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Comparative Advantage and Trade Specialization of East Asian Countries: *Do East Asian Countries Specialize on Product Groups with High Comparative Advantage?*

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Abstract

This paper analyzes whether East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore) specialize on product groups with high comparative advantage. We use the data on the 3-digit SITC Revision 2 for 237 product groups published by the UN-COMTRADE. Firstly, we calculate the Revealed Symmetric Comparative Advantage (RSCA) index to know the product groups with high comparative advantage from each the East Asian countries. Secondly, we calculate the export share to know the trade specialization of product groups from each the East Asian countries. Thirdly, we compare between the product groups included in top-twenty SITC of comparative advantage with top-twenty SITC of trade specialization from each the East Asian countries. This paper concludes that throughout the study periods of 1995, 2005, and 2015, East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore) specialize on product groups with low comparative advantage. It was also found that product classification dominating the comparative advantage and trade specialization of East Asian countries was the technology intensive products classification.

JEL classification: F10, F14, F17

Keywords: comparative advantage, export share, RSCA, trade specialization

1. Introduction

Comparative advantage is the advantage that a country obtains in specializing to produce products that have relatively lower prices than in other countries. Comparative advantage is usually used as an indicator to measure the performance and competitiveness of international trade. In comparative advantage condition, a country in a competitive condition will specialize in producing and exporting goods. Minondo (2011) found that products of comparative advantage of a country play a very important role in explaining the level of export diversification. While Laursen (1998) found that RSCA is the best measurement in measuring comparative advantage.

In international trade theory, comparative advantage is an important concept in explaining the trade patterns. The concept of comparative advantage was introduced by David Ricardo (1817) with the rigid assumptions then known as the Ricardian model. In modern international trade theory, these assumptions are made more realistic. According to traditional international trade theory, a country will export goods that have comparative advantage and will import goods that have no comparative advantage (comparative disadvantage).

The high economic development in East Asia shows the ability of production from East Asian countries in producing manufactured products and capability in developing industrial production. In this study, the countries analyzed are the East Asian countries. Based on the World Bank classification and geographically region includes Indonesia, China, Japan, Hong Kong, South Korea (Republic of Korea) and Singapore. The selection of

East Asian countries in this study is based on several reasons. First, the East Asian countries have succeeded in creating a very high export and excellent leading exporters such as Japan, China, South Korea, Hong Kong, and Singapore. The spectacular export of these countries mostly based on government support in planning the economy and promoting the sectors of export industry as a pillar of the economy. Second, the successes of Hong Kong, South Korea and Singapore in changing the economic structure from unskilled-labor intensive production to skilled-labor intensive production and eventually became capital-intensive production, so these countries became pioneers in shifting the export focus from primary commodities into manufactured products. Third, trade expansion for the Asian region is geographically concentrated in the East Asia especially in Japan and China. Fourth, Hong Kong, South Korea, and Singapore are examples of successful countries in export promotion strategies as well as the earliest countries adopted export promotion strategy. Figure 1 shows the trend of comparative advantage of East Asian countries during the period 1995-2015.

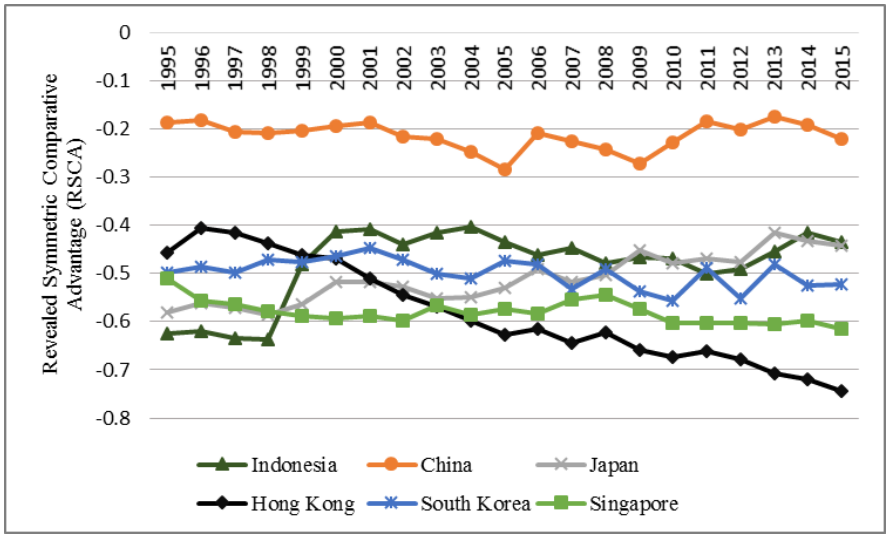


Figure 1. Trends of Comparative Advantages from East Asian Countries, 1995-2015

Source: UN-COMTRADE 3-digit SITC Revision 2. Authors' calculations.

China in the period 1995-2015 is a country that has the highest comparative advantage compared to Indonesia, Japan, Hong Kong, South Korea, and Singapore. Hong Kong is a country that has a trend of comparative advantage that continues to decline from the period 1996-2015 and the lowest comparative advantage in the period 2004-2015. In the period 1995-1999, comparative advantage of Hong Kong was higher than South Korea, Japan, Singapore, and Indonesia. While Japan in 1995-2015 has a trend of comparative advantage that continues to increase. The trend of Indonesia's comparative advantage in the period 1995-1998 was the lowest but it had experienced a very sharp and significant increase in 1998-2000 and then in 2000-2015 tended to be flat but still high from South Korea, Singapore and Hong Kong. While South Korea and Singapore during the period 1995-2015 have a trend of comparative advantage that tends to flat. The trend of South Korea's comparative advantage is higher than the trend of Singapore's comparative advantage.

In this study, the authors want to know the export products that become a comparative advantage and trade specialization of the East Asian countries. This study investigates whether East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore) specialize on product groups with high comparative advantage. The rest of this paper is organized as follows. The second section describes the literature review about the comparative advantage and trade specialization. The third section describes the methodology that consists of data and analytical tools that are used. The fourth section discusses the results and analysis of comparative advantage, trade specialization, and comparison between the product groups included in top-twenty SITC of comparative advantage with top-twenty SITC of trade specialization from each the East Asian countries, then the fifth section discusses the conclusions of this research.

2. Literature Review

As a solution to the weakness of absolute advantage theory of Adam Smith, David Ricardo (1817) introduced the comparative advantage theory. Not all countries have an absolute advantage or absolute advantage is owned by only one country. Comparative advantage theory of David Ricardo mentions that the country will export

products that have a comparative advantage. Comparative advantage is the advantage that a country gets in specializing to produce products that have a relatively lower price than in other country. The principle of comparative advantage states that a country in a competitive condition will specialize in producing and exporting goods at the lowest relative cost.

Previous studies of comparative advantage and trade specialization are research conducted by Balassa (1977) which analyzes the patterns of comparative advantage of manufactured products from major industrialized countries (United States, Canada, European Common Market, United Kingdom, Sweden, and Japan) using RCA. In his research, Balassa (1977) states that the increased in specialization and diversification of manufactured exports depends on a variety of factors namely the size of the domestic market, the rate of technological development, natural resources, and the impact of economic integration. The results of the analysis show that the industrialized countries tend to have high export diversification. The presence of the European Common Market contributes to the increased diversification of manufacturing exports of its member countries. Balassa and Noland (1989) examined the comparative advantages of Japan and the United States for 57 primary products and 167 manufactured products using the RCA index. Testing is done by calculating the relative export share index and net export ratio. The results show that between 1967 and 1985 there was an increase in Japanese specialization on human-capital intensive products while United States increased specialization in natural-resource intensive products. Research conducted by Widodo (2009) is to examine the changes of dynamic comparative advantage of ASEAN countries, China, Republic of Korea, and Japan (ASEAN+3) using RSCA index. The results show that there is a change in the pattern of comparative advantage of ASEAN+3 countries. The increase in overall comparative advantage is supported by the high increase in comparative advantage of product groups that had a low comparative advantage in the past. The pattern of comparative advantage of ASEAN countries is similar to the pattern of Japan's comparative advantage. The catching-up process is supported by changes in the pattern of comparative advantages in both ASEAN and Japan in terms of Japan's foreign direct investment (FDI) in ASEAN countries. Then the study conducted by Phuong (2010) is to analyze the comparative advantages of Vietnam and its changes using RCA. Implemented since the implementation of state reform program that is starting in 1986. The data used in this study is International Economics Databank (IEDB) and United Nations Statistical Division (UNSD). The results show that Vietnam's largest comparative advantage is based on the ownership of labor and natural resources. Therefore, that Vietnam is able to develop its exports with the condition of this wealth.

3. Methodology

3.1 Data

The author uses international trade data published by United Nations Commodity Trade Statistics Database (UN-COMTRADE) on 3-digit SITC revised 2 for 237 product groups. In this research, there are 2 product groups which are not included in the analysis because the data are not available, namely SITC 675 (Hoop and strip of iron or steel, hot-rolled or cold-rolled) and SITC 911 (Postal packages not classified according to kind). The countries analyzed in this study consist of six countries that refer to the World Bank classification and geographically located in the East Asia region i.e. Indonesia, China, Japan, Hong Kong, South Korea, and Singapore.

3.2 RSCA and Export Share

In this study, following Laursen (1998) and Widodo (2009), the authors use the RSCA (Revealed Symmetric Comparative Advantage) index to measure the comparative advantage of East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore). The RSCA index has a range -1 ≤ RSCA ≤ 1 which will give a symmetrical value. An export commodity of a country that has the RSCA value greater than zero, then these commodities have comparative advantage. If the value of RSCA is less than zero, then the country has no comparative advantage for the commodity. In this study, the authors use the RCA index from Vollrath (1991) and the RSCA index from Laursen (1998) with the following formula:

$$RCA_{ij} = \frac{(X_{ij}/X_{Tj})}{(X_{iw}-X_{ij})/(X_{Tw}-X_{Tj})} \quad (1)$$

$$RSCA_{ij} = \left(RCA_{ij} - 1\right)/\left(RCA_{ij} + 1\right) \quad (2)$$

Following Hinloopen and Marrewijk (2005), the level of export specialization is the export share which calculating the percentage of export value of a product group (SITC) of a country to the total export value of that country.

$$\text{Export Share} = (X_{ij}/X_{Tj}) \times 100 \quad (3)$$

where RCA_{ij} denotes revealed comparative advantage for group of products (SITC) i from country j; $RSCA_{ij}$ denotes revealed symmetric comparative advantage for group of products (SITC) i from country j; X_{ij} represents exports for group of products (SITC) i from country j; X_{Tj} represents total exports from country j; X_{iw} represents the world exports for group of products (SITC) i; and X_{Tw} represents the world total exports.

