Carboxylic acids with additional oxygen function and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives
	5146	Oxygen-function amino-compounds
	5156	Lactams; heterocyclic compounds with oxygen hetero-atom(s) only
	5169	Organic chemicals, n.e.s.
	5221	Carbon (including carbon black), n.e.s.
	5238	Other metal salts and peroxysalts of inorganic acids
	5311	Synthetic organic colouring matter and preparations based thereon

Table 4.17, continued

Singapore	5332	Printing ink
	5411	Provitamins and vitamins, natural or reproduced by synthesis (including natural concentrates), derivatives thereof used primarily as vitamins, and intermixtures of the foregoing, whether or not in any solvent, not put up as medicaments of group 542
	5415	Hormones, natural or reproduced by synthesis; derivatives thereof, used primarily as hormones; other steroids used primarily as hormones, not put up as medicaments of group 542
	5629	Fertilizers, n.e.s.
	5816	Other tubes, pipes and hoses
	5817	Fittings for tubes, pipes and hoses (e.g., joints, elbows, flanges), of plastics
	5829	Other plates, sheets, film, foil and strip, of plastics
	5839	Monofilament of other plastic of which any cross-sect. dim. > 1mm
	5922	Albuminoidal substances, modified starches and glues
Thailand	5335	Colouring preparations of a kind used in the ceramic, enamelling and glass industries; artists' colours, paint driers and mastics
	5419	Pharmaceutical goods, other than medicaments
	5421	Medicaments containing antibiotics or derivatives thereof
	5759	Plastics, n.e.s.

Source: Author's analysis based on HVIIT

The trade surpluses between respective ASEAN5 countries and China (with the exception of Indonesia and Philippines) in SITC 5 are attributable in part to the identified resilient products for ASEAN5 countries. With the lower price of intermediate goods imported from China, each ASEAN5 country is able to further enhance her comparative advantage. For instance, GrandChem Technology Sdn. Bhd. is one of the Malaysian domestic companies, which specializes in paints and varnishes (product code: 5334). To enhance its competitiveness, GrandChem Technology Sdn. Bhd. imports enamels and pigments (product code: 5334, raw materials for paints and varnishes) from China to process into paints and varnishes (product code: 5334), which are then re-exported to China.

Based on Table 4.17, Indonesia's resilient products for VIIT with China in SITC 5 are vegetable alkaloids, which are not from group 542, essential oils, tubes, pipes and hoses, and rigid products. Malaysia's resilient products are mainly made up of Amino, phenolic resin etc, additive for mineral oil and paints as well as varnish. Meanwhile, resilient products for Philippines are Acyclic monohydric alcohols and organic chemical products. Singapore has the most resilient products in relation to VIIT with China. They are mainly organic chemicals products and plastics in non-primary forms. Besides, Singapore's resilient products also include inorganic chemicals, dyes, colouring materials as well as pharmaceutical products. On the other hand, resilient products of Thailand in SITC 5 are mainly made up of dyes, colouring materials followed by medical and pharmaceutical products.

Nevertheless, the results reveal that some ASEAN5 countries are sharing the similar resilient products. Such products are presented in Table 4.19.

Table 4.18: List of Resilient Products among ASEAN5 Countries with China Bilateral Trade in SITC 5

ASEAN5 Countries	Product Code	Product Description
Indonesia and Singapore	5157	Other heterocyclic compounds; nucleic acids
	5822	Other plates, sheets, film, foil and strip, of plastics, non-cellular and not reinforced, laminated, supported or similarly combined with other materials
Malaysia and Singapore	5223	Inorganic acids and inorganic oxygen compounds of non-metals
	5742	Epoxide resins
Philippines and Thailand	5535	Pre-shave, shaving or aftershave preparations, personal deodorants, bath preparations, depilatories and other perfumery, cosmetic or toilet preparations, n.e.s.; prepared room deodorizers, whether or not perfumed or having disinfectant properties

Table 4.18, continued

Philippines, Singapore and Thailand	5821	Plates, sheets, film, foil, tape, strip and other flat shapes, self-adhesive, of plastics, whether or not in rolls, other than floor, wall and ceiling coverings of heading 893.31
Singapore and Thailand	5514	Mixtures of odoriferous substances and mixtures (including alcoholic solutions) with a basis of one or more of these substances, of a kind used as raw materials in industry
	5989	Chemical products and preparations, n.e.s.
Philippines and Singapore	5542	Organic surface-active agents (other than soap); surface-active preparations, washing preparations (including auxiliary washing preparations) and cleaning preparations, whether or not containing soap, n.e.s.

Source: Same as Figure 4.17

Based on the table above, the resilient products that are shared among ASEAN5 countries in SITC 5 comprise of essential oil, perfume or related products. The negative sign of SVIIT in SITC 5 implies that there is intense competition rather than complementary among ASEAN5 countries in relation to China's trade in SITC 5. However, the competition in ASEAN5 countries' resilient products is healthy as this could foster improvement in the quality of the products.

SITC 6

Table 4.19: List of Resilient Products between Each ASEAN5 Country and China Bilateral Trade in SITC 6

Country	Product code	Description
Indonesia	6299	Hard rubber; articles of hardened rubber or of unhardened vulcanized rubber, n.e.s.
	6551	Pile fabrics (including "long pile" fabrics and terry fabrics), knitted or crocheted, whether or not impregnated, coated, covered, or laminated
	6579	Special products of textile materials
	6651	Containers, of glass, of a kind used for the conveyance or packing of goods; stoppers and closures, of glass; glass inners for vacuum vessels
	6659	Articles made of glass, n.e.s.
Malaysia	6255	Other new pneumatic tyres
	6351	Packings and cable-drums of wood; wooden box pallets and the like
	6578	Rubber thread and cord, textile-covered; textile yarn, and strip and the like of heading 651.77 or 651.88, impregnated, coated, covered or sheathed with rubber or plastics
	6595	Carpets and other textile floor coverings, woven, not tufted or flocked, whether or not made up
	6823	Copper bars, rods and profiles
	6852	Lead and lead alloys, worked
	6963	Razors and razor-blades (including razor-blade blanks in strips)
Philippines	6129	Other articles of leather or of composition leather
	6514	Sewing thread of man-made fibres, whether or not put up for retail
	6531	Fabrics, woven, of synthetic filament yarn (including woven fabrics obtained from materials of heading 651.88), other than pile and chenille fabrics
	6561	Narrow woven fabrics (other than goods of subgroup 656.2); narrow fabrics consisting of warp without weft assembled by means of an adhesive (bolducs)

Table 4.19, continued

Philippine	6618	Construction materials of asbestos-cement and fibre-cement and of unfired non-metallic minerals, n.e.s.
	6649	Glass, n.e.s.
	6955	Blades for saws of all kinds (including slitting, slotting or toothless saw blades)
Singapore	6414	Kraft paper and paperboard, uncoated, n.e.s., in rolls or sheets
	6633	Manufactures of mineral materials, n.e.s. (other than ceramic)
	6770	Railway or tramway track construction material, of iron or steel
	6782	Wire of stainless steel or other alloy steel
	6825	Copper plates, sheets and strip, of a thickness exceeding 0.15 mm
	6826	Copper foil (whether or not printed or backed with paper, paperboard, plastics or similar backing materials), of a thickness (excluding any backing) not exceeding 0.15 mm; copper powders and flakes
	6832	Nickel and nickel alloys, worked (excluding electroplating anodes)
	6872	Tin and tin alloys, worked
	6924	Tanks, casks, drums, cans, boxes and similar containers, for any material (including compressed or liquefied gas), of iron, steel or aluminium, of a capacity not exceeding 300 litres, whether or not lined or heat-insulated, but not fitted with mechanical or thermal equipment
	6941	Nails, tacks, drawing-pins, corrugated nails, staples (other than those of heading 895.12) and similar articles, of iron or steel, whether or not with heads of other material, but excluding such articles with heads of copper
Singapore	6943	Nails, tacks, drawing-pins, staples (other than those of heading 895.12) and similar articles, of copper or of iron or steel with heads of copper; screws, bolts, nuts, screw hooks, rivets, cotters, cotter pins, washers (including spring washers) and similar articles, of copper
	6952	Handsaws, files, rasps, pliers, pincers, tweezers, metal-cutting shears, pipe cutters, bolt croppers, perforating punches and similar hand tools

Table 4.19, continued

Singapore	6996	Articles of iron or steel, n.e.s.
Thailand	6354	Manufactures of wood for domestic or decorative use (excluding furniture)
	6419	Converted paper and paperboard, n.e.s.
	6564	Tulles and other net fabrics (not including woven, knitted or crocheted fabrics); lace in the piece, in strips or in motifs
	6571	Felt, whether or not impregnated, coated, covered or laminated, n.e.s.
	6573	Coated or impregnated textile fabrics and products, n.e.s.
	6631	Millstones, grindstones, grinding wheels and the like, without frameworks, for grinding, sharpening, polishing, trueing or cutting, hand sharpening or polishing stones, and parts thereof, of natural stone, of agglomerated natural or artificial abrasives or of ceramics, with or without parts of other materials
	6648	Glass mirrors, whether or not framed (including rear-view mirrors)

Source: Same as Table 4.17

Based on the table above, the number of identified resilient products is relatively large as compared to SITC 5. Referring to the table above, generally, the resilient products for each ASEAN5 country to China are prone to be textile yarn, fabric and related products. Despite textile related products, Indonesia's resilient products also include non-metallic mineral manufactures and rubber manufactures while Malaysia's resilient products are made up of non-ferrous metal; cork and wood manufactures (excluding furniture); rubber manufactures and metal manufactures. The resilient products of Philippines are leather and leather manufactures; non-metallic mineral manufacturing goods and metal manufactures.

Similar to SITC 5, Singapore is having the most resilient products among ASEAN5 countries in relation to China's trade. They are mainly metal manufactures. Besides, Singapore's resilient products also include non-ferrous metal, iron and steel; non-

metallic mineral manufacturing goods as well as paper, paperboard and related products.

The resilient products of Thailand are non-metallic mineral manufacturing goods; cork and wood manufactures (excluding furniture) as well as paper, paperboard and related products.

Besides, the results reveal that some ASEAN5 countries are sharing the similar types of resilient products. These products are presented Table 4.20.

Table 4.20: List of Resilient Products among ASEAN5 Countries with China Bilateral Trade in SITC 6

ASEAN5 Countries	Product Code	Product Description
Indonesia and Malaysia	6533	Fabrics, woven, of synthetic staple fibres, containing less than 85% by weight of such fibres, mixed mainly or solely with cotton (other than pile and chenille fabrics)
Indonesia and Philippines	6997	Articles, n.e.s., of copper, nickel, aluminium, lead, zinc and tin
Indonesia and Singapore	6213	Vulcanized rubber thread and cord; plates, sheets, strip, rods and profile shapes, of unhardened vulcanized rubber
	6518	Yarn (other than sewing thread) of staple fibres; synthetic monofilament, n.e.s.; strip and the like of synthetic textile materials of an apparent width not exceeding 5 mm
Indonesia and Thailand	6638	Manufactures of asbestos; friction materials
Indonesia, Philippines and Thailand	6292	Conveyor or transmission belts or belting, of vulcanized rubber
Malaysia and Singapore	6417	Paper, paperboard, cellulose wadding and webs of cellulose fibres, coated, impregnated, covered, surface-coloured, surface-decorated or printed, not constituting printed matter within group 892, in rolls or sheets, n.e.s.
	6942	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers (including spring washers) and similar articles, of iron or steel

Table 4.20, continued

Singapore and Thailand	6931	Stranded wire, ropes, cables, plaited bands, slings and the like, of iron, steel, copper or aluminium, not electrically insulated
Indonesia, Malaysia, Singapore and Thailand	6632	Natural or artificial abrasive powder or grain, on a base of textile material, of paper, of paperboard or of other materials, whether or not cut to shape or sewn or otherwise made up
Philippines and Singapore	6214	Tubes, pipes and hoses, of unhardened vulcanized rubber, with or without their fittings (e.g., joints, elbows, flanges)
	6995	Miscellaneous articles of base metal
Malaysia, Philippines, Singapore and Thailand	6994	Springs and leaves for springs, of iron, steel or copper

Source: Same as Table 4.17

Based on Table 4.20, these products are mainly made up of metal manufactures, fabric and yarn. To enhance competitiveness, the domestic producers of ASEAN5 countries should focus on the products mentioned above. For instance, PT. Indah Jaya is a domestic producer of Indonesia who specializes in yarn (product code: 6518). Yarn has emerged as one of the resilient products shared by Indonesia and Singapore. To enhance the company competitiveness, it is advised that Indonesia should engage intensively in VIIT with China.

Besides, the econometric estimation shows that SVIIT for SITC 6 is negative but insignificant. It implies that competition among ASEAN5 countries for HVIIT trade with China is insignificant in SITC 6.

However, it is believed that the quality improvement of these products is relatively slow than that of SITC 5 as there is no intense competition that could serve as a catalyst to boost the product development.

SITC 7

Table 4.21: List of Resilient Products between Each ASEAN5 Country and China Bilateral Trade in SITC 7

Country	Product Code	Description
Indonesia	7161	Electric motors of an output not exceeding 37.5 W
	7456	Mechanical appliances (whether or not hand-operated) for projecting, dispersing or spraying liquids or powders; fire extinguishers, whether or not charged; spray-guns and similar appliances; steam or sandblasting machines and similar jet-projecting machines; parts thereof
	7483	Articulated link chain, and parts thereof, of iron or steel
	7492	Gaskets and similar joints of metal sheeting combined with other material or of two or more layers of metal; sets or assortments of gaskets and similar joints, dissimilar in composition, put up in pouches, envelopes or similar packing
	7526	Input or output units for automatic data-processing machines, whether or not presented with the rest of a system and whether or not containing storage units in the same housing
Indonesia	7761	Television picture tubes, cathode-ray (including video monitor cathode-ray tubes
	7763	Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices (including photovoltaic cells, whether or not assembled in modules or made up into panels); light-emitting diodes
	7764	Electronic integrated circuits and micro assemblies
	7781	Batteries and electric accumulators, and parts thereof
Malaysia	7212	Harvesting or threshing machinery (including straw or fodder balers); grass or hay mowers; machines for cleaning, sorting or grading seed or grain or for grading eggs, fruit or other agricultural produce (other than milling machinery of heading 727.11); parts thereof, n.e.s.
	7281	Machine tools specialized for particular industries; parts and accessories thereof
	7331	Machine tools (including presses) for working metal by forging, hammering or die-stamping; machine tools (including presses) for working metal by bending, folding, straightening, flattening, shearing, punching or notching; presses for working metal or metal carbides, n.e.s.
	7471	Pressure-reducing valves
	7621	Radio-broadcast receivers capable of operating without an external source of power (including apparatus capable of receiving radio-telephony or radio-telegraphy)

Table 4.21, continued

Malaysia	7622	Radio-broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles (including apparatus capable of receiving radio-telephony or radio-telegraphy)
	7628	Other radio-broadcast receivers (including apparatus capable of receiving radio-telephony or radio-telegraphy)
	7641	Electrical apparatus for line telephony or line telegraphy (including such apparatus for carrier-current line systems)
Philippines	7272	Other food-processing machinery, and parts thereof, n.e.s
	7284	Machinery and mechanical appliances specialized for particular industries, n.e.s
	7413	Industrial or laboratory furnaces and ovens, etc., and parts thereof
	7419	Parts, n.e.s., for the machinery of headings 741.73 through 741.89
	7429	Parts of the pumps and liquid elevators of group 742
	7519	Other office machines (e.g., hectograph or stencil-duplicating machines, addressing machines, automatic banknote dispensers, coin-sorting machines, coin-counting or wrapping machines, pencil-sharpening machines, perforating or stapling machines)
	7599	Parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with the machines of subgroups 751.1, 751.2, 751.9 and group 752
	7712	Other electric power machinery; parts of the electric power machinery of group 77
Singapore	7132	Internal combustion piston engines for propelling vehicles
	7133	Internal combustion piston engines, marine propulsion
	7138	Internal combustion piston engines, n.e.s.
	7165	Generating sets
	7233	Moving, grading, leveling, scraping, excavating, tamping, compacting, extracting or boring machinery, for earth, minerals or ores, self-propelled, n.e.s
	7234	Construction and mining machinery, n.e.s.
	7252	Other machinery for making up paper pulp, paper or paperboard (including cutting machines of all kinds)
	7317	Machine tools for planning, shaping, slotting, broaching, gear-cutting, gear grinding or gear finishing, sawing, cutting off, and other machine tools working by removing metal, sintered metal carbides or cermets, n.e.s

Table 4.21, continued

Singapore	7339	Other machine tools for working metal, sintered metal carbides or cermets, without removing material
	7421	Pumps fitted or designed to be fitted with a measuring device
	7422	Fuel, lubricating or cooling medium pumps for internal combustion piston
	7424	Reciprocating positive displacement pumps, n.e.s.
	7425	Rotary positive displacement pumps, n.e.s.
	7426	Centrifugal pumps, n.e.s.
	7434	Fans and cooker hoods incorporating a fan
	7435	Centrifuges (including centrifugal driers), n.e.s
	7444	Jacks; hoists of a kind used for raising vehicles
	7447	Continuous-action elevators and conveyors, for goods or materials
	7448	Lifting, handling, loading or unloading machinery, n.e.s.
	7453	Weighing machinery (excluding balances of a sensitivity of 5 cg or better), including weight-operated counting or checking machines; weighing-machine weights of all kinds; parts thereof
	7523	Digital processing units, whether or not presented with the rest of a system, which may contain in the same housing one or two of the following types of unit: storage units, input units, output units
	7758	Electro thermic appliances, n.e.s.
	7939	Other floating structures (e.g., rafts, tanks, coffer-dams, landing-stages, buoys and beacons)
Thailand	7139	Parts, n.e.s, for the internal combustion piston engines
	7169	Parts, n.e.s., suitable for use with the machines of group 716
	7271	Machinery used in the milling industry or for the working of cereals or dried leguminous vegetables (other than farm-type machinery)
	7285	Parts, n.e.s., of the machines and mechanical appliances of headings 723.48, 727.21 and 728.41 through 728.49
	7351	Work folders, self-opening die-heads and dividing heads for machine tools; tool folders
	7359	Parts, n.e.s., and accessories suitable for use solely or principally with the machine tools
	7469	Parts of ball- and roller bearings

Table 4.21, continued

Thailand	7491	Molding boxes for metal foundry; mould bases; molding patterns; moulds for metal (other than ingot moulds), metal carbides, glass, mineral materials, rubber or plastics
	7722	Printed circuits
	7724	Electrical apparatus for switching or protecting electrical circuits or for making connections to or in electrical circuits (e.g., switches, fuses, lightning arresters, voltage limiters, surge suppressors, plugs, junction boxes), for a voltage exceeding 1,000 V
	7726	Boards, panels (including numerical control panels), consoles, desks, cabinets and other bases, equipped with two or more apparatus of subgroup 772.4 or 772.5, for electrical control or the distribution of electricity (including those incorporating instruments or apparatus of groups 774, 881, 884 or of division 87, but excluding the switching apparatus of subgroup 764.1)
	7728	Parts suitable for use solely or principally with the apparatus falling within subgroups 772.4, 772.5 and 772.6
	7732	Electrical insulating equipment

Source: Same as Table 4.17

Based on Table 4.21, the number of resilient products identified with HVIIT linkage to China is the largest for SITC 7 among all manufacturing sub-sectors given that SITC 7 has contributed the largest trade value for respective ASEAN5 countries in relation to China's trade.

Referring to the Table 4.21 above, Indonesia's resilient products are mainly made up of mechanical and basic electrical and electronics products. Malaysia's resilient products are machine tools, radio and broadcasting, electrical and electronics products.

As such, PENSONIC Holdings Berhad, which is the domestic producer of Malaysia specializing in manufacturing electronic and electrical products including the identified Malaysia's resilient products (product code: 7621, 7622, 7628 and 7641) are advised to engage in VIIT with China intensively in order for the products mentioned above to further enhance its comparative advantage.

Meanwhile, the resilient products for Philippines are food processing and office machineries. Singapore's resilient products are more diversified and sophisticated than other ASEAN5 countries. They include pumps, equipment, and more advance electronics. Finally, Thailand's resilient products mainly consist of machine tools, moulds and dies, and electrical machineries.

Besides, the results reveal that some ASEAN5 countries are sharing the similar types of resilient products in SITC 7. These products are presented in the following table.

Table 4.22: List of Resilient Products among ASEAN5 Countries with China Bilateral Trade in SITC 7

ASEAN5 Countries	Product Code	Product Description
Indonesia and Malaysia	7638	Sound-recording and other sound-reproducing apparatus; video-recording or reproducing apparatus, whether or not incorporating a video tuner
Indonesia and Philippines	7723	Electrical resistors (including rheostats and potentiometers), other than heating resistors; parts thereof
Indonesia and Singapore	7431	Air or vacuum pumps, air or other gas compressors, ventilating or recycling hoods (other than cooker hoods) incorporating a fan
	7527	Storage units, whether or not presented with the rest of a system
	7529	Data processing equipment, n.e.s.
Indonesia and Thailand	7649	Parts and accessories suitable for use solely or principally with the apparatus of division 76
	7788	Electrical machinery and equipment, n.e.s.
Indonesia, Philippines and Thailand	7725	Electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits (e.g., switches, relays, fuses, surge suppressors, plugs, sockets, lamp-folders, junction boxes) for a voltage not exceeding 1,000 V
	7783	Electrical equipment, n.e.s., for internal combustion engines and vehicles; parts thereof
	7786	Electrical capacitors, fixed, variable or adjustable (pre-set)

Table 4.22, continued

Malaysia and Singapore	7247	Machinery (other than machines of subgroup 775.1) for washing, cleaning, wringing, drying, ironing, pressing (including fusing presses), bleaching, dyeing, dressing, finishing, coating or impregnating textile yarns, fabrics or made-up textile articles; machines for applying the paste to the base fabric or other support used in the manufacture of floor coverings such as linoleum; machines for reeling, unreeling, folding, cutting or pinking textile fabrics
	7314	Way-type unit head machines; other machine tools for drilling or boring
	7315	Machine tools for milling, threading or tapping by removing metal (other than the lathes of subgroup 731.3 or the machine tools of subgroups 731.1, 731.2 or 731.4)
	7316	Machine tools for deburring, sharpening, grinding, honing, lapping, polishing or otherwise finishing metal, sintered metal carbides or cermets by means of grinding stones, abrasives or polishing products (other than gear-cutting, gear-grinding or gear-finishing machines of subgroup 731.7)
	7436	Filtering or purifying machinery and apparatus, for liquids or gases
	7442	Pulley tackle and hoists (other than skip hoists or hoists of a kind used for raising vehicles); winches and capstans
Malaysia, Philippines and Thailand	7843	Other parts and accessories of the motor vehicles of groups 722, 781, 782 and 783
Philippines and Thailand	7438	Parts for the pumps, compressors, fans and hoods of subgroups 743.1 and 743.4
	7499	Machinery parts, not containing electrical connectors, insulators, coils, contacts or other electrical features, n.e.s.
Philippines, Singapore and Thailand	7415	Air-conditioning machines comprising a motor-driven fan and elements for changing the temperature and humidity, including those machines in which the humidity cannot be separately regulated; parts thereof
	7731	Insulated (including enamelled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fibre cables made up of individually sheathed fibres, whether or not assembled with electric conductors or fitted with connectors
Singapore and Thailand	7313	Lathes for removing metal (other than those of subgroup 731.1, 731.2 or 733.9)
	7427	Pumps for liquids, n.e.s., and liquid elevators

Source: Same as Table 4.17

Based on Table 4.22, these products are broader than other manufacturing sub-sectors, and they are mainly made up of general industrial machinery and equipments, electrical machinery apparatus and appliances, and electrical parts.

Since SVIIT is negative and significant in SITC 7, there is intense competition among ASEAN5 countries in relation to VIIT with China. However, competition in these products is healthy which enhances the improvement of product quality. As a result, the competition among ASEAN5 countries has created mutual benefit in enhancing ASEAN5-China bilateral trade. Thus, China-ASEAN Free Trade Agreement (CAFTA) will likely provide depth and breath for bilateral trade between ASEAN5 countries and China in creating contested market spaces that make competition relevant (Wong and Chan, 2003; Mckibbin and Woo, 2003; Lee et al., 2004; Chirathivat, 2002).

