Export Competitiveness of Malaysian Electrical and Electronic (E&E) Product: Comparative Study of China, Indonesia and Thailand

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Abstract

Malaysia is among the world's top 20 trading nations. This is due to the structural change in the Malaysian economy that turned the country from an exporter of primary commodities into an exporter of high value-added manufactured products. In Malaysia, E&E forged a strong foundation over the last 3 decades, which provides new opportunities for such investments. This study analyzed the structural effect on export competitiveness of Malaysia E&E products focusing on semiconductor (SITC 776), Telecommunication product (SITC 764), Electrical machinery, Apparatus, Part and necessary (SITC 772), Printed Circuit Board (SITC 759) and Disk drives, printers and PCs (SITC 752). Further, the study used the Constant Market Share (CMS) and Revealed Comparative Advantage (RCA) framework to analyze the extent of the export competition between Malaysia and other competitor economies. Overall, CMS result showed that, in the first sub-period (1990-1994), Malaysia E&E export was competitive in the four markets studied, namely the USA, Singapore, Japan and Hong Kong. However, in the second and third period, CMS result showed that Malaysia E&E export increased not due to market competitiveness but due to the structural effect - that is, due to an increase in the world import. In terms of export performance ratio, RCA results showed that, Malaysia E&E products was highly perform only in the US market, for almost all SITC. Indonesia has monopolized the Singapore market and Hong Kong was dominated by China. However, Malaysia E&E export to the world generally has comparative advantage over other competitors namely Indonesia, Thailand and China. The study also revealed that Malaysia has higher export capacity compared to other countries besides the USA, Singapore, Japan and Hong Kong. Therefore, the argument saying that China will intensify the competitiveness of Malaysia E&E market is questionable since the study could not reveal the comparative advantage held by China. The study found that China only dominated in the Hong Kong Market for almost all SITC studied.

Keywords: Export Competitiveness, Constant Market Share, Revealed Comparative Advantage

1. Introduction

Issue on Malaysia's competitiveness has been widely debated and researched. The crisis that started a few years ago in the Asian NICs (Hong Kong, Singapore, South Korea, Taiwan, Malaysia, Thailand, Philippines, Indonesia), with the implementation of ASEAN Free Trade Area (AFTA) and the open policy of China, have an important impact on the Malaysian economy. The past two decades have seen substantial changing patterns of export share and export merchandise with Malaysia among exporters of primary commodities, labor-intensive goods as well as technology or capital-intensive manufacturers in the world market. As a response to previous studies, this paper assessed Malaysian export competitiveness of Electrical and Electronic (E&E) products vis-a vis the Indonesia, Thailand and China with major exporters (US, Singapore, Japan and Hong Kong) using CMS and RCA indices during a longer time period of 1990 to 2004 (15 years).

This study analyzed the structural effect on export competitiveness of Malaysia E&E products focusing on semiconductor (SITC 776), Telecommunication product (SITC 764), Electrical machinery, Apparatus, Part and Necessary (SITC 772), Printed Circuit Board (SITC 759) and Disk drives, printers and PCs (SITC 752). Further, the study used the Constant Market Share (CMS) and Revealed Comparative Advantage (RCA) frameworks to analyze the extent of the export competition between Malaysia and other world economies. It was argued that the

emergence of other low cost producers such as China and ASEAN Free Trade Area (AFTA) would intensify the competitiveness of the Malaysia E&E market.

Many studies have assessed the competitiveness of Malaysian commodity exports, namely Palm Oil (Fatimah and Roslan, 1988, Mohamad, Fatimah, Abdul Aziz, 1992), Cocoa and rubber (Md Nasir, Mohd Ghazali, Othman, 1993) and all Malaysian manufacturing product (Amir,2000), using CMS and RCA models. In the current study, the researchers extended the research area by comparing the performance of Malaysia E&E products and their competitiveness with three other countries namely Indonesia, Thailand and China from year 1990 to year 2004. In addition, this study focused on identifying measures and determinants of Malaysian competitiveness in specific E&E sectors using CMS approach and RCA approach.