Higher value of export share indicate that the product group is produced in greater proportion than other product groups. The higher the export share value of a product group the higher the trade specialization of that product group in a country compared to other product groups in that country.

Then to find out whether a country specializes in a product groups with high comparative advantage or specializes in a product groups with low comparative advantage is examined by comparing between the product groups included in the top-twenty SITC of comparative advantage with the top-twenty SITC of export share of the country concerned. If the top-twenty SITC of comparative advantages of a country are all become trade specialization from that country, it indicates that the country specializes in a product group that has a high comparative advantage. If the top-twenty SITC of comparative advantages of a country are not all (in part) become trade specialization, it indicates that the country specializes in product group which comparative advantage is low.

The skewness value of RSCA from a country at time t is negative, indicates that the country is more specialized in products with high comparative advantage. In contrast, the RSCA skewness coefficient of a country at time t is positive, indicates that the country is more specialized in products with low comparative advantage. The RSCA skewness formula (Karl Person) is:

$$Sk_{RSCA_{j,t}} = \frac{3\left(mean_{RSCA_{j,t}} - median_{RSCA_{j,t}}\right)}{stdev_{RSCA_{j,t}}} \quad (4)$$

$SkRSCA_{j,t}$ is the skewness coefficient of RSCA variable (Karl Person formula) for country j at time t.

4. Results and Discussion

4.1 Comparative Advantage of East Asian Countries

Comparative advantage of East Asian countries is determined by calculating the RSCA index value of each East Asian country (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore) using UN-Comtrade data on 3-digit SITC Revision 2 for 237 product groups in 1995, 2005 and 2015. The higher of RSCA index value from a product group, the higher of comparative advantage from that product group in a country compared to the other product groups in that country. After calculating the RSCA index value of 237 SITC, then it is ranked based on the value of the RSCA index and selected twenty SITC with the highest RSCA value as the comparative advantage products of the country concerned. To simplify the interpretation of the results of the comparative advantage analysis, the authors classified 237 SITC into 6 product classifications based on the classification of Empirical Trade Analysis (ETA), see Appendix A. Table 1-6 shows the changes in comparative advantage of each East Asian country that shown through products that include on top-twenty SITC of comparative advantages in 1995, 2005, and 2015 using the UN-Comtrade data on 3-digit SITC Revision 2 for 237 product groups.

Table 1. Top-Twenty SITC of Indonesia Comparative Advantage 1995, 2005, and 2015

Year	Rank	SITC	Commodity	RSCA
1995	1	S2-232	Natural rubber latex; rubber and gums	0.95
	2	S2-634	Veneers, plywood, "improved" wood and other wood, worked	0.95
	3	S2-687	Tin	0.90
	4	S2-341	Gas, natural and manufactured	0.90
	5	S2-075	Spices	0.89
	6	S2-245	Fuel wood and wood charcoal	0.89
	7	S2-424	Other fixed vegetable oils, fluid or solid, crude, refined	0.88
	8	S2-287	Ores and concentrates of base metals	0.85
	9	S2-431	Animal and vegetable oils and fats, processed, and waxes	0.79
	10	S2-072	Cocoa	0.78
	11	S2-036	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	0.78
	12	S2-635	Wood manufactures	0.74
	13	S2-322	Coal, lignite and peat	0.73
	14	S2-851	Footwear	0.69
	15	S2-074	Tea and mate	0.68

	16	S2-071	Coffee and coffee substitutes	0.65
	17	S2-844	Under garments of textile fabrics, not knitted or crocheted	0.62
	18	S2-333	Crude petroleum and oils obtained from bituminous minerals	0.62
	19	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	0.58
	20	S2-763	Gramophones, dictating machines and other sound recorders	0.56
2005	1	S2-424	Other fixed vegetable oils, fluid or solid, crude, refined	0.97
	2	S2-687	Tin	0.96
	3	S2-232	Natural rubber latex; rubber and gums	0.95
	4	S2-322	Coal, lignite and peat	0.85
	5	S2-287	Ores and concentrates of base metals	0.83
	6	S2-072	Cocoa	0.82
	7	S2-634	Veneers, plywood, "improved" wood and other wood, worked	0.81
	8	S2-075	Spices	0.74
	9	S2-341	Gas, natural and manufactured	0.74
	10	S2-036	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	0.73
	11	S2-245	Fuel wood and wood charcoal	0.71
	12	S2-431	Animal and vegetable oils and fats, processed, and waxes	0.71
	13	S2-091	Margarine and shortening	0.69
	14	S2-267	Other man-made fibres suitable for spinning, and waste	0.67
	15	S2-651	Textile yarn	0.66
	16	S2-844	Under garments of textile fabrics, not knitted or crocheted	0.65
	17	S2-635	Wood manufactures	0.64
	18	S2-251	Pulp and waste paper	0.63
	19	S2-071	Coffee and coffee substitutes	0.61
	20	S2-074	Tea and mate	0.61
2015	1	S2-424	Other fixed vegetable oils, fluid or solid, crude, refined	1.00
	2	S2-232	Natural rubber latex; rubber and gums	0.98
	3	S2-687	Tin	0.96
	4	S2-322	Coal, lignite and peat	0.95
	5	S2-431	Animal and vegetable oils and fats, processed, and waxes	0.93
	6	S2-245	Fuel wood and wood charcoal	0.91
	7	S2-091	Margarine and shortening	0.87
	8	S2-075	Spices	0.87
	9	S2-634	Veneers, plywood, "improved" wood and other wood, worked	0.85
	10	S2-267	Other man-made fibres suitable for spinning, and waste	0.80
	11	S2-072	Cocoa	0.79
	12	S2-289	Ores and concentrates of precious metals, waste, scrap	0.70
	13	S2-036	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	0.70
	14	S2-651	Textile yarn	0.69
	15	S2-071	Coffee and coffee substitutes	0.68
	16	S2-287	Ores and concentrates of base metals	0.68
	17	S2-037	Fish, crustaceans and molluscs, prepared or preserved	0.65
	18	S2-251	Pulp and waste paper	0.64
	19	S2-341	Gas, natural and manufactured	0.63
	20	S2-851	Footwear	0.63

Source: UN-COMTRADE SITC 3-digit Revision 2, author's calculation.

Based on table 1, the top-twenty comparative advantages of Indonesia in 1995 based on ETA classification are dominated by product groups which are included in the classification of primary products, there are 13 SITC i.e. SITC 232, 341, 075, 245, 424, 287, 431, 072, 036, 322, 074, 071, and 333. In 2005, Indonesia's comparative advantage was still dominated by product groups included in the classification of primary products with SITC increasing to 15 SITC i.e. SITC 424, 232, 322, 287, 072, 075, 341, 036 , 245, 431, 091, 267, 251, 071, and 074. From 1995 to 2005, Indonesia's comparative advantage changes in rank position and changes in product group composition where 3 new SITC emerged in 2005 were SITC 091, 267, 251 and 1 SITC were missing from the top-twenty comparative advantages of 1995 is SITC 333. Then in 2015 Indonesia's comparative advantage remained dominated by the classification of primary products with a larger proportion than in 2005 indicated by the increasing number of SITC to 16 SITC namely SITC 424, 232, 322, 431, 245, 091, 075, 267, 072, 289, 036, 071, 287, 037, 251, and 341. From 2005 to 2015 there was also a change in rank position and product group composition where there were 2 new SITC that emerged in 2015 i.e. SITC 289, 037 and 1 SITC lost from top-twenty comparative advantage in 2005 that is SITC 074. So during the period 1995-2015, although the products classification of Indonesia's comparative advantage did not change, but there has been an increase in the number of SITC, changes in rank position and changes in product group composition.

Table 2. Top-Twenty SITC of China Comparative Advantage 1995, 2005, and 2015

Year	Rank	SITC	Commodity	RSCA
1995	1	S2-261	Silk	0.96
	2	S2-323	Briquettes; coke and semi-coke; lignite or peat; retort carbon	0.86
	3	S2-848	Articles of apparel, clothing accessories, non-textile, headgear	0.80
	4	S2-658	Made-up articles, wholly or chiefly of textile materials	0.77
	5	S2-291	Crude animal materials	0.77
	6	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.77
	7	S2-671	Pig and sponge iron, spiegeleisen, etc, and ferro-alloys	0.77
	8	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	0.75
	9	S2-666	Pottery	0.75
	10	S2-844	Under garments of textile fabrics, not knitted or crocheted	0.74
	11	S2-572	Explosives and pyrotechnic products	0.73
	12	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	0.72
	13	S2-689	Miscellaneous non-ferrous base metals, employed in metallurgy	0.72
	14	S2-687	Tin	0.71
	15	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	0.71
	16	S2-851	Footwear	0.70
	17	S2-074	Tea and mate	0.69
	18	S2-056	Vegetables, roots and tubers, prepared or preserved	0.68
	19	S2-899	Other miscellaneous manufactured articles	0.68
	20	S2-894	Baby carriages, toys, games and sporting goods	0.68
2005	1	S2-261	Silk	0.96
	2	S2-323	Briquettes; coke and semi-coke; lignite or peat; retort carbon	0.77
	3	S2-848	Articles of apparel, clothing accessories, non-textile, headgear	0.77
	4	S2-666	Pottery	0.76
	5	S2-763	Gramophones, dictating machines and other sound recorders	0.72
	6	S2-658	Made-up articles, wholly or chiefly of textile materials	0.72
	7	S2-894	Baby carriages, toys, games and sporting goods	0.70
	8	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.70
	9	S2-751	Office machines	0.70
	10	S2-786	Trailers, and other vehicles, not motorized	0.69
	11	S2-851	Footwear	0.69
	12	S2-696	Cutlery	0.67
	13	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	0.66
	14	S2-752	Automatic data processing machines and units thereof	0.66
	15	S2-871	Optical instruments and apparatus	0.63
	16	S2-847	Clothing accessories, of textile fabrics	0.63
	17	S2-689	Miscellaneous non-ferrous base metals, employed in metallurgy	0.61
	18	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	0.61
	19	S2-697	Household equipment of base metal	0.61
	20	S2-844	Under garments of textile fabrics, not knitted or crocheted	0.61
2015	1	S2-261	Silk	0.93
	2	S2-666	Pottery	0.88
	3	S2-812	Sanitary, plumbing, heating, lighting fixtures and fittings	0.75
	4	S2-658	Made-up articles, wholly or chiefly of textile materials	0.70
	5	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	0.70
	6	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	0.70
	7	S2-697	Household equipment of base metal	0.70
	8	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	0.69
	9	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.69
	10	S2-851	Footwear	0.68
	11	S2-894	Baby carriages, toys, games and sporting goods	0.67
	12	S2-847	Clothing accessories, of textile fabrics	0.67
	13	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.65
	14	S2-752	Automatic data processing machines and units thereof	0.65
	15	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	0.64
	16	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	0.62
	17	S2-764	Telecommunication equipment, nes; parts and accessories	0.61
	18	S2-763	Gramophones, dictating machines and other sound recorders	0.60
	19	S2-848	Articles of apparel, clothing accessories, non-textile, headgear	0.60
	20	S2-696	Cutlery	0.59