SITC 8

Table 4.23: List of Resilient Products between Each ASEAN5 Country and China Bilateral Trade in SITC 8

Country	Product code	Description
Indonesia	8122	Ceramic sinks, wash-basins, wash-basin pedestals, baths, bidets, water-closet pans, flushing cisterns, urinals and similar sanitary fixtures
	8319	Binocular cases, camera cases, musical instrument cases, spectacle cases, gun cases, holsters and similar cases, n.e.s.; travelling bags, toilet bags, rucksacks, shopping bags, wallets, purses, map cases, cigarette cases, tobacco pouches, tool bags, sports bags, bottle cases, jewellery boxes, powder boxes, cutlery cases and similar containers, of leather or of composition leather, of sheeting of plastics, of textile materials, of vulcanized fibre or of paperboard, or wholly or mainly covered with such materials or with paper, n.e.s.
	8454	T-shirts, singlets and other vests, knitted or crocheted
	8482	Articles of apparel and clothing accessories (including gloves), for all purposes, of plastics or of vulcanized rubber (other than hard rubber)

Table 4.23, continued

Indonesia	8981	Pianos and other string musical instruments
	8982	Musical instruments (other than pianos and other string musical instruments)
	8998	Smallwares and toilet articles, n.e.s.; sieves; tailors' dummies, etc.
	8999	Manufactured goods, n.e.s.
Malaysia	8741	Compasses; other navigational instruments and appliances; surveying (including photogrammetrical surveying), hydrographic, oceanographic, hydrological, meteorological or geophysical instruments and appliances; rangefinders
	8933	Floor coverings, wall or ceiling coverings and housefold and and toilet articles of plastics
	8952	Pens, pencils and fountain-pens
Philippines	8211	Seats (other than those of heading 872.4), whether or not convertible into beds, and parts thereof
	8217	Furniture, n.e.s., of other materials
	8426	Trousers, bib and brace overalls, breeches and shorts
	8455	Brassières, girdles, corsets, braces, suspenders, garters and similar articles, and parts thereof, whether or not knitted or crocheted
	8469	Gloves, mittens and mitts, knitted or crocheted; other made-up clothing accessories, knitted or crocheted; knitted or crocheted parts of garments or of clothing accessories
	8743	Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases (e.g., flowmeters, level gauges, manometers, heat meters), excluding instruments and apparatus of subgroups 873.1, 874.1 and 874.6; parts and accessories
	8745	Measuring, controlling and scientific instruments, n.e.s.
	8841	Optical fibres and optical fibre bundles; optical fibre cables other than those of subgroup 773.1; sheets and plates of polarizing material; lenses (including contact lenses), prisms, mirrors and other optical elements, of any material, unmounted, other than such elements of glass not optically worked

Table 4.23, continued

Philippines	8928	Printed matter, n.e.s.
	8947	Sports goods
Singapore	8732	Revolution counters, production counters, taximeters, mileometers, pedometers and the like; speed indicators and tachometers (other than articles of subgroup 874.1); stroboscopes
	8959	Other office and stationery supplies
Thailand	8437	Shirts
	8456	Swimwear
	8458	Other garments, not knitted or crocheted
	8939	Articles of plastics, n.e.s.
	8993	Candles; matches, pyrophoric alloys, articles of combustible materials; smokers' requisites

Source: Same as Table 4.17

The table above presents the resilient products for respective ASEAN5 countries in SITC 8. Given the nature of SITC 8, which is relatively general, the number of identified resilient products is relatively less.

Based on the table above, 8 types of products have been identified with consistent HVIIT linkage to China in Indonesia. They are made up of miscellaneous manufactured goods as well as clothing and accessories. Meanwhile, only 3 types of resilient products have been identified for Malaysia. They are miscellaneous manufacturing goods as well as professional, scientific and controlling instruments and apparatus. Besides, 10 types of products have been identified as resilient products for Philippines. They are mainly made up of clothing and accessories, followed by furniture and related goods; professional, scientific and controlling instruments and apparatus; miscellaneous manufactured goods. Conversely, since Singapore is not focusing on SITC 8, there are

only 2 types of products with consistent HVIIT linkage to China, namely meter and relevant products; as well as other office and stationery supplies.

Finally, 5 types of products have been identified as resilient products for Thailand in relation to China's trade. They are mostly made up of clothing and accessories and followed by miscellaneous manufactured goods.

Besides, the analysis results reveal that some ASEAN5 countries are sharing the similar types of resilient products in SITC 8. These products are presented in the following table.

Table 4.24: List of Products with HVIIT among ASEAN5 Countries with China Bilateral Trade in SITC 8

ASEAN5 Countries	Product Code	Product Description
Indonesia and Thailand	8512	Sports footwear
	8514	Other footwear with uppers of leather or composition leather
Malaysia and Singapore	8714	Compound optical microscopes (including those for photomicrography, cinephotomicrography or microprojection)
	8747	Oscilloscopes, spectrum analyzers and other instruments and apparatus for measuring or checking electrical quantities (other than meters of subgroup 873.1); instruments and apparatus for measuring or detecting alpha, beta, gamma, X-ray, cosmic or other ionizing radiations
Malaysia, Philippines and Thailand	8414	Trousers, bib and brace overalls, breeches and shorts
Philippines and Thailand	8811	Photographic (other than cinematographic) cameras; photographic flashlight apparatus and flash bulbs (other than the discharge lamps of subgroup 778.2); parts and accessories thereof

Table 4.24, continued

Malaysia and Thailand	8742	Drawing, marking-out or mathematical calculating instruments (e.g., drafting machines, pantographs, protractors, drawing sets, slide-rules, disc calculators); instruments for measuring length, for use in the hand (e.g., measuring rods and tapes, micrometers, callipers), n.e.s.; measuring or checking instruments, appliances and machines, n.e.s.; profile projectors; parts and accessories therefor
Malaysia, Singapore and Thailand	8746	Automatic regulating or controlling instruments and apparatus

Source: Similar with Table 4.17

Based on Table 4.24, the resilient products that are shared among ASEAN5 countries are the least in number among all of the manufacturing sub-sectors as the nature of SITC 8 is relatively general and therefore chances for the countries to have similar resilient products are slimmer. Based on the analysis, Indonesia and Thailand are mainly competing against each other in footwear while most of the other ASEAN5 countries are competing against each other in professional, scientific and controlling instruments and apparatus.

Besides, the processing trade between each ASEAN5 country and China would affect the trade ties between her neighbouring ASEAN5 countries and China adversely as the SVIIT is negative and strongly significant. As such, ASEAN5 countries are competing against each other on the resilient products identified in Table 4.24 above for having HVIIT with China in SITC 8.

4.6 Conclusions

This chapter presented the empirical findings on new aspects of IIT between ASEAN5 countries and China in SITC 5, 6, 7 and 8. The analysis of intra-industry trade indices revealed that the intensity of IIT varies among ASEAN5 countries. Besides, the decomposition of the IIT into horizontal and vertical intra-industry trade illustrated that in general, VIIT is attributable to production fragmentation dominated IIT in all manufacturing sub-sectors. Nevertheless, the spatial econometric estimation has identified the catalyst in strengthening VIIT relationship between ASEAN5 countries and China in each manufacturing sub-sector. Finally, to enhance the sustainability of IIT between ASEAN5 countries and China, resilient products for each ASEAN5 country in each manufacturing sub-sector are identified through the decomposition of VIIT into HVIIT and LVIIT and the further analysis of HVIIT products.

CHAPTER 5

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Summary

ASEAN was established in 1967 with five original members. The main purpose of the establishment of ASEAN is to have vigorous collaboration and mutual support on common interest including stimulation of economic growth.

The 1997 Asia Financial Crisis has changed the trade structure of ASEAN (Cai, 2003; Sheng, 2003; Park, 2007; and Tong and Lim, 2009). ASEAN has established closer economic ties with China since then. The shares of China's trade with each ASEAN5 country illustrate an ascending trend. Based on ASEAN Statistical Yearbook (2010), China has emerged as the largest trading partner of ASEAN in 2009. However, as China is large and endowed with a variety of recourse, she is less reliant on international trade relative to ASEAN5 countries. Hence, the emergence of China is being regarded as both opportunities and threat to ASEAN5 countries. Besides, the integration of ASEAN5 countries and China offers greater market share for regional trade in manufacturing sub-sectors. However, the changes of trade balance from surplus to deficit or vice-versa have raised the problem of whether ASEAN5-China bilateral trade is dependent on the nature of inter-industry or intra-industry trade.

Nevertheless, the trade networking between ASEAN5 countries and China is getting complicated as China has diversified the trade regime. The processing trade stemmed from production fragmentation has become increasingly important in China's trade. It is also noticeable that macroeconomic variables will provide different dynamic impact on ASEAN5-China bilateral vertical trade.

Furthermore, ASEAN5 countries and China are getting more dependent on western markets, particularly the United States for their exports of final goods (Gaulier, Lemoine, Kesenci and Unal-Kesenci, 2005 and 2007). As such, both ASEAN5 countries and China can easily feel the deterioration of western economic growth tremor. Hence, this put forward the argument on whether trading partner will pass the risk to others in relation to regional trade. In fact, the purpose of regional trade is to increase the integration among member countries in order to shelter their economies from global economic downturn. However, countries with low value-added products are more vulnerable to external risk. Therefore, this has raised the concern of value chain in enhancing bilateral trade between respective ASEAN5 countries and China.

In addition, China is moving up to the high value-added exported products. Based on Luo and Zhang (2010), China has shifted gradually from labour-intensive products to capital-intensive products and technology-intensive products. As a result, the trade relationship between ASEAN5 countries and China is at stake if China's dependency on high value-added products from ASEAN5 countries decreases over time.

With these problems in mind, this study analyzed the new aspects of bilateral intra-industry trade relationship between ASEAN5 countries and China in each manufacturing sub-sector. By narrowing down the nature of intra-industry trade, the outcome of this study could gauge the extent of ASEAN5 countries involvement in China's production network and to identify the resilient products, which appeared as HVIIT products in most of the years during the study period for each ASEAN5 country with regard to bilateral trade with China.

The methodology was developed based on the theoretical frameworks and the findings from the literature review pertaining to intra-industry trade. The decomposition–type threshold based indices developed by Fontagne and Freudenberg (1997) and spatial

panel econometric model are employed. Data are drawn from the annual series covering a period of 17 years from 1993 to 2009 with a total of 35,581 observations.

The results of the decomposition-type threshold based indices reveal that IIT between each ASEAN5 country and China is generally significant, but the intensity of IIT varies among ASEAN5 countries. More to the point, the IIT between each ASEAN5 country and China in each manufacturing sub-sector is dominated by VIIT, which confirms that the IIT between the two regions is processing trade in nature.

Besides, in order to explore the new aspects of IIT between ASEAN5 countries and China, spatial panel econometric model is employed to examine the macroeconomic variables that provide impact in facilitating ASEAN5-China bilateral vertical trade in each manufacturing sub-sector. The selection of explanatory variables is based on the theoretical framework and empirical studies. The selected explanatory variables are DGDP, FDI, SVIIT, SGDP and SFDI for SITC 5 to SITC 7. Owing to the nature of SITC 8, which is relatively general, FDI and DGDP may not be the essential determinants for the VIIT between ASEAN5 countries and China. Arising from this and in line with the theoretical framework, trade openness in log form is used as one of the explanatory variables for SITC 8. Thus, the selected explanatory variables for SITC 8 *per se* are DGDP, FDI, SVIIT and TO.

The approaches of spatial econometrics, namely specific to general approach and general to specific approach are then adopted to estimate the panel data. The findings reveal that the impact of each explanatory variable varies in different manufacturing sub-sectors, but the presence of spatial interaction effects are confirmed in each manufacturing sub-sector with different extents.

VIIT is then further decomposed into HVIIT and LVIIT in order to gauge the quality of VIIT products between each ASEAN5 country and China. The results reveal that in general, HVIIT dominates VIIT across manufacturing sub-sectors. However, the vulnerability of each ASEAN5 country to China's external shock varies across manufacturing sub-sectors. Finally, the resilient products, which are derived from the further analysis of HVIIT products are identified for each ASEAN5 country in each manufacturing sub-sector.

5.2 Concluding Remarks

The main findings of the study are as follows:

- The percentages of products involved in IIT in each manufacturing sub-sector between ASEAN5 countries and China were generally significant with an average of 42.8% for SITC 5, 24% for SITC 6, 40.4% for SITC 7 and 25.6% for SITC 8.

- The intensity of IIT in each manufacturing sub-sector varies among ASEAN5 countries. Singapore, Malaysia and Thailand are prone to IIT while the intensity of IIT for Indonesia and Philippines are relatively low.

- SITC 7 emerged as the most important manufacturing sub-sector for ASEAN5-China bilateral trade as the IIT indices were the highest in this sector. The average IIT index of SITC 7 throughout the period of study was 0.734 for Malaysia, 0.632 for Thailand, 0.517 for Singapore, 0.435 for Philippines and 0.317 for Indonesia.

- IIT between each ASEAN5 country and China is mainly processing trade in nature as VIIT dominates IIT in all manufacturing sub-sectors with an average VIIT index of 0.799 in SITC 5, 0.750 in SITC 6, 0.832 in SITC 7 and 0.841 in SITC 8. This indicates that production fragmentation plays a vital role in IIT between ASEAN5 countries and China.

- FDI significantly affects VIIT between ASEAN5 countries and China in all manufacturing sub-sectors except SITC 8 while DGDP between each ASEAN5 country and China significantly affects VIIT in SITC 6 and SITC 7.

- This study explores the new aspects of IIT between ASEAN5 countries and China by examining the spatial interaction effects among ASEAN5 countries in relation to China's trade. In addition, the extent of the vulnerability of each ASEAN5 country to China's external shock is analyzed based on the relationship between HVIIT and VIIT in each manufacturing sub-sector. Lastly, resilient products for each ASEAN5 country in each manufacturing sub-sector are identified based on in-depth HVIIT analysis.

- The econometric estimation confirms the presence of the spatial interaction effects in VIIT between ASEAN5 countries and China in each manufacturing sub-sector in different extents. The results reveal that SGDP is significant for SITC 6 and SITC 7 while SFDI is significant for SITC 5 and SITC 6. In addition, SVIIT is significant for SITC 5, SITC 7 and SITC 8.

- The decomposition of VIIT reveals that in general, HVIIT dominates VIIT across manufacturing sub-sectors except Indonesia for SITC 5 and Thailand for SITC 6.

- Resilient products in relation to Chinese trade are identified for each ASEAN5 country in each manufacturing sub-sector. The number of these products is the greatest in SITC 7 and the least in SITC 8. Besides, some ASEAN5 countries are sharing similar resilient products. Domestic producers of ASEAN5 should focus on the identified resilient products to enhance their competitiveness and efficiency in relation to China's trade.

The main findings above have met the objectives spelt out in Chapter 1. The findings are in compliance with theories and consistent with other empirical studies.

Intra-Industry Trade Analysis

The percentages of products involved in IIT between respective ASEAN5 countries with China were in the range of 10%- 67% in SITC 5, 12%-51% in SITC 6, 20%-70% in SITC 7 and 11% - 44% in SITC 8. Therefore, the above findings confirm that IIT plays a significant role in the bilateral trade between ASEAN5 countries and China, which is in line with the findings of Hu and Ma (1999); Fongtagne, Freudenberg and Gaulier (2005); Zhang, Witteloostuijn and Zhou (2005) and Fukao, Ishito and Ito (2003), in their studies on trade in China as well as other Asian countries.

Besides, the results reveal that SITC 7 generates the greatest number of products involved in IIT. More to the point, the results of IIT indices, which are presented in Table 4.1 to Table 4.4, also confirm that the intensity of IIT between ASEAN5 countries and China is the highest in SITC 7. This finding is consistent with the findings of Wong and Chan (2003); Ando (2006) and Tong and Lim (2009) with their respective studies in Asian countries. Based on Table 4.3, the average IIT indices for Singapore, Malaysia and Thailand were 0.517, 0.734 and 0.632 respectively while they

were 0.317 and 0.435 for Indonesia and Philippines in the most striking manufacturing sub-sector, SITC 7, during the study period.

The IIT indices in other manufacturing sub-sectors are different from the above and are diverse across ASEAN5 countries. Singapore, Malaysia and Thailand are prone to IIT while the IIT indices for Indonesia and Philippines are relatively low.

The Nature of Intra-Industry Trade

VIIT dominates IIT between respective ASEAN5 countries and China in all manufacturing sub-sectors which is consistent with the findings of Fukao, Ishito and Ito (2003); Hurley (2003); Zhang, Witteloostuijn and Zhou (2005) in their studies on Asia's IIT. These findings infer that the IIT between these two regions are processing trade in nature where production fragmentation is actively taking place. This reflects that ASEAN5 countries are integrated into China's production network and able to reap the benefits of the rise of China. Consequently, the trade deficit or trade surplus of each ASEAN5 country in manufacturing sub-sectors is mainly due to the reshuffling of the production platforms from one country to another.

However, the relatively low intensity of IIT between China and both Indonesia and Philippines implies that both countries have yet to integrate well into China's production network although their VIIT indices remained high. Part of these findings are similar with Tong and Lim (2009), where the authors pointed out that Indonesia is having difficulties in integrating into China's production network as her trade with China in manufactured products dropped significantly.

The Analysis of Econometric Estimation

The results of the econometric estimation confirm that FDI and DGDP are the influential determinants of VIIT although their impacts on VIIT vary across manufacturing sub-sectors. FDI has a negative and significant impact on VIIT in SITC 5, which is consistent with the findings of Hurley (2003) for VIIT of Indonesia and Zhang and Li (2006) for China's VIIT with East Asia. This finding reveals that the motive of ASEAN5's affiliates in China in SITC 5 is market seeking in nature.

Conversely, the coefficient of FDI is positive and significant for SITC 6 and SITC 7, which is consistent with the theoretical expectation. This finding is consistent with Hu and Ma (1999); Kimura and Ando (2003); Fukao, Ishido and Ito (2003); Zhang, Witteloostuijn and Zhou (2005); Okubo (2007); Turkcan (2010); Turkcan and Ates (2011) in their studies of the determinants of VIIT in other countries, as well as Hurley (2003) in his study of VIIT for intra-ASEAN trade in Singapore, Malaysia and Thailand. The positive coefficient infers that the motive of ASEAN5's affiliates in China is efficiency seeking, that it aims to form or strengthen production linkages and resources network.

Although the sign of FDI for SITC 6 and SITC 7 is different from that of SITC 5, the elasticity of coefficient remains low at -0.118, 0.359 and 0.117 for SITC 5, SITC 6 and SITC 7 respectively. This implies that VIIT between ASEAN5 countries and China is less responsive to the changes of the utilization of ASEAN5's capital in China.

On the other hand, the coefficient of DGDP is negative and significant for SITC 6 and SITC 7 which is consistent with the theoretical expectation and the findings of Grossman and Helpman (2005); Zhang and Li (2006) and Okubo (2007). Based on Grossman and Helpman (2005), this finding infers that the reduction in difference in

market size would eventually accelerate the production fragmentation, which stimulates the VIIT.

Conversely, DGDP is found insignificant for SITC 5 and SITC 8. Therefore, this implies that reduction in difference in market size is not the necessary condition for both sectors to perform VIIT.

Besides, the elasticity of DGDP is contradictory to that of FDI. The elasticity of this variable is high at -3.862 and -1.407 in SITC 6 and SITC 7, respectively. Hence, these imply that VIIT is very responsive to the changes of market size between the two regions. As such, the expansion of market size serves as the catalyst, which facilitates VIIT between ASEAN5 countries and China in SITC 6 and SITC 7.

Given the nature of SITC 8, which consists of miscellaneous manufacturing articles, both FDI and DGDP do not play a prominent role in stimulating or influencing VIIT. Instead, the size of trade openness is consistent with the theoretical expectation, which is positive and significant. This finding is similar to the findings of Yi (2003); Zhang, Wittloostuijn and Zhou (2005) and Zhang and Li (2006). This infers that VIIT between ASEAN5 countries and China can be stimulated in SITC 8 if the trade barriers in these two regions are liberalized. As such, the formation of CAFTA would provide a platform for ASEAN5 countries to expand VIIT with China. However, with the low elasticity at 0.021, the VIIT can be stimulated provided that the trade barriers are liberalized to a very large extent.

The econometric estimation based on spatial panel model confirms the presence of spatial interaction effects among ASEAN5 countries in relation to China's trade. This is mainly attributable to the intense economic cooperation and integration to ASEAN5

countries. Furthermore, the establishment of ASEAN Investment Region also provides complementary advantages among member countries.

The coefficient of SFDI is positive and significant for SITC 5 and SITC 6. This implies that the inflow of FDI from any ASEAN5 countries will complement VIIT between her neighbouring ASEAN5 countries with China. Concisely, the inflows of FDI will expand the production capacity of China, which will eventually stimulate production fragmentation and heighten VIIT in SITC 5 and SITC 6. However, the elasticity of SFDI coefficient is low at 0.161 and 0.357 for SITC 5 and SITC 6 respectively. The low elasticity indicates that although SFDI significant, it does not serve as the prominent determinant for VIIT between ASEAN5 countries and China for the above manufacturing sub-sectors.

Besides, the coefficient of SGDP is negative and significant in SITC 6 and SITC 7. This implies that the VIIT between each ASEAN5 country and China can be strengthened by the reduction in difference in market size between her neighbouring ASEAN5 countries and China. This finding implies that the expansion of market size in each ASEAN5 country not only brings advantages to domestic country, but the benefits will spillover to other neighbouring ASEAN5 countries as well. This is due to the fact that the expansion of market size will stimulate VIIT between ASEAN5 country and China. The heighten VIIT will then cause China to increase her demand in parts and components, which will in turn stimulate VIIT between other ASEAN5 countries with China. In addition, the elasticity of SGDP coefficient is high at -3.254 and -5.595 in SITC 6 and SITC 7, respectively. Hence, this implies that the VIIT between each ASEAN5 country and China is very responsive to the changes of difference in market size between her neighbouring ASEAN5 countries and China. As a result, the integration of ASEAN5 countries to enlarge their market size is crucial in order to

stimulate the VIIT between these two regions. AFTA, AIA (ASEAN Investment Area) and AICO (ASEAN Industrial Cooperation) as well as CAFTA are the platforms for the above to materialize.

Besides, SVIIT plays a prominent role in SITC 5, SITC 7 and SITC 8. The negative and significant coefficient implies that ASEAN5 countries are competing with rather than complementing each other in VIIT with China in the above manufacturing sub-sectors. The high elasticity of the coefficient at -2.701,-2.552 and -2.251 for SITC 5, SITC 7 and SITC 8, respectively suggests that there is a stiff competition among ASEAN5 countries in having VIIT with China. However, such competition is healthy for ASEAN5's HVIIT products as this could lead to improvement in the quality of the products and development of resilient products. Such products are crucial in sustaining bilateral trade between ASEAN5 countries and China.

The Decomposition of VIIT into HVIIT and LVIIT

The VIIT is further decomposed into HVIIT and LVIIT for each ASEAN5 country in each manufacturing sub-sector. Subsequently, the descriptive analysis of the relationship between HVIIT and VIIT indices was carried out to examine the vulnerability of ASEAN5 countries to China's external shock. The descriptive analysis is based on several arguments. Firstly, if VIIT products are relatively less, ASEAN5 country is less vulnerable to China's external shock regardless of the performance of HVIIT as her focus is not on China's trade. Secondly, if both HVIIT and VIIT indices are consistently high and stable throughout the study period, the trade ties between each ASEAN5 country and China is complementary in nature and therefore less vulnerable to China's external shock. Thirdly, if the trend of VIIT index is following the trend of HVIIT index, the high quality products will lead to processing trade. Therefore the VIIT between ASEAN5 country and China is sustainable and less vulnerable to China's

external shock as long as high quality products are developed and expanded. Fourthly, if both HVIIT and VIIT indices demonstrate similar trend simultaneously, HVIIT is dependent on VIIT and therefore there is relatively weak VIIT collaboration between ASEAN5 country and China. As such, ASEAN5 country is more vulnerable to China's external shock. Lastly, ASEAN5 country is vulnerable to China's external shock if the trend of VIIT index diverges from the trend of HVIIT index. This is due to the fact that the emergence of HVIIT is unable to stimulate processing trade.

Based on the aforementioned arguments, although the main hub for ASEAN5 countries is on SITC 7 as this manufacturing sub-sector generates the greatest value of VIIT for ASEAN5 as a whole in relation to China's trade, the analysis for each ASEAN5 country exhibits a different picture for each manufacturing sub-sector.

Singapore and Malaysia are able to sustain the bilateral VIIT with China and be less vulnerability to China's external shock in SITC 5 as long as they continue to develop and expand HVIIT products. Besides, Philippines is less vulnerable to China's external shock in SITC 5 as the number of VIIT products involved is relatively low. On the other hand, there is relatively weak processing trade collaboration for Indonesia-China and Thailand-China, respectively in SITC 5. This is attributable to the fact that the volume of VIIT, rather than high value-added products (HVIIT products) is crucial to strengthen the trade ties, which cause them to be more vulnerable to China's external shocks.

