

COMPARATIVE ADVANTAGE ANALYSIS AND PRODUCTS MAPPING OF INDONESIA, MALAYSIA, PHILIPPINES, SINGAPORE, THAILAND, AND VIETNAM EXPORT PRODUCTS

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Abstract

The research aims to answer some questions. First, what kind of export product groups that the six countries have comparative advantage? Second, is there a shifting on its comparative advantage? Third, what is the relationship between six countries? Data used in this study is secondary data which published by the World Integrated Solution (WITS) of World Bank, from 1997 to 2014. Analytical tools applied are products mapping using Revealed Symmetric Comparative Advantage (RSCA) and Trade Balance Index (TBI). The results of this study showed as follows: first, on average, the comparative advantage of six countries increase. Second, Thailand and Vietnam's comparative advantage and trade balance changes seems more dynamic than those of other four countries. Third, there is competition and complementary amongst six countries.

Keywords: comparative advantage, export specialization, products mapping, flying geese

INTRODUCTION

Amongst ASEAN countries, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam are the biggest in GDP nominal. It's trade also very dynamics either by the number of products or by the value. Those six countries became the investment destination, due to its abundance natural resource and human resource, as well as a big market for the goods and services.

In order to survive and compete in free trade, each country made specialization in some products. One will maximize its endowment factor, as the source of competitive and comparative advantage, to produce goods efficiently. According to Widodo's finding (2008a) comparative advantages of some Asian countries are as follows: 1) China, Thailand and Indonesia currently have high comparative advantage in unskilled labor-intensive industries. 2) Singapore, Malaysia, Indonesia and the Philippines have comparative advantage in human capital-intensive industries. 3) Japan and Korea have comparative advantage in technology-intensive industries.

In the early development process, one country will rely on natural resources. The next step it will intensify the human capital resources. Later, the technology will be applied to be the base of the production. There is structural transformation during the development process. According to Aiginger (1999 in Widodo 2008c) The issue of dynamic specialization and convergence of trade patterns are important to economic policy and to the countries' competitiveness.

The pattern which one country shift from one stage to upper stage of development (characterized by its industries) is known as "Flying Geese" (FG) model. The model was firstly introduced by Kaname Akamatsu in the 1930s (see Widodo 2008a), as a analogous sequential development or catching up process of manufacturing industries in developing countries.

This paper aims to analyze and map the comparative advantage and export specialization of six ASEAN countries. Previous research had been conducted by several

researchers, i.e Widodo (2009b), Shohibul (2013), Ginzburg (2005), Dowling (2000). The results showed that there is shifting comparative advantage among the countries.

LITERATURE REVIEW

According to Maule (1996), the more divergent the patterns of comparative advantage between countries members, the greater the belief of the existence of scope for trade creation in the free trade era. In contrast, a similar pattern of comparative advantage among countries members to the other world countries will affect the magnitude of trade problems possibility.

Dalum, Laursen and Villumsen (1998) research about the structural change in export specialization patterns of OECD countries found that national export specialization patterns is difficult to do. Specialization in international trade of OECD countries slightly declined in less than 30 years, and contrary to the general findings of technology specialization.

Kwan's (2002) study about the increased flying geese pattern of economic development in China and Asia found that although industrial manufactured goods made rapid progress in China's exports, but China's competitiveness still in the low value-added products. China's exports did not compete with Japanese exports, but rather complementary.

Wong and Chan (2003) found that in the beginning the ASEAN countries' economy (excluding Singapore) based on natural resources (their economic growth depends on natural resources and primary products exports). Since 2001 the trade between China and ASEAN has shifted from primary commodities into manufactured products. Instead China's exports to ASEAN more diverse, ranging from agricultural commodities, metals, mineral products to manufactured goods. In 1993, machine/electricity tools, minerals, vegetables, basic metals, textiles, clothing and footwear became the largest products of China and ASEAN's trade.

Widodo (2008b) found that in early trade reform era (1983-1997) the comparative advantage of unskilled labor-intensive products and primary products increased significantly, and the more rapidly during periods of growth-oriented trade regime (1986-1988). Comparative advantages of natural resource-intensive products and human-intensive products also increased significantly, while the technology-intensive products increased moderately during those period.

Other study of Widodo (2008a) found the indications of transfer between the Japan industrialization as the lead goose to Korea, ASEAN countries and China as the follower-geese. China, together with Thailand and Indonesia has a comparative advantage in unskilled labor-intensive industries. China has overtaken Japan in the human resource-intensive industries. Until now, Japan still has a comparative advantage in technology-intensive industries. China still must compete intensively with South Korea and Singapore in technology-intensive industries.

Comparative advantage

Theories and concepts of comparative advantage provide by Ricardo, Hecksher and Ohlin, Krugman and Redding. Redding (2002) found that endogenous comparative advantage determined by changes in technology and innovation in the past. Its dynamics caused by the role of trade in inputs (Jones, 2000); friction of international trade and investment flows regarding to geographical factors, institution, transportation, and cost of information (Venables, 2001); transmission of knowledge across borders (Grossman and Helpman, 1991); cross-country differences in technology (Trefler, 1995), and monopolistic competition in product differentiation with increasing returns to scale (Krugman, 1979) (see Widodo, 2008c).

A country's comparative advantage is determined by relative prices before the trade. If the relative price of domestic products is lower than those of the world, then the country has a comparative advantage on those products. The relative price before the trade depends on its relative production costs. Due to the lack of the observation data on the relative costs and/or price of any domestic product, so Balassa (1965) developed an alternative approach by assuming that comparative advantage is reflected by its exports to the world. Comparative advantage of exports is represented by the composition of a country's commodity exports to world exports (see Maule, 1996).