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

When viewed from the top-twenty of China's comparative advantage (table 2) in 1995, 2005, and 2015, China's comparative advantage is dominated by a group of products included in the unskilled-labor intensive products

classification. In 1995, 10 SITC were SITC 848, 658, 831, 842, 666, 844, 843, 652, 851, and 894. In 2005, 10 SITC were SITC 848, 666, 658, 894, 831, 851, 845, 847, 842, and 844. In 2015, it increased to 14 SITC namely SITC 666, 812, 658, 653, 845, 652, 831, 851, 894, 847, 655, 843, 842, and 848. From 1995 to 2005 there was a change in the rank position and product group composition where 2 new SITC emerged in 2005 were SITC 845, 847 and 2 SITC lost from the top-twenty comparative advantages of 1995 i.e. SITC 843, 652. Changes in rank position and product group composition also occurred in 2005 to 2015, where there were 5 new SITC emerging in 2015 that SITC 812, 653, 652, 655, 843 and 1 SITC were missing from the top-twenty comparative advantage of 2005 i.e. SITC 844. So for 20 years, although there is a change in rank position and product group composition but China's comparative advantage product group is still dominated by the unskilled-labor intensive products classification, which differ only the type of product group.

Table 3. Top-Twenty SITC of Japan Comparative Advantage 1995, 2005, and 2015

Year	Rank	SITC	Commodity	RSCA
1995	1	S2-881	Photographic apparatus and equipment	0.68
	2	S2-793	Ships, boats and floating structures	0.63
	3	S2-871	Optical instruments and apparatus	0.59
	4	S2-763	Gramophones, dictating machines and other sound recorders	0.56
	5	S2-751	Office machines	0.53
	6	S2-736	Metalworking machine-tools, parts and accessories thereof	0.53
	7	S2-713	Internal combustion piston engines, and parts thereof	0.51
	8	S2-882	Photographic and cinematographic supplies	0.51
	9	S2-884	Optical goods	0.47
	10	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.47
	11	S2-782	Lorries and special purposes motor vehicles	0.44
	12	S2-737	Metalworking machinery (other than machine-tools), and parts	0.42
	13	S2-712	Steam engines, turbines	0.41
	14	S2-711	Steam boilers and auxiliary plant; and parts thereof	0.40
	15	S2-724	Textile and leather machinery, and parts thereof	0.39
	16	S2-728	Other machinery, equipment, for specialized industries; parts	0.39
	17	S2-781	Passenger motor vehicles (excluding buses)	0.38
	18	S2-895	Office and stationary supplies	0.38
	19	S2-778	Electrical machinery and apparatus	0.37
	20	S2-674	Universals, plates, and sheets, of iron or steel	0.36
2005	1	S2-712	Steam engines, turbines	0.75
	2	S2-881	Photographic apparatus and equipment	0.72
	3	S2-882	Photographic and cinematographic supplies	0.68
	4	S2-884	Optical goods	0.67
	5	S2-785	Cycles, scooters, motorized or not; invalid carriages	0.67
	6	S2-736	Metalworking machine-tools, parts and accessories thereof	0.63
	7	S2-763	Gramophones, dictating machines and other sound recorders	0.58
	8	S2-728	Other machinery, equipment, for specialized industries; parts	0.57
	9	S2-793	Ships, boats and floating structures	0.54
	10	S2-711	Steam boilers and auxiliary plant; and parts thereof	0.53
	11	S2-781	Passenger motor vehicles (excluding buses)	0.52
	12	S2-723	Civil engineering, contractors' plant and equipment and parts	0.44
	13	S2-737	Metalworking machinery (other than machine-tools), and parts	0.43
	14	S2-713	Internal combustion piston engines, and parts thereof	0.42
	15	S2-778	Electrical machinery and apparatus	0.40
	16	S2-511	Hydrocarbons, nes, and derivatives	0.40
	17	S2-266	Synthetic fibres suitable for spinning	0.40
	18	S2-724	Textile and leather machinery, and parts thereof	0.38
	19	S2-722	Tractors (other than those falling in heading 74411 and 7832)	0.38
	20	S2-674	Universals, plates, and sheets, of iron or steel	0.37
2015	1	S2-882	Photographic and cinematographic supplies	0.80
	2	S2-712	Steam engines, turbines	0.77
	3	S2-584	Regenerated cellulose; derivatives of cellulose; vulcanized fibre	0.69
	4	S2-736	Metalworking machine-tools, parts and accessories thereof	0.67
	5	S2-267	Other man-made fibres suitable for spinning, and waste	0.65
	6	S2-728	Other machinery, equipment, for specialized industries; parts	0.59
	7	S2-672	Ingots and other primary forms, of iron or steel	0.58
	8	S2-781	Passenger motor vehicles (excluding buses)	0.56
	9	S2-511	Hydrocarbons, nes, and derivatives	0.55
	10	S2-676	Rails and railway track construction materials, of iron or steel	0.54
	11	S2-266	Synthetic fibres suitable for spinning	0.53
	12	S2-233	Synthetic rubber, latex, etc; waste, scrap of unhardened rubber	0.53

	13	S2-884	Optical goods	0.51
	14	S2-723	Civil engineering, contractors' plant and equipment and parts	0.49
	15	S2-674	Universals, plates, and sheets, of iron or steel	0.43
	16	S2-737	Metalworking machinery (other than machine-tools), and parts	0.43
	17	S2-713	Internal combustion piston engines, and parts thereof	0.42
	18	S2-282	Waste and scrap metal of iron or steel	0.41
	19	S2-663	Mineral manufactures	0.40
	20	S2-774	Electro-medical and radiological equipment	0.39

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

Table 3 reports that Japan's comparative advantage is dominated by products with the classification of technology intensive products. In 1995, there are 14 SITC i.e. SITC 881, 871, 751, 736, 713, 882, 884, 776, 737, 712, 711, 724, 728, and 778. In 2005, there are 14 SITC i.e. SITC 712, 881, 882, 884, 736, 728, 711, 723, 737, 713, 778, 511, 724, and 722. Then in 2015 the number of SITC decreased to 11 SITC namely SITC 882, 712, 584, 736, 728, 511, 884, 723, 737, 713, and 774. From 1995 to 2005 there was a change in rank position and product group composition, there were 3 new SITC that emerged in 2005 i.e. SITC 723, 511, 722 and 3 SITC lost from top-twenty comparative advantage of 1995, namely SITC 871, 751, 776. In 2015 as well as in 2005, Japan's comparative advantage also experienced the dynamics of changes in rank position and product group composition, where there were 2 new SITC that emerged in 2015 i.e. SITC 584, 774 and 5 SITC missing from the top-twenty comparative advantages of 2005 i.e. SITC 881, 711, 778, 724, 722. So for 20 years, Japan did not experience a change in product classification of comparative advantage but changed its rank position and product group composition as well as decreasing the number of SITC where in 2015, there were 4 SITC classification of primary products did not exist in top-twenty comparative advantage of Japan in 1995.

Table 4. Top-Twenty SITC of Hong Kong Comparative Advantage 1995, 2005, and 2015

Year	Rank	SITC	Commodity	RSCA
1995	1	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.85
	2	S2-885	Watches and clocks	0.81
	3	S2-894	Baby carriages, toys, games and sporting goods	0.81
	4	S2-261	Silk	0.75
	5	S2-762	Radio-broadcast receivers	0.74
	6	S2-851	Footwear	0.71
	7	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	0.70
	8	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.67
	9	S2-899	Other miscellaneous manufactured articles	0.67
	10	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	0.64
	11	S2-844	Under garments of textile fabrics, not knitted or crocheted	0.64
	12	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	0.61
	13	S2-696	Cutlery	0.59
	14	S2-846	Under-garments, knitted or crocheted	0.59
	15	S2-848	Articles of apparel, clothing accessories, non-textile, headgear	0.58
	16	S2-277	Natural abrasives	0.56
	17	S2-881	Photographic apparatus and equipment	0.56
	18	S2-572	Explosives and pyrotechnic products	0.53
	19	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	0.52
	20	S2-771	Electric power machinery, and parts thereof	0.52
2005	1	S2-613	Furskins, tanned or dressed; pieces of furskin, tanned or dressed	0.88
	2	S2-885	Watches and clocks	0.82
	3	S2-212	Furskins, raw	0.80
	4	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.79
	5	S2-894	Baby carriages, toys, games and sporting goods	0.76
	6	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.71
	7	S2-763	Gramophones, dictating machines and other sound recorders	0.70
	8	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	0.69
	9	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	0.68
	10	S2-611	Leather	0.68
	11	S2-771	Electric power machinery, and parts thereof	0.67
	12	S2-762	Radio-broadcast receivers	0.67
	13	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	0.63
	14	S2-897	Gold, silver ware, jewelry and articles of precious materials	0.61
	15	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	0.60
	16	S2-881	Photographic apparatus and equipment	0.57
	17	S2-851	Footwear	0.57
	18	S2-656	Tulle, lace, embroidery, ribbons, trimmings and other small wares	0.54
	19	S2-651	Textile yarn	0.52