Using similar method of analysis, it is found out that all ASEAN5 countries except Indonesia and Thailand are less vulnerable to China's external shock in SITC 6. Besides, Singapore and Thailand are able to excel in SITC 7. Indonesia is also less vulnerable to China's external shock in SITC 7, but she is urged to expand the range of products involved in IIT with China. On the other hand, Malaysia and Philippines is vulnerable to China's external shock in SITC 7.

For SITC 8, the analysis found out that Indonesia, Malaysia and Thailand have relatively weak processing trade collaboration with China in SITC 8. On the contrary, Philippines is less vulnerable to China's external shock in SITC 8 partly due to the fact that the number of VIIT products involved in China's trade is relatively less. Besides, Singapore is also less vulnerable to China's external shock in SITC 8 as the HVIIT index of Singapore is extremely high, and the number of VIIT products is the least across manufacturing sub-sectors.

Arising from the above, the focal points for both Indonesia and Thailand are on SITC 7. Besides, Malaysia should expand her trade ties with China on SITC 5 and SITC 6 even though the largest IIT between Malaysia and China is on SITC 7. Although Philippines focuses on SITC 7, her trade tie with China in SITC 7 is relatively unstable and vulnerable to China's external shock. Furthermore, Philippines is found less engaged in IIT with China in other manufacturing sub-sectors. Hence, Philippines needs to reshuffle her trade policies to enhance the trade ties with China. Lastly, the focal points for Singapore are in all manufacturing sub-sectors except SITC 8.

The Analysis of HVIIT Products for each ASEAN5 Country

HVIIT products enhance price determination power of ASEAN5 countries in relation to VIIT with China. This study identifies the products, which appeared as HVIIT in most of the years during the study period, particularly during 2000s. The consistently high unit export price over import price reflects the quality of the exported products from each ASEAN5 country to China. As such, these products emerge as resilient products for each ASEAN5 country. The resilient products enhance the competitiveness and efficiency of ASEAN5 domestic producers in relation to China's trade. They have the potential to generate new sources of growth as well as provide synergy in strengthening and sustaining the bilateral trade between each ASEAN5 country and China.

Based on the analysis, the number of resilient products is the largest in SITC 7 for Indonesia, which are mainly in mechanical and basic electrical and electronics products. Besides, the resilient products for Malaysia in SITC 7 are made up of machine tools, radio, broadcasting electrical, and electronics products. At present, these products are essential for Malaysia to enhance the trade ties with China in SITC 7. More importantly, Malaysia should expand the trade ties with China in SITC 5 and SITC 6 as Malaysia is found less vulnerable to China's external shock in these manufacturing sub-sectors. The resilient products for Malaysia in SITC 5 mainly consist of paints and varnishes, Amino, phenolic resin etc., and additive for mineral oil. Meanwhile, the resilient products for SITC 6 mainly consist of non-ferrous metal, cork, wood (excluding furniture), rubber and metal manufactures.

Conversely, the trade ties between Philippines and China is unstable compared to other ASEAN5 countries as Philippines has yet to integrate well into China's production networking in light of her low intensity of IIT with China. Nonetheless, the focal point of Philippines is on SITC 7. They mainly consist of food processing and office machineries. At present, these products are vital for Philippines to enhance the trade ties with China in SITC 7.

Singapore's resilient products for SITC 5 are mainly made up of organic chemical products, plastic in non-primary forms, inorganic chemicals, dyes, colouring materials as well as pharmaceutical products while the resilient products for SITC 6 mainly consist of metal manufactures. Besides, Singapore has the broadest number of resilient products in SITC 7. Those products are more advanced and sophisticated such as pumps, equipment and advance electronics.

Nevertheless, Thailand should expand SITC 7. The identified resilient products for SITC 7 are machine tools, moulds and dies as well as electrical machineries.

Apart from that, ASEAN5 countries are sharing similar resilient products in each manufacturing sub-sector. These products are mainly made up of essential oil perfume or related products in SITC 5; metal manufactures and fabric and yarns in SITC 6. As per SITC 7, they mainly consist of general industrial machinery and equipments, electrical machinery apparatus as well as appliances and electrical parts. Meanwhile, some ASEAN5 countries are sharing the similar resilient products, which are professional, scientific and controlling instruments and apparatus as well as footwear in SITC 8.

Since the coefficient of SVIIT is negative and significant for SITC 5, SITC 7 and SITC 8, there is intense competition among ASEAN5 countries on the identified resilient products that are shared among them. However, the competition is healthy as it would eventually lead to a heightened efficiency level and greater product development.

On the other hand, the coefficient of SVIIT is insignificant in SITC 6. Therefore, it is believed that the quality improvement in the identified resilient products that are shared among ASEAN5 countries is relatively slower than that of other manufacturing sub-sectors.

5.3 Policy Implications

Each ASEAN5 country has her own aspiration concerning intra-industry trade with China and thereby the trade policies recommended for each ASEAN5 country should be different from each other. However, the results of the econometric analysis confirm the presence of spatial interaction effects among ASEAN5 countries in relation to VIIT with China. As such, ASEAN5 countries should encourage deeper cooperation and integration. Intra-ASEAN manufacturing trade should be stimulated in order to expand

the market size of each country and subsequently enhance the trade ties with China as the SGDP variable is negative and strongly elastic for SITC 6 and SITC 7.

Policy makers of ASEAN5 countries should give due consideration particularly to SITC 7 in order to sustain the activities of production fragmentation in this sector as SITC 7 is the key industry which contributed the largest trade value for ASEAN5 countries. However, the integration among ASEAN5 countries has yet to be fully exploited (Yoshimatsu, 2006).

The situation illustrated above shows that intra-ASEAN manufacturing trade should be promoted aggressively through AFTA and AIA (ASEAN Investment Area) programmes. In addition, the formation of AEC (ASEAN Economic Community) with a single market for merchandise, services and factors of production, which is estimated to be materialized by 2020 is a good channel to promote intra-ASEAN manufacturing trade if the enforcement and implementation of the programme is carried out effectively.

On the other hand, the cooperation in terms of FDI outflow to China should not be greatly emphasized in the cooperation plan for ASEAN5 countries as a whole as the elasticity for SFDI for each manufacturing sub-sector is low. The VIIT between each ASEAN5 country and China is less responsive to the changes of FDI from her neighbouring ASEAN5 countries to China. In addition, the motive of FDI varies across manufacturing sub-sectors.

It is noticeable that trade policy capacity varies among ASEAN5 countries. As Singapore is at the one end with sophisticated globalized economy but Philippines and Indonesia at the other end (Sally and Sen, 2011). Besides, 70% of intra-ASEAN trade is with, to or through Singapore (Basri and Hill, 2008). Hence, Singapore should play the

leading role in expanding market size and driving the economic growth of ASEAN5 countries and subsequently improve the product quality of ASEAN5 countries. Based on this study, policy makers of ASEAN5 countries must take measures to upgrade the quality of ASEAN5 countries' exports to China in order to sustain the VIIT with China.

Singaporean government has adopted the most liberalized trade policies (Thangavelu and Toh, 2005) and is focusing on higher value-added activities in manufacturing sub-sectors, particularly in SITC 7 in comparison with her neighbouring ASEAN5 countries. As a result, one may believe that if Singapore leads the intra-ASEAN5 trade, the quality of the products exported by ASEAN5 countries can be improved to various degrees depending on each member country's capacity. This strategy could indirectly assist Indonesia and Philippines to integrate well into China's production network. Upgrading products quality is crucial in enhancing VIIT with China as China is moving to higher value-added products gradually. However, to materialize the above, policy makers of each ASEAN5 country are urged to accommodate the changes and surrender part of their power, which is hard to achieve in the short run.

Indonesia

Although Indonesia is having an open economy, her openness remains precarious. Besides, Indonesia is far behind her neighbours such as Thailand and Malaysia in the exports of electronic parts and components as well as automotive industries (Basri and Hill, 2008). In line with the findings of Basri and Hill (2008), this study finds that even though Indonesia is a member of CAFTA, she is not integrated well into China's production network and therefore the economic benefits that Indonesia reap from China's rise is minimal. Hence, it is crucial for Indonesia to have domestic reforms and adopt credible trade policies.

The major challenges and obstacles to domestic reforms in Indonesia include corruption; weak and slow public administration; high cost of domestic-regulatory and institutional environment (Sally and Sen, 2011). For instance, the Indonesian government has adopted her own industrial policy instrument, in which she assigns preferences to indigenous owned enterprises.

The challenge of labour market policy is also one of the obstacles. Chronic disequilibrium of labour market happens despite economic recovery. Indonesia's unemployment rate is in the range of 9% to 11% and has been persistent from 2002 onwards (Basri and Hill, 2008). The high unemployment rate will result in deterioration in the production of labour-intensive products, which will in turn weaken the export-oriented sectors and cause negative implication on bilateral trade with China.

In view of the above, the reformers need to address the obstacles by having competent macroeconomic management; uncomplicated and speedy procedures for trade, provide employment training and set up government employment agencies to connect workers to key industries.

Besides, in order to enhance the bilateral trade with China, Indonesia needs to integrate into China's production network through intensive investment and trade in SITC 7. Thus far, SITC 7 has contributed the greatest value to Indonesia in relation to China's trade. This study also finds that Indonesia is less vulnerable to China's external shock in SITC 7.

To enhance competitiveness, domestic producers of Indonesia should be given incentive such as production subsidy or tax relief in producing mechanical and basic electrical and electronics products of SITC 7. This is because this study found out that the

products above have appeared as HVIIT in most of the years during the period of study and have therefore emerged as the resilient products for Indonesia.

Malaysia

Malaysia has emerged as the most globalized economies based on developing country standards (Sally and Sen, 2011). Therefore, Malaysia is trying to harvest the greatest benefits from China's accession to WTO and the formation of CAFTA. Shafaeddin (2004) revealed that the final markets of capital products for China are more superior to that for Malaysia. As such, Malaysia should focus on processing trade instead of ordinary trade with China. This study also confirms that processing trade dominated IIT between Malaysia and China.

Although SITC 7 contributed the largest trade value to Malaysia in relation to processing trade with China, she is urged to diversify her trade structure with China and focusing more on SITC 5 and SITC 6. This is because this study has found out that Malaysia is less vulnerable to China's external shock in SITC 5 and SITC 6, as long as Malaysia continues to develop high value-added products. As such, the domestic producers of Malaysia should be encouraged with various incentives to augment the VIIT with China in various types of resins, paints and varnishes, additive for mineral oil in SITC 5 and nonferrous metal, cork, wood, rubber , fabric and yarns as well as metal manufactured products in SITC 6, as these products emerged as the resilient products for Malaysia.

Besides, in order to develop high value-added products in SITC 5 and SITC 6, it is crucial for the country to upgrade her pool of human capital (McKibbin and Woo, 2003). The country should have a long-term plan to train and to improve human capital of the country continuously.

Furthermore, Devadason (2009) pointed out that Malaysia should enhance the technology capacity. In addition to that, the policy makers should stimulate the R&D in these manufacturing sub-sectors (SITC 5 and SITC 6) with due assistance such as raising the budget for R&D and enforcing a strict intellectual property right.

Philippines

Philippines pursues trade liberalization and multilateral economic integration. However, similar to Indonesia, this study finds that Philippines has not yet been able to integrate well into China's production network. There are many significant obstacles in Philippines to expand her bilateral trade with China. Based on Sally and Sen (2011), Philippines is not an active member of WTO and has relatively weak trade policy capacity. The domestic protection pressure has been heightened since 1997 Asian financial crisis. Besides, Philippines is facing restriction on foreign ownership, and operating in weak domestic regulatory and institutional environment. As such, comprehensive trade policy reform should be carried out**.**

In order to have sustainable trade with China in the future, Philippines should truly liberalize her trade barrier by removing restrictions on foreign ownership and establishing effective institutions for macroeconomic management aids.

In addition, the infrastructure provision of Philippines is relatively weak and therefore Philippines should invest more in producing high-quality logistics infrastructures to enhance the distribution network, which will smoothen the movement of goods within the country or across international borders.

Furthermore, Philippines needs to change the structure of her exports. This country should continue to develop high value-added products in SITC 7, which has contributed the largest trade value to Philippines. The domestic producers of Philippines should

focus on VIIT with China in food processing and office machineries as these products are the identified resilient products for Philippines. More importantly, Philippines should diversify her exports structure by investing more in other manufacturing sub-sectors. Owing to limited technology capacity and skill labour as compared to Singapore, Malaysia and Thailand, Philippines should focus on less sophisticated products such as sewing thread, fabrics and furniture. Thus, the domestic producers who produce the products mentioned above should be given subsidies or any form of financial assistances.

Singapore

Based on this study, owing to the differences in stages of economic growth and product development, Singapore has become the main beneficiary of China's rise among ASEAN5 countries. In addition, Singapore is less vulnerable to China's external shock in all manufacturing sub-sectors. This implies that Singaporean policies in moving Singapore towards high value-added activities and focusing on both manufacturing and services sectors simultaneously (Thangavelu and Toh, 2005) have achieved great success. Singapore has reaped the greatest benefit from her processing trade with China in SITC 7 as this sector contributed the largest number of resilient products. This is followed by SITC 5. Hence, Singapore is the hub for the machinery and electrical appliances as well as chemical related products.

Singapore should increase the flow of FDI to China as this study finds that the motive of FDI is efficiency seeking in nature for SITC 7 and therefore the heightening of FDI inflow to China will complement the VIIT between Singapore and China and result in deeper integration between Singapore and China. However, the policy makers have to identify the causes of low elasticity of FDI on VIIT.

On the other hand, this study notes that the motive of FDI is market seeking in nature for SITC 5 as it is negatively affecting the VIIT. As a result, the policy makers are urged to strategize her FDI plan to avoid diverting the VIIT with China in SITC 5.

Besides, in order to further expand the VIIT (processing trade) with China, Singapore should promote capital investments in machinery and electrical as well as chemical related sectors. In order to enhance competitiveness and price determination power, the domestic producers of Singapore should be advised to augment IIT with China in pump and more advanced electronics and equipment in SITC 7 and organic chemical products, plastic in non-primary forms, inorganic chemicals, dyes, colouring materials as well as pharmaceutical products in SITC 5 as these are the resilient products for Singapore. Moreover, in order to maintain the leading position, Singapore should enhance her high quality products by promoting innovation and creativity. Based on Thangavelu and Toh (2005), the adoption of global standard for intellectual property rights has been a right move. In addition, the contemporary managerial skill is another key to motivate the development and the invention of high quality products.

Thailand

Thailand is having relatively liberalized, globally integrated economy. The trade policies in Thailand are relatively flexible than in Malaysia, Philippines and Indonesia although her trade policies are prone to centralize (Sally, 2007). Similar to Singapore and Malaysia, this study reveals that Thailand is well integrated into China's production network. Besides, SITC 7 contributed the largest trade value to Thailand in relation to China's trade. In addition, Thailand is less vulnerable to China's external shock in SITC 7 as long as high value-added products are developed continuously.

Hence, to sustain the bilateral trade with China, Thailand should promote the development of high value-added products in SITC 7. In order to achieve the aforementioned purpose, as pointed by Mckibbin and Woo (2003), Thailand has to upgrade her technology capacity and human capital through a focus on applied research.

The improved technology capacity and a better pool of human capital would enable the country to change the relative factor endowment and would then allow the country to produce and expand higher value-added products.

The domestic producers of Thailand should be encouraged to focus on VIIT with China in machine tools, moulds, dies and electrical machineries in order to enhance their competitiveness and efficiency as these products are the identified resilient products for Thailand in SITC 7.

5.4 Limitations of the Study

Owing to limited data availability and the large differences in terms of economic structure between ASEAN5 countries with CMLV and Brunei, this study does not include CMLV and Brunei.

Furthermore, finely disaggregated trade data, which distinguish finished goods and intermediate goods or components are not available at this point in time. Besides, there is lack of data concerning domestic value-added on imported intermediate goods. The disaggregated FDI data for each manufacturing sub-sector is also lacking. Hence, the total FDI data in China by each ASEAN5 country is adopted, which has limited the precision of this study.

In addition, time series analysis is not able to be carried out for each ASEAN5 country due to limited data availability. It is believed that the impact of each variable varies for each ASEAN5 country and therefore the results of econometric analysis for ASEAN5 countries as a whole are relatively general.

Lastly, difference in GDP per capita is not taken as one of the explanatory variables due to limited observations and the adoption of spatial panel econometric model. The nature of spatial panel econometric model has caused a great number of explanatory variables. Therefore, difference in GDP per capita, which is less important than DGDP and FDI, is excluded in this analysis.

5.5 Suggestions for Further Research

Time series analysis for each country is impossible to be carried out due to limited data. When a longer period of data is available, such study can be carried out for each country, which is highly believed that the impact of each explanatory variable would be varied for each country.

Future studies should include Brunei and CMLV if relevant data for these countries are available as they are part of ASEAN. The inclusion of these countries will be more representative for ASEAN as a group.

Lastly, to increase the preciseness of the study, subject to data availability, more finely disaggregated trade data such as SITC data with 5-digit code or data solely for intermediate goods should be adopted in future studies.

APPENDIX

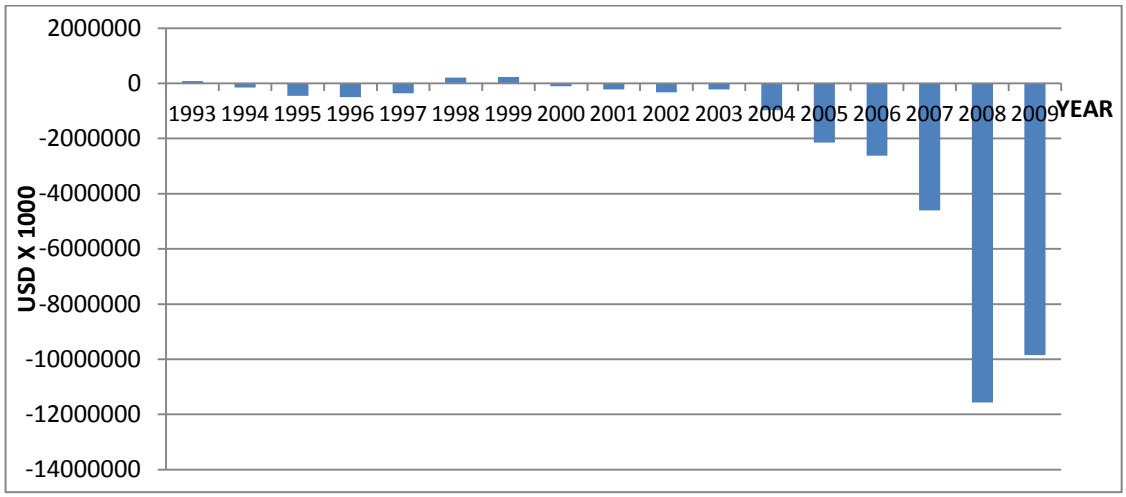


Figure A1a: Figure A1a: Trade Balance of Indonesia with China for Manufacturing sectors during 1993-2009

Source: Author's calculation based on UNCTAD, various issues

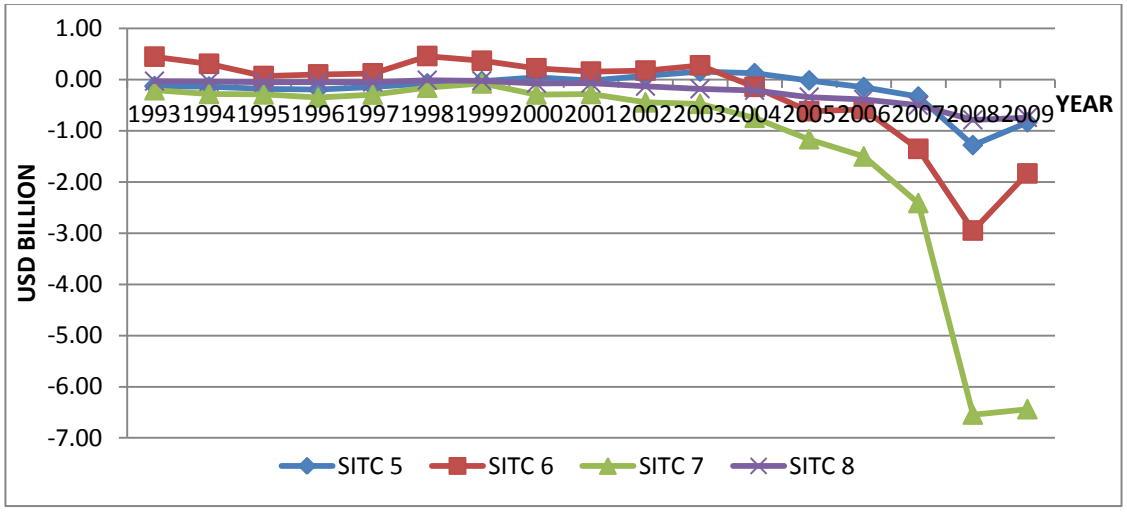


Figure A1b: Trade Balance of Indonesia with China for Respective Manufacturing Sub-sector during 1993-2009

Source: same as Figure A1

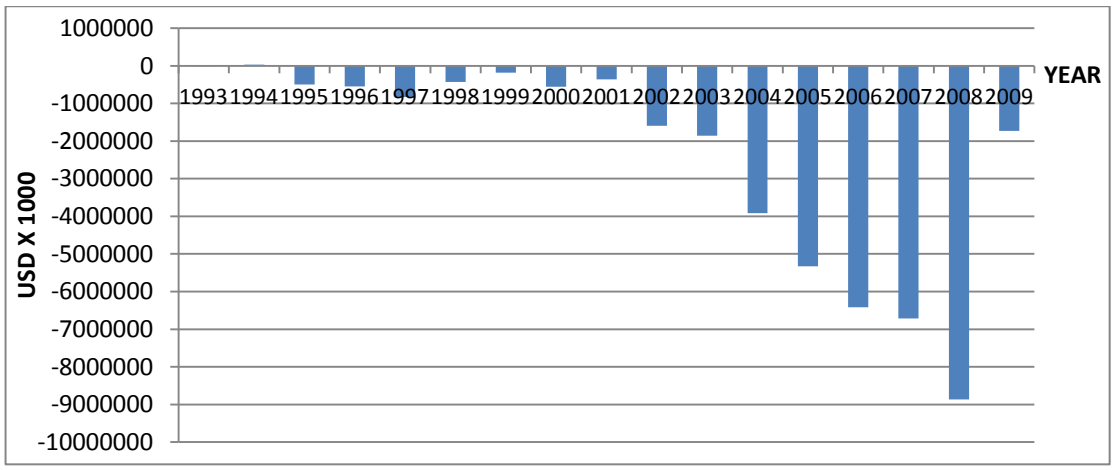


Figure A2a: Trade Balance of Malaysia with China for Manufacturing sectors during 1993-2009

Source: same as Figure A1

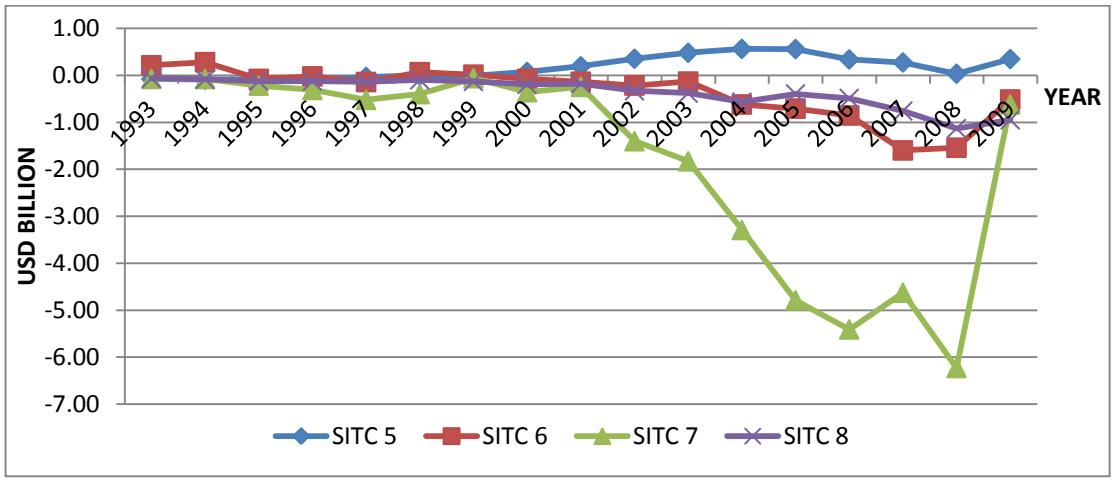


Figure A2b: Trade Balance of Malaysia with China for Respective Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A1