Flying geese

According to Kojima (2000), flying geese paradigm developed by Kaname Akamatsu consists of four stages of catching-up process, i.e.: *first stage*, the industrial consumption goods imported from developing countries; *second stage*, the domestic production (import substitution strategy) begins. At the same time, the country had to import capital goods; *third stage*, the domestic production is exported. This stage reflects the success of the implementation of industrial catching-up process along the consequential patterns of import-production-export (MPE); and the *fourth stage*, the advanced status in the consumer goods industry has been lifted away. It is seen from the decline in exports of consumer goods, and the beginning of capital goods export. Industry then relocated to developing countries (off-shore production) based on comparative advantage (see Widodo, 2008a, and Ljungwall and Sjoberg, 2005).

To simplify the analysis, illustrate that we are sitting in a room. Outside, there are the geese flying, which represent the products are exported to be analyzed. The room has a window that represents an analytical tool. Through the window we saw the geese are flying. Each (group of) geese are distinguished by their group, namely A, B, C and D (see Widodo, 2009b).

Products mapping

Products mapping is made using two analysis tools, i.e. Revealed Symmetric Comparative Advantage (RSCA) and the Trade Balance Index (TBI). RSCA by Dalum, Laursen and Villumsen (1998) is an indicator of comparative advantage, while the TBI by Lafay (1992) is an indicator of export-import activity (see Widodo, 2009b).

Revealed symmetric comparative advantage (RSCA). RSCA is a simple transformation of the Revealed Comparative Advantage (RCA) by Balassa (1965). RCA index is defined as follows:

$$RCA_{ij} = (X_{ij} / X_{in}) / (X_{rj} / X_{rn}) \dots \dots \dots (1)$$

RCA_{ij} represents the country's i comparative advantage for product j . X_{ij} represents the total exports of country i in commodity group j . The r letter refers to all states without state i , and the n letter refers to all product groups except the group of product j (see Widodo, 2009b).

RSCA index is formulated as follows:

$$RSCA_{ij} = (RCA_{ij} - 1) / (RCA_{ij} + 1) \dots \dots \dots (2)$$

$RSCA_{ij}$ index values range from -1 to +1 ($-1 \leq RSCA_{ij} \leq +1$). If $RSCA_{ij}$ more than 0 means that country i have a comparative advantage in product group j , on the contrary, if $RSCA_{ij}$ less than 0 then the country i do not have a comparative advantage in product group j (Widodo, 2009b).

Trade balance index (TBI). According to Lafay (1992) TBI is used to analyze whether a country has specialized in the export (as a net-exporter) or the import (as a net-

importer) for a particular product group (see Widodo 2009b).

TBI is defined as follows:

$$TBI_{ij} = (X_{ij} - M_{in}) / (X_{ij} + M_{ij}) \dots \dots \dots (3)$$

TBI_{ij} symbolizes the trade balance index of country i for product group j . The index values range from -1 to +1. Extremely, TBI is equal to -1 if an country only importing (net-importer), and TBI is equal to +1 if a country is only exporting (net-exporters). Values between -1 and +1 indicate that the country is export and import commodities simultaneously (Widodo, 2009b)

Products can be categorized into four groups, namely A, B, C and D as shown in Figure 2.1.

Net Importer / Net Exporter (TBI)	TBI > 0	Group B Have Comparative Advantage No Export-Specialization (net-importer) (RSCA < 0 and TBI > 0)	Group A Have Comparative Advantage Have Export-Specialization (Net-exporter) (RSCA > 0 and TBI > 0)
		Group D No Comparative Advantage No Export-Specialization (net-importer) (RSCA < 0 and TBI < 0)	Group C No Comparative Advantage Have Export-Specialization (net-exporter) (RSCA > 0 and TBI < 0)
	TBI < 0		
		RSCA < 0	RSCA > 0
		Comparative Advantage (RSCA)	

Source: Widodo (2008a, 2009b), author's modification on axis position

Figure 2.1

Products Mapping

Group A consists of products that have a comparative advantage as well as export specialization. Group B consists of products that have a comparative advantage but have no exports specialization. Group C consists of products that have export specialization but have no comparative advantage. Group D consists of products that have no both a comparative advantage and export specialization (Widodo, 2009b).

RESEARCH METHOD

Data collecting method

The research data was obtained by literature study (studying the literature and the results of previous studies) and documentary studies (using secondary data related to the research problem).

Data and the sources

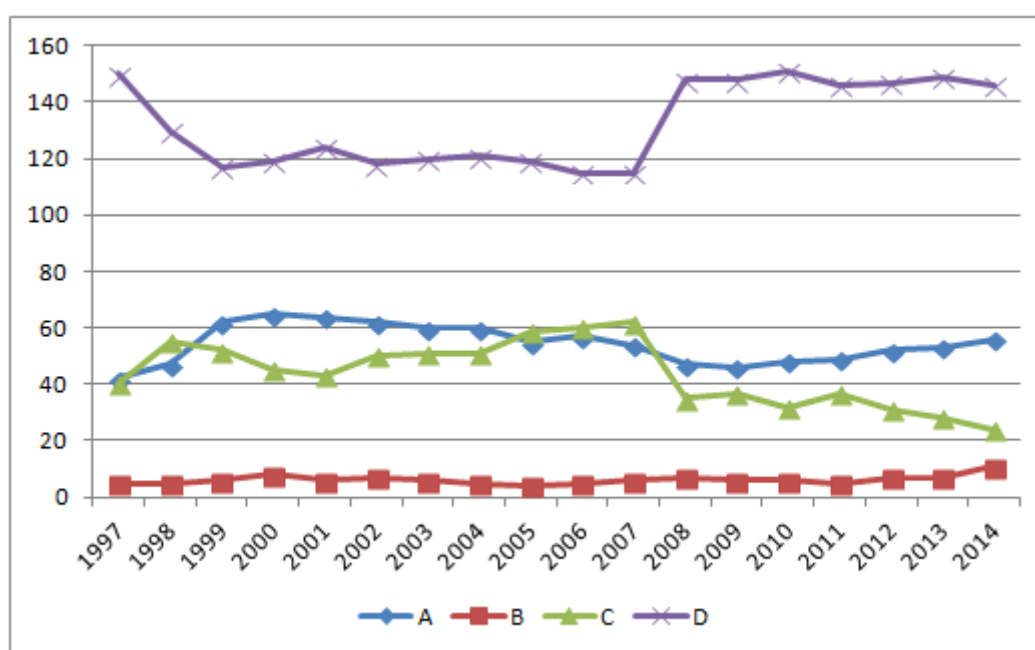
The data used in this study is the export and import data released by the World Integrated Trade Solution (WITS) of World Bank (<http://wits.worldbank.org/wits/>). Data is classified as Standard International Trade Classification (SITC) 3 revised 2, which covers 237 product groups. Two groups of products that are not included is the product code 675 (hoop and strip, of iron/steel, hot-roll) and 911 due to its data unavailability in all countries. Another groups that eliminated in this reseach are 043, 286, 351 and 688 for Philippines, as well as 961 for Vietnam.