	20	S2-846	Under-garments, knitted or crocheted	0.52
2015	1	S2-613	Furskins, tanned or dressed; pieces of furskin, tanned or dressed	0.81
	2	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	0.74
	3	S2-885	Watches and clocks	0.72
	4	S2-971	Gold, non-monetary (excluding gold ores and concentrates)	0.70
	5	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.69
	6	S2-764	Telecommunication equipment, nes; parts and accessories	0.69
	7	S2-667	Pearl, precious and semi-precious stones, unworked or worked	0.67
	8	S2-212	Furskins, raw	0.65
	9	S2-771	Electric power machinery, and parts thereof	0.59
	10	S2-883	Cinematograph film, exposed and developed	0.52
	11	S2-656	Tulle, lace, embroidery, ribbons, trimmings and other small wares	0.52
	12	S2-611	Leather	0.50
	13	S2-772	Electrical apparatus for making and breaking electrical circuits	0.48
	14	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.44
	15	S2-894	Baby carriages, toys, games and sporting goods	0.42
	16	S2-897	Gold, silver ware, jewelry and articles of precious materials	0.41
	17	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.40
	18	S2-763	Gramophones, dictating machines and other sound recorders	0.37
	19	S2-881	Photographic apparatus and equipment	0.34
	20	S2-884	Optical goods	0.33

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

According to table 4, the top-twenty comparative advantages of Hong Kong in 1995 are dominated with unskilled-labor intensive products by 11 SITC i.e. SITC 831, 894, 851, 845, 655, 843, 844, 652, 846, 848, and 842. In 2005 is still dominated by 10 SITC unskilled-labor intensive products i.e. SITC 831, 894, 655, 845, 652, 843, 851, 656, 651, and 846. While in 2015, Hong Kong's comparative advantage is dominated by 8 SITC of technology intensive products i.e. SITC 759, 776, 764, 771, 883, 772, 881 and 884. From 1995 to 2005 there was a change in rank position and product group composition, where 2 new SITC emerged in 2005 were SITC 656, 651 and 3 SITC lost from the top-twenty comparative advantages of 1995 i.e. SITC 844, 848, 842. From 2005 to 2015 there was a change in product classification of comparative advantage from unskilled-labor intensive products to technology intensive products.

Table 5. Top-Twenty SITC of South Korea Comparative Advantage 1995, 2005, and 2015

Year	Rank	SITC	Commodity	RSCA
1995	1	S2-883	Cinematograph film, exposed and developed	0.87
	2	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	0.79
	3	S2-266	Synthetic fibres suitable for spinning	0.77
	4	S2-793	Ships, boats and floating structures	0.75
	5	S2-971	Gold, non-monetary (excluding gold ores and concentrates)	0.68
	6	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.62
	7	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.62
	8	S2-691	Structures and parts, nes, of iron, steel or aluminium	0.61
	9	S2-611	Leather	0.61
	10	S2-786	Trailers, and other vehicles, not motorized	0.58
	11	S2-656	Tulle, lace, embroidery, ribbons, trimmings and other small wares	0.57
	12	S2-763	Gramophones, dictating machines and other sound recorders	0.56
	13	S2-761	Television receivers	0.53
	14	S2-847	Clothing accessories, of textile fabrics	0.49
	15	S2-778	Electrical machinery and apparatus	0.48
	16	S2-657	Special textile fabrics and related products	0.48
	17	S2-677	Iron or steel wire (excluding wire rod), not insulated	0.45
	18	S2-696	Cutlery	0.45
	19	S2-511	Hydrocarbons, nes, and derivatives	0.42
	20	S2-625	Rubber tires, tire cases, inner and flaps, for wheels of all kinds	0.41
2005	1	S2-793	Ships, boats and floating structures	0.84
	2	S2-871	Optical instruments and apparatus	0.78
	3	S2-266	Synthetic fibres suitable for spinning	0.72
	4	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.69
	5	S2-511	Hydrocarbons, nes, and derivatives	0.58
	6	S2-513	Carboxylic acids, and their derivatives	0.57
	7	S2-764	Telecommunication equipment, nes; parts and accessories	0.57
	8	S2-656	Tulle, lace, embroidery, ribbons, trimmings and other small wares	0.53
	9	S2-677	Iron or steel wire (excluding wire rod), not insulated	0.51
	10	S2-711	Steam boilers and auxiliary plant; and parts thereof	0.50
	11	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	0.48

	12	S2-233	Synthetic rubber, latex, etc; waste, scrap of unhardened rubber	0.48
	13	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.48
	14	S2-686	Zinc	0.43
	15	S2-674	Universals, plates, and sheets, of iron or steel	0.42
	16	S2-269	Old clothing and other old textile articles; rags	0.40
	17	S2-693	Wire products (excluding insulated electrical wire); fencing grills	0.40
	18	S2-724	Textile and leather machinery, and parts thereof	0.37
	19	S2-582	Condensation, polycondensation and polyaddition products	0.36
	20	S2-625	Rubber tires, tire cases, inner and flaps, for wheels of all kinds	0.35
2015	1	S2-793	Ships, boats and floating structures	0.83
	2	S2-871	Optical instruments and apparatus	0.80
	3	S2-711	Steam boilers and auxiliary plant; and parts thereof	0.69
	4	S2-511	Hydrocarbons, nes, and derivatives	0.69
	5	S2-266	Synthetic fibres suitable for spinning	0.68
	6	S2-233	Synthetic rubber, latex, etc; waste, scrap of unhardened rubber	0.60
	7	S2-655	Knitted or crocheted fabrics (including tubular, etc, fabrics)	0.55
	8	S2-686	Zinc	0.51
	9	S2-674	Universals, plates, and sheets, of iron or steel	0.49
	10	S2-685	Lead	0.49
	11	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.49
	12	S2-513	Carboxylic acids, and their derivatives	0.46
	13	S2-672	Ingots and other primary forms, of iron or steel	0.45
	14	S2-677	Iron or steel wire (excluding wire rod), not insulated	0.43
	15	S2-724	Textile and leather machinery, and parts thereof	0.39
	16	S2-778	Electrical machinery and apparatus	0.38
	17	S2-269	Old clothing and other old textile articles; rags	0.37
	18	S2-582	Condensation, polycondensation and polyaddition products	0.36
	19	S2-583	Polymerization and copolymerization products	0.35
	20	S2-884	Optical goods nes	0.34

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

Table 5 reports the top-twenty comparative advantages of South Korea in 1995 dominated by product groups included in human-capital intensive products classification i.e. SITC 691, 786, 763, 761, 677, 696 and 625. While in 2005, the comparative advantage of South Korea experienced a change that is dominated by product groups included in the classification of technology intensive products of 8 SITC that is SITC 871, 511, 513, 764, 711, 776, 724, and 582. Then in 2015, the comparative advantage of South Korea is dominated by technology intensive products with SITC increasing to 10 SITC i.e. SITC 871, 711, 511, 776, 513, 724, 778, 582, 583 and 884. From 1995 to 2005 there was a change in the products classification of comparative advantage from human-capital intensive products to technology intensive products. From 2005 to 2015, South Korea's comparative advantage remained unchanged but there was a change of rank position and product group composition where there were 3 new SITC emerging in 2015 i.e. SITC 778, 583, 884 and 1 SITC missing from top-twenty comparative advantages of 2005 is SITC 764.

Table 6. Top-Twenty SITC of Singapore Comparative Advantage 1995, 2005, and 2015

Year	Rank	SITC	Commodity	RSCA
1995	1	S2-752	Automatic data processing machines and units thereof	0.75
	2	S2-687	Tin	0.73
	3	S2-075	Spices	0.71
	4	S2-763	Gramophones, dictating machines and other sound recorders	0.65
	5	S2-334	Petroleum products, refined	0.63
	6	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.62
	7	S2-762	Radio-broadcast receivers	0.61
	8	S2-232	Natural rubber latex; rubber and gums	0.61
	9	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	0.60
	10	S2-761	Television receivers	0.52
	11	S2-431	Animal and vegetable oils and fats, processed, and waxes	0.48
	12	S2-686	Zinc	0.47
	13	S2-764	Telecommunication equipment, nes; parts and accessories	0.41
	14	S2-122	Tobacco, manufactured	0.40
	15	S2-277	Natural abrasives	0.36
	16	S2-771	Electric power machinery, and parts thereof	0.30
	17	S2-716	Rotating electric plant and parts thereof	0.30
	18	S2-269	Old clothing and other old textile articles; rags	0.29
	19	S2-681	Silver, platinum and other metals of the platinum group	0.29
	20	S2-072	Cocoa	0.26

2005	1	S2-687	Tin	0.79
	2	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.76
	3	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	0.59
	4	S2-515	Organo-inorganic and heterocyclic compounds	0.58
	5	S2-334	Petroleum products, refined	0.54
	6	S2-277	Natural abrasives	0.52
	7	S2-898	Musical instruments, parts and accessories thereof	0.47
	8	S2-752	Automatic data processing machines and units thereof	0.45
	9	S2-335	Residual petroleum products, nes and related materials	0.44
	10	S2-723	Civil engineering, contractors' plant and equipment and parts	0.36
	11	S2-514	Nitrogen-function compounds	0.35
	12	S2-511	Hydrocarbons, nes, and derivatives	0.34
	13	S2-512	Alcohols, phenols etc, and their derivatives	0.31
	14	S2-895	Office and stationary supplies	0.29
	15	S2-737	Metalworking machinery (other than machine-tools), and parts	0.25
	16	S2-764	Telecommunication equipment, nes; parts and accessories	0.25
	17	S2-882	Photographic and cinematographic supplies	0.23
	18	S2-762	Radio-broadcast receivers	0.22
	19	S2-772	Electrical apparatus for making and breaking electrical circuits	0.21
	20	S2-075	Spices	0.20
2015	1	S2-687	Tin	0.81
	2	S2-776	Thermionic, microcircuits, transistors, valves, etc	0.75
	3	S2-881	Photographic apparatus and equipment	0.65
	4	S2-898	Musical instruments, parts and accessories thereof	0.64
	5	S2-683	Nickel	0.56
	6	S2-334	Petroleum products, refined	0.55
	7	S2-514	Nitrogen-function compounds	0.50
	8	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	0.45
	9	S2-512	Alcohols, phenols etc, and their derivatives	0.43
	10	S2-723	Civil engineering, contractors' plant and equipment and parts	0.42
	11	S2-277	Natural abrasives	0.41
	12	S2-714	Engines and motors, non-electric; parts, nes; group 714, item 71888	0.40
	13	S2-511	Hydrocarbons, nes, and derivatives	0.37
	14	S2-551	Essential oils, perfume and flavour materials	0.35
	15	S2-122	Tobacco, manufactured	0.35
	16	S2-931	Special transactions, commodity not classified according to class	0.32
	17	S2-728	Other machinery, equipment, for specialized industries; parts	0.31
	18	S2-553	Perfumery, cosmetics, toilet preparations, etc	0.31
	19	S2-583	Polymerization and copolymerization products	0.30
	20	S2-515	Organo-inorganic and heterocyclic compounds	0.30

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

In Singapore (table 6), in 1995 the top-twenty comparative advantages were dominated by the 8 SITC primary products i.e. SITC 075, 334, 232, 431, 122, 277, 269 and 072. In 2005 Singapore's comparative advantage is dominated by 12 SITC technology intensive products, namely SITC 776, 759, 515, 752, 723, 514, 511, 512, 737, 764, 882 and 772. Then in 2015 top-twenty of Singapore's comparative advantage is dominated by technology intensive products as many as 11 SITC are SITC 776, 881, 514, 759, 512, 723, 714, 511, 728, 583, and 515. From 1995 to 2005, there was a change of product classification of comparative advantage from primary products to technology intensive products. While from 2005 to 2015, the comparative advantage remains, but only a change in the rank position and product group composition where there are 4 new SITC emerging in 2015 i.e. SITC 881, 714, 728, 583 and 5 SITC missing from top-twenty comparative advantages of 2005 i.e. SITC 752, 737, 764, 882, 772.