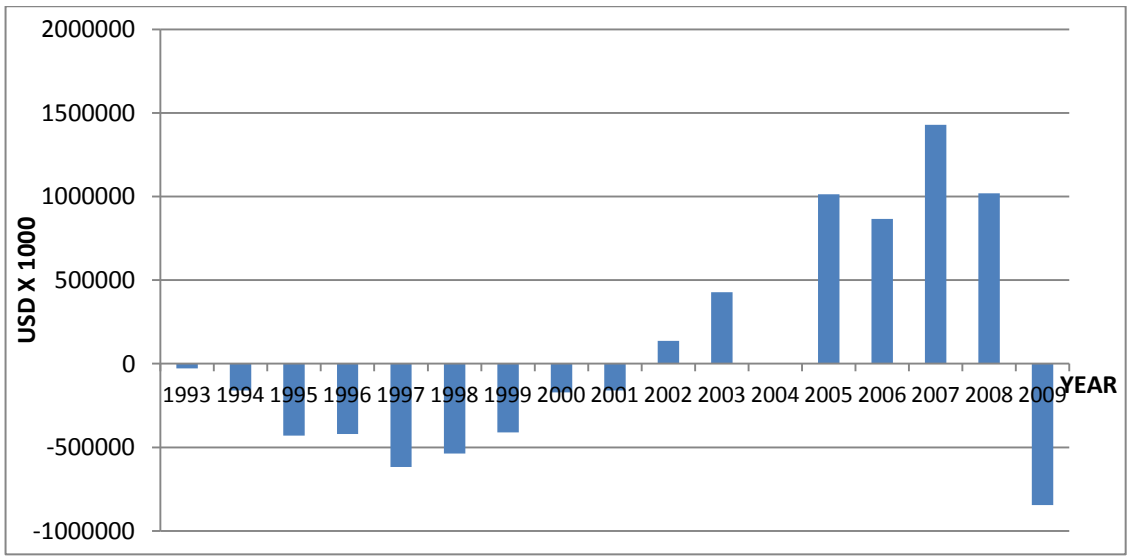


Figure A3a: Trade Balance of Philippines with China for Manufacturing sectors during 1993-2009

Source: same as Figure A1

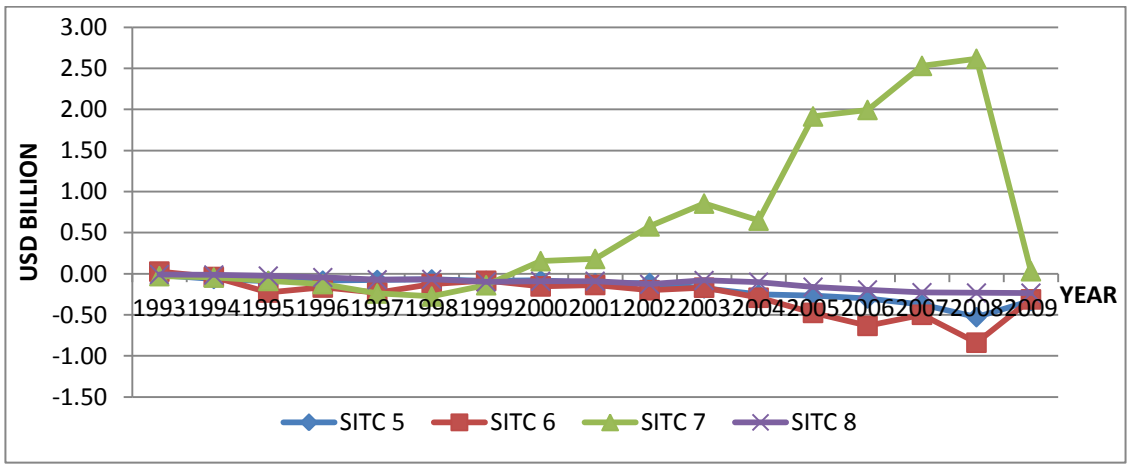


Figure A3b: Trade Balance of Philippines with China for Respective Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A1

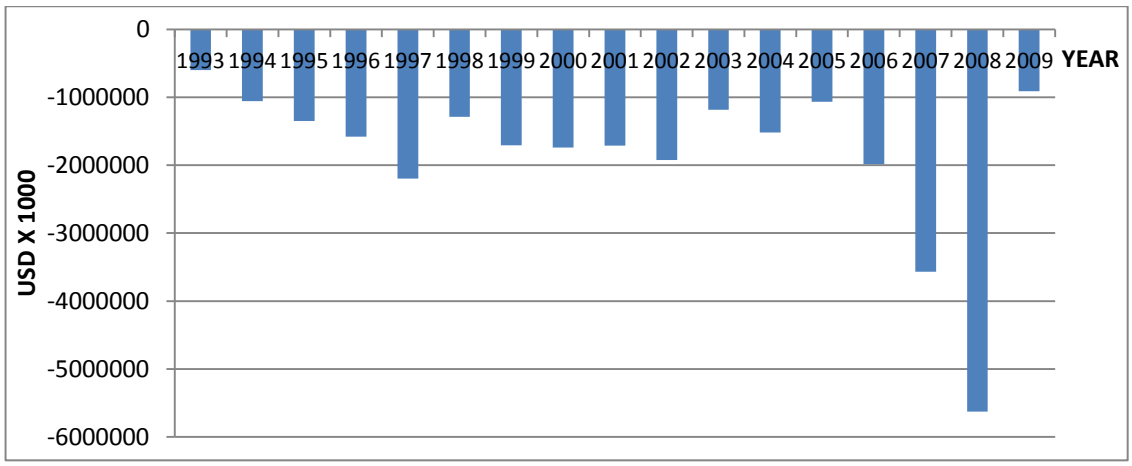


Figure A4a: Trade Balance of Singapore with China for Manufacturing sectors during 1993-2009

Source: same as Figure A1

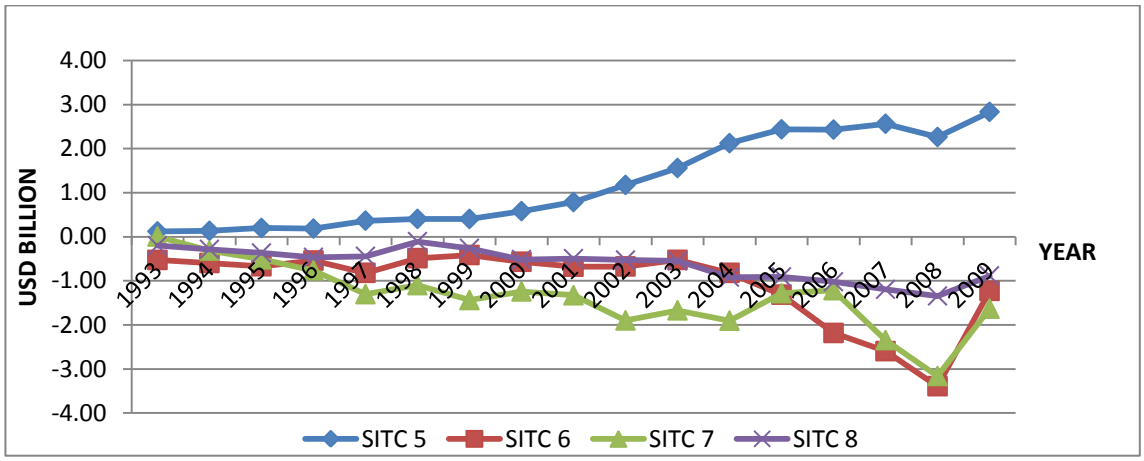


Figure A4b: Trade Balance of Singapore with China for Respective Manufacturing Sub-sector during 1993-2009

Source: same as Figure A1

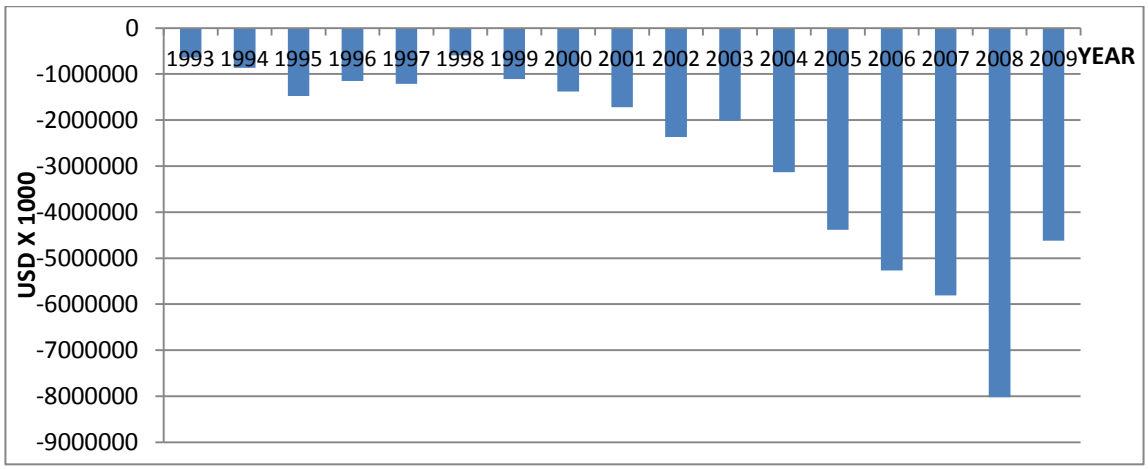


Figure A5a: Figure A1a: Trade Balance of Thailand with China for Manufacturing sectors during 1993-2009

Source: same as Figure A1

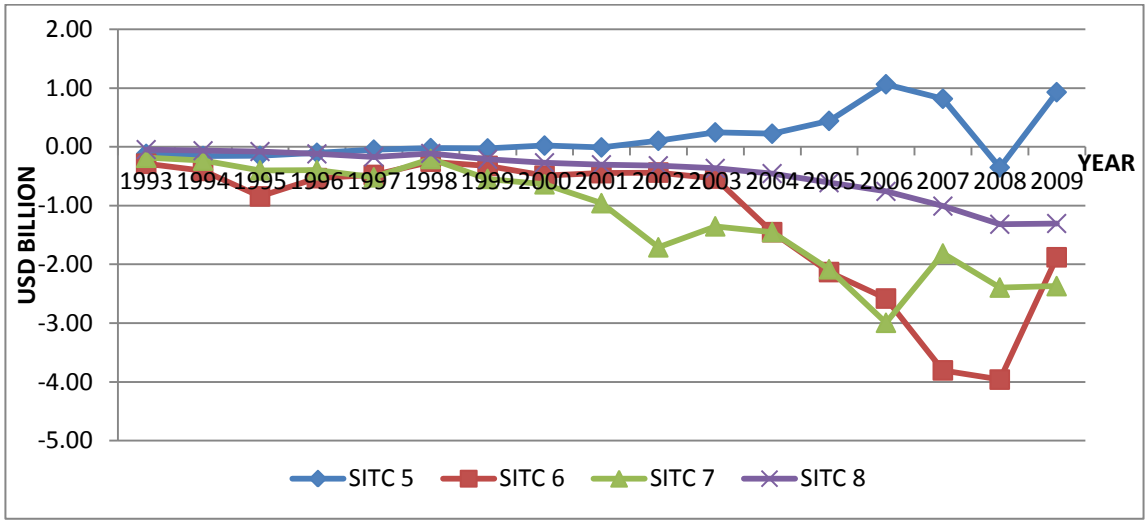


Figure A5b: Trade Balance of Thailand with China for Respective Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A1

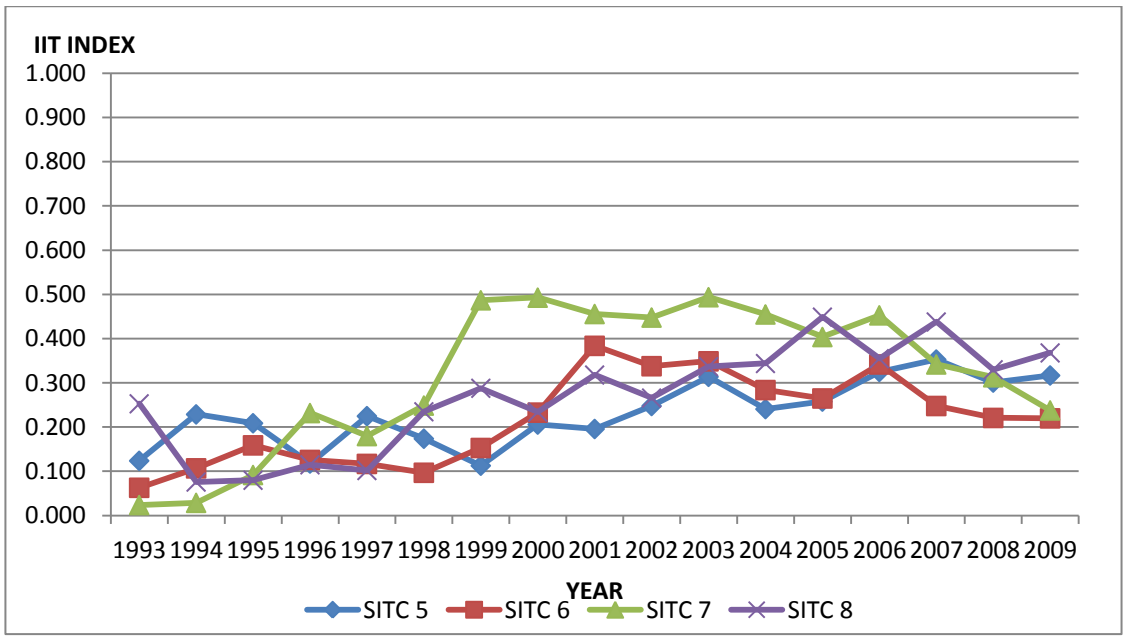


Figure A6: IIT Index between Indonesia and China in Each Manufacturing Sub-Sector during 1993-2009

Source: Author's calculation

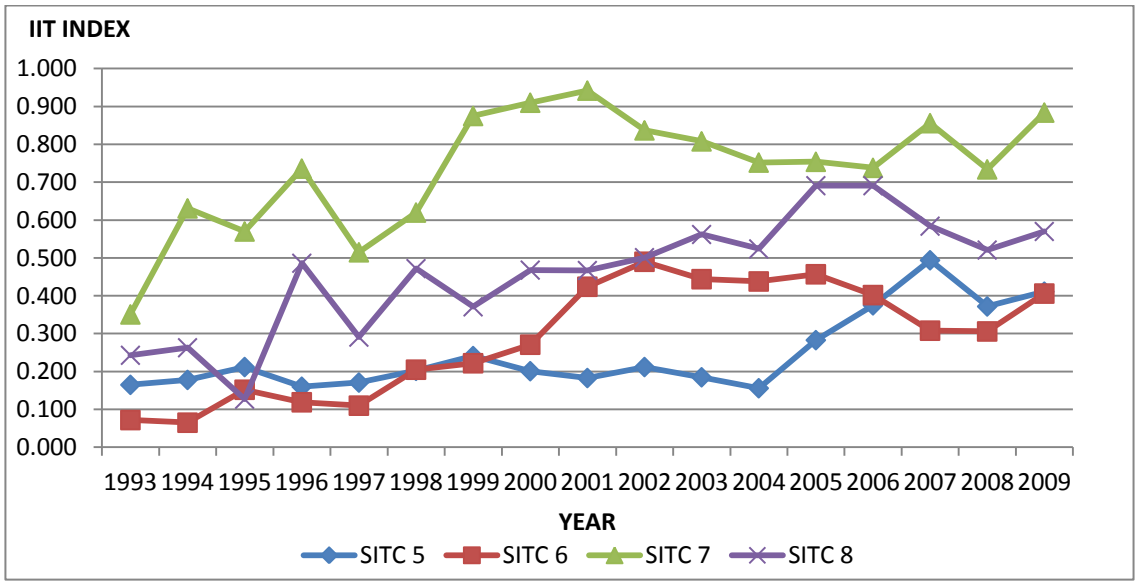


Figure A7: IIT Index between Malaysia and China for Each Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A6

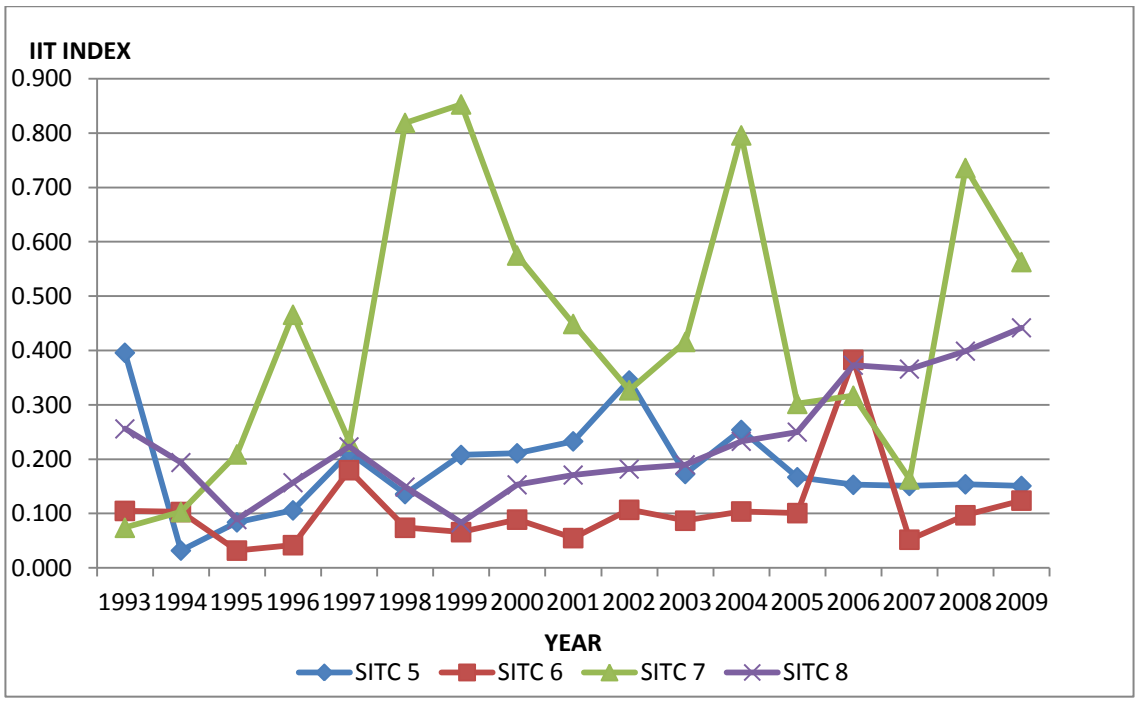


Figure A8: IIT Index between Philippines and China in Each Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A6

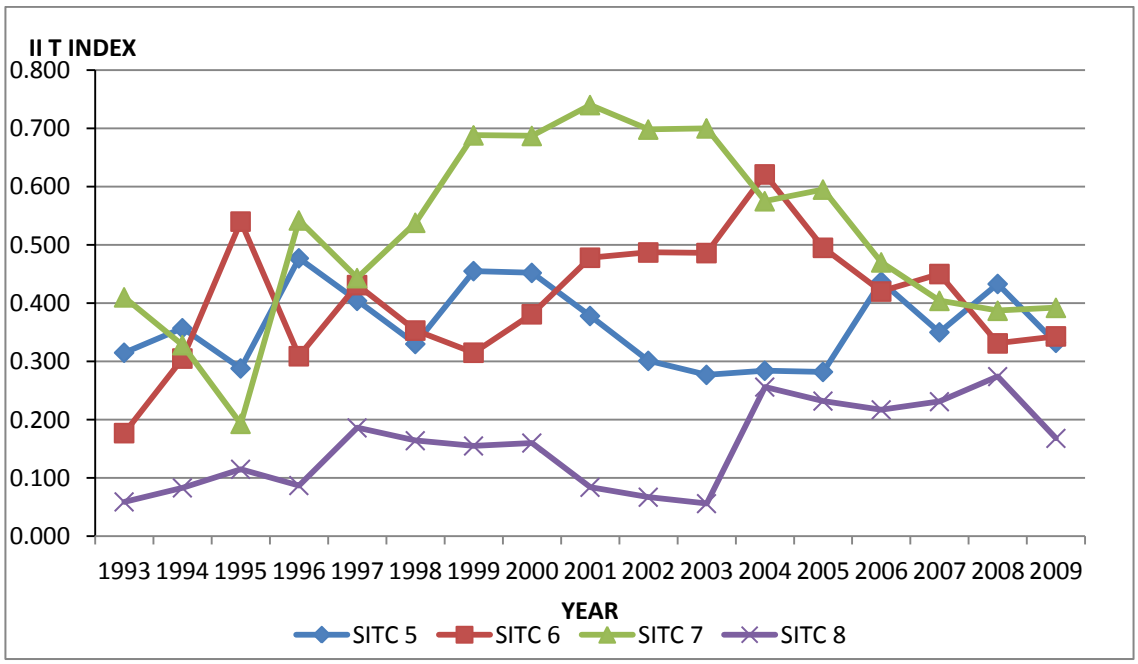


Figure A9: IIT Index between Singapore and China in Each Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A6

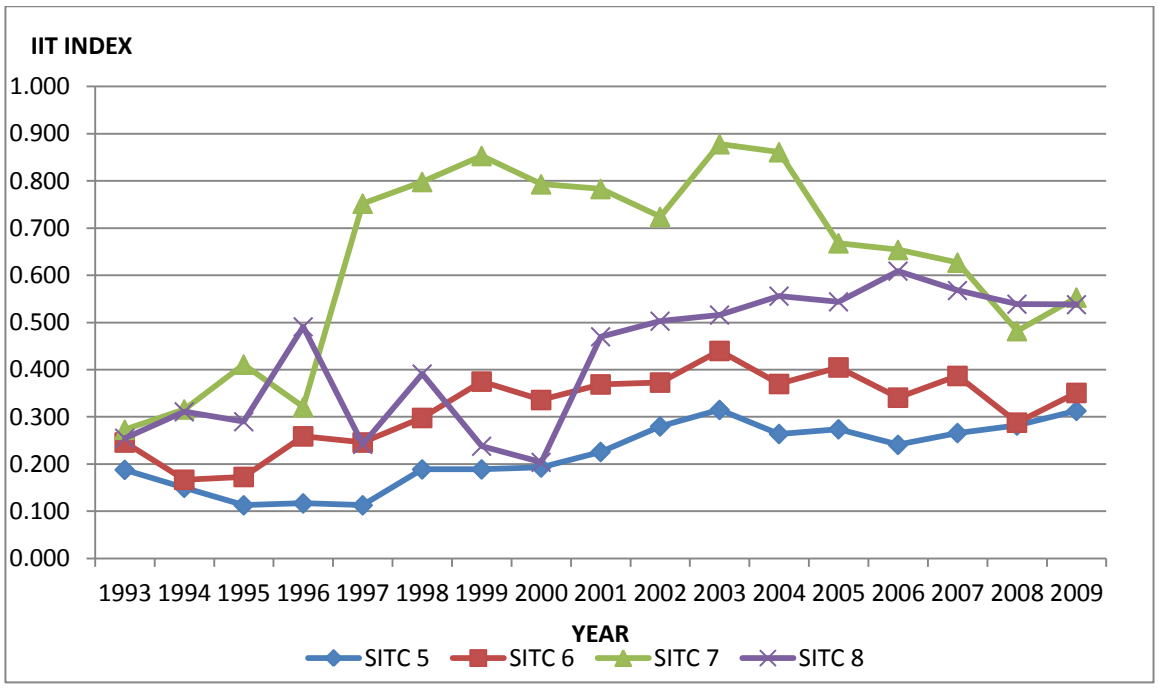


Figure A10: IIT Index between Thailand and China in Each Manufacturing Sub-sector during 1993-2009

Source: Same as Figure A6

Table A1: Samples of Product for Indonesia in SITC 5

5113	5155	5231	5331	5514	5731	5829
5114	5156	5232	5332	5532	5741	5921
5122	5157	5233	5334	5533	5743	5922
5123	5158	5234	5335	5534	5751	5977
5124	5161	5235	5411	5535	5754	5981
5137	5162	5236	5413	5541	5755	5983
5138	5163	5237	5414	5542	5759	5986
5139	5169	5238	5415	5543	5812	5988
5145	5221	5243	5416	5621	5813	5989
5146	5222	5249	5419	5623	5816	
5147	5223	5311	5421	5629	5817	
5148	5225	5312	5429	5711	5821	
5154	5226	5322	5513	5729	5822	