Completely, data of this study are: the export and import of Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam, to the world, and world's exports (and import) to (and from) all countries. Each data are from 1997 to 2014 in US\$.

RESULTS AND DISCUSSION

Analysis of the average number of export product groups

Indonesia has positive trend for products A and B in the past three years, negative trend for products C and flat curve for products D. Positive trend in group A and negative trend in group D show an increase in comparative advantage and exports specialization.

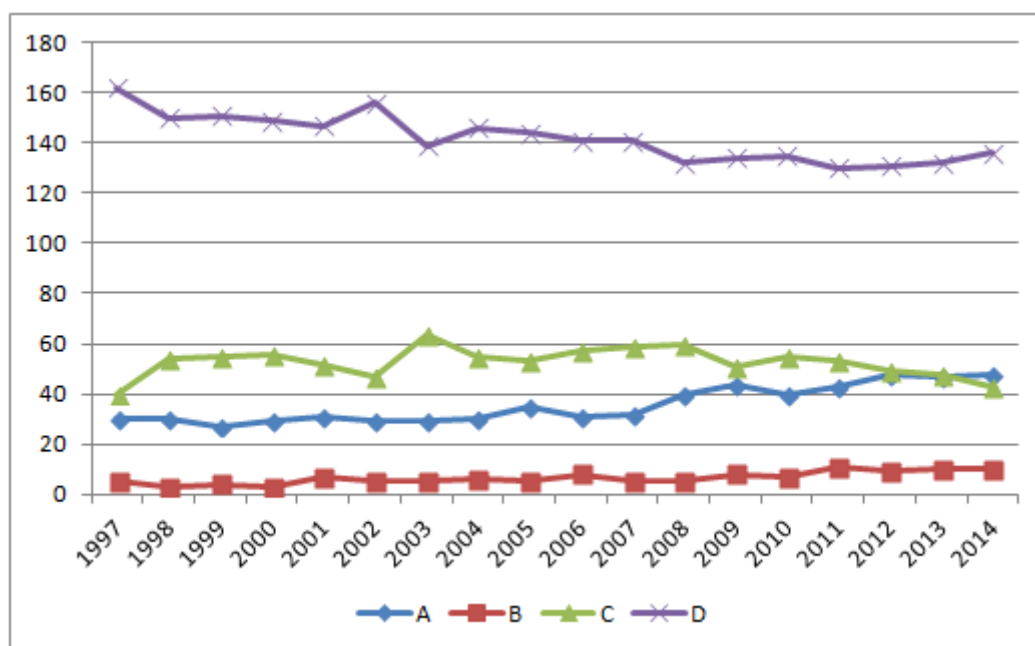


Sources: WITS (author's calculation)

Figure 3.1

Trends in Number of Products Groups A, B, C and D of Indonesia, 1997-2014

Malaysia has positive trend for products A in the past five years, and flat trend for products B, negative trend for products C and positive trend in group D. It shows an increase in comparative advantage and exports specialization.

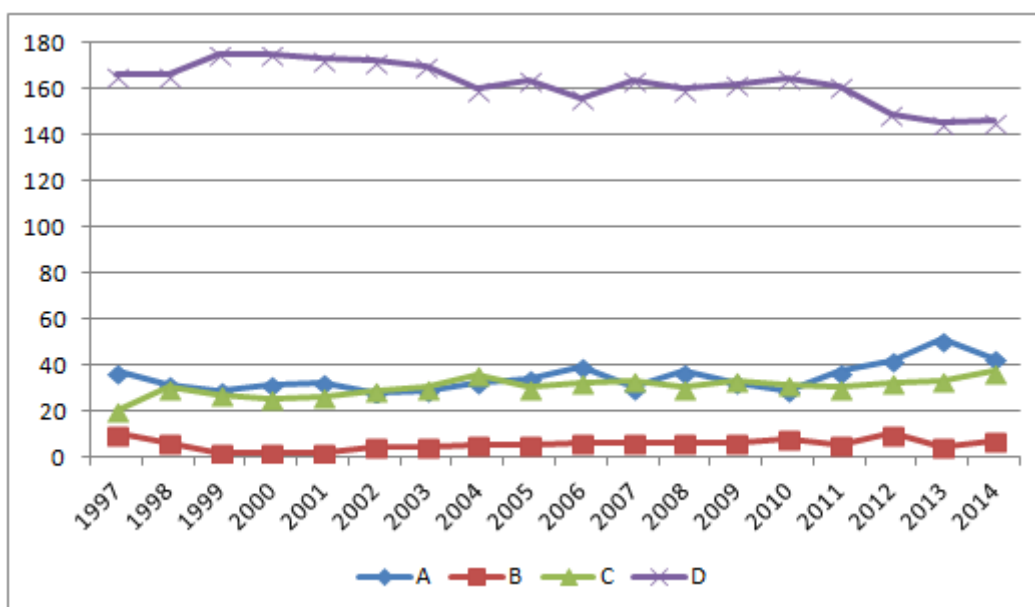


Sources: WITS (author's calculation)

Figure 3.2

Trends in Number of Products Groups A, B, C and D of Malaysia, 1997-2014

Philippines has positive trend for products A until 2013 but then decrease in 2014. Flat trend for products B and D, and positive trend for products C. It shows that Philippines quite stagnant on its comparative advantage and exports specialization.