4.2 Trade Specialization of East Asian Countries

In this study, referring to Hinloopen and Marrewijk (2005), the trade specialization of East Asian countries determined by calculating the value of export shares from each the East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore). The higher the export share value of a product group, the higher the trade specialization of that product group in a country compared to other product groups in that country.

The export share is calculated by calculating the percentage of a product group (SITC) of a country on the total export value of the country concerned. Higher export share values indicate that the product group is produced in greater proportion than other product groups. After calculating the export share value of 237 SITC, then ranked based on the value of the export share and selected twenty SITC with the highest export share value to serve as trade specialization products of the country concerned. Similar with the determination of comparative advantage, to simplify the interpretation of the results of trade specialization analysis, the authors classified 237 SITC into 6

classification of products based on the classification of ETA. Table 7-12 shows the top-twenty SITC of East Asian trade specialization in 1995, 2005, and 2015 using the UN-Comtrade data on 3-digit SITC Revision 2 for 237 product groups.

Table 7. Top-Twenty SITC of Indonesia Trade Specialization 1995, 2005, and 2015

Year	Rank	SITC	Commodity	Export Share (%)
1995	1	S2-333	Crude petroleum and oils obtained from bituminous minerals	11.330
	2	S2-341	Gas, natural and manufactured	8.855
	3	S2-634	Veneers, plywood, "improved" wood and other wood, worked	8.423
	4	S2-851	Footwear	4.399
	5	S2-232	Natural rubber latex; rubber and gums	4.324
	6	S2-287	Ores and concentrates of base metals	4.118
	7	S2-334	Petroleum products, refined	2.810
	8	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	2.754
	9	S2-036	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	2.397
	10	S2-424	Other fixed vegetable oils, fluid or solid, crude, refined	2.278
	11	S2-322	Coal, lignite and peat	2.275
	12	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	1.951
	13	S2-821	Furniture and parts thereof	1.903
	14	S2-635	Wood manufactures	1.843
	15	S2-651	Textile yarn	1.790
	16	S2-641	Paper and paperboard	1.610
	17	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	1.609
	18	S2-763	Gramophones, dictating machines and other sound recorders	1.525
	19	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	1.366
	20	S2-071	Coffee and coffee substitutes	1.352
2005	1	S2-341	Gas, natural and manufactured	10.686
	2	S2-333	Crude petroleum and oils obtained from bituminous minerals	9.510
	3	S2-424	Other fixed vegetable oils, fluid or solid, crude, refined	5.561
	4	S2-287	Ores and concentrates of base metals	5.146
	5	S2-322	Coal, lignite and peat	5.083
	6	S2-232	Natural rubber latex; rubber and gums	3.017
	7	S2-641	Paper and paperboard	2.370
	8	S2-334	Petroleum products, refined	2.234
	9	S2-821	Furniture and parts thereof	2.174
	10	S2-752	Automatic data processing machines and units thereof	2.160
	11	S2-634	Veneers, plywood, "improved" wood and other wood, worked	1.948
	12	S2-651	Textile yarn	1.893
	13	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	1.589
	14	S2-851	Footwear	1.574
	15	S2-763	Gramophones, dictating machines and other sound recorders	1.488
	16	S2-682	Copper	1.382
	17	S2-764	Telecommunication equipment, nes; parts and accessories	1.350
	18	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	1.318
	19	S2-778	Electrical machinery and apparatus	1.317
	20	S2-772	Electrical apparatus for making and breaking electrical circuits	1.316
2015	1	S2-424	Other fixed vegetable oils, fluid or solid, crude, refined	11.815
	2	S2-322	Coal, lignite and peat	10.640
	3	S2-341	Gas, natural and manufactured	6.877
	4	S2-333	Crude petroleum and oils obtained from bituminous minerals	4.309
	5	S2-851	Footwear	2.917
	6	S2-287	Ores and concentrates of base metals	2.746
	7	S2-232	Natural rubber latex; rubber and gums	2.479
	8	S2-897	Gold, silver ware, jewelry and articles of precious materials	2.204
	9	S2-641	Paper and paperboard	2.128
	10	S2-781	Passenger motor vehicles (excluding buses)	1.614
	11	S2-634	Veneers, plywood, "improved" wood and other wood, worked	1.589
	12	S2-651	Textile yarn	1.554
	13	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	1.547
	14	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	1.258
	15	S2-784	Motor vehicle parts and accessories	1.222
	16	S2-431	Animal and vegetable oils and fats, processed, and waxes	1.168
	17	S2-821	Furniture and parts thereof	1.165
	18	S2-251	Pulp and waste paper	1.149
	19	S2-778	Electrical machinery and apparatus	1.138
	20	S2-625	Rubber tires, tire cases, inner and flaps, for wheels of all kinds	1.072

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

Based on table 7, in 1995 the Indonesian trade specialization was dominated by product groups classified in the primary products of 9 SITC i.e. SITC 333, 341, 232, 287, 334, 036, 424, 322, and 071. In 2005, the trade specialization of Indonesia is still dominated by primary products with the number of SITC declining to 7 SITC namely SITC 341, 333, 424, 287, 322, 232, and 334. Then in 2015, Indonesian trade specialization remains dominated by product groups in primary products classification i.e. SITC 424, 322, 341, 333, 287, 232, 431, and 251 (8 SITC). From 1995 to 2005 there was a change in rank position and product group composition where there were 2 missing SITC of the top-twenty trade specializations of 1995 i.e. SITC 036 and 071. Then from 2005 to 2015 also changed in rank position and product group composition where there are 2 new SITC, which appear in 2015, i.e. SITC 431, 251 and 1 SITC lost from the top-twenty trade specialization of Indonesia in 2005 that is SITC 334.

Table 8. Top-Twenty SITC of China Trade Specialization 1995, 2005, and 2015

Year	Rank	SITC	Commodity	Export Share (%)
1995	1	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	4.223
	2	S2-851	Footwear	4.217
	3	S2-894	Baby carriages, toys, games and sporting goods	3.940
	4	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	3.524
	5	S2-764	Telecommunication equipment, nes; parts and accessories	2.718
	6	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	2.686
	7	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	2.326
	8	S2-848	Articles of apparel, clothing accessories, non-textile, headgear	1.964
	9	S2-846	Under-garments, knitted or crocheted	1.958
	10	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	1.929
	11	S2-899	Other miscellaneous manufactured articles	1.822
	12	S2-658	Made-up articles, wholly or chiefly of textile materials	1.721
	13	S2-762	Radio-broadcast receivers	1.718
	14	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	1.692
	15	S2-893	Articles, nes of plastic materials	1.679
	16	S2-778	Electrical machinery and apparatus	1.607
	17	S2-752	Automatic data processing machines and units thereof	1.547
	18	S2-333	Crude petroleum and oils obtained from bituminous minerals	1.503
	19	S2-775	Household type equipment	1.419
	20	S2-651	Textile yarn	1.419
2005	1	S2-752	Automatic data processing machines and units thereof	10.014
	2	S2-764	Telecommunication equipment, nes; parts and accessories	8.162
	3	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	3.898
	4	S2-894	Baby carriages, toys, games and sporting goods	2.699
	5	S2-763	Gramophones, dictating machines and other sound recorders	2.681
	6	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	2.679
	7	S2-776	Thermionic, microcircuits, transistors, valves, etc	2.679
	8	S2-851	Footwear	2.419
	9	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	2.275
	10	S2-821	Furniture and parts thereof	2.186
	11	S2-778	Electrical machinery and apparatus	2.178
	12	S2-775	Household type equipment	1.989
	13	S2-871	Optical instruments and apparatus	1.543
	14	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	1.535
	15	S2-893	Articles, nes of plastic materials	1.522
	16	S2-772	Electrical apparatus for making and breaking electrical circuits	1.466
	17	S2-658	Made-up articles, wholly or chiefly of textile materials	1.346
	18	S2-846	Under-garments, knitted or crocheted	1.234
	19	S2-699	Manufactures of base metal	1.177
	20	S2-771	Electric power machinery, and parts thereof	1.118
2015	1	S2-764	Telecommunication equipment, nes; parts and accessories	10.738
	2	S2-752	Automatic data processing machines and units thereof	6.151
	3	S2-776	Thermionic, microcircuits, transistors, valves, etc	4.628
	4	S2-821	Furniture and parts thereof	2.694
	5	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	2.543
	6	S2-778	Electrical machinery and apparatus	2.502
	7	S2-851	Footwear	2.244
	8	S2-894	Baby carriages, toys, games and sporting goods	2.010
	9	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	1.825
	10	S2-812	Sanitary, plumbing, heating, lighting fixtures and fittings	1.819
	11	S2-772	Electrical apparatus for making and breaking electrical circuits	1.805

12	S2-775	Household type equipment	1.765
13	S2-893	Articles, nes of plastic materials	1.757
14	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	1.603
15	S2-871	Optical instruments and apparatus	1.513
16	S2-749	Non-electric parts and accessories of machinery	1.385
17	S2-699	Manufactures of base metal	1.327
18	S2-793	Ships, boats and floating structures	1.262
19	S2-784	Motor vehicle parts and accessories	1.250
20	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	1.247

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

According to table 8, the Chinese's trade specialization in 1995 was dominated by unskilled-labor intensive products i.e. SITC 843, 851, 894, 842, 845, 652, 848, 846, 831, 658, 653, and 651 (12 SITC). In 2005, China's trade specialization was dominated by technology intensive products with 10 SITC namely SITC 752, 764, 759, 776, 778, 775, 871, 893, 772, and 771. Later in 2015, China's trade specialization is still dominated by technology intensive products as much as 10 SITC i.e. SITC 752, 764, 759, 778, 772, 775, 893, 759, 871, and 749. From 1995 to 2005 there was a change of trade specialization from unskilled-labor intensive products to technology intensive products. Then from 2005 to 2015, China's trade specialization has not changed, but only changing in composition of product groups where there are 2 new SITC emerging in 2015 i.e. SITC 759, 749 and 2 SITC lost from the top-twenty trade specialization of 2005 i.e. SITC 776, 771. For the period 2005 and 2015, the rank on 1-3 of China's trade specializations are occupied by the same product groups i.e. SITC 752, 764, and 759.