Source: UN CONTRADE Database

Table A2: Samples of Product for Indonesia in SITC 6

6114	6412	6534	6583	6659	6842	6965
6115	6413	6535	6584	6661	6851	6966
6116	6414	6536	6585	6662	6852	6968
6117	6415	6538	6589	6712	6861	6973
6118	6416	6539	6594	6713	6863	6974
6211	6417	6541	6596	6714	6891	6975
6212	6419	6542	6613	6715	6899	6978
6213	6421	6543	6618	6726	6911	6991
6214	6424	6544	6623	6735	6912	6992
6252	6429	6546	6624	6742	6921	6993
6254	6511	6549	6631	6755	6924	6994
6255	6513	6551	6632	6761	6931	6995
6259	6514	6552	6633	6762	6935	6996
6291	6515	6561	6635	6764	6941	6997
6292	6516	6562	6637	6768	6942	
6299	6517	6564	6638	6770	6943	
6332	6518	6565	6639	6781	6944	
6341	6519	6571	6641	6782	6952	
6342	6521	6572	6644	6791	6953	
6343	6522	6573	6645	6794	6954	
6344	6523	6575	6647	6795	6955	
6351	6524	6577	6648	6823	6956	
6353	6525	6578	6649	6824	6957	
6354	6531	6579	6651	6825	6963	
6359	6533	6581	6652	6827	6964	

Source: Same as Table A1

Table A3: Samples of Product for Indonesia in SITC 7

7111	7245	7339	7436	7478	7622	7761
7119	7246	7351	7438	7479	7633	7762
7121	7247	7359	7439	7481	7638	7763
7132	7248	7371	7441	7482	7641	7764
7133	7249	7372	7442	7483	7642	7781
7138	7251	7373	7443	7484	7643	7782
7139	7252	7374	7444	7485	7648	7783
7161	7259	7412	7447	7486	7649	7784
7162	7265	7413	7448	7489	7711	7786
7163	7266	7414	7449	7491	7712	7787
7165	7268	7415	7451	7492	7722	7788
7169	7269	7417	7452	7499	7723	7822
7189	7271	7418	7453	7511	7724	7843
7211	7272	7419	7456	7512	7725	7853
7212	7281	7421	7459	7513	7726	7862
7219	7283	7422	7461	7519	7728	7868
7224	7284	7424	7463	7523	7731	7919
7231	7285	7425	7465	7526	7732	7939
7232	7313	7426	7468	7527	7742	
7233	7314	7427	7469	7529	7751	
7234	7315	7429	7471	7591	7752	
7239	7316	7431	7472	7599	7754	
7243	7317	7434	7473	7611	7757	
7244	7331	7435	7474	7621	7758	

Source: Same as Table A1

Table A4: Samples of Product for Indonesia in SITC 8

8121	8319	8512	8742	8841	8941	8989
8122	8416	8514	8743	8842	8942	8991
8131	8428	8515	8744	8854	8943	8992
8138	8442	8519	8745	8857	8944	8993
8139	8453	8714	8746	8859	8947	8994
8211	8454	8719	8747	8921	8951	8996
8212	8455	8722	8811	8924	8952	8997
8213	8461	8723	8813	8928	8959	8998
8215	8469	8724	8821	8931	8981	8999
8218	8481	8731	8822	8932	8982	
8311	8482	8732	8823	8933	8984	
8312	8484	8741	8824	8939	8985	

Source: Same as Table A1

Table A5: Samples of Product for Malaysia in SITC 5

5114	5169	5236	5335	5721	5759	5922
5121	5221	5237	5414	5729	5799	5933
5122	5223	5238	5513	5731	5812	5972
5123	5225	5243	5514	5742	5813	5977
5124	5226	5249	5621	5743	5816	5981
5137	5231	5311	5622	5751	5817	5985
5138	5232	5312	5623	5752	5821	5986
5139	5233	5331	5629	5753	5822	5988
5161	5234	5332	5711	5754	5839	
5162	5235	5334	5719	5755	5921	

Source: Same as Table A1

Table A6: Samples of Product for Malaysia in SITC 6

6114	6413	6521	6594	6715	6821	6935
6115	6414	6532	6595	6726	6823	6941
6211	6415	6533	6596	6741	6824	6942
6212	6416	6534	6612	6742	6825	6943
6213	6417	6536	6613	6743	6826	6951
6251	6419	6538	6618	6744	6827	6955
6252	6421	6539	6623	6745	6841	6963
6254	6423	6549	6624	6753	6842	6964
6255	6424	6551	6631	6755	6851	6965
6331	6511	6552	6632	6757	6852	6966
6341	6512	6561	6633	6761	6861	6968
6342	6513	6572	6635	6768	6863	6973
6343	6514	6573	6638	6770	6871	6992
6344	6515	6575	6647	6781	6872	6994
6345	6516	6578	6649	6782	6911	6995
6351	6517	6579	6661	6791	6924	
6411	6518	6581	6713	6794	6931	
6412	6519	6592	6714	6795	6932	

Source: Same as Table A1

Table A7: Samples of Product for Malaysia in SITC 7

7132	7248	7339	7444	7483	7628	7764
7133	7251	7414	7447	7484	7633	7781
7138	7252	7417	7448	7485	7638	7783
7161	7265	7418	7451	7486	7641	7784
7162	7266	7421	7452	7511	7642	7786
7165	7268	7422	7453	7512	7643	7788
7211	7272	7424	7461	7513	7648	7843
7212	7281	7425	7462	7519	7712	7852
7219	7283	7426	7468	7522	7731	7919
7224	7284	7427	7471	7523	7751	7931
7231	7313	7434	7472	7526	7752	7932
7232	7314	7435	7473	7529	7754	7939
7234	7315	7436	7474	7611	7757	
7243	7316	7441	7478	7612	7758	
7245	7317	7442	7481	7621	7761	
7247	7331	7443	7482	7622	7763	

Source: Same as Table A1

Table A8: Samples of Product for Malaysia in SITC 8

8121	8414	8427	8455	8515	8746	8952
8138	8415	8428	8459	8517	8747	8981
8211	8416	8432	8461	8519	8811	8982
8212	8421	8438	8481	8713	8824	8994
8311	8422	8442	8482	8714	8931	8997
8312	8423	8448	8484	8719	8932	
8411	8424	8452	8512	8724	8933	
8412	8425	8453	8513	8741	8947	
8413	8426	8454	8514	8742	8951	

Source: Same as Table A1

Table A9: Samples of Product for Philippines in SITC 5

5121	5157	5232	5331	5532	5731	5822
5123	5158	5233	5332	5533	5751	5829
5137	5161	5234	5334	5534	5752	5921
5138	5162	5235	5335	5535	5753	5922
5139	5221	5236	5413	5541	5754	5986
5146	5222	5237	5419	5542	5759	5989
5148	5223	5243	5429	5543	5799	
5154	5225	5249	5513	5621	5812	
5156	5226	5311	5514	5629	5821	

Source: Same as Table A1

Table A10: Samples of Product for Philippines in SITC 6

6114	6419	6532	6589	6661	6899	6966
6117	6421	6533	6612	6662	6911	6968
6129	6423	6534	6613	6713	6912	6973
6213	6424	6535	6618	6714	6921	6974
6214	6429	6536	6623	6715	6924	6975
6251	6513	6541	6624	6762	6931	6991
6252	6514	6549	6631	6764	6935	6992
6254	6515	6552	6632	6768	6941	6993
6255	6516	6561	6633	6781	6942	6994
6259	6517	6562	6635	6791	6951	6995
6291	6518	6563	6638	6794	6952	6996
6292	6519	6565	6639	6795	6953	6997
6341	6521	6572	6644	6821	6954	
6342	6522	6573	6648	6824	6955	
6345	6523	6577	6649	6827	6956	
6353	6524	6579	6651	6842	6963	
6415	6525	6583	6652	6851	6964	
6417	6531	6584	6659	6872	6965	

Source: Same as Table A1

Table A11: Samples of Product for Philippines in SITC 7

7132	7249	7351	7439	7482	7641	7763
7138	7252	7359	7441	7483	7642	7764
7139	7259	7372	7442	7484	7643	7768
7162	7266	7373	7443	7485	7711	7781
7163	7271	7413	7444	7486	7712	7782
7165	7272	7414	7447	7489	7722	7783
7169	7281	7415	7448	7491	7723	7784
7211	7283	7417	7449	7499	7724	7786
7212	7284	7418	7452	7511	7725	7787
7224	7285	7419	7453	7512	7728	7788
7231	7313	7426	7456	7513	7731	7812
7239	7314	7427	7461	7519	7732	7843
7243	7315	7429	7468	7526	7741	7852
7244	7316	7431	7473	7599	7751	7853
7245	7317	7434	7478	7621	7757	7868
7246	7331	7436	7479	7628	7758	
7247	7339	7438	7481	7638	7761	

Source: Same as Table A1

Table A12: Samples of Product for Philippines in SITC 8

8122	8218	8455	8515	8746	8933	8982
8131	8312	8461	8519	8747	8939	8984
8138	8319	8462	8714	8811	8941	8992
8139	8414	8469	8723	8813	8942	8993
8211	8415	8481	8724	8841	8943	8994
8212	8426	8482	8731	8911	8944	8996
8213	8427	8484	8742	8921	8947	8997
8215	8442	8512	8743	8928	8951	8998
8217	8454	8513	8745	8931	8959	8999

Source: Same as Table A1

Table A13: Samples of Product for Singapore in SITC 5

5111	5157	5235	5413	5731	5814	5933
5112	5158	5236	5414	5739	5816	5972
5121	5161	5237	5415	5741	5817	5973
5122	5162	5238	5513	5742	5821	5977
5123	5163	5243	5514	5743	5822	5981
5124	5169	5249	5541	5751	5829	5983
5137	5221	5311	5542	5752	5832	5986
5138	5222	5312	5543	5753	5839	5988
5139	5223	5322	5621	5754	5912	5989
5145	5225	5323	5629	5755	5913	
5146	5226	5331	5711	5759	5914	
5148	5231	5332	5712	5799	5921	
5154	5232	5334	5719	5811	5922	
5155	5233	5335	5721	5812	5931	
5156	5234	5411	5729	5813	5932	

Source: Same as Table A1

Table A14: Samples of Product for Singapore in SITC 6

6114	6413	6524	6583	6724	6795	6921
6116	6414	6525	6592	6728	6821	6924
6117	6415	6526	6594	6735	6823	6931
6211	6416	6529	6595	6741	6824	6932
6212	6417	6531	6596	6742	6825	6935
6213	6419	6532	6612	6751	6826	6941
6214	6421	6533	6613	6753	6827	6942
6251	6423	6534	6618	6755	6831	6943
6252	6511	6535	6623	6756	6832	6951
6253	6512	6536	6624	6757	6841	6952
6254	6513	6538	6631	6762	6842	6953
6255	6514	6541	6632	6763	6851	6955
6259	6515	6542	6633	6764	6861	6968
6292	6516	6543	6635	6768	6863	6973
6331	6517	6546	6637	6770	6871	6992
6332	6518	6551	6641	6781	6872	6994
6341	6519	6552	6644	6782	6891	6995
6343	6521	6575	6647	6791	6899	6996
6344	6522	6578	6712	6793	6911	6998
6412	6523	6581	6715	6794	6912	6999

Source: Same as Table A1

Table A15: Samples of Product for Singapore in SITC 7

7111	7232	7311	7431	7474	7628	7782
7112	7233	7312	7434	7478	7638	7784
7132	7234	7313	7435	7483	7641	7787
7133	7243	7314	7436	7511	7642	7812
7138	7245	7315	7441	7512	7643	7822
7148	7247	7316	7442	7513	7648	7851
7161	7252	7317	7443	7519	7711	7852
7162	7263	7331	7444	7522	7712	7863
7163	7265	7339	7447	7523	7731	7931
7164	7266	7415	7448	7526	7751	7932
7165	7268	7421	7452	7527	7752	7939
7211	7271	7422	7453	7529	7754	
7212	7272	7424	7456	7611	7757	
7213	7281	7425	7471	7612	7758	
7219	7283	7426	7472	7621	7761	
7224	7284	7427	7473	7622	7781	

Source: Same as Table A1

Table A16: Samples of Product for Singapore in SITC 8

8311	8416	8428	8448	8461	8515	8952
8312	8421	8431	8452	8462	8517	8959
8319	8422	8432	8453	8481	8714	8981
8411	8423	8437	8454	8484	8732	8994
8412	8424	8438	8455	8511	8744	8997
8413	8425	8441	8456	8512	8746	
8414	8426	8442	8458	8513	8747	
8415	8427	8447	8459	8514	8842	

Source: Same as Table A1

Table A17: Samples of Product for Thailand in SITC 5

5113	5156	5233	5334	5534	5743	5911
5114	5157	5234	5335	5535	5751	5912
5122	5158	5235	5411	5541	5752	5913
5123	5161	5236	5413	5542	5754	5914
5124	5162	5237	5414	5543	5755	5921
5137	5163	5238	5415	5621	5759	5922
5138	5169	5243	5419	5629	5799	5931
5139	5221	5249	5421	5711	5812	5932
5145	5222	5311	5429	5719	5816	5933
5146	5223	5312	5513	5721	5817	5977
5147	5225	5322	5514	5729	5821	5981
5148	5226	5323	5531	5731	5822	5983
5154	5231	5331	5532	5739	5829	5986
5155	5232	5332	5533	5742	5839	5989

Source: Same as Table A1

Table A18: Samples of Product for Thailand in SITC 6

6114	6415	6552	6618	6714	6842	6956
6117	6416	6561	6623	6715	6851	6957
6129	6417	6562	6624	6726	6852	6963
6212	6419	6563	6631	6741	6861	6964
6213	6421	6564	6632	6762	6863	6965
6214	6422	6565	6633	6763	6891	6966
6252	6423	6571	6635	6764	6899	6968
6253	6424	6572	6637	6768	6911	6973
6255	6429	6573	6638	6781	6912	6974
6259	6511	6574	6639	6782	6921	6975
6292	6512	6575	6641	6791	6924	6978
6299	6513	6577	6643	6794	6931	6991
6341	6514	6578	6648	6795	6935	6992
6342	6515	6579	6649	6823	6941	6993
6351	6516	6581	6651	6824	6942	6994
6353	6517	6583	6652	6825	6943	6995
6354	6518	6584	6659	6826	6951	6996
6359	6519	6585	6661	6827	6952	6997
6411	6544	6589	6662	6831	6953	6999
6413	6546	6592	6712	6832	6954	
6414	6551	6613	6713	6841	6955	

Source: Same as Table A1

Table A19: Samples of Product for Thailand in SITC 7

7131	7248	7371	7441	7479	7621	7758
7132	7249	7372	7442	7481	7622	7764
7133	7252	7373	7443	7482	7628	7781
7139	7263	7374	7444	7483	7638	7783
7161	7266	7414	7447	7484	7641	7784
7162	7269	7415	7448	7485	7648	7786
7163	7271	7417	7449	7486	7649	7787
7169	7272	7418	7451	7489	7711	7788
7189	7281	7419	7452	7491	7722	7843
7211	7283	7421	7453	7492	7723	7852
7212	7284	7422	7459	7499	7724	7853
7219	7285	7425	7461	7511	7725	7863
7224	7311	7426	7462	7512	7726	7868
7233	7313	7427	7463	7513	7728	7919
7234	7315	7429	7464	7522	7731	7931
7239	7316	7431	7468	7523	7732	
7243	7317	7434	7469	7526	7742	
7244	7331	7435	7471	7527	7751	
7245	7339	7436	7473	7529	7752	
7246	7351	7438	7474	7599	7754	
7247	7359	7439	7478	7611	7757	

Source: Same as Table A1

Table A20: Samples of Product for Thailand in SITC 8

8110	8312	8427	8459	8722	8841	8951
8121	8313	8428	8461	8723	8842	8952
8122	8319	8432	8462	8732	8843	8959
8131	8412	8437	8469	8741	8921	8981
8132	8413	8438	8482	8742	8922	8982
8138	8414	8442	8484	8743	8924	8989
8139	8415	8447	8512	8745	8928	8991
8211	8416	8448	8513	8746	8931	8992
8212	8421	8451	8514	8747	8932	8993
8213	8422	8453	8515	8749	8933	8994
8215	8423	8454	8517	8811	8939	8996
8217	8424	8455	8519	8812	8942	8997
8218	8425	8456	8711	8821	8944	8998
8311	8426	8458	8719	8823	8947	8999

Source: Same as Table A1

Table A21: List of SITC 5 Products in Bilateral VIIT between Indonesia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	5421	5743				
	5541	5822				
LVIIT	5137	5542	5921			
	5146	5731				
VIIT	5137	5541	5743			
	5146	5542	5822			
	5421	5731	5921			
1996						
HVIIT	5335	5534	5812			
	5419	5542	5817			
	5429	5731	5822			
LVIIT	5137	5541	5751			
	5146	5729				
VIIT	5137	5419	5541	5731	5817	
	5146	5429	5542	5751	5822	
	5335	5534	5729	5812		
1999						
HVIIT	5124	5334	5532	5754	5829	
	5154	5419	5534	5812	5977	
	5331	5421	5541	5821	5986	
	5332	5513	5542	5981	5989	
LVIIT	5146	5312	5514			
	5161	5335	5621			
VIIT	5124	5331	5421	5541	5821	5989
	5146	5332	5513	5542	5829	
	5154	5334	5514	5621	5977	
	5161	5335	5532	5754	5981	
	5312	5419	5534	5812	5986	

Table A21, continued

2002						
HVIIT	5124	5334	5532	5543	5829	
	5148	5421	5533	5751		
	5221	5513	5534	5821		
	5331	5514	5542	5822		
LVIIT	5113	5146	5161	5335	5922	
	5137	5157	5312	5416		
VIIT	5113	5157	5334	5514	5543	5922
	5124	5161	5335	5532	5751	
	5137	5221	5416	5533	5821	
	5146	5312	5421	5534	5822	
	5148	5331	5513	5542	5829	
2005						
HVIIT	5124	5513	5729	5817	5983	
	5148	5534	5754	5822		
	5223	5535	5812	5829		
LVIIT	5113	5147	5222	5751	5986	
	5137	5157	5226	5921		
	5146	5161	5416	5922		
VIIT	5113	5148	5226	5729	5822	5986
	5124	5157	5416	5751	5829	
	5137	5161	5513	5754	5921	
	5146	5222	5534	5812	5922	
	5147	5223	5535	5817	5983	
2009						
HVIIT	5157	5414	5532	5822		
	5223	5513	5535			
LVIIT	5113	5138	5312	5534	5743	5981
	5124	5161	5416	5542	5751	
	5137	5226	5533	5729	5754	
VIIT	5157	5535	5138	5533	5751	
	5223	5822	5161	5534	5754	
	5414	5113	5226	5542	5981	
	5513	5124	5312	5729		
	5532	5137	5416	5743		

Source: Author’s calculation

Table A22: List of SITC 6 Products in Bilateral VIIT between Indonesia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	6116	6416	6533	6583	6963	
	6213	6518	6536	6613	6974	
	6354	6523	6573	6924		
LVIIT	6212	6514	6842			
	6341	6823	6994			
	6415	6825				
VIIT	6116	6415	6533	6823	6974	
	6212	6416	6536	6825	6994	
	6213	6514	6573	6842		
	6341	6518	6583	6924		
	6354	6523	6613	6963		
1996						
HVIIT	6213	6424	6536	6583	6662	
	6252	6429	6538	6613	6824	
	6254	6522	6573	6632	6921	
	6259	6525	6575	6644	6996	
	6354	6533	6581	6659		
LVIIT	6255	6516	6649	6713	6997	
	6415	6565	6652	6735		
VIIT	6213	6415	6533	6581	6652	6921
	6252	6424	6536	6583	6659	6996
	6254	6429	6538	6613	6662	6997
	6255	6516	6565	6632	6713	
	6259	6522	6573	6644	6735	
	6354	6525	6575	6649	6824	

Table A22, continued

1999						
HVIIT	6117	6531	6575	6594	6648	6974
	6254	6533	6577	6596	6659	6975
	6259	6535	6581	6618	6662	6978
	6429	6552	6583	6632	6795	6995
	6514	6565	6584	6638	6824	
	6523	6573	6585	6641	6827	
LVIIT	6212	6518	6571	6649	6996	
	6341	6525	6633	6652		
	6359	6536	6645	6924		
VIIT	6117	6518	6565	6585	6645	6827
	6212	6523	6571	6594	6648	6924
	6254	6525	6573	6596	6649	6974
	6259	6531	6575	6618	6652	6975
	6341	6533	6577	6632	6659	6978
	6359	6535	6581	6633	6662	6995
	6429	6536	6583	6638	6795	6996
	6514	6552	6584	6641	6824	
2002						
HVIIT	6213	6531	6579	6632	6755	6931
	6299	6533	6581	6639	6824	6944
	6514	6535	6589	6645	6827	6966
	6522	6565	6596	6651	6842	6994
	6523	6577	6613	6659	6921	
LVIIT	6114	6359	6417	6516	6652	6825
	6212	6414	6419	6518	6713	
	6354	6416	6421	6647	6761	
VIIT	6114	6417	6531	6596	6659	6921
	6212	6419	6533	6613	6713	6931
	6213	6421	6535	6632	6755	6944
	6299	6514	6565	6639	6761	6966
	6354	6516	6577	6645	6824	6994
	6359	6518	6579	6647	6825	
	6414	6522	6581	6651	6827	
	6416	6523	6589	6652	6842	

Table A22, continued

2005						
HVIIT	6211	6514	6541	6589	6649	6842
	6213	6522	6551	6596	6651	6852
	6292	6523	6573	6623	6659	6924
	6299	6533	6577	6632	6791	6966
	6354	6534	6581	6638	6825	6997
	6424	6538	6583	6641	6827	
LVIIT	6254	6414	6416	6515	6613	6652
	6359	6415	6417	6516	6644	6713
VIIT	6211	6415	6523	6581	6641	6825
	6213	6416	6533	6583	6644	6827
	6254	6417	6534	6589	6649	6842
	6292	6424	6538	6596	6651	6852
	6299	6514	6541	6613	6652	6924
	6354	6515	6551	6623	6659	6966
	6359	6516	6573	6632	6713	6997
	6414	6522	6577	6638	6791	
2009						
HVIIT	6114	6299	6414	6551	6632	6996
	6116	6341	6514	6579	6638	6997
	6213	6343	6518	6581	6639	
	6292	6353	6533	6613	6715	
LVIIT	6117	6351	6417	6515	6713	6851
	6254	6415	6429	6516	6761	6861
	6342	6416	6513	6652	6825	
VIIT	6114	6341	6416	6518	6638	6851
	6116	6342	6417	6533	6639	6861
	6117	6343	6429	6551	6652	6996
	6213	6351	6513	6579	6713	6997
	6254	6353	6514	6581	6715	
	6292	6414	6515	6613	6761	
	6299	6415	6516	6632	6825	

Source: Same as Table A21

Table A23: List of SITC 7 Products in Bilateral VIIT between Indonesia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	7272	7479				
	7452					
LVIIT	7239					
	7781					
VIIT	7239	7452	7781			
	7272	7479				
1996						
HVIIT	7161	7245	7272	7491	7781	
	7162	7247	7284	7638		
	7163	7252	7285	7752		
	7189	7259	7417	7764		
LVIIT	7372	7452				
	7418	7499				
VIIT	7161	7247	7285	7491	7781	
	7162	7252	7372	7499		
	7163	7259	7417	7638		
	7189	7272	7418	7752		
	7245	7284	7452	7764		
1999						
HVIIT	7119	7239	7281	7434	7526	7731
	7132	7245	7284	7436	7633	7752
	7161	7249	7331	7456	7642	7781
	7163	7252	7339	7491	7649	7787
	7169	7259	7373	7512	7712	7788
	7212	7266	7374	7519	7723	7853
LVIIT	7244	7722				
	7248	7761				
VIIT	7119	7244	7281	7436	7642	7761
	7132	7245	7284	7456	7649	7781
	7161	7248	7331	7491	7712	7787
	7163	7249	7339	7512	7722	7788
	7169	7252	7373	7519	7723	7853
	7212	7259	7374	7526	7731	
	7239	7266	7434	7633	7752	

Table A23, continued

2002						
HVIIT	7119	7317	7469	7711	7758	7786
	7161	7415	7499	7712	7761	7787
	7252	7431	7523	7723	7763	7788
	7281	7436	7526	7725	7764	7843
	7285	7439	7638	7726	7781	
	7315	7451	7649	7752	7783	
LVIIT	7251	7599				
	7259	7712				
VIIT	7119	7315	7469	7711	7758	7787
	7161	7317	7499	7712	7761	7788
	7251	7415	7523	7712	7763	7843
	7252	7431	7526	7723	7764	
	7259	7436	7599	7725	7781	
	7281	7439	7638	7726	7783	
	7285	7451	7649	7752	7786	
2005						
HVIIT	7139	7436	7523	7638	7754	7788
	7161	7449	7526	7642	7761	7843
	7281	7469	7529	7649	7763	
	7285	7483	7599	7711	7764	
	7374	7492	7621	7723	7781	
	7431	7499	7633	7725	7786	
LVIIT	7169	7722	7762			
	7439	7728				
VIIT	7139	7436	7523	7642	7754	7788
	7161	7439	7526	7649	7761	7843
	7169	7449	7529	7711	7762	
	7281	7469	7599	7722	7763	
	7285	7483	7621	7723	7764	
	7374	7492	7633	7725	7781	
	7431	7499	7638	7728	7786	
2009						
HVIIT	7161	7456	7527	7642	7762	
	7231	7472	7529	7649	7763	
	7429	7483	7599	7712	7781	
	7431	7492	7622	7725	7786	
	7442	7526	7638	7761		
LVIIT	NA					
VIIT	7161	7456	7527	7642	7762	
	7231	7472	7529	7649	7763	
	7429	7483	7599	7712	7781	
	7431	7492	7622	7725	7786	
	7442	7526	7638	7761		