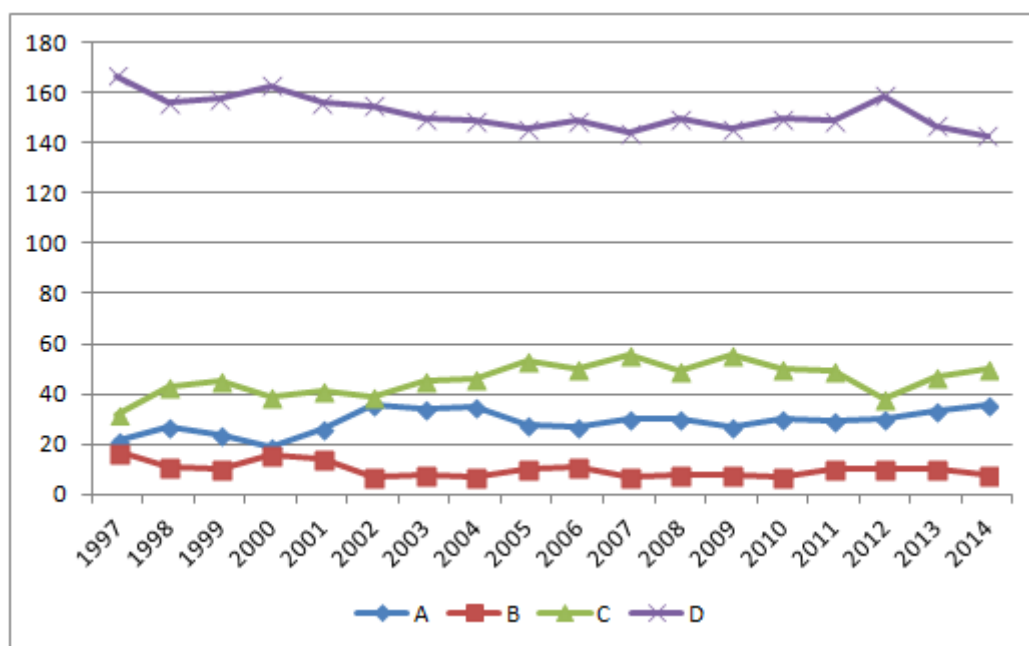


Sources: WITS (author's calculation)

Figure 3.3

Trends in Number of Products Groups A, B, C and D of Philippines, 1997-2014

Singapore has positive trend for products C (in the past three years) and products A, negative trend for products D and B. Singapore shows significant increasing in comparative advantage and exports specialization.

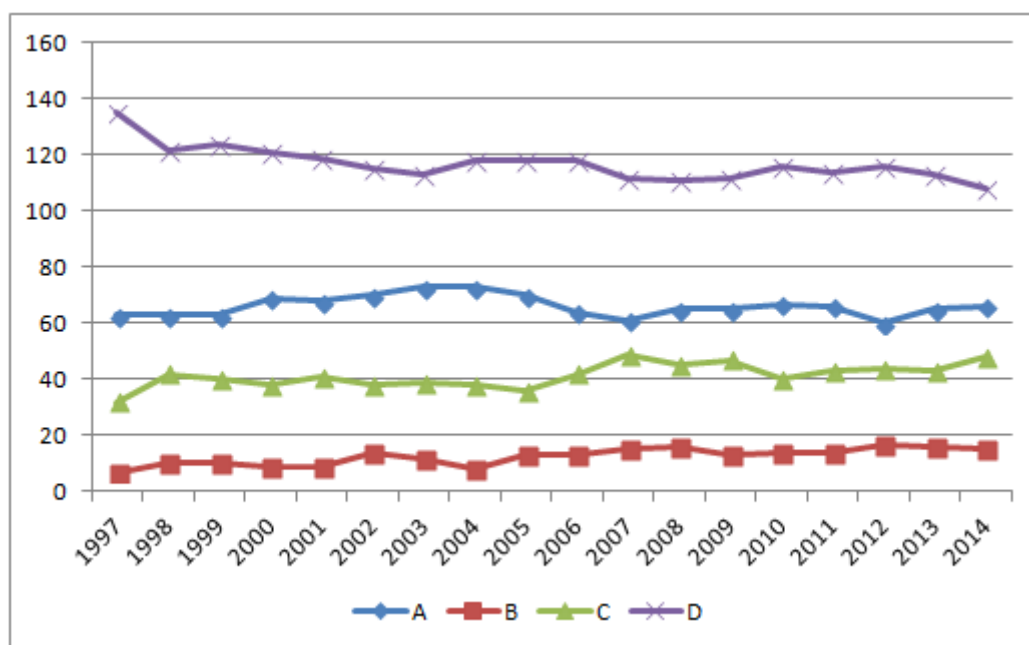


Sources: WITS (author's calculation)

Figure 3.4

Trends in Number of Products Groups A, B, C and D of Singapore, 1997-2014

Thailand has positive trend for products A (in the past two years) and products C, negative trend for products D, and flat curve for products B. Thailand shows increasing in comparative advantage and exports specialization.