Table 9. Top-Twenty SITC of Japan Trade Specialization 1995, 2005, and 2015

Year	Rank	SITC	Commodity	Export Share (%)
1995	1	S2-781	Passenger motor vehicles (excluding buses)	9.529
	2	S2-776	Thermionic, microcircuits, transistors, valves, etc	9.222
	3	S2-784	Motor vehicle parts and accessories	4.438
	4	S2-764	Telecommunication equipment, nes; parts and accessories	4.112
	5	S2-752	Automatic data processing machines and units thereof	3.875
	6	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	3.691
	7	S2-778	Electrical machinery and apparatus	3.258
	8	S2-713	Internal combustion piston engines, and parts thereof	2.962
	9	S2-772	Electrical apparatus for making and breaking electrical circuits	2.582
	10	S2-728	Other machinery, equipment, for specialized industries; parts	2.542
	11	S2-793	Ships, boats and floating structures	2.468
	12	S2-749	Non-electric parts and accessories of machinery	2.253
	13	S2-674	Universals, plates, and sheets, of iron or steel	2.181
	14	S2-782	Lorries and special purposes motor vehicles	2.050
	15	S2-931	Special transactions, commodity not classified according to class	2.047
	16	S2-874	Measuring, checking, analysis, controlling instruments, nes, parts	1.722
	17	S2-736	Metalworking machine-tools, parts and accessories thereof	1.604
	18	S2-785	Cycles, scooters, motorized or not; invalid carriages	1.310
	19	S2-741	Heating and cooling equipment and parts thereof	1.259
	20	S2-763	Gramophones, dictating machines and other sound recorders	1.255
2005	1	S2-781	Passenger motor vehicles (excluding buses)	13.408
	2	S2-776	Thermionic, microcircuits, transistors, valves, etc	6.704
	3	S2-931	Special transactions, commodity not classified according to class	4.397
	4	S2-784	Motor vehicle parts and accessories	4.353
	5	S2-778	Electrical machinery and apparatus	3.115
	6	S2-728	Other machinery, equipment, for specialized industries; parts	3.102
	7	S2-764	Telecommunication equipment, nes; parts and accessories	2.921
	8	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	2.799
	9	S2-772	Electrical apparatus for making and breaking electrical circuits	2.568
	10	S2-713	Internal combustion piston engines, and parts thereof	2.495
	11	S2-874	Measuring, checking, analysis, controlling instruments, parts	2.207
	12	S2-674	Universals, plates, and sheets, of iron or steel	2.128
	13	S2-749	Non-electric parts and accessories of machinery	2.057
	14	S2-763	Gramophones, dictating machines and other sound recorders	1.991
	15	S2-793	Ships, boats and floating structures	1.984
	16	S2-723	Civil engineering, contractors' plant and equipment and parts	1.779
	17	S2-736	Metalworking machine-tools, parts and accessories thereof	1.630
	18	S2-583	Polymerization and copolymerization products	1.452
	19	S2-782	Lorries and special purposes motor vehicles	1.323
	20	S2-884	Optical goods	1.320

2015	1	S2-781	Passenger motor vehicles (excluding buses)	13.762
	2	S2-931	Special transactions, commodity not classified according to class	5.927
	3	S2-776	Thermionic, microcircuits, transistors, valves, etc	5.177
	4	S2-784	Motor vehicle parts and accessories	4.677
	5	S2-728	Other machinery, equipment, for specialized industries; parts	3.863
	6	S2-778	Electrical machinery and apparatus	3.091
	7	S2-874	Measuring, checking, analysis, controlling instruments, parts	2.490
	8	S2-772	Electrical apparatus for making and breaking electrical circuits	2.452
	9	S2-749	Non-electric parts and accessories of machinery	2.399
	10	S2-713	Internal combustion piston engines, and parts thereof	2.281
	11	S2-674	Universals, plates, and sheets, of iron or steel	1.990
	12	S2-793	Ships, boats and floating structures	1.825
	13	S2-334	Petroleum products, refined	1.686
	14	S2-723	Civil engineering, contractors' plant and equipment and parts	1.680
	15	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	1.666
	16	S2-583	Polymerization and copolymerization products	1.629
	17	S2-782	Lorries and special purposes motor vehicles	1.588
	18	S2-736	Metalworking machine-tools, parts and accessories thereof	1.563
	19	S2-764	Telecommunication equipment, nes; parts and accessories	1.471
	20	S2-598	Miscellaneous chemical products	1.393

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

When viewed from the top-twenty of Japan's trade specializations (table 9) for 1995, 2005, and 2015, the Japan's trade specialization is dominated by technology intensive products classification. In 1995 Japan's trade specialization was dominated by 12 SITC of technology intensive products, namely SITC 776, 764, 752, 759, 778, 713, 772, 728, 749, 874, 736, and 741. Then in 2005, as many as 13 SITC, i.e. SITC 776, 778, 728, 764, 759, 772, 713, 874, 749, 723, 736, 583 and 884. In 2015 is dominated by 13 SITC i.e. SITC 776, 728, 778, 874, 772, 749, 713, 723, 759, 583, 736, 764, and 598. From 1995 to 2005 there was a change in rank position and product group composition where there were 3 new SITC that emerged in 2005 that were SITC 723, 583, 884 and 2 SITC lost from top-twenty trade specialization in 1995 that is SITC 752 and 741. Then from 2005 to 2015 also change the position of rank and product group composition where there is 1 new SITC that emerged in 2015 that is SITC 598 and 1 SITC lost from top-twenty of trade specialization in 2005 that is SITC 884. During the period 1995, 2005, and 2015 the first rank of Japan's trade specialization is occupied by the same product group i.e. SITC 781 (Passenger motor vehicles (excluding buses)).

Table 10. Top-Twenty SITC of Hong Kong Trade Specialization 1995, 2005, and 2015

Year	Rank	SITC	Commodity	Export Share (%)
1995	1	S2-894	Baby carriages, toys, games and sporting goods	6.358
	2	S2-764	Telecommunication equipment, nes; parts and accessories	5.212
	3	S2-776	Thermionic, microcircuits, transistors, valves, etc	4.357
	4	S2-851	Footwear	4.257
	5	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	3.756
	6	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	3.489
	7	S2-885	Watches and clocks	3.330
	8	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	3.256
	9	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	2.663
	10	S2-583	Polymerization and copolymerization products	2.662
	11	S2-762	Radio-broadcast receivers	2.611
	12	S2-775	Household type equipment	1.890
	13	S2-893	Articles, nes of plastic materials	1.817
	14	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	1.774
	15	S2-842	Men's and boys' outerwear, textile fabrics not knitted or crocheted	1.742
	16	S2-899	Other miscellaneous manufactured articles	1.734
	17	S2-846	Under-garments, knitted or crocheted	1.719
	18	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	1.667
	19	S2-651	Textile yarn	1.664
	20	S2-778	Electrical machinery and apparatus	1.632
2005	1	S2-776	Thermionic, microcircuits, transistors, valves, etc	10.472
	2	S2-764	Telecommunication equipment, nes; parts and accessories	10.086
	3	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	9.352
	4	S2-894	Baby carriages, toys, games and sporting goods	4.069
	5	S2-772	Electrical apparatus for making and breaking electrical circuits	3.471
	6	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	3.443
	7	S2-752	Automatic data processing machines and units thereof	3.090
	8	S2-763	Gramophones, dictating machines and other sound recorders	3.003

	9	S2-778	Electrical machinery and apparatus	2.676
	10	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	2.544
	11	S2-583	Polymerization and copolymerization products	2.262
	12	S2-771	Electric power machinery, and parts thereof	2.064
	13	S2-851	Footwear	1.995
	14	S2-885	Watches and clocks	1.918
	15	S2-667	Pearl, precious and semi-precious stones, unworked or worked	1.810
	16	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	1.652
	17	S2-897	Gold, silver ware, jewelry and articles of precious materials	1.544
	18	S2-846	Under-garments, knitted or crocheted	1.481
	19	S2-651	Textile yarn	1.213
	20	S2-652	Cotton fabrics, woven (not including narrow or special fabrics)	1.166
2015	1	S2-776	Thermionic, microcircuits, transistors, valves, etc	19.088
	2	S2-764	Telecommunication equipment, nes; parts and accessories	18.142
	3	S2-971	Gold, non-monetary (excluding gold ores and concentrates)	8.822
	4	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	6.017
	5	S2-772	Electrical apparatus for making and breaking electrical circuits	4.128
	6	S2-752	Automatic data processing machines and units thereof	3.672
	7	S2-667	Pearl, precious and semi-precious stones, unworked or worked	3.639
	8	S2-778	Electrical machinery and apparatus	2.461
	9	S2-771	Electric power machinery, and parts thereof	2.040
	10	S2-885	Watches and clocks	1.811
	11	S2-897	Gold, silver ware, jewelry and articles of precious materials	1.682
	12	S2-894	Baby carriages, toys, games and sporting goods	1.461
	13	S2-845	Outerwear knitted or crocheted, not elastic nor rubberized	1.357
	14	S2-874	Measuring, checking, analysis, controlling instruments, parts	1.134
	15	S2-583	Polymerization and copolymerization products	1.107
	16	S2-831	Travel goods, handbags etc, of leather, plastics, textile, others	0.930
	17	S2-843	Womens, girls, infants outerwear, textile, not knitted or crocheted	0.761
	18	S2-884	Optical goods	0.758
	19	S2-846	Under-garments, knitted or crocheted	0.741
	20	S2-851	Footwear	0.701

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

Based on table 10, in 1995 Hong Kong's trade specialization was dominated by unskilled-labor intensive products classification of 10 SITC namely SITC 894, 851, 845, 843, 831, 653, 842, 846, 652 and 651. In 2005 Hong Kong's trade specialization was dominated by 2 product groups: unskilled-labor intensive products and technology intensive products classification with each amount of 8 SITC. Then in 2015 Hong Kong's trade specialization is dominated by 10 SITC of technology intensive products classification i.e. SITC 776, 764, 759, 772, 752, 778, 771, 874, 583, and 884. When viewed from the top-twenty Hong Kong's trade specialization from 1995, 2005, and 2015 there was a change of trade specialization from unskilled-labor intensive products in 1995 to technology intensive products in 2015.