Source: Same as Table A21

Table A24: List of SITC 8 Products in Bilateral VIIT between Indonesia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	8218	8481	8921	8998		
	8312	8743	8942			
LVIIT	8122	8215				
	8211					
VIIT	8122	8215	8312	8743	8942	
	8211	8218	8481	8921	8998	
1996						
HVIIT	8212	8311	8481	8811	8932	
	8215	8453	8512	8921	8944	
LVIIT	8482					
	8745					
VIIT	8212	8311	8481	8512	8811	8932
	8215	8453	8482	8745	8921	8944
1999						
HVIIT	8131	8428	8461	8811	8931	8981
	8212	8442	8484	8823	8932	8984
	8312	8453	8512	8841	8947	8994
	8319	8454	8514	8842	8951	8997
	8416	8455	8731	8921	8959	
LVIIT	8213					
VIIT	8131	8416	8455	8731	8921	8959
	8212	8428	8461	8811	8931	8981
	8213	8442	8484	8823	8932	8984
	8312	8453	8512	8841	8947	8994
	8319	8454	8514	8842	8951	8997
2002						
HVIIT	8122	8442	8514	8811	8981	8998
	8212	8453	8714	8841	8985	
	8416	8454	8724	8924	8991	
	8428	8512	8743	8931	8994	
LVIIT	8211	8484				
	8218	8928				
VIIT	8122	8428	8512	8811	8981	
	8211	8442	8514	8841	8985	
	8212	8453	8714	8924	8991	
	8218	8454	8724	8928	8994	
	8416	8484	8743	8931	8998	

Table A24, continued

2005						
HVIIT	8122	8515	8741	8924	8981	8999
	8218	8519	8747	8933	8982	
	8482	8719	8811	8942	8985	
	8512	8724	8823	8951	8998	
LVIIT	8212	8931	8989			
	8454	8932	8991			
VIIT	8122	8512	8741	8931	8981	8998
	8212	8515	8747	8932	8982	8999
	8218	8519	8811	8933	8985	
	8454	8719	8823	8942	8989	
	8482	8724	8924	8951	8991	
2009						
HVIIT	8215	8454	8514	8841	8981	8999
	8319	8482	8515	8942	8982	
	8453	8512	8745	8944	8989	
LVIIT	8211	8931				
	8218	8991				
VIIT	8211	8453	8514	8931	8982	
	8215	8454	8515	8942	8989	
	8218	8482	8745	8944	8991	
	8319	8512	8841	8981	8999	

Source: Same as Table A21

Table A25: List of SITC 5 Products in Bilateral VIIT between Malaysia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	5122	5331	5334	5755	5922	5988
	5137	5332	5743	5812	5977	
LVIIT	5335	5719	5753	5822		
	5414	5721	5821	5986		
VIIT	5122	5334	5721	5812	5977	
	5137	5335	5743	5821	5986	
	5331	5414	5753	5822	5988	
	5332	5719	5755	5922		
1996						
HVIIT	5225	5816	5821	5922		
	5755	5817	5839	5977		
LVIIT	5331	5335	5731	5759	5986	
	5334	5514	5754	5812		
VIIT	5225	5335	5754	5812	5821	5977
	5331	5514	5755	5816	5839	5986
	5334	5731	5759	5817	5922	
1999						
HVIIT	5169	5331	5743	5759	5821	5977
	5223	5513	5753	5812	5921	
	5249	5742	5755	5817	5922	
LVIIT	5137	5226	5754	5822	5986	
	5161	5332	5816	5972	5988	
VIIT	5137	5249	5743	5812	5921	5988
	5161	5331	5753	5816	5922	
	5169	5332	5754	5817	5972	
	5223	5513	5755	5821	5977	
	5226	5742	5759	5822	5986	
2002						
HVIIT	5225	5742	5812	5977		
	5237	5753	5817	5985		
LVIIT	5114	5161	5334	5754	5922	
	5123	5223	5514	5799	5988	
	5139	5332	5752	5822		
VIIT	5114	5223	5334	5753	5817	5985
	5123	5225	5514	5754	5822	5988
	5139	5237	5742	5799	5922	
	5161	5332	5752	5812	5977	

Table A25, continued

2005						
HVIIT	5223	5621	5743	5754	5972	
	5335	5742	5753	5813		
LVIIT	5138	5226	5799	5816	5922	
	5225	5514	5812	5821	5981	
VIIT	5138	5335	5743	5812	5922	
	5223	5514	5753	5813	5972	
	5225	5621	5754	5816	5981	
	5226	5742	5799	5821		
2009						
HVIIT	5221	5238	5742	5972	5986	
	5223	5334	5813	5977		
	5226	5414	5821	5985		
LVIIT	5124	5138	5514	5721	5759	5839
	5137	5225	5719	5754	5812	5922
VIIT	5124	5225	5514	5759	5922	
	5137	5226	5719	5812	5972	
	5138	5238	5721	5813	5977	
	5221	5334	5742	5821	5985	
	5223	5414	5754	5839	5986	

Source: Same as Table A21

Table A26: List of SITC 6 Products in Bilateral VIIT between Malaysia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	6211	6415	6575	6824	6995	
	6255	6518	6624	6911		
	6331	6533	6741	6924		
LVIIT	6212	6417	6511	6517	6826	
	6416	6424	6515	6791		
VIIT	6211	6415	6511	6533	6791	6924
	6212	6416	6515	6575	6824	6995
	6255	6417	6517	6624	6826	
	6331	6424	6518	6741	6911	
1996						
HVIIT	6518	6618	6826	6852	6995	
	6533	6649	6827	6911		
	6573	6753	6842	6924		
LVIIT	6212	6421	6516	6647	6824	
	6411	6424	6552	6713		
	6417	6515	6572	6823		
VIIT	6212	6515	6572	6713	6827	6995
	6411	6516	6573	6753	6842	
	6417	6518	6618	6823	6852	
	6421	6533	6647	6824	6911	
	6424	6552	6649	6826	6924	
1999						
HVIIT	6114	6421	6595	6741	6823	6963
	6255	6533	6618	6744	6852	6994
	6351	6573	6624	6757	6863	6995
	6416	6578	6635	6781	6924	
	6419	6579	6647	6791	6942	
LVIIT	6211	6424	6516	6713	6794	6931
	6414	6512	6561	6753	6826	
	6415	6515	6612	6755	6911	
VIIT	6114	6421	6578	6713	6794	6942
	6211	6424	6579	6741	6823	6963
	6255	6512	6595	6744	6826	6994
	6351	6515	6612	6753	6852	6995
	6414	6516	6618	6755	6863	
	6415	6533	6624	6757	6911	
	6416	6561	6635	6781	6924	
	6419	6573	6647	6791	6931	

Table A26, continued

2002						
HVIIT	6255	6578	6755	6852	6955	
	6417	6581	6782	6863	6963	
	6519	6592	6823	6924	6992	
	6533	6623	6825	6941	6995	
LVIIT	6114	6212	6416	6612	6757	6842
	6115	6414	6515	6618	6761	6911
	6211	6415	6518	6649	6826	6942
VIIT	6114	6416	6581	6757	6852	
	6115	6417	6592	6761	6863	6963
	6211	6515	6612	6782	6911	6992
	6212	6518	6618	6823	6924	6995
	6255	6519	6623	6825	6941	
	6414	6533	6649	6826	6942	
	6415	6578	6755	6842	6955	
2005						
HVIIT	6251	6512	6623	6824	6941	6995
	6255	6519	6632	6842	6942	
	6351	6578	6753	6852	6943	
	6423	6592	6755	6871	6968	
	6511	6595	6823	6911	6994	
LVIIT	6212	6518	6649	6872		
	6415	6633	6713	6935		
VIIT	6212	6511	6595	6755	6872	6968
	6251	6512	6623	6823	6911	6994
	6255	6518	6633	6824	6935	6995
	6351	6519	6649	6842	6941	
	6415	6578	6713	6852	6942	
	6423	6592	6753	6871	6943	
2009						
HVIIT	6251	6419	6595	6755	6852	6966
	6252	6421	6632	6781	6924	6992
	6255	6533	6647	6823	6941	6995
	6351	6578	6649	6842	6942	
	6417	6581	6661	6851	6963	
LVIIT	6115	6415	6513	6612	6753	6861
	6342	6424	6519	6635	6821	
VIIT	6115	6417	6578	6649	6842	6963
	6251	6419	6581	6661	6851	6966
	6252	6421	6595	6753	6852	6992
	6255	6424	6612	6755	6861	6995
	6342	6513	6632	6781	6924	
	6351	6519	6635	6821	6941	
	6415	6533	6647	6823	6942	

Source: Same as Table A21

Table A27: List of SITC 7 Products in Bilateral VIIT between Malaysia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	7162	7281	7422	7512	7638	7757
	7243	7283	7427	7519	7641	7781
	7252	7317	7441	7611	7648	7788
	7265	7315	7452	7621	7751	7843
	7272	7417	7486	7628	7754	
LVIIT	7245	7339	7436	7763		
	7284	7418	7633	7764		
VIIT	7162	7283	7422	7519	7648	7788
	7243	7284	7427	7611	7751	7843
	7245	7315	7436	7621	7754	
	7252	7317	7441	7628	7757	
	7265	7339	7452	7633	7763	
	7272	7417	7486	7638	7764	
	7281	7418	7512	7641	7781	
1996						
HVIIT	7133	7265	7317	7427	7474	7712
	7161	7266	7339	7436	7513	7757
	7211	7268	7417	7441	7529	7758
	7212	7272	7418	7448	7611	7764
	7219	7281	7421	7451	7638	7788
	7243	7283	7422	7452	7642	
	7252	7314	7426	7472	7648	
LVIIT	7232	7414	7471	7633	7786	
	7284	7462	7628	7731		
VIIT	7133	7266	7414	7448	7611	7758
	7161	7268	7417	7451	7628	7764
	7211	7272	7418	7452	7633	7786
	7212	7281	7421	7462	7638	7788
	7219	7283	7422	7471	7642	
	7232	7284	7426	7472	7648	
	7243	7314	7427	7474	7712	
	7252	7317	7436	7513	7731	
	7265	7339	7441	7529	7757	

Table A27, continued

1999						
HVIIT	7133	7268	7418	7452	7628	7758
	7161	7284	7421	7453	7641	7761
	7162	7313	7422	7471	7642	7781
	7234	7315	7425	7472	7643	7788
	7245	7316	7427	7473	7648	
	7247	7317	7436	7523	7712	
	7265	7339	7441	7611	7752	
	7266	7417	7447	7621	7757	
LVIIT	7211	7251	7331	7474	7638	7783
	7219	7281	7414	7522	7731	7786
	7248	7283	7448	7526	7763	
VIIT	7133	7266	7414	7452	7628	7761
	7161	7268	7417	7453	7638	7763
	7162	7281	7418	7471	7641	7781
	7211	7283	7421	7472	7642	7783
	7219	7284	7422	7473	7643	7786
	7234	7313	7425	7474	7648	7788
	7245	7315	7427	7522	7712	
	7247	7316	7436	7523	7731	
	7248	7317	7441	7526	7752	
	7251	7331	7447	7611	7757	
	7265	7339	7448	7621	7758	
2002						
HVIIT	7133	7266	7317	7436	7483	7641
	7165	7272	7331	7442	7485	7758
	7211	7281	7339	7447	7519	7764
	7212	7284	7414	7448	7523	7781
	7219	7313	7417	7452	7526	7843
	7243	7314	7421	7472	7611	
	7245	7315	7426	7473	7621	
	7247	7316	7435	7474	7628	
LVIIT	7161	7232	7265	7511	7648	7763
	7162	7248	7283	7643	7731	7788
VIIT	7133	7247	7315	7436	7511	7731
	7161	7248	7316	7442	7519	7758
	7162	7265	7317	7447	7523	7763
	7165	7266	7331	7448	7526	7764
	7211	7272	7339	7452	7611	7781
	7212	7281	7414	7472	7621	7788
	7219	7283	7417	7473	7628	7843
	7232	7284	7421	7474	7641	
	7243	7313	7426	7483	7643	
	7245	7314	7435	7485	7648	

Table A27, continued

2005						
HVIIT	7165	7265	7317	7442	7486	7641
	7219	7266	7331	7447	7519	7648
	7234	7281	7339	7461	7529	7783
	7247	7314	7418	7471	7622	7786
	7251	7315	7435	7472	7628	7843
	7252	7316	7436	7481	7638	7931
LVIIT	7284	7526	7643	7758	7781	
	7511	7633	7712	7761	7919	
VIIT	7165	7281	7418	7481	7633	7781
	7219	7284	7435	7486	7638	7783
	7234	7314	7436	7511	7641	7786
	7247	7315	7442	7519	7643	7843
	7251	7316	7447	7526	7648	7919
	7252	7317	7461	7529	7712	7931
	7265	7331	7471	7622	7758	
	7266	7339	7472	7628	7761	
2009						
HVIIT	7133	7314	7435	7611	7638	7843
	7212	7315	7442	7612	7642	
	7248	7316	7447	7621	7643	
	7266	7331	7471	7622	7764	
	7281	7418	7513	7628	7788	
LVIIT	7132	7284	7731	7763	7786	
	7161	7443	7758	7781		
	7219	7523	7761	7784		
VIIT	7132	7281	7435	7611	7643	7784
	7133	7284	7442	7612	7731	7786
	7161	7314	7443	7621	7758	7788
	7212	7315	7447	7622	7761	7843
	7219	7316	7471	7628	7763	
	7248	7331	7513	7638	7764	
	7266	7418	7523	7642	7781	

Source: Same as Table A21

Table A28: List of SITC 8 Products in Bilateral VIIT between Malaysia and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	8211	8415	8424	8432	8517	8747
	8411	8422	8425	8448	8741	8932
	8412	8423	8426	8454	8746	8933
LVIIT	8442	8482	8931			
	8459	8724				
VIIT	8211	8422	8426	8454	8724	8931
	8411	8423	8432	8459	8741	8932
	8412	8424	8442	8482	8746	8933
	8415	8425	8448	8517	8747	
1996						
HVIIT	8121	8411	8425	8459	8519	8742
	8211	8414	8448	8515	8713	8746
	8212	8421	8453	8517	8741	8747
LVIIT	8811	8933				
	8931					
VIIT	8121	8414	8453	8519	8746	8933
	8211	8421	8459	8713	8747	
	8212	8425	8515	8741	8811	
	8411	8448	8517	8742	8931	
1999						
HVIIT	8211	8413	8455	8741	8747	8981
	8411	8424	8714	8742	8933	
LVIIT	8212	8746	8931			
	8482	8811				
VIIT	8211	8413	8482	8742	8811	8981
	8212	8424	8714	8746	8931	
	8411	8455	8741	8747	8933	
2002						
HVIIT	8121	8421	8455	8746	8933	
	8411	8427	8714	8747	8981	
	8412	8454	8742	8811	8982	
LVIIT	8482					
	8713					
VIIT	8121	8421	8455	8714	8747	8981
	8411	8427	8482	8742	8811	8982
	8412	8454	8713	8746	8933	

Table A28, continued

2005						
HVIIT	8121	8454	8713	8741	8811	8952
	8453	8482	8714	8747	8933	
LVIIT	8424					
	8931					
VIIT	8121	8454	8714	8811	8952	
	8424	8482	8741	8931		
	8453	8713	8747	8933		
2009						
HVIIT	8453	8714	8742	8747	8933	
	8713	8741	8746	8931	8952	
LVIIT	8121					
	8432					
VIIT	8121	8453	8714	8742	8747	8933
	8432	8713	8741	8746	8931	8952

Source: Same as Table A21

Table A29: List of SITC 5 Products in Bilateral VIIT between Philippines and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code				
1993					
HVIIT	5331	5629	5989		
	5334	5922			
LVIIT	5161	5514	5986		
	5335	5731			
VIIT	5161	5334	5514	5731	5986
	5331	5335	5629	5922	5989
1996					
HVIIT	5121	5533	5754		
	5532	5541	5922		
LVIIT	5514	5822			
	5799				
VIIT	5121	5532	5541	5799	5922
	5514	5533	5754	5822	
1999					
HVIIT	5332	5541	5986		
	5335	5542			
LVIIT	5223	5759	5822		
	5731	5821			
VIIT	5223	5335	5542	5759	5822
	5332	5541	5731	5821	5986
2002					
HVIIT	5121	5541	5543	5922	
	5429	5542	5822	5989	
LVIIT	5223	5752	5986		
	5334	5759			
VIIT	5121	5429	5543	5822	5989
	5223	5541	5752	5922	
	5334	5542	5759	5986	
2005					
HVIIT	5121	5542	5752	5986	
	5222	5731	5821	5989	
LVIIT	5753				
VIIT	5121	5542	5752	5821	5989
	5222	5731	5753	5986	
2009					
HVIIT	5535	5821			
	5542	5986			
LVIIT	5222	5223	5751		
VIIT	5222	5535	5751	5986	
	5223	5542	5821		

Source: Same as Table A21

Table A30: List of SITC 6 Products in Bilateral VIIT between Philippines and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	6251	6514	6577	6921		
	6424	6518	6613	6924		
LVIIT	6562	6644	6899			
	6563	6794	6911			
VIIT	6251	6518	6577	6794	6921	
	6424	6562	6613	6899	6924	
	6514	6563	6644	6911		
1996						
HVIIT	6292	6421	6532	6589	6921	
	6353	6514	6561	6911	6993	
LVIIT	6417	6516	6565			
	6515	6518				
VIIT	6292	6421	6516	6561	6911	
	6353	6514	6518	6565	6921	
	6417	6515	6532	6589	6993	
1999						
HVIIT	6117	6424	6519	6565	6649	6996
	6129	6514	6561	6589	6955	
	6417	6518	6563	6613	6956	
LVIIT	6353	6924				
	6899					
VIIT	6117	6424	6561	6613	6955	
	6129	6514	6563	6649	6956	
	6353	6518	6565	6899	6996	
	6417	6519	6589	6924		
2002						
HVIIT	6129	6292	6419	6561	6649	6955
	6214	6341	6531	6632	6954	6956
LVIIT	6117	6872	6911			
	6535	6899	6924			
VIIT	6117	6292	6531	6632	6899	6954
	6129	6341	6535	6649	6911	6955
	6214	6419	6561	6872	6924	6956

Table A30, continued

2005						
HVIIT	6129	6292	6514	6561	6618	6955
	6214	6429	6531	6589	6649	6994
LVIIT	6415	6644				
	6518	6851				
VIIT	6129	6415	6518	6589	6649	6994
	6214	6429	6531	6618	6851	
	6292	6514	6561	6644	6955	
2009						
HVIIT	6114	6424	6549	6638	6824	6997
	6129	6517	6561	6649	6924	
	6259	6531	6577	6662	6955	
	6292	6533	6618	6795	6996	
LVIIT	6117	6644				
	6613					
VIIT	6114	6292	6533	6613	6649	6924
	6117	6424	6549	6618	6662	6955
	6129	6517	6561	6638	6795	6996
	6259	6531	6577	6644	6824	6997

Source: Same as Table A21

Table A31: List of SITC 7 Products in Bilateral VIIT between Philippines and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	7243	7284	7418	7732		
	7252	7413	7491			
LVIIT	7642					
VIIT	7243	7284	7418	7642		
	7252	7413	7491	7732		
1996						
HVIIT	7212	7284	7418	7491	7728	
	7244	7316	7439	7526	7731	
	7245	7359	7452	7642	7732	
	7252	7413	7456	7643	7843	
	7272	7415	7479	7725	7868	
LVIIT	7599					
	7763					
VIIT	7212	7284	7418	7491	7725	7843
	7244	7316	7439	7526	7728	7868
	7245	7359	7452	7599	7731	
	7252	7413	7456	7642	7732	
	7272	7415	7479	7643	7763	
1999						
HVIIT	7138	7285	7419	7491	7731	
	7252	7314	7427	7599	7732	
	7259	7316	7449	7722	7763	
	7272	7331	7478	7725	7788	
	7284	7413	7479	7728	7843	
LVIIT	7162	7245	7764			
	7244	7351	7768			
VIIT	7138	7272	7351	7479	7731	7843
	7162	7284	7413	7491	7732	
	7244	7285	7419	7599	7763	
	7245	7314	7427	7722	7764	
	7252	7316	7449	7725	7768	
	7259	7331	7478	7728	7788	

Table A31, continued

2002						
HVIIT	7239	7316	7439	7486	7599	7768
	7243	7359	7443	7489	7641	7786
	7247	7373	7447	7491	7723	7843
	7252	7413	7452	7499	7725	7868
	7272	7418	7453	7513	7728	
	7284	7429	7461	7519	7731	
	7314	7431	7468	7526	7763	
LVIIT	7244	7331				
	7285					
VIIT	7239	7285	7418	7453	7513	7728
	7243	7314	7429	7461	7519	7731
	7244	7316	7431	7468	7526	7763
	7247	7331	7439	7486	7599	7768
	7252	7359	7443	7489	7641	7786
	7272	7373	7447	7491	7723	7843
	7284	7413	7452	7499	7725	7868
2005						
HVIIT	7244	7284	7438	7456	7723	7786
	7245	7359	7442	7489	7725	7787
	7249	7413	7447	7499	7728	7843
	7259	7415	7449	7599	7731	7868
	7266	7431	7453	7712	7783	
LVIIT	7285					
	7722					
VIIT	7244	7285	7442	7499	7728	7868
	7245	7359	7447	7599	7731	
	7249	7413	7449	7712	7783	
	7259	7415	7453	7722	7786	
	7266	7431	7456	7723	7787	
	7284	7438	7489	7725	7843	
2009						
HVIIT	7239	7285	7415	7438	7712	7788
	7243	7313	7419	7478	7723	7843
	7245	7316	7429	7519	7731	
	7284	7359	7436	7599	7783	
LVIIT	7722					
VIIT	7239	7285	7415	7438	7712	7783
	7243	7313	7419	7478	7722	7788
	7245	7316	7429	7519	7723	7843
	7284	7359	7436	7599	7731	

Source: Same as Table A21

Table A32: List of SITC 8 Products in Bilateral VIIT between Philippines and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	8213	8469	8928	8939	8998	
	8461	8482	8931	8942		
LVIIT	NA					
VIIT	8213	8469	8928	8939	8998	
	8461	8482	8931	8942		
1996						
HVIIT	8217	8319	8481	8745	8998	
	8218	8461	8482	8928		
	8312	8469	8723	8944		
LVIIT	NA					
VIIT	8217	8319	8481	8745	8998	
	8218	8461	8482	8928		
	8312	8469	8723	8944		
1999						
HVIIT	8122	8217	8469	8746	8931	
	8215	8461	8481	8928	8959	
LVIIT	8841					
VIIT	8122	8217	8469	8746	8928	8959
	8215	8461	8481	8841	8931	
2002						
HVIIT	8217	8426	8469	8746	8947	
	8218	8442	8714	8747	8982	
	8414	8461	8742	8921	8984	
LVIIT	NA					
VIIT	8217	8426	8469	8746	8947	
	8218	8442	8714	8747	8982	
	8414	8461	8742	8921	8984	
2005						
HVIIT	8217	8454	8469	8745	8841	8947
	8414	8455	8481	8747	8928	8998
	8426	8462	8743	8811	8931	
LVIIT	NA					
VIIT	8217	8454	8469	8745	8841	8947
	8414	8455	8481	8747	8928	8998
	8426	8462	8743	8811	8931	

Table A32, continued

2009						
HVIIT	8211	8415	8742	8811	8841	8939
	8414	8455	8746	8813	8928	8947
LVIIT	NA					
VIIT	8211	8415	8742	8811	8841	8939
	8414	8455	8746	8813	8928	8947