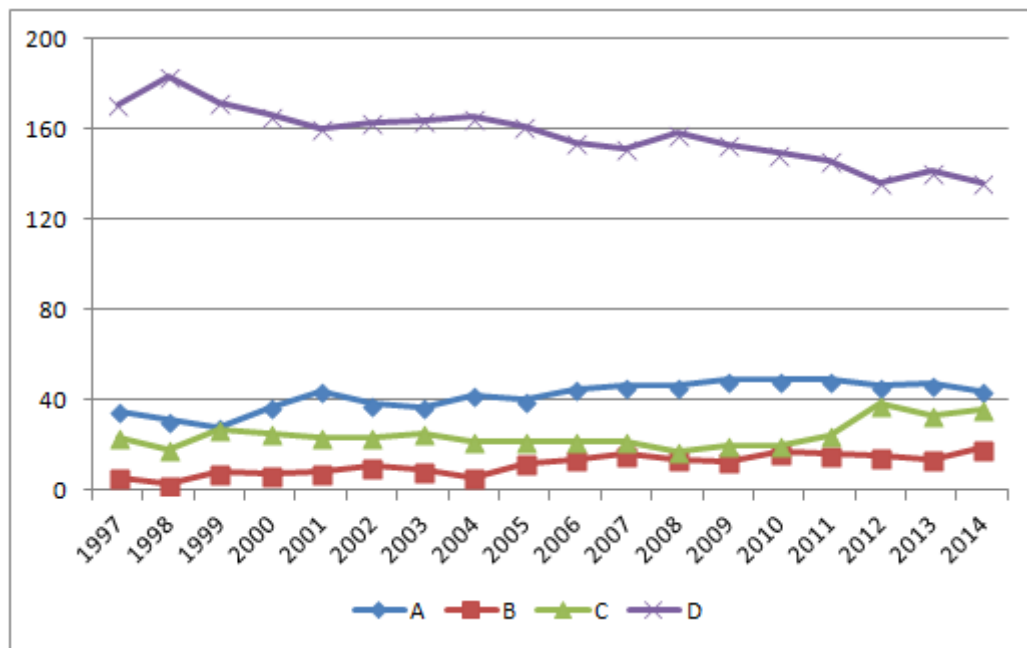


Sources: WITS (author's calculation)

Figure 3.5

Trends in Number of Products Groups A, B, C and D of Thailand, 1997-2014

Vietnam has positive trend for products B and C, negative trend for products A and steep negative curve in products D. Vietnam shows significant increasing in comparative advantage and exports specialization.



Sources: WITS (author's calculation)

Figure 3.6

Trends in Number of Products Groups A, B, C and D of Vietnam, 1997-2014

The results above support Widodo's study (2009b) on Indonesia, Malaysia, Philippines, Singapore and Thailand where each country shows comparative advantage and trade balance, either increasing in group A or decreasing in group D.

The table below shows the average number of export products of six countries of group A, group B, group C, and group D. In the group A, Thailand is the biggest country with total average 66 products, and Singapore as the smallest country of group A products 29 products on average (below the average of six countries).

In group B, Thailand also the biggest with 12 products on average, while Philippines as the smallest with 5 products on average. In group C, Singapore is the biggest with 46 products, while Vietnam as the smallest with 24 products on average. In the group D, Philippines is the biggest with 162 products on average, while Thailand as the smallest with 116 products on average.

Table 3.1
Average Number of Product Groups A, B, C and D, 1997-2014

Group C			Group A		
Indonesia	44	(18.57%)	Indonesia	54	(22.78%)
Malaysia	52	(21.94%)	Malaysia	35	(14.77%)
Philippines	30	(12.88%)	Philippines	34	(14.59%)
Singapore	46	(19.41%)	Singapore	29	(12.24%)
Thailand	41	(17.30%)	Thailand	66	(27.85%)
Vietnam	24	(10.21%)	Vietnam	41	(17.45%)
All	40	(16.72%)	All	43	(18.28%)

Group D			Group B		
Indonesia	132	(55.70%)	Indonesia	6	(2.53%)
Malaysia	142	(59.92%)	Malaysia	6	(2.53%)
Philippines	162	(68.35%)	Philippines	5	(2.15%)
Singapore	152	(64.14%)	Singapore	9	(3.80%)
Thailand	116	(48.95%)	Thailand	12	(5.06%)
Vietnam	157	(66.24%)	Vietnam	11	(4.68%)
All	144	(60.55%)	All	8	(3.46%)

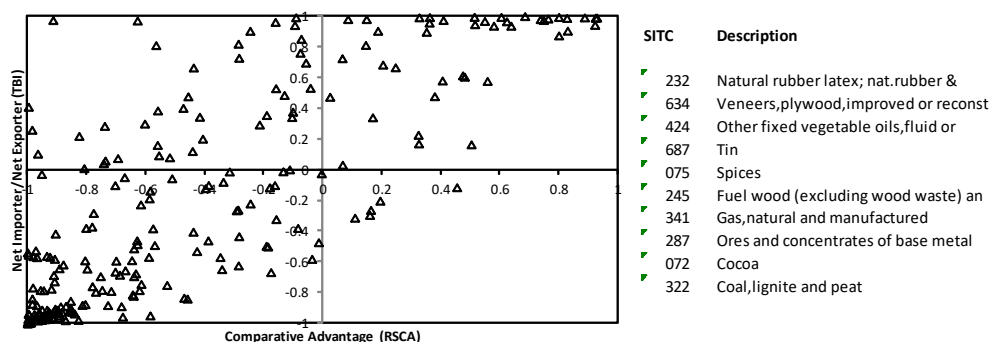
Sources: WITS (author's calculation)

The result is different with Widodo's (2009b) finding, which put Singapore as the biggest in group A, and Philippines in group D. There is shifting in 6 years (2008 to 2014). It also happen in group B and C, where Singapore does not dominte the group.

Products mapping analysis of Indonesia, Malaysia, Philippines, Singapore, Thialnd, and Vietnam's export

Products mapping of Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam's export show the changes in top-ten (ten biggest in the value) of groups A product over 18 years (from 1997 to 2014). The ten products are the one which have comparative advantage in international trade and the country as a net exporter of the products.