Table 11. Top-Twenty SITC of South Korea Trade Specialization 1995, 2005, and 2015

Year	Rank	SITC	Commodity	Export Share (%)
1995	1	S2-776	Thermionic, microcircuits, transistors, valves, etc	15.491
	2	S2-781	Passenger motor vehicles (excluding buses)	5.792
	3	S2-653	Fabrics, woven, of man-made fibres (not narrow or special fabrics)	5.356
	4	S2-778	Electrical machinery and apparatus	4.443
	5	S2-793	Ships, boats and floating structures	4.424
	6	S2-764	Telecommunication equipment, nes; parts and accessories	3.393
	7	S2-752	Automatic data processing machines and units thereof	3.163
	8	S2-583	Polymerization and copolymerization products	2.419
	9	S2-674	Universals, plates, and sheets, of iron or steel	2.105
	10	S2-971	Gold, non-monetary (excluding gold ores and concentrates)	1.944
	11	S2-334	Petroleum products, refined	1.844
	12	S2-761	Television receivers	1.520
	13	S2-763	Gramophones, dictating machines and other sound recorders	1.459
	14	S2-775	Household type equipment	1.352
	15	S2-611	Leather	1.220
	16	S2-582	Condensation, polycondensation and polyaddition products	1.128
	17	S2-898	Musical instruments, parts and accessories thereof	1.108
	18	S2-691	Structures and parts, nes, of iron, steel or aluminium	1.092
	19	S2-651	Textile yarn	1.068
	20	S2-625	Rubber tires, tire cases, inner and flaps, for wheels of all kinds	1.063
2005	1	S2-764	Telecommunication equipment, nes; parts and accessories	11.711

	2	S2-776	Thermionic, microcircuits, transistors, valves, etc	9.665
	3	S2-781	Passenger motor vehicles (excluding buses)	9.583
	4	S2-793	Ships, boats and floating structures	6.059
	5	S2-334	Petroleum products, refined	5.328
	6	S2-752	Automatic data processing machines and units thereof	3.249
	7	S2-871	Optical instruments and apparatus	2.995
	8	S2-583	Polymerization and copolymerization products	2.934
	9	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	2.863
	10	S2-784	Motor vehicle parts and accessories	2.738
	11	S2-674	Universals, plates, and sheets, of iron or steel	2.457
	12	S2-778	Electrical machinery and apparatus	2.157
	13	S2-511	Hydrocarbons, nes, and derivatives	1.634
	14	S2-582	Condensation, polycondensation and polyaddition products	1.456
	15	S2-728	Other machinery, equipment, for specialized industries; parts	1.205
	16	S2-775	Household type equipment	1.192
	17	S2-672	Ingots and other primary forms, of iron or steel	1.176
	18	S2-513	Carboxylic acids, and their derivatives	1.109
	19	S2-761	Television receivers	1.039
	20	S2-772	Electrical apparatus for making and breaking electrical circuits	1.003
2015	1	S2-776	Thermionic, microcircuits, transistors, valves, etc	10.888
	2	S2-781	Passenger motor vehicles (excluding buses)	7.926
	3	S2-793	Ships, boats and floating structures	7.296
	4	S2-764	Telecommunication equipment, nes; parts and accessories	7.046
	5	S2-334	Petroleum products, refined	5.843
	6	S2-784	Motor vehicle parts and accessories	4.394
	7	S2-871	Optical instruments and apparatus	4.088
	8	S2-778	Electrical machinery and apparatus	3.179
	9	S2-583	Polymerization and copolymerization products	2.946
	10	S2-772	Electrical apparatus for making and breaking electrical circuits	2.364
	11	S2-674	Universals, plates, and sheets, of iron or steel	2.282
	12	S2-728	Other machinery, equipment, for specialized industries; parts	2.145
	13	S2-511	Hydrocarbons, nes, and derivatives	2.012
	14	S2-582	Condensation, polycondensation and polyaddition products	1.486
	15	S2-749	Non-electric parts and accessories of machinery	1.205
	16	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	1.101
	17	S2-713	Internal combustion piston engines, and parts thereof	0.987
	18	S2-752	Automatic data processing machines and units thereof	0.947
	19	S2-741	Heating and cooling equipment and parts thereof	0.916
	20	S2-672	Ingots and other primary forms, of iron or steel	0.876

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

South Korea's trade specialization in 1995 was dominated by 2 product groups: technology intensive products and human-capital intensive products (7 SITC). In 2005, South Korea's trade specialization was dominated by technology intensive products with 13 SITC i.e. SITC 764, 776, 752, 871, 583, 759, 778, 511, 582, 728, 775, 513 and 772. Then in 2015, South Korea's trade specialization is still dominated by 14 SITC of technology intensive products classification i.e. SITC 776, 764, 871, 778, 583, 772, 728, 511, 582, 749, 759, 713, 752 and 741. From 1995 to 2005, there was a change in product classification of trade specialization from human-capital intensive products to technology intensive products. From 2005 to 2015, the product classification remains fixed but there is a change in rank position and product group composition where there are 3 new SITC that emerged in 2015 i.e. SITC 749, 713, 741 and 2 SITC lost from top-twenty of trade specialization of 2005 i.e. SITC 775, and 513.

Table 12. Top-Twenty SITC of Singapore Trade Specialization 1995, 2005, and 2015

Year	Rank	SITC	Commodity	Export Share (%)
1995	1	S2-752	Automatic data processing machines and units thereof	16.521
	2	S2-776	Thermionic, microcircuits, transistors, valves, etc	15.552
	3	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	7.526
	4	S2-334	Petroleum products, refined	6.559
	5	S2-764	Telecommunication equipment, nes; parts and accessories	5.813
	6	S2-931	Special transactions, commodity not classified according to class	2.232
	7	S2-778	Electrical machinery and apparatus	2.135
	8	S2-772	Electrical apparatus for making and breaking electrical circuits	2.073
	9	S2-763	Gramophones, dictating machines and other sound recorders	1.913
	10	S2-762	Radio-broadcast receivers	1.775
	11	S2-761	Television receivers	1.464
	12	S2-749	Non-electric parts and accessories of machinery	1.082
	13	S2-716	Rotating electric plant and parts thereof	0.950

	14	S2-583	Polymerization and copolymerization products	0.899
	15	S2-771	Electric power machinery, and parts thereof	0.885
	16	S2-723	Civil engineering, contractors' plant and equipment and parts	0.864
	17	S2-728	Other machinery, equipment, for specialized industries; parts	0.859
	18	S2-122	Tobacco, manufactured	0.844
	19	S2-515	Organo-inorganic and heterocyclic compounds	0.773
	20	S2-874	Measuring, checking, analysis, controlling instruments, parts	0.733
2005	1	S2-776	Thermionic, microcircuits, transistors, valves, etc	23.456
	2	S2-334	Petroleum products, refined	11.584
	3	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	7.172
	4	S2-752	Automatic data processing machines and units thereof	6.775
	5	S2-764	Telecommunication equipment, nes; parts and accessories	5.657
	6	S2-931	Special transactions, commodity not classified according to class	3.787
	7	S2-772	Electrical apparatus for making and breaking electrical circuits	2.111
	8	S2-778	Electrical machinery and apparatus	2.071
	9	S2-515	Organo-inorganic and heterocyclic compounds	2.061
	10	S2-583	Polymerization and copolymerization products	1.573
	11	S2-723	Civil engineering, contractors' plant and equipment and parts	1.569
	12	S2-898	Musical instruments, parts and accessories thereof	1.329
	13	S2-541	Medicinal and pharmaceutical products	1.282
	14	S2-749	Non-electric parts and accessories of machinery	1.122
	15	S2-514	Nitrogen-function compounds	1.059
	16	S2-874	Measuring, checking, analysis, controlling instruments, parts	1.033
	17	S2-511	Hydrocarbons, nes, and derivatives	0.947
	18	S2-582	Condensation, polycondensation and polyaddition products	0.917
	19	S2-598	Miscellaneous chemical products	0.762
	20	S2-667	Pearl, precious and semi-precious stones, unworked or worked	0.733
2015	1	S2-776	Thermionic, microcircuits, transistors, valves, etc	24.375
	2	S2-334	Petroleum products, refined	12.167
	3	S2-931	Special transactions, commodity not classified according to class	5.723
	4	S2-764	Telecommunication equipment, nes; parts and accessories	3.476
	5	S2-752	Automatic data processing machines and units thereof	2.980
	6	S2-759	Parts, nes of and accessories for machines of headings 751 or 752	2.742
	7	S2-583	Polymerization and copolymerization products	2.728
	8	S2-541	Medicinal and pharmaceutical products	2.194
	9	S2-874	Measuring, checking, analysis, controlling instruments, parts	2.111
	10	S2-728	Other machinery, equipment, for specialized industries; parts	2.102
	11	S2-778	Electrical machinery and apparatus	1.959
	12	S2-792	Aircraft and associated equipment, and parts thereof	1.855
	13	S2-772	Electrical apparatus for making and breaking electrical circuits	1.536
	14	S2-723	Civil engineering, contractors' plant and equipment and parts	1.460
	15	S2-714	Engines and motors, non-electric; parts, nes; group 714, item 71888	1.423
	16	S2-598	Miscellaneous chemical products	1.339
	17	S2-898	Musical instruments, parts and accessories thereof	1.314
	18	S2-514	Nitrogen-function compounds	1.171
	19	S2-515	Organo-inorganic and heterocyclic compounds	1.057
	20	S2-749	Non-electric parts and accessories of machinery	0.998

Source: UN-COMTRADE 3-digit SITC Revision 2 Authors' calculations.