Source: Same as Table A21

Table A33: List of SITC 5 Products in Bilateral VIIT between Singapore and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	5124	5169	5731	5812	5829	5986
	5138	5225	5739	5813	5839	5989
	5145	5232	5743	5816	5913	
	5154	5413	5754	5817	5922	
	5156	5542	5755	5821	5977	
	5161	5543	5759	5822	5983	
LVIIT	5137	5162	5721	5811		
	5146	5322	5742	5973		
VIIT	5124	5161	5542	5754	5817	5973
	5137	5162	5543	5755	5821	5977
	5138	5169	5721	5759	5822	5983
	5145	5225	5731	5811	5829	5986
	5146	5232	5739	5812	5839	5989
	5154	5322	5742	5813	5913	
	5156	5413	5743	5816	5922	
1996						
HVIIT	5138	5232	5331	5629	5817	5981
	5139	5235	5411	5743	5821	5986
	5155	5236	5513	5754	5822	5989
	5157	5238	5541	5755	5829	
	5221	5249	5542	5799	5839	
	5223	5312	5543	5812	5913	
	5225	5322	5621	5813	5921	
LVIIT	5111	5137	5154	5169	5721	5922
	5112	5145	5161	5243	5739	5988
	5124	5146	5162	5514	5753	

Table A33, continued

1996						
VIIT	5111	5157	5238	5542	5799	5922
	5112	5161	5243	5543	5812	5981
	5124	5162	5249	5621	5813	5986
	5137	5169	5312	5629	5817	5988
	5138	5221	5322	5721	5821	5989
	5139	5223	5331	5739	5822	
	5145	5225	5411	5743	5829	
	5146	5232	5513	5753	5839	
	5154	5235	5514	5754	5913	
	5155	5236	5541	5755	5921	
1999						
HVIIT	5139	5232	5415	5812	5912	5989
	5156	5234	5514	5813	5913	
	5158	5238	5542	5817	5977	
	5223	5311	5543	5821	5981	
	5226	5335	5731	5822	5988	
LVIIT	5137	5162	5541	5754	5922	
	5146	5169	5741	5829		
	5157	5222	5743	5839		
VIIT	5137	5169	5311	5731	5821	5977
	5139	5222	5335	5741	5822	5981
	5146	5223	5415	5743	5829	5988
	5156	5226	5514	5754	5839	5989
	5157	5232	5541	5812	5912	
	5158	5234	5542	5813	5913	
	5162	5238	5543	5817	5922	
2002						
HVIIT	5139	5223	5332	5621	5821	5933
	5154	5225	5411	5811	5822	5981
	5155	5226	5415	5812	5829	5986
	5157	5238	5514	5814	5912	5988
	5163	5311	5542	5816	5914	5989
	5222	5312	5543	5817	5921	
LVIIT	5146	5162	5719	5759	5839	
	5158	5335	5755	5799	5922	
VIIT	5139	5222	5335	5755	5821	5933
	5146	5223	5411	5759	5822	5981
	5154	5225	5415	5799	5829	5986
	5155	5226	5514	5811	5839	5988
	5157	5238	5542	5812	5912	5989
	5158	5311	5543	5814	5914	
	5162	5312	5621	5816	5921	
	5163	5332	5719	5817	5922	

Table A33, continued

2005						
HVIIT	5123	5221	5332	5621	5817	5914
	5139	5223	5411	5742	5821	5922
	5146	5225	5415	5755	5822	5977
	5157	5234	5514	5813	5829	5986
	5161	5238	5542	5814	5832	5988
	5169	5323	5543	5816	5839	
LVIIT	5145	5158	5322	5541	5754	
	5154	5162	5335	5753		
VIIT	5123	5162	5323	5543	5816	5922
	5139	5169	5332	5621	5817	5977
	5145	5221	5335	5742	5821	5986
	5146	5223	5411	5753	5822	5988
	5154	5225	5415	5754	5829	
	5157	5234	5514	5755	5832	
	5158	5238	5541	5813	5839	
	5161	5322	5542	5814	5914	
2009						
HVIIT	5123	5221	5335	5629	5821	5933
	5139	5223	5411	5739	5822	5983
	5146	5234	5415	5742	5829	5986
	5155	5236	5514	5811	5839	5988
	5156	5243	5541	5812	5913	5989
	5157	5311	5542	5813	5914	
	5169	5332	5543	5817	5922	
LVIIT	5111	5145	5162	5322	5729	5932
	5137	5148	5222	5331	5731	5981
	5138	5154	5237	5513	5755	
VIIT	5111	5156	5243	5541	5812	5932
	5123	5157	5311	5542	5813	5933
	5137	5162	5322	5543	5817	5981
	5138	5169	5331	5629	5821	5983
	5139	5221	5332	5729	5822	5986
	5145	5222	5335	5731	5829	5988
	5146	5223	5411	5739	5839	5989
	5148	5234	5415	5742	5913	
	5154	5236	5513	5755	5914	
	5155	5237	5514	5811	5922	

Source: Same as Table A21

Table A34: List of SITC 6 Products in Bilateral VIIT between Singapore and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	6213	6525	6633	6782	6827	6942
	6214	6532	6644	6793	6841	6994
	6255	6546	6647	6794	6842	6995
	6259	6594	6755	6795	6863	
	6292	6624	6764	6824	6912	
	6417	6632	6768	6826	6924	
LVIIT	6416	6741				
	6421	6757				
	6551					
VIIT	6213	6421	6632	6764	6826	6942
	6214	6525	6633	6768	6827	6994
	6255	6532	6644	6782	6841	6995
	6259	6546	6647	6793	6842	
	6292	6551	6741	6794	6863	
	6416	6594	6755	6795	6912	
	6417	6624	6757	6824	6924	
1996						
HVIIT	6211	6419	6535	6641	6794	6943
	6212	6423	6552	6644	6795	6955
	6214	6515	6596	6751	6827	6994
	6259	6525	6613	6755	6832	6995
	6331	6526	6618	6763	6911	6996
	6332	6529	6624	6764	6921	
	6413	6531	6632	6770	6931	
	6416	6532	6633	6791	6942	
LVIIT	6292	6412	6415	6578	6753	
	6344	6414	6421	6741	6823	
VIIT	6211	6414	6531	6633	6791	6943
	6212	6415	6532	6641	6794	6955
	6214	6416	6535	6644	6795	6994
	6259	6419	6552	6741	6823	6995
	6292	6421	6578	6751	6827	6996
	6331	6423	6596	6753	6832	
	6332	6515	6613	6755	6911	
	6344	6525	6618	6763	6921	
	6412	6526	6624	6764	6931	
	6413	6529	6632	6770	6942	

Table A34, continued

1999						
HVIIT	6212	6524	6618	6755	6825	6955
	6213	6525	6624	6757	6891	6994
	6214	6526	6632	6768	6911	6995
	6259	6531	6633	6770	6912	6996
	6414	6532	6635	6791	6921	
	6416	6533	6735	6793	6931	
	6419	6543	6741	6794	6942	
	6516	6575	6742	6795	6943	
	6517	6596	6753	6824	6952	
LVIIT	6341	6417	6513	6724		
	6413	6421	6518	6823		
VIIT	6212	6421	6533	6735	6794	6942
	6213	6513	6543	6741	6795	6943
	6214	6516	6575	6742	6823	6952
	6259	6517	6596	6753	6824	6955
	6341	6518	6618	6755	6825	6994
	6413	6524	6624	6757	6891	6995
	6414	6525	6632	6768	6911	6996
	6416	6526	6633	6770	6912	
	6417	6531	6635	6791	6921	
	6419	6532	6724	6793	6931	
2002						
HVIIT	6211	6512	6633	6762	6832	6941
	6212	6513	6637	6763	6863	6942
	6213	6515	6712	6764	6872	6943
	6214	6517	6724	6782	6891	6951
	6292	6518	6728	6791	6911	6952
	6343	6525	6751	6793	6921	6994
	6419	6618	6753	6794	6924	6995
	6421	6632	6755	6795	6931	6996
LVIIT	6114	6613	6998			
	6612	6827	6999			
VIIT	6114	6512	6632	6762	6832	6942
	6211	6513	6633	6763	6863	6943
	6212	6515	6637	6764	6872	6951
	6213	6517	6712	6782	6891	6952
	6214	6518	6724	6791	6911	6994
	6292	6525	6728	6793	6921	6995
	6343	6612	6751	6794	6924	6996
	6419	6613	6753	6795	6931	6998
	6421	6618	6755	6827	6941	6999

Table A34, continued

2005						
HVIIT	6211	6513	6753	6826	6911	6995
	6212	6518	6762	6827	6924	6996
	6213	6632	6763	6832	6931	6998
	6214	6633	6770	6842	6941	6999
	6414	6641	6782	6861	6942	
	6415	6724	6791	6863	6943	
	6416	6728	6793	6872	6955	
	6417	6735	6795	6899	6994	
LVIIT	6251	6421	6742	6823		
	6253	6517	6821	6824		
VIIT	6211	6417	6728	6793	6861	6943
	6212	6421	6735	6795	6863	6955
	6213	6513	6742	6821	6872	6994
	6214	6517	6753	6823	6899	6995
	6251	6518	6762	6824	6911	6996
	6253	6632	6763	6826	6924	6998
	6414	6633	6770	6827	6931	6999
	6415	6641	6782	6832	6941	
	6416	6724	6791	6842	6942	
2009						
HVIIT	6211	6419	6632	6764	6832	6973
	6213	6423	6633	6770	6924	6992
	6251	6514	6715	6781	6931	6994
	6255	6515	6728	6782	6941	6995
	6331	6518	6753	6794	6942	6996
	6332	6529	6757	6823	6943	6998
	6414	6533	6762	6825	6951	
	6417	6592	6763	6826	6952	
LVIIT	6114					
	6517					
VIIT	6114	6417	6533	6762	6825	6951
	6211	6419	6592	6763	6826	6952
	6213	6423	6632	6764	6832	6973
	6251	6514	6633	6770	6924	6992
	6255	6515	6715	6781	6931	6994
	6331	6517	6728	6782	6941	6995
	6332	6518	6753	6794	6942	6996
	6414	6529	6757	6823	6943	6998

Source: Same as Table A21

Table A35: List of SITC 7 Products in Bilateral VIIT between Singapore and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	7132	7245	7331	7442	7526	7758
	7133	7252	7339	7444	7527	7782
	7138	7266	7421	7448	7529	7784
	7162	7281	7422	7452	7611	7787
	7164	7283	7424	7453	7628	7931
	7212	7284	7425	7456	7641	7932
	7219	7311	7426	7471	7642	
	7224	7313	7427	7474	7643	
	7233	7315	7431	7513	7712	
	7234	7316	7435	7519	7752	
	7243	7317	7441	7522	7757	
LVIIT	7265	7443	7523			
	7436	7478	7851			
VIIT	7132	7252	7339	7443	7523	7758
	7133	7265	7421	7444	7526	7782
	7138	7266	7422	7448	7527	7784
	7162	7281	7424	7452	7529	7787
	7164	7283	7425	7453	7611	7851
	7212	7284	7426	7456	7628	7931
	7219	7311	7427	7471	7641	7932
	7224	7313	7431	7474	7642	
	7233	7315	7435	7478	7643	
	7234	7316	7436	7513	7712	
	7243	7317	7441	7519	7752	
	7245	7331	7442	7522	7757	
1996						
HVIIT	7132	7283	7422	7448	7641	7784
	7133	7284	7426	7456	7643	7787
	7162	7313	7427	7471	7711	7812
	7163	7314	7431	7473	7731	7822
	7211	7316	7434	7474	7751	7931
	7212	7317	7435	7519	7757	
	7252	7331	7436	7523	7758	
	7268	7339	7442	7526	7761	
	7271	7415	7443	7529	7781	
	7281	7421	7444	7611	7782	
LVIIT	7112	7472	7712			
	7232	7478				

Table A35, continued

1996						
VIIT	7112	7271	7415	7443	7523	7757
	7132	7281	7421	7444	7526	7758
	7133	7283	7422	7448	7529	7761
	7162	7284	7426	7456	7611	7781
	7163	7313	7427	7471	7641	7782
	7211	7314	7431	7472	7643	7784
	7212	7316	7434	7473	7711	7787
	7232	7317	7435	7474	7712	7812
	7252	7331	7436	7478	7731	7822
	7268	7339	7442	7519	7751	7931
1999						
HVIIT	7138	7266	7316	7427	7456	7641
	7148	7268	7317	7434	7472	7643
	7163	7271	7331	7435	7512	7757
	7212	7283	7339	7436	7519	7782
	7219	7284	7415	7442	7523	7822
	7233	7312	7421	7443	7526	
	7245	7313	7422	7444	7527	
	7247	7314	7425	7448	7529	
	7252	7315	7426	7452	7611	
LVIIT	7111	7311	7447	7648	7731	
	7272	7441	7478	7712	7784	
VIIT	7111	7266	7315	7427	7452	7611
	7138	7268	7316	7434	7456	7641
	7148	7271	7317	7435	7472	7643
	7163	7272	7331	7436	7478	7648
	7212	7283	7339	7441	7512	7712
	7219	7284	7415	7442	7519	7731
	7233	7311	7421	7443	7523	7757
	7245	7312	7422	7444	7526	7782
	7247	7313	7425	7447	7527	7784
	7252	7314	7426	7448	7529	7822

Table A35, continued

2002						
HVIIT	7132	7281	7421	7444	7478	7761
	7133	7283	7422	7447	7512	7781
	7164	7284	7424	7448	7523	7782
	7233	7312	7426	7452	7526	7787
	7234	7313	7427	7453	7527	7863
	7252	7316	7431	7456	7529	7932
	7263	7317	7434	7471	7611	
	7266	7331	7435	7472	7712	
	7268	7339	7436	7473	7751	
	7271	7415	7442	7474	7758	
LVIIT	7211	7511	7648			
	7247	7641				
VIIT	7132	7271	7421	7447	7512	7761
	7133	7281	7422	7448	7523	7781
	7164	7283	7424	7452	7526	7782
	7211	7284	7426	7453	7527	7787
	7233	7312	7427	7456	7529	7863
	7234	7313	7431	7471	7611	7932
	7247	7316	7434	7472	7641	
	7252	7317	7435	7473	7648	
	7263	7331	7436	7474	7712	
	7266	7339	7442	7478	7751	
	7268	7415	7444	7511	7758	
2005						
HVIIT	7133	7232	7315	7427	7448	7754
	7138	7233	7316	7431	7452	7758
	7161	7234	7339	7434	7511	7782
	7162	7247	7421	7435	7523	7822
	7164	7252	7422	7436	7526	7863
	7165	7265	7424	7442	7527	7931
	7212	7266	7425	7444	7529	7939
	7213	7313	7426	7447	7731	
LVIIT	7314	7331	7648	7812		
	7317	7641	7712			
VIIT	7133	7233	7316	7427	7452	7731
	7138	7234	7317	7431	7511	7754
	7161	7247	7331	7434	7523	7758
	7162	7252	7339	7435	7526	7782
	7164	7265	7421	7436	7527	7812
	7165	7266	7422	7442	7529	7822
	7212	7313	7424	7444	7641	7863
	7213	7314	7425	7447	7648	7931
	7232	7315	7426	7448	7712	7939

Table A35, continued

2009						
HVIIT	7132	7233	7315	7425	7443	7527
	7133	7234	7316	7426	7444	7612
	7138	7245	7317	7427	7447	7711
	7161	7247	7331	7431	7453	7731
	7164	7252	7415	7434	7511	7758
	7165	7311	7421	7435	7513	7822
	7224	7313	7422	7436	7519	7931
	7232	7314	7424	7442	7523	
LVIIT	7163	7265	7648			
	7219	7266				
VIIT	7132	7232	7313	7424	7443	7612
	7133	7233	7314	7425	7444	7648
	7138	7234	7315	7426	7447	7711
	7161	7245	7316	7427	7453	7731
	7163	7247	7317	7431	7511	7758
	7164	7252	7331	7434	7513	7822
	7165	7265	7415	7435	7519	7931
	7219	7266	7421	7436	7523	
	7224	7311	7422	7442	7527	

Source: Same as Table A21

Table A36: List of SITC 8 Products in Bilateral VIIT between Singapore and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code		
1993			
HVIIT	8452	8746	
	8732	8747	
LVIIT	8842		
VIIT	8452	8746	8842
	8732	8747	
1996			
HVIIT	8732	8747	
	8746		
LVIIT	NA		
VIIT	8732	8747	
	8746		
1999			
HVIIT	8714	8744	8842
	8732	8747	8959
LVIIT	NA		
VIIT	8714	8744	8842
	8732	8747	8959
2002			
HVIIT	8746		
	8959		
LVIIT	NA		
VIIT	8746		
	8959		
2005			
HVIIT	8714	8959	
	8744		
LVIIT	NA		
VIIT	8714	8959	
	8744		
2009			
HVIIT	8511	8732	8842
	8714	8747	8959
LVIIT	NA		
VIIT	8511	8732	8842
	8714	8747	8959

Source: Same as Table A21

Table A37: List of SITC 5 Products in Bilateral VIIT between Thailand and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	5234	5335	5821	5911	5983	
	5331	5542	5829	5914	5989	
LVIIT	5169	5531	5541	5816	5922	
	5411	5532	5721	5822		
	5429	5533	5812	5921		
VIIT	5169	5411	5533	5812	5829	5922
	5234	5429	5541	5816	5911	5983
	5331	5531	5542	5821	5914	5989
	5335	5532	5721	5822	5921	
1996						
HVIIT	5169	5419	5534	5754	5986	
	5231	5514	5541	5821	5989	
	5335	5531	5719	5913		
LVIIT	5122	5334	5533	5731	5822	
	5146	5429	5542	5817	5829	
VIIT	5122	5334	5514	5541	5754	5829
	5146	5335	5531	5542	5817	5913
	5169	5419	5533	5719	5821	5986
	5231	5429	5534	5731	5822	5989
1999						
HVIIT	5169	5335	5514	5743	5829	
	5331	5419	5534	5754	5911	
	5332	5429	5719	5821		
LVIIT	5122	5238	5531	5759	5822	
	5146	5249	5532	5812	5983	
	5221	5334	5542	5817	5989	
VIIT	5122	5249	5419	5534	5759	5829
	5146	5331	5429	5542	5812	5911
	5169	5332	5514	5719	5817	5983
	5221	5334	5531	5743	5821	5989
	5238	5335	5532	5754	5822	

Table A37, continued

2002						
HVIIT	5156	5331	5421	5535	5754	5821
	5169	5335	5429	5543	5755	
	5238	5419	5514	5752	5816	
LVIIT	5122	5146	5323	5742	5822	5983
	5124	5161	5533	5759	5829	5989
	5137	5226	5541	5812	5921	
	5145	5249	5719	5817	5922	
VIIT	5122	5169	5419	5543	5812	5922
	5124	5226	5421	5719	5816	5983
	5137	5238	5429	5742	5817	5989
	5145	5249	5514	5752	5821	
	5146	5323	5533	5754	5822	
	5156	5331	5535	5755	5829	
	5161	5335	5541	5759	5921	
2005						
HVIIT	5156	5238	5419	5514	5759	
	5157	5331	5421	5535	5821	
	5221	5335	5429	5719		
LVIIT	5124	5323	5534	5742	5839	
	5146	5532	5542	5755	5922	
	5249	5533	5543	5817		
VIIT	5124	5238	5419	5533	5719	5821
	5146	5249	5421	5534	5742	5839
	5156	5323	5429	5535	5755	5922
	5157	5331	5514	5542	5759	
	5221	5335	5532	5543	5817	
2009						
HVIIT	5137	5311	5514	5742	5821	
	5158	5419	5531	5752	5822	
	5221	5421	5535	5754	5989	
	5226	5429	5541	5759		
LVIIT	5156	5169	5532	5719	5922	
	5161	5249	5534	5721	5977	
	5162	5323	5543	5839	5983	
VIIT	5137	5221	5421	5535	5752	5922
	5156	5226	5429	5541	5754	5977
	5158	5249	5514	5543	5759	5983
	5161	5311	5531	5719	5821	5989
	5162	5323	5532	5721	5822	
	5169	5419	5534	5742	5839	

Source: Same as Table A21

Table A38: List of SITC 6 Products in Bilateral VIIT between Thailand and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	6213	6413	6429	6639	6661	6956
	6214	6421	6551	6648	6791	6974
	6259	6422	6572	6652	6842	6994
	6341	6424	6577	6659	6924	6996
LVIIT	6129	6299	6561	6624	6649	6762
	6212	6518	6581	6633	6651	6782
VIIT	6129	6341	6518	6624	6652	6842
	6212	6413	6551	6633	6659	6924
	6213	6421	6561	6639	6661	6956
	6214	6422	6572	6648	6762	6974
	6259	6424	6577	6649	6782	6994
	6299	6429	6581	6651	6791	6996
1996						
HVIIT	6114	6354	6564	6649	6795	6943
	6212	6421	6573	6659	6826	6956
	6214	6422	6613	6661	6842	6974
	6255	6546	6623	6782	6921	6978
	6292	6561	6624	6791	6924	
LVIIT	6129	6351	6417	6514	6578	6648
	6213	6411	6419	6516	6585	
	6252	6414	6512	6518	6592	
	6259	6415	6513	6565	6633	
VIIT	6114	6351	6512	6573	6649	6924
	6129	6354	6513	6578	6659	6943
	6212	6411	6514	6585	6661	6956
	6213	6414	6516	6592	6782	6974
	6214	6415	6518	6613	6791	6978
	6252	6417	6546	6623	6795	
	6255	6419	6561	6624	6826	
	6259	6421	6564	6633	6842	
	6292	6422	6565	6648	6921	

Table A38, continued

1999						
HVIIT	6212	6417	6613	6794	6924	6994
	6214	6421	6631	6795	6931	6995
	6259	6422	6637	6826	6942	6996
	6292	6564	6661	6827	6956	
	6353	6573	6713	6863	6974	
	6354	6589	6741	6912	6975	
LVIIT	6114	6415	6512	6518	6648	6824
	6129	6424	6513	6624	6649	6842
	6299	6429	6516	6639	6782	
VIIT	6114	6415	6518	6648	6826	6974
	6129	6417	6564	6649	6827	6975
	6212	6421	6573	6661	6842	6994
	6214	6422	6589	6713	6863	6995
	6259	6424	6613	6741	6912	6996
	6292	6429	6624	6782	6924	
	6299	6512	6631	6794	6931	
	6353	6513	6637	6795	6942	
	6354	6516	6639	6824	6956	
2002						
HVIIT	6129	6421	6571	6632	6794	6956
	6212	6423	6572	6635	6921	6966
	6292	6429	6573	6638	6924	6975
	6419	6565	6631	6659	6931	6994
LVIIT	6114	6415	6515	6518	6637	6713
	6213	6513	6516	6578	6639	6827
VIIT	6114	6419	6516	6578	6639	6924
	6129	6421	6518	6631	6659	6931
	6212	6423	6565	6632	6713	6956
	6213	6429	6571	6635	6794	6966
	6292	6513	6572	6637	6827	6975
	6415	6515	6573	6638	6921	6994

Table A38, continued

2005						
HVIIT	6252	6422	6571	6632	6823	6991
	6292	6423	6573	6638	6924	6994
	6359	6515	6574	6648	6931	6995
	6417	6564	6581	6649	6956	
	6419	6565	6631	6782	6975	
LVIIT	6114	6416	6511	6577	6768	6842
	6129	6424	6513	6618	6825	6996
	6415	6429	6518	6713	6826	6997
VIIT	6252	6419	6518	6618	6782	6975
	6114	6422	6564	6631	6823	6991
	6129	6423	6565	6632	6825	6994
	6292	6424	6571	6638	6826	6995
	6359	6429	6573	6648	6842	6996
	6415	6511	6574	6649	6924	6997
	6416	6513	6577	6713	6931	
	6417	6515	6581	6768	6956	
2009						
HVIIT	6117	6354	6573	6648	6823	6991
	6212	6416	6581	6659	6827	6994
	6214	6419	6583	6661	6921	6995
	6252	6515	6589	6662	6931	
	6292	6564	6631	6764	6957	
	6299	6571	6632	6768	6974	
LVIIT	6114	6421	6514	6637	6826	
	6351	6424	6562	6652	6832	
	6414	6512	6577	6713	6851	
	6415	6513	6618	6824	6863	
VIIT	6114	6414	6515	6618	6713	6863
	6117	6415	6562	6631	6764	6921
	6212	6416	6564	6632	6768	6931
	6214	6419	6571	6637	6823	6957
	6252	6421	6573	6648	6824	6974
	6292	6424	6577	6652	6826	6991
	6299	6512	6581	6659	6827	6994
	6351	6513	6583	6661	6832	6995
	6354	6514	6589	6662	6851	