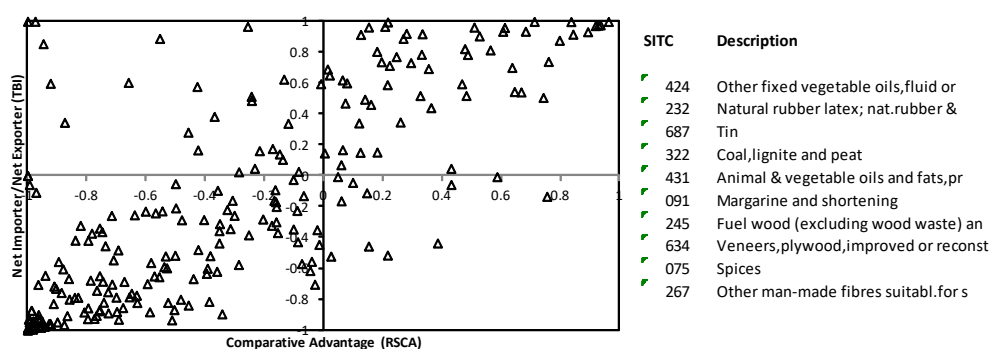
Indonesia. Nine of top-ten export products of Indonesia in 1997 came from primary sector: agriculture (6 products) as well as mining (3 products). Only one product derived from secondary sector, i.e. natural and artificial gas (341).



Sources: WITS (author's calculation)

Figure 4.1

Products Mapping and the Top-Ten Export Products of Indonesia, 1997



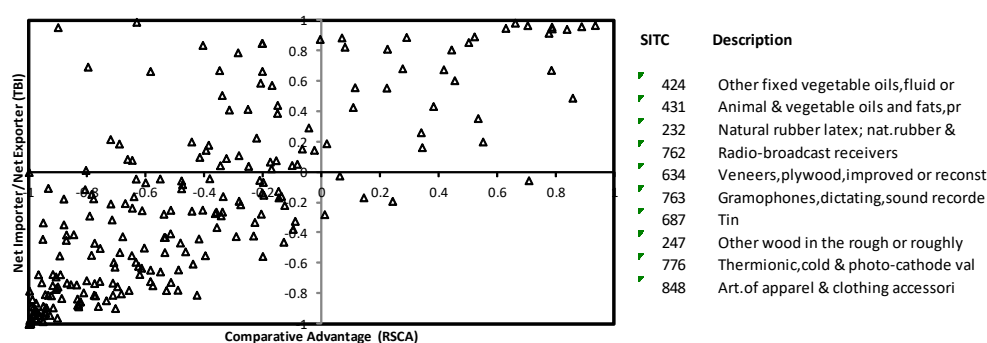
Sources: WITS (author's calculation)

Figure 4.2

Products Mapping and the Top-Ten Export Products of Indonesia, 2014

Indonesia's top-ten export product in 2014 contributed by only one product from secondary sector, namely other man-made fibers (267). The other nine of the primary sectors are: six from agriculture (vegetable oil, natural rubber, cocoa, animal and vegetable oils, spices, and plywood) and three from mining (tin, and coal).

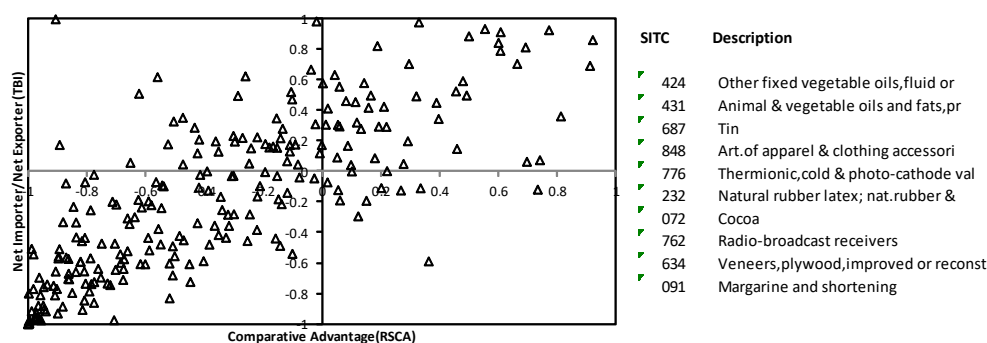
Malaysia. In 1997, four among the top-ten export products of Malaysia are from the manufacturing sector (secondary). The five other products derived from agriculture (primary). In this year, Malaysia already specialized on technology products, i.e.: radio-broadcast receiver (762), gramophones, dictating and sound recorder (763) and thermionic, cold and photo cathode (776).



Sources: WITS (author's calculation)

Figure 4.3

Products Mapping and the Top-Ten Export Products of Malaysia, 1997



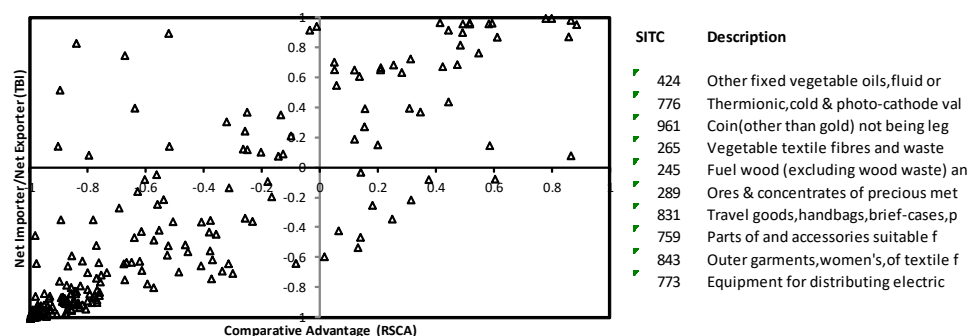
Sources: WITS (author's calculation)

Figure 4.4

Products Mapping and the Top-Ten Export Products of Malaysia, 2014

Malaysia's 2014 top-ten export products almost entirely (seven) from the primary sector. Only three products come from secondary sector, i.e.: art of apparel & clothing accessories (848), thermionic, cold & photo-cathode (776) and radio-broadcast receivers (762). Compare to 1997, specialization of Malaysian products seems to be on primary products.