In 1995, Singapore's trade specialization was dominated by 14 SITC of technology intensive products classification i.e. SITC 752, 776, 759, 764, 778, 772, 749, 716, 583, 771, 723, 728, 515 and 874. In 2005, Singapore's trade specialization was still dominated by technology intensive products with 16 SITC namely SITC 776, 759, 752, 764, 772, 778, 515, 583, 723, 541, 749, 514, 874, 511, 582 and 598. Then in 2015, the Singapore's trade specialization is still dominated by technology intensive products classification with an increasing number of SITC to 17 SITC namely SITC 776, 764, 752, 759, 583, 541, 874, 728 , 778, 792, 772, 723, 714, 598, 514, 515, and 749. From 1995 to 2005, there was a change of rank position and product group composition where 5 new SITC emerged in 2005 were SITC 541, 514, 511, 582, 598 and 3 SITC are missing from top-twenty of trade specialization in 1995 that is SITC 716, 771, 728. Then from 2005 to 2015 also change in position of rank and product group composition where there are 3 new SITC that appear in 2015 that is SITC 728, 792, 714 and 2 SITC which missing from the top-twenty of trade specializations in 2005 i.e. SITC 511 and 582.

4.3 Do East Asian Countries Specialize in Product Groups with High Comparative Advantage?

During the period 1995, 2005, and 2015, based on the top-twenty of Indonesia's comparative advantages and

trade specialization, the comparative advantages and trade specialization of Indonesia are on the classification of primary products but not all of the product groups that constitute Indonesia's comparative advantage is as Indonesia's trade specialization. In 1995, the proportion of Indonesian trade specialization which is a comparative advantage is 65%, from 20 SITC of high comparative advantage only 13 SITC are used as trade specialization of Indonesia. In 2005, Indonesia did not specialize in products with high comparative advantages due to the proportion of product groups in Indonesian trade specialization which is a comparative advantage of Indonesia only 35%, from 20 SITC of Indonesia comparative advantage is only 7 SITC become the Indonesian's trade specialization namely SITC 341, 424, 287, 322, 232, 634, 651. Then in 2015 Indonesia still does not specialize in product groups with high comparative advantage, where the proportion of Indonesian trade specialization which is a comparative advantage of Indonesia is only 50% i.e. only 10 SITC Indonesia's trade specialization with high comparative advantage, that is SITC 424, 322, 341, 851, 287, 232, 634, 651, 431, 251.

China's comparative advantages and trade specialization in 1995 was in unskilled-labor intensive products classification, but the product group that China's comparative advantage has not all become into trade specialization, the proportion of China's comparative advantage that is China's trade specialization is 45%, from 20 SITC with high comparative advantage, only 9 SITC are used as China's trade specialization. For 2005 and 2015, the product group that became China's comparative advantage was not used as a Chinese trade specialization, where China's comparative advantages in 2005 and 2015 were dominated by unskilled-labor intensive products but Chinese trade specialization in the same year was dominated by technology intensive products. In 2005 and 2015, the proportion of China's trade specialization which is a comparative advantage is 40%, from 20 SITCs in Chinese trade specialization only 8 SITC with high comparative advantages. For 2005 were SITC 763, 658, 894, 851, 845, 752, 871, and 842 while for 2015 were SITC 812, 845, 831, 851, 894, 752, 843, and 764.

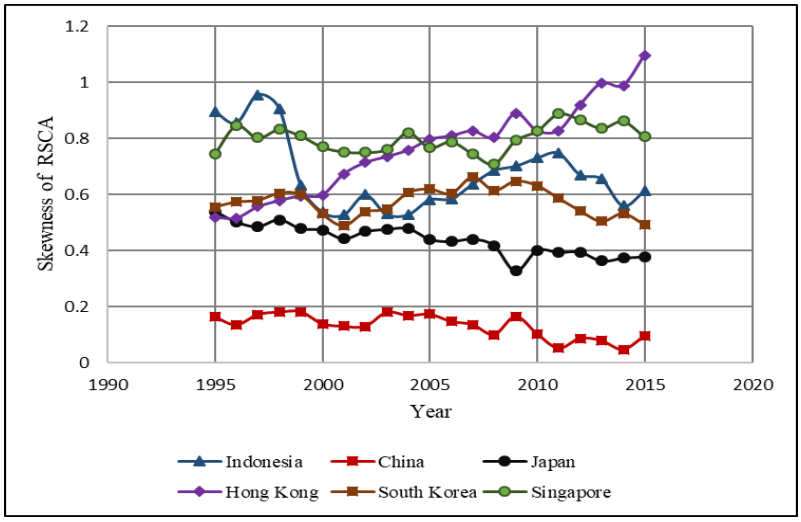
Based on the top-twenty Japan's comparative advantages and trade specialization, during the 1995, 2005, and 2015, the comparative advantages and trade specialization of Japan is on the technology intensive products classification. Despite the comparative advantages and trade specialization of Japan in the classification of technology, intensive products but not all of the product groups that become comparative advantages become the trade specialization. In 1995 and 2005, from 20 SITC with high comparative advantages, only 10 SITC were used as Japan's trade specializations. In 2015 Japan did not specialize in products with high comparative advantages because the proportion of Japan product group which is a comparative advantage is only 30% from 20 SITC of comparative advantage only 6 SITC become as trade specialization, that is SITC 736, 728, 781, 723, 674, and 713.

From the results of Hong Kong's comparative advantage analysis and trade specialization for the period of 1995 and 2005 is on the unskilled-labor intensive products classification but not all product groups of comparative advantages become as trade specialization, where from 20 SITC comparative advantage only 11 SITC, which serve as trade specialization in 1995, and 13 SITC in 2005. In 2015, there was a change in the classification of comparative advantages and trade specialization from unskilled-labor intensive products to technology intensive products but it is the same as 1995 and 2005, that in 2015 not all of the product groups on comparative advantage become the trade specialization, from 20 SITC comparative advantage only 12 SITC which serve as a Hong Kong's trade specialization.

South Korea in 1995 has not fully specialized in product groups with high comparative advantages, in which South Korea's comparative advantage in 1995 was dominated by human-capital intensive products but South Korea's trade specialization in the same year was dominated by technology intensive products and human-capital intensive products. The product group that became a comparative advantage of South Korea is not all of them as trade specialization, where from 20 SITC with high comparative advantages, only 10 SITC are used as South Korea's trade specialization. In 2005 and 2015, although South Korea's comparative advantage and trade specialization were in the classification of technology intensive products but not all of the comparative advantage were made as trade specialization, where from 20 SITC comparative advantages in 2005 only 8 SITC (40%) of South Korea's trade specialization has a high comparative advantage, namely SITC 793, 871, 511, 513, 764, 776, 674, 582 and by 2015 only 9 SITC (45%) of South Korean trade specialization with high comparative advantages i.e. SITC 793, 871, 511, 674, 776, 672, 778, 582, and 583.

Based on the top-twenty comparative advantage and trade specialization of Singapore, in 1995 the product group that became Singapore's comparative advantage was not used as a trade specialization, where Singapore's comparative advantage was dominated by primary products but Singapore's trade specialization was dominated by technology intensive products. In 2005 and 2015, although Singapore's comparative advantages and trade specialization were in the classification of technology intensive products but not all of the product groups that

became comparative advantages were made as trade specializations. During the period of 1995, 2005, and 2015, the proportion of Singapore's trade specialization, which is Singapore's comparative advantage, is only 55% of the 20 SITC with high comparative advantage, only 11 SITC are made as Singapore's trade specialization.



Source: UN-COMTRADE 3-digit SITC Revision 2. *Authors' calculation.*

Figure 3. Trends in Skewness of Comparative Advantages from East Asian Countries, 1995–2015

The positive value of skewness on RSCA coefficient indicates that a country specializes more on products that have low comparative advantages. While the negative value of RSCA skewness coefficient indicates that a country specializes more on products with high comparative advantage (Widodo, 2010). From Figure 3 above, it is shown that all East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore) have positive values of skewness coefficient, indicating that Indonesia, China, Japan, Hong Kong, South Korea, and Singapore specialize in product groups with low comparative advantages.

5. Conclusions

During the 1995, 2005, and 2015 study periods, East Asian countries (Indonesia, China, Japan, Hong Kong, South Korea, and Singapore) specialize in products with low comparative advantages where not all product groups that become comparative advantages serve as trade specialization. Throughout the study period, it was found that technology intensive products are a classification of product groups that dominate comparative advantage and trade specialization of East Asian countries. This result is also supported by a positive value of skewness, indicating that during the period 1995-2015, Indonesia, China, Japan, Hong Kong, South Korea, and Singapore specialize in product groups with low comparative advantages.

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Appendix A

Classification by Empirical Trade Analysis (ETA)

No	Product Classification	Amount of SITC	The 3-digit SITC Revision 2
1	Primary Products	83	001, 011, 012, 014, 022, 023, 024, 025, 034, 035, 036, 037, 041, 042, 043, 044, 045, 046, 047, 048, 054, 056, 057, 058, 061, 062, 071, 072, 073, 074, 075, 081, 091, 098, 111, 112, 121, 122, 211, 212, 222, 223, 232, 233, 244, 245, 246, 247, 248, 251, 261, 263, 264, 265, 266, 267, 268, 269, 271, 273, 274, 277, 278, 281, 282, 286, 287, 288, 289, 291, 292, 322, 323, 333, 334, 335, 341, 351, 411, 423, 424, 431, 941
2	Natural-resource intensive products	21	524, 611, 612, 613, 633, 634, 635, 661, 662, 663, 667, 671, 681, 682, 683, 684, 685, 686, 687, 688, 689
3	Unskilled-labor intensive products	26	651, 652, 653, 654, 655, 656, 657, 658, 659, 664, 665, 666, 793, 812, 821, 831, 842, 843, 844, 845, 846, 847, 848, 851, 894, 895
4	Technology intensive products	62	511, 512, 513, 514, 515, 516, 522, 523, 541, 562, 572, 582, 583, 584, 585, 591, 592, 598, 711, 712, 713, 714, 716, 718, 721, 722, 723, 724, 725, 726, 727, 728, 736, 737, 741, 742, 743, 744, 745, 749, 751, 752, 759, 764, 771, 772, 773, 774, 775, 776, 778, 792, 871, 872, 873, 874, 881, 882, 883, 884, 893, 951
5	Human-capital intensive products	43	531, 532, 533, 551, 553, 554, 621, 625, 628, 641, 642, 672, 673, 674, 675, 676, 677, 678, 679, 691, 692, 693, 694, 695, 696, 697, 699, 761, 762, 763, 781, 782, 783, 784, 785, 786, 791, 885, 892, 896, 897, 898, 899
6	Not classified	5	911, 931, 961, 971, 999

Source: http://www2.econ.uu.nl/users/marrewijk/eta/