Source: Same as Table A21

Table A39: List of SITC 7 Products in Bilateral VIIT between Thailand and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	7133	7246	7284	7427	7452	7726
	7161	7247	7285	7431	7485	7751
	7212	7266	7315	7436	7491	7764
	7224	7271	7373	7438	7492	7783
	7245	7272	7414	7447	7641	7843
LVIIT	7219	7244	7415	7459	7786	
	7234	7281	7418	7742		
VIIT	7133	7245	7284	7427	7485	7764
	7161	7246	7285	7431	7491	7783
	7212	7247	7315	7436	7492	7786
	7219	7266	7373	7438	7641	7843
	7224	7271	7414	7447	7726	
	7234	7272	7415	7452	7742	
	7244	7281	7418	7459	7751	
1996						
HVIIT	7161	7266	7316	7415	7491	7731
	7169	7269	7331	7418	7499	7758
	7212	7271	7351	7436	7529	7781
	7245	7281	7359	7448	7611	7787
	7246	7285	7371	7452	7649	7863
	7252	7311	7373	7469	7711	
LVIIT	7162	7284	7439	7461	7786	
	7244	7414	7447	7527		
	7263	7417	7459	7764		
VIIT	7161	7263	7316	7417	7461	7711
	7162	7266	7331	7418	7469	7731
	7169	7269	7351	7436	7491	7758
	7212	7271	7359	7439	7499	7764
	7244	7281	7371	7447	7527	7781
	7245	7284	7373	7448	7529	7786
	7246	7285	7414	7452	7611	7787
	7252	7311	7415	7459	7649	7863

Table A39, continued

1999						
HVIIT	7139	7272	7359	7449	7526	7731
	7161	7284	7371	7452	7611	7732
	7169	7311	7373	7459	7641	7764
	7239	7313	7374	7473	7649	7788
	7245	7315	7414	7479	7711	7843
	7252	7316	7415	7481	7722	
	7269	7331	7421	7485	7723	
	7271	7351	7427	7499	7725	
LVIIT	7162	7219	7418	7491	7931	
	7163	7263	7447	7529		
	7189	7285	7461	7786		
VIIT	7139	7263	7331	7427	7491	7725
	7161	7269	7351	7447	7499	7731
	7162	7271	7359	7449	7526	7732
	7163	7272	7371	7452	7529	7764
	7169	7284	7373	7459	7611	7786
	7189	7285	7374	7461	7641	7788
	7219	7311	7414	7473	7649	7843
	7239	7313	7415	7479	7711	7931
	7245	7315	7418	7481	7722	
	7252	7316	7421	7485	7723	
2002						
HVIIT	7139	7283	7417	7469	7599	7732
	7161	7284	7418	7479	7649	7764
	7169	7285	7427	7485	7711	7788
	7243	7311	7431	7489	7722	7843
	7263	7316	7444	7491	7724	7868
	7271	7351	7448	7499	7726	
	7272	7359	7452	7526	7728	
LVIIT	7162	7269	7371	7641	7731	
	7248	7339	7434	7725	7786	
VIIT	7139	7272	7371	7469	7649	7764
	7161	7283	7417	7479	7711	7786
	7162	7284	7418	7485	7722	7788
	7169	7285	7427	7489	7724	7843
	7243	7311	7431	7491	7725	7868
	7248	7316	7434	7499	7726	
	7263	7339	7444	7526	7728	
	7269	7351	7448	7599	7731	
	7271	7359	7452	7641	7732	

Table A39, continued

2005						
HVIIT	7139	7281	7415	7489	7725	7788
	7161	7284	7427	7491	7726	7843
	7162	7316	7438	7499	7728	7863
	7169	7331	7439	7526	7732	
	7234	7351	7452	7648	7764	
	7263	7359	7468	7649	7783	
	7269	7373	7469	7722	7786	
	7271	7374	7478	7724	7787	
LVIIT	7266	7313	7429	7492		
	7285	7419	7448	7599		
VIIT	7139	7281	7374	7468	7648	7783
	7161	7284	7415	7469	7649	7786
	7162	7285	7419	7478	7722	7787
	7169	7313	7427	7489	7724	7788
	7234	7316	7429	7491	7725	7843
	7263	7331	7438	7492	7726	7863
	7266	7351	7439	7499	7728	
	7269	7359	7448	7526	7732	
	7271	7373	7452	7599	7764	
2009						
HVIIT	7132	7271	7431	7478	7722	7752
	7139	7311	7434	7489	7723	7783
	7161	7313	7438	7491	7724	7786
	7169	7316	7444	7492	7725	7788
	7189	7359	7452	7599	7726	7843
	7244	7414	7462	7621	7728	
	7263	7415	7468	7638	7731	
	7269	7427	7469	7649	7732	
LVIIT	7247	7418	7429	7474	7513	7711
	7248	7421	7471	7512	7529	7751
VIIT	7132	7271	7429	7474	7638	7732
	7139	7311	7431	7478	7649	7751
	7161	7313	7434	7489	7711	7752
	7169	7316	7438	7491	7722	7783
	7189	7359	7444	7492	7723	7786
	7244	7414	7452	7512	7724	7788
	7247	7415	7462	7513	7725	7843
	7248	7418	7468	7529	7726	
	7263	7421	7469	7599	7728	
	7269	7427	7471	7621	7731	

Source: Same as Table A21

Table A40: List of SITC 8 Products in Bilateral VIIT between Thailand and China in Year 1993, 1996, 1999, 2002, 2005 and 2009

Year / Type of Products	Product Code					
1993						
HVIIT	8211	8319	8458	8745	8939	
	8215	8415	8462	8921	8998	
	8217	8422	8513	8933		
LVIIT	8110	8416	8425	8928	8993	
	8212	8424	8432	8952		
VIIT	8110	8217	8422	8458	8921	8952
	8211	8319	8424	8462	8928	8993
	8212	8415	8425	8513	8933	8998
	8215	8416	8432	8745	8939	
1996						
HVIIT	8121	8215	8455	8723	8746	8932
	8139	8217	8456	8742	8747	8933
	8211	8414	8462	8743	8924	8944
	8213	8447	8722	8745	8931	8947
LVIIT	8212	8415	8432	8482	8811	
	8319	8416	8437	8513		
	8412	8424	8454	8749		
VIIT	8121	8319	8437	8513	8747	8944
	8139	8412	8447	8722	8749	8947
	8211	8414	8454	8723	8811	
	8212	8415	8455	8742	8924	
	8213	8416	8456	8743	8931	
	8215	8424	8462	8745	8932	
	8217	8432	8482	8746	8933	
1999						
HVIIT	8110	8217	8442	8722	8842	8924
	8138	8413	8456	8742	8921	8932
	8213	8414	8711	8811	8922	8947
LVIIT	8211	8412	8423	8437	8461	8928
	8212	8415	8425	8447	8462	8933
	8218	8421	8426	8448	8482	
VIIT	8110	8218	8423	8448	8722	8924
	8138	8412	8425	8456	8742	8928
	8211	8413	8426	8461	8811	8932
	8212	8414	8437	8462	8842	8933
	8213	8415	8442	8482	8921	8947
	8217	8421	8447	8711	8922	

Table A40, continued

2002						
HVIIT	8211	8423	8745	8924	8991	
	8217	8458	8746	8928	8992	
	8413	8512	8811	8932		
LVIIT	8110	8215	8432	8749	8939	
	8121	8218	8482	8843	8996	
	8213	8414	8732	8931		
VIIT	8110	8217	8432	8745	8924	8991
	8121	8218	8458	8746	8928	8992
	8211	8413	8482	8749	8931	8996
	8213	8414	8512	8811	8932	
	8215	8423	8732	8843	8939	
2005						
HVIIT	8313	8437	8458	8722	8922	
	8412	8438	8482	8742	8933	
	8414	8442	8512	8746	8939	
	8432	8454	8514	8811	8993	
LVIIT	8218	8821	8843			
	8451	8841	8996			
VIIT	8218	8437	8458	8742	8843	8996
	8313	8438	8482	8746	8922	
	8412	8442	8512	8811	8933	
	8414	8451	8514	8821	8939	
	8432	8454	8722	8841	8993	
2009						
HVIIT	8312	8437	8454	8482	8722	8922
	8414	8438	8456	8512	8732	8939
	8421	8448	8458	8513	8742	8993
	8425	8451	8459	8514	8749	8999
	8432	8453	8462	8719	8811	
LVIIT	8122	8841				
	8215	8931				
VIIT	8122	8432	8454	8512	8742	8939
	8215	8437	8456	8513	8749	8993
	8312	8438	8458	8514	8811	8999
	8414	8448	8459	8719	8841	
	8421	8451	8462	8722	8922	
	8425	8453	8482	8732	8931	

Source: Same as Table A21

Table A41: VIIT Indices between ASEAN5 Countries and China for SITC 5 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	1.000	0.862	0.970	0.763	0.855
1994	0.971	0.866	0.900	0.794	0.963
1995	0.472	0.826	0.611	0.750	0.821
1996	0.810	0.865	0.821	0.899	0.820
1997	0.760	0.886	0.977	0.687	0.783
1998	0.926	0.726	0.538	0.881	0.811
1999	0.962	0.915	0.646	0.655	0.900
2000	0.852	0.674	0.702	0.916	0.908
2001	0.871	0.616	0.823	0.896	0.886
2002	0.824	0.767	0.595	0.736	0.840
2003	0.783	0.528	0.956	0.642	0.624
2004	0.920	0.332	1.000	0.828	0.783
2005	0.852	0.664	0.964	0.659	0.668
2006	0.856	0.734	1.000	0.884	0.879
2007	0.847	0.746	0.874	0.822	0.680
2008	0.790	0.726	0.963	0.759	0.663
2009	0.867	0.669	0.588	0.870	0.852

Source: Author's calculation

Table A42: HIIT Indices between ASEAN5 Countries and China for SITC 5 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.000	0.138	0.030	0.237	0.145
1994	0.029	0.134	0.100	0.206	0.037
1995	0.528	0.174	0.389	0.250	0.179
1996	0.190	0.135	0.179	0.101	0.180
1997	0.240	0.114	0.023	0.313	0.217
1998	0.074	0.274	0.462	0.119	0.189
1999	0.038	0.085	0.354	0.345	0.100
2000	0.148	0.326	0.298	0.084	0.092
2001	0.129	0.384	0.177	0.104	0.114
2002	0.176	0.233	0.405	0.264	0.160
2003	0.217	0.472	0.044	0.358	0.376
2004	0.080	0.668	0.000	0.172	0.217
2005	0.148	0.336	0.036	0.341	0.332
2006	0.144	0.266	0.000	0.116	0.121
2007	0.153	0.254	0.126	0.178	0.320
2008	0.210	0.274	0.037	0.241	0.337
2009	0.133	0.331	0.412	0.130	0.148

Source: Same as Table A21

Table A43: VIIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.938	0.847	0.981	0.839	0.684
1994	0.425	0.852	0.808	0.837	0.969
1995	0.473	0.662	0.899	0.364	0.738
1996	0.552	0.744	0.907	0.663	0.787
1997	0.723	0.954	0.196	0.485	0.788
1998	0.603	0.696	0.625	0.778	0.982
1999	0.777	0.725	1.000	0.892	0.976
2000	0.764	0.866	0.979	0.609	0.855
2001	0.802	0.902	1.000	0.440	0.686
2002	0.744	0.654	1.000	0.465	0.801
2003	0.673	0.767	0.435	0.566	0.864
2004	0.867	0.558	0.715	0.555	0.859
2005	0.793	0.441	0.866	0.866	0.766
2006	0.857	0.741	0.959	0.601	0.578
2007	0.658	0.662	0.965	0.595	0.680
2008	0.707	0.810	1.000	0.813	0.761
2009	0.848	0.656	0.983	0.773	0.804

Source: Same as Table A21

Table A44: HIIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.062	0.153	0.019	0.161	0.316
1994	0.575	0.148	0.192	0.163	0.031
1995	0.527	0.338	0.101	0.636	0.262
1996	0.448	0.256	0.093	0.337	0.213
1997	0.277	0.046	0.804	0.515	0.212
1998	0.397	0.304	0.375	0.222	0.018
1999	0.223	0.275	0.000	0.108	0.024
2000	0.236	0.134	0.021	0.391	0.145
2001	0.198	0.098	0.000	0.560	0.314
2002	0.256	0.346	0.000	0.535	0.199
2003	0.327	0.233	0.565	0.434	0.136
2004	0.133	0.442	0.285	0.445	0.141
2005	0.207	0.559	0.134	0.134	0.234
2006	0.143	0.259	0.041	0.399	0.422
2007	0.342	0.338	0.035	0.405	0.320
2008	0.293	0.190	0.000	0.187	0.239
2009	0.152	0.344	0.017	0.227	0.196

Source: Same as Table A21

Table A45: VIIT Indices between ASEAN5 Countries and China for SITC 7 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	1.000	0.984	0.879	0.860	0.949
1994	1.000	0.668	0.564	0.740	0.950
1995	0.923	0.700	0.938	0.661	0.943
1996	0.844	0.733	0.929	0.833	0.996
1997	1.000	0.631	0.793	0.987	0.964
1998	0.934	0.884	0.992	0.658	0.206
1999	0.953	0.779	1.000	0.851	0.461
2000	0.927	0.536	0.991	0.814	0.465
2001	0.988	0.924	1.000	0.915	0.926
2002	0.979	0.811	0.997	0.876	0.979
2003	0.956	0.941	0.730	0.850	0.673
2004	0.965	0.914	0.988	0.870	0.448
2005	0.951	0.384	0.983	0.816	0.830
2006	0.932	0.957	0.818	0.945	0.577
2007	0.975	0.248	0.968	0.955	0.697
2008	0.797	0.599	0.993	0.845	0.726
2009	0.996	0.947	0.418	0.845	0.858

Source: Same as Table A21

Table A46: HIIT Indices between ASEAN5 Countries and China for SITC 7 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.000	0.016	0.121	0.140	0.051
1994	0.000	0.332	0.436	0.260	0.050
1995	0.077	0.300	0.062	0.339	0.057
1996	0.156	0.267	0.071	0.167	0.004
1997	0.000	0.369	0.207	0.013	0.036
1998	0.066	0.116	0.008	0.342	0.794
1999	0.047	0.221	0.000	0.149	0.539
2000	0.073	0.464	0.009	0.186	0.535
2001	0.012	0.076	0.000	0.085	0.074
2002	0.021	0.189	0.003	0.124	0.021
2003	0.044	0.059	0.270	0.150	0.327
2004	0.035	0.086	0.012	0.130	0.552
2005	0.049	0.616	0.017	0.184	0.170
2006	0.068	0.043	0.182	0.055	0.423
2007	0.025	0.752	0.032	0.045	0.303
2008	0.203	0.401	0.007	0.155	0.274
2009	0.004	0.053	0.582	0.155	0.142

Source: Same as Table A21

Table A47: VIIT Indices between ASEAN5 Countries and China for SITC 8 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	1.000	0.569	1.000	1.000	0.823
1994	0.882	0.929	1.000	1.000	0.530
1995	0.949	0.909	1.000	0.780	0.936
1996	0.571	0.956	1.000	0.941	0.748
1997	1.000	0.967	0.978	0.719	0.851
1998	0.917	1.000	1.000	0.656	0.886
1999	0.940	0.985	1.000	0.777	0.645
2000	0.972	0.974	1.000	0.788	0.866
2001	0.879	1.000	1.000	0.974	0.437
2002	0.891	0.844	0.550	0.975	0.853
2003	0.794	0.822	1.000	1.000	0.830
2004	0.888	0.976	1.000	0.401	0.853
2005	0.814	0.720	1.000	0.197	0.820
2006	0.895	0.943	0.740	0.465	0.731
2007	0.909	0.918	0.784	0.800	0.950
2008	0.925	0.565	1.000	0.168	0.786
2009	1.000	0.861	0.578	0.727	0.901

Source: Same as Table A21

Table A48: HIIT Indices between ASEAN5 Countries and China for SITC 8 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.000	0.431	0.000	0.000	0.177
1994	0.118	0.071	0.000	0.000	0.470
1995	0.051	0.091	0.000	0.220	0.064
1996	0.429	0.044	0.000	0.059	0.252
1997	0.000	0.033	0.022	0.281	0.149
1998	0.083	0.000	0.000	0.344	0.114
1999	0.060	0.015	0.000	0.223	0.355
2000	0.028	0.026	0.000	0.212	0.134
2001	0.121	0.000	0.000	0.026	0.563
2002	0.109	0.156	0.450	0.025	0.147
2003	0.206	0.178	0.000	0.000	0.170
2004	0.112	0.024	0.000	0.599	0.147
2005	0.186	0.280	0.000	0.803	0.180
2006	0.105	0.057	0.260	0.535	0.269
2007	0.091	0.082	0.216	0.200	0.050
2008	0.075	0.435	0.000	0.832	0.214
2009	0.000	0.139	0.422	0.273	0.099

Source: Same as Table A21

Table A49: HVIIT Indices between ASEAN5 Countries and China for SITC 5 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.614	0.789	0.976	0.867	0.552
1994	0.622	0.597	0.950	0.679	0.191
1995	0.365	0.715	0.986	0.620	0.481
1996	0.350	0.339	0.481	0.636	0.458
1997	0.160	0.420	0.175	0.696	0.557
1998	0.208	0.445	0.721	0.709	0.362
1999	0.477	0.575	0.186	0.584	0.498
2000	0.240	0.355	0.484	0.638	0.384
2001	0.342	0.536	0.632	0.740	0.239
2002	0.349	0.491	0.753	0.822	0.290
2003	0.290	0.609	0.682	0.786	0.211
2004	0.403	0.503	0.845	0.843	0.594
2005	0.315	0.530	0.990	0.841	0.686
2006	0.468	0.653	0.924	0.716	0.734
2007	0.415	0.438	1.000	0.701	0.602
2008	0.311	0.312	0.915	0.731	0.535
2009	0.452	0.328	0.724	0.706	0.684

Source: Same as Table A21

Table A50: LVIIT Indices between ASEAN5 Countries and China for SITC 5 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.386	0.211	0.024	0.133	0.448
1994	0.378	0.403	0.050	0.321	0.809
1995	0.635	0.285	0.014	0.380	0.519
1996	0.650	0.661	0.519	0.364	0.542
1997	0.840	0.580	0.825	0.304	0.443
1998	0.792	0.555	0.279	0.291	0.638
1999	0.523	0.425	0.814	0.416	0.502
2000	0.760	0.645	0.516	0.362	0.616
2001	0.658	0.464	0.368	0.260	0.761
2002	0.651	0.509	0.247	0.178	0.710
2003	0.710	0.391	0.318	0.214	0.789
2004	0.597	0.497	0.155	0.157	0.406
2005	0.685	0.470	0.010	0.159	0.314
2006	0.532	0.347	0.076	0.284	0.266
2007	0.585	0.562	0.000	0.299	0.398
2008	0.689	0.688	0.085	0.269	0.465
2009	0.548	0.672	0.276	0.294	0.316

Source: Same as Table A21

Table A51: HVIIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.809	0.826	0.388	0.954	0.484
1994	0.762	0.980	0.227	0.989	0.317
1995	0.648	0.858	0.936	0.871	0.446
1996	0.738	0.829	0.495	0.921	0.482
1997	0.513	0.819	0.743	0.892	0.334
1998	0.445	0.630	0.994	0.858	0.323
1999	0.660	0.644	0.907	0.926	0.380
2000	0.650	0.484	0.723	0.982	0.300
2001	0.522	0.331	0.799	0.890	0.262
2002	0.527	0.287	0.618	0.819	0.290
2003	0.414	0.265	0.948	0.775	0.295
2004	0.441	0.572	0.805	0.807	0.485
2005	0.704	0.636	0.673	0.904	0.352
2006	0.769	0.544	0.243	0.956	0.490
2007	0.535	0.761	0.984	0.929	0.460
2008	0.733	0.676	0.948	0.983	0.510
2009	0.606	0.654	0.833	0.994	0.638

Source: Same as Table A21

Table A52: LVIIT Indices between ASEAN5 Countries and China for SITC 6 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.191	0.174	0.612	0.046	0.516
1994	0.238	0.020	0.773	0.011	0.683
1995	0.352	0.142	0.064	0.129	0.554
1996	0.262	0.171	0.505	0.079	0.518
1997	0.487	0.181	0.257	0.108	0.666
1998	0.555	0.370	0.006	0.142	0.677
1999	0.340	0.356	0.093	0.074	0.620
2000	0.350	0.516	0.277	0.018	0.700
2001	0.478	0.669	0.201	0.110	0.738
2002	0.473	0.713	0.382	0.181	0.710
2003	0.586	0.735	0.052	0.225	0.705
2004	0.559	0.428	0.195	0.193	0.515
2005	0.296	0.364	0.327	0.096	0.648
2006	0.231	0.456	0.757	0.044	0.510
2007	0.465	0.239	0.016	0.071	0.540
2008	0.267	0.324	0.052	0.017	0.490
2009	0.394	0.346	0.167	0.006	0.362

Source: Same as Table A21

Table A53: HVIIT Indices between ASEAN5 Countries and China for SITC 7 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.311	0.463	0.937	0.940	0.844
1994	0.559	0.469	0.757	0.783	0.590
1995	0.932	0.699	0.715	0.950	0.421
1996	0.940	0.758	0.561	0.839	0.724
1997	1.000	0.673	0.956	0.740	0.317
1998	0.946	0.860	0.316	0.779	0.711
1999	0.954	0.763	0.316	0.786	0.888
2000	0.970	0.567	0.997	0.806	0.865
2001	0.903	0.848	0.987	0.814	0.975
2002	0.958	0.740	0.982	0.984	0.853
2003	0.974	0.873	0.998	0.871	0.995
2004	0.997	0.823	0.993	0.893	0.845
2005	0.982	0.399	0.940	0.882	0.633
2006	0.987	0.715	0.990	0.864	0.981
2007	0.994	0.341	0.964	0.985	0.672
2008	0.983	0.562	0.987	0.869	0.924
2009	1.000	0.872	0.967	0.951	0.928

Source: Same as Table A21

Table A54: LVIIT Indices between ASEAN5 Countries and China for SITC 7 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.689	0.537	0.063	0.060	0.156
1994	0.441	0.531	0.243	0.217	0.410
1995	0.068	0.301	0.285	0.050	0.579
1996	0.060	0.242	0.439	0.161	0.276
1997	0.000	0.327	0.044	0.260	0.683
1998	0.054	0.140	0.684	0.221	0.289
1999	0.046	0.237	0.684	0.214	0.112
2000	0.030	0.433	0.003	0.194	0.135
2001	0.097	0.152	0.013	0.186	0.025
2002	0.042	0.260	0.018	0.016	0.147
2003	0.026	0.127	0.002	0.129	0.005
2004	0.003	0.177	0.007	0.107	0.155
2005	0.018	0.601	0.060	0.118	0.367
2006	0.013	0.285	0.010	0.136	0.019
2007	0.006	0.659	0.036	0.015	0.328
2008	0.017	0.438	0.013	0.131	0.076
2009	0.000	0.128	0.033	0.049	0.072

Source: Same as Table A21

Table A55: HVIIT Indices between ASEAN5 Countries and China for SITC 8 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.924	0.772	1.000	0.768	0.702
1994	0.437	0.470	0.879	1.000	0.516
1995	0.612	0.626	0.994	1.000	0.921
1996	0.504	0.381	1.000	1.000	0.631
1997	0.785	0.664	1.000	1.000	0.385
1998	0.942	0.273	1.000	1.000	0.822
1999	0.999	0.286	0.971	1.000	0.794
2000	1.000	0.775	0.992	1.000	0.771
2001	0.984	0.698	0.927	1.000	0.698
2002	0.860	0.957	1.000	1.000	0.302
2003	0.816	0.803	1.000	1.000	0.380
2004	0.483	0.892	1.000	1.000	0.792
2005	0.816	0.884	1.000	1.000	0.824
2006	0.533	0.547	1.000	1.000	0.964
2007	0.743	0.479	0.722	0.916	0.927
2008	0.871	1.000	0.998	1.000	0.822
2009	0.733	0.986	1.000	1.000	0.788

Source: Same as Table A21

Table A56: LVIIT Indices between ASEAN5 Countries and China for SITC 8 (1993-2009)

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand
1993	0.076	0.228	0.000	0.232	0.298
1994	0.563	0.530	0.121	0.000	0.484
1995	0.388	0.374	0.006	0.000	0.079
1996	0.496	0.619	0.000	0.000	0.369
1997	0.215	0.336	0.000	0.000	0.615
1998	0.058	0.727	0.000	0.000	0.178
1999	0.001	0.714	0.029	0.000	0.206
2000	0.000	0.225	0.008	0.000	0.229
2001	0.016	0.302	0.073	0.000	0.302
2002	0.140	0.043	0.000	0.000	0.698
2003	0.184	0.197	0.000	0.000	0.620
2004	0.517	0.108	0.000	0.000	0.208
2005	0.184	0.116	0.000	0.000	0.176
2006	0.467	0.453	0.000	0.000	0.036
2007	0.257	0.521	0.278	0.084	0.073
2008	0.129	0.000	0.002	0.000	0.178
2009	0.267	0.014	0.000	0.000	0.212

Source: Same as Table A21

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