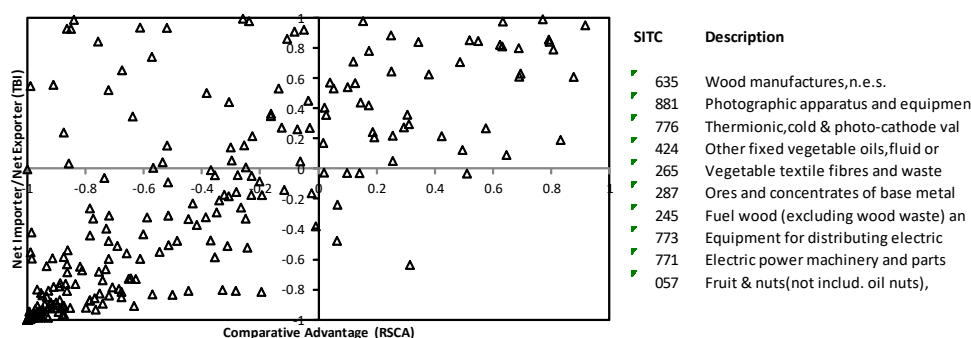
Philippines. In 1997, only four among the top-ten export products of Philippines are from primary sector. Six other products come from manufacturing sector (secondary), i.e.: thermionic, cold & photo-cathode (776), coin other than gold (961), travel goods, handbag, brief-case (831), parts of accessories suitable for (759), outer garments, textile (843) and equipment for distributing electric (773).



Sources: WITS (author's calculation)

Figure 4.5

Products Mapping and the Top-Ten Export Products of Philippines, 1997



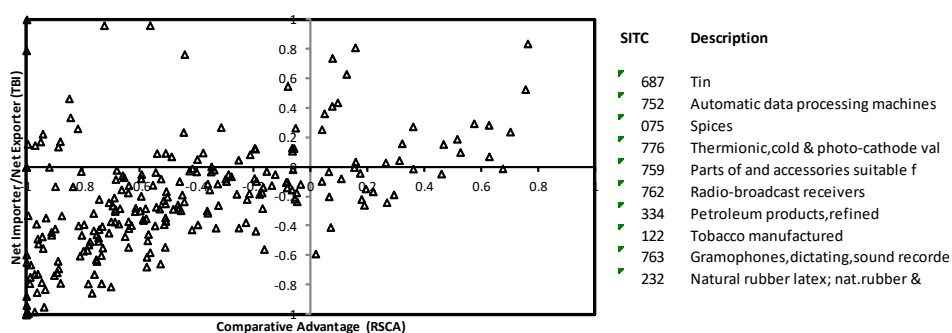
Sources: WITS (author's calculation)

Figure 4.6

Products Mapping and the Top-Ten Export Products of Philippines, 2014

Philippines' 2014 top-ten products inversly with those of 1997. Six of them come from primary sector, i.e.: wood manufactures (635), other fixed vegetable oils (424), vegetable textile fibre (265), ores and concentrates of base metal (287), fuel wood excluding wood waste (265) and fruit & nuts, not includ oil nut (057).

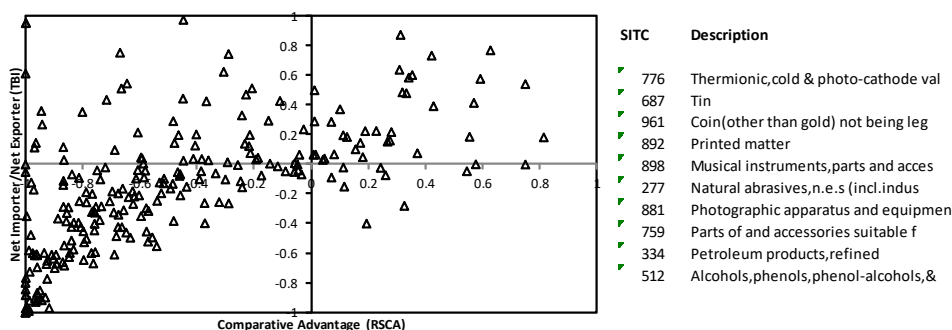
Singapore. In 1997, five among the top-ten export products of Singapore are from the manufacturing sector (secondary), and five others derived from agriculture (primary), i.e.: tin (687), spices (075), petroleum products (334), tobacco manufactured (122), and natural rubber latex (232).



Sources: WITS (author's calculation)

Figure 4.7

Products Mapping and the Top-Ten Export Products of Singapore, 1997



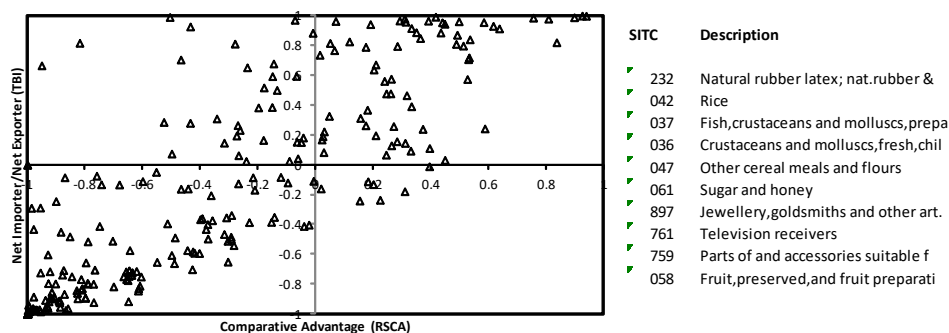
Sources: WITS (author's calculation)

Figure 4.8

Products Mapping and the Top-Ten Export Products of Singapore, 2014

Compare to 1997, Singapore's 2014 top-ten products almost entirely from secondary sector (eight). Only two of them come from primary sectors, i.e tin (687) and petroleum products (334). The rest are from manufacturing and technology industries.

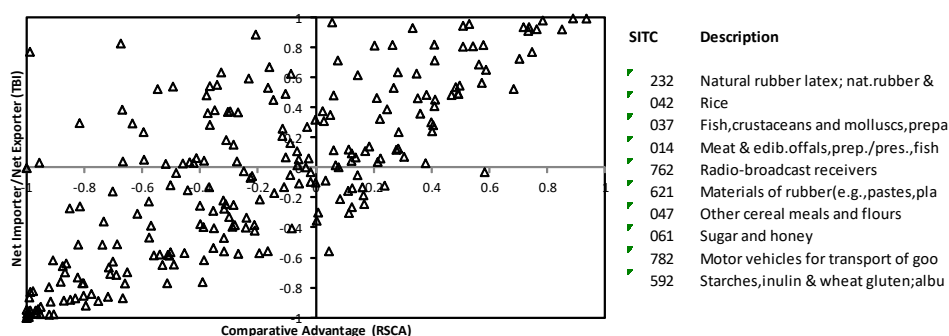
Thailand. In 1997, among the top-ten export products of Thailand's are from the manufacturing sector (secondary), i.e.: jewellery, goldsmith and other art (897), television receivers (761) and parts of accessories (759). The seven other products derived from agriculture and mining (primary).



Sources: WITS (author's calculation)

Figure 4.9

Products Mapping and the Top-Ten Export Products of Thailand, 1997



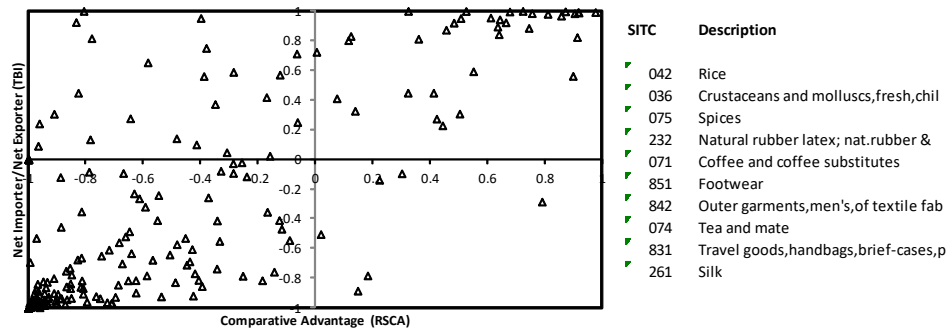
Sources: WITS (author's calculation)

Figure 4.10

Products Mapping and the Top-Ten Export Products of Thailand, 2014

Four of Thailand's 2014 top-ten come from the secondary sector. There is shifting specialization on technology based industries. It can be seen from its products, e.g.: radio-broadcast receivers (762), materials for rubber (621), motor vehicles for transport (782) and starches, inulin & wheat gluten (592).

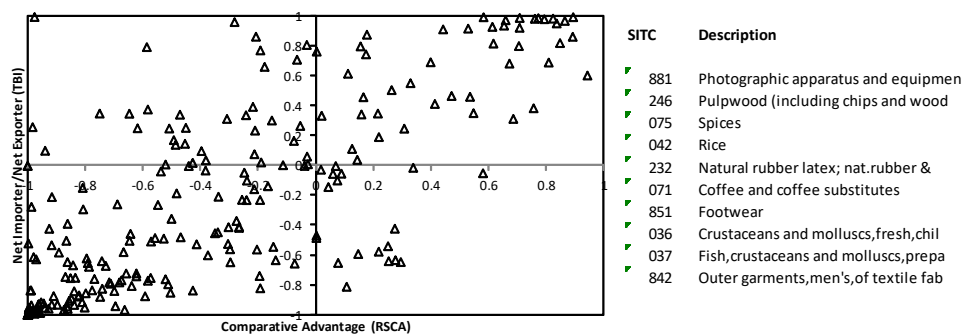
Vietnam. In 1997, four among the top-ten export products of Vietnam's are from the manufacturing sector (secondary), i.e.: footwear 9851), outer garments, textile (842), travel goods, handbag, brief-case (831) and silk (261). The rest are from primary sector.



Sources: WITS (author's calculation)

Figure 4.11

Products Mapping and the Top-Ten Export Products of Vietnam, 1997



Sources: WITS (author's calculation)

Figure 4.12

Products Mapping and the Top-Ten Export Products of Vietnam, 2014

Vietnam's 2014 top-ten are like 1997, which is half of it come from secondary sector. The five of primary sectors products are: spices (075), rice (042), coffee and coffee substitutes (071), crustaceans and molluscs (037) and fish, crustaceans and molluscs (036).

The results shows that between comparative advantage and trade balance have positive relationship. The product with high index in RSCA also has high TBI index. The results support Widodo's (2009b) finding in study of Indonesia, Malaysia, Singapore, Thailand and Philippines.

CONCLUSION

From the discussion above, it can be concluded that: first, on average, the comparative advantage of six countries increase. It can be seen from the negative trend of groups D curve, or positive trend of groups A curve. Second, Thailand and Vietnam's comparative advantage and trade balance changes seems more dynamic than those of other four countries.

Third, there is competition and complementary amongst six countries. Indonesia, Thailand and Vietnam are competing in the similar industries (primary sector), while Malaysia and Singapore are in secondary sector (manufacture and technology). It supported Shohibul (2013) study that Indonesia is not consistent for manufactured products, but consistent with primary sector.

The six countries showed flying geese pattern where Singapore is the leader among the others in manufactured and technology products. It is followed sequentially by Malaysia,

Philippines, Indonesia, Thailand, and Vietnam. This supports Kojima's study on Asian economic development.

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