China's robust economic growth and strong gravitational pull of foreign direct investments were argued to cause serious threats to ASEAN countries, particularly to those which are highly dependent on the E&E sector for their export revenue. Does this then imply doom or gloom for Malaysia? To answer this question, the current study investigated the performance of Malaysia E&E exports and their competitiveness as compared to other competitors. Therefore, the objectives of the study were:

(1) To analyze the competitiveness of Malaysia E&E exports using constant Market Share (CMS) approach.

(2) To identify the Malaysian competitive position of E&E exports in the major importing countries between 1990-2004.

(3) To examine whether the decline in Malaysia E&E export performance over 1990 –2004 was associated with the decline in Malaysian Competitiveness

2. Methodology

There are numerous methodologies of research in the field of international trade studies. Among those methodologies, that are to analyze the determinants of manufactured export growth, this research uses a decomposition method called Constant Market Share (CMS) analysis and Revealed Competitive Advantage (RCA) for comparison. The method used was similar to the previous studies of the export competitiveness either primary export commodities-palm oil, rubber, cocoa and pepper or manufactured products such as E&E's, in the global market.

2.1 Constant Market Share (CMS)

CMS analysis was used in the present study in order to examine Malaysia's E&E export growth and competitiveness attributable to 'world trade effect', 'commodity composition effect', 'market distribution effect' and 'competitiveness effect'.

'World trade effect' indicated that part of Malaysia E&E export growth was attributed to the general increases of major importers in this study (i.e. USA, Japan, Singapore and Hong Kong). The magnitude of this effect would show the potential increase of Malaysia's exports if they were able to maintain it share as major importers. Commodity composition effect would show whether Malaysia had concentrated on the export of E&E which caused markets to expand rapidly, or on E&E which made markets expanding less rapidly. This effect would reflect the factor endowment of the export country (for instance, Malaysia endowed with technology and labor intensive) and the income and price elasticity of demand for the products in which that country specialized in.

Market distribution effect indicated Malaysia's ability to concentrate on relatively growing countries. The change in exports due to market distribution depended on trade policies and income growth in foreign countries. Competitive effect is defined by the residual term of the CMS model. As residual, it picks up everything not explained by the first three effects. However, this term is taken to indicate the improvement or the deterioration in the competitiveness of exports depending on whether the term has a positive or negative sign. It is usually assumed that this effect is independent of other effects discussed above and it largely reflects the role of domestic factors of the exporting country.

The method basically was built from the assumption that a country's exports may succeed (fail) to grow as rapidly as the world average for three reasons: (1) exports may concentrate in commodities or manufactured product whose demand is growing relatively fast (slowly); (2) exports may have gone to relatively (stagnant) regions; (3) the country in question may have been able (unable) to compete effectively with other sources of supply. Another assumption of the method is that a country's export share in the world market should remain unchanged over time. The differences between the export growth, implied by the constant-share norm, and the actual export growth are assumed to be caused by competitiveness, commodity-composition and market-distribution effect, as mentioned earlier.

2.1.1 Conceptual Framework of CMS model

The constant market share model (CMS) is a method that has frequently been used during the last decade to analyze international trade (Chen and Duan, 2000; Ferto, 2004). The idea behind the model is that, given the same level of competitiveness, an industry's market share should remain constant. Therefore, a change in export should be caused by a change of competitiveness. Therefore, to analyze the export performance and competitiveness, CMS model that decomposes the growth of Malaysian E&E exports into two levels of CMS decomposition were used. At the First level, the CMS model decomposes the change in exports into three components:

(1) The structural effect (*the change in exports due to the change in the selected   E&E importing countries);*

(2) The competitive effect (*the change in exports due to the change in the exporting country's competitiveness);*and

(3) The second-order-effect (*the change in exports due to the interaction of the change in Malaysia selected E&E product competitiveness and the change in the selected   E&E importing countries).*

With the second-level decomposition:

(4) the structural effect is further decomposed into

a. the growth effect (*the change in exports due to the change in selected   E&E importing countries)*

b. the market effect *(the change in exports due to the market distribution of an exporting country's E&E exports),*

c. the commodity effect *(the change in exports due to the commodity composition of and exporting country's E&E exports),* and

d. the interaction effect (*the change in exports due to the interaction of the market distribution effect and the commodity composition effect);*

(5) The competitive effect is split into:

a. General competitive effect *(the change in exports due to the change of an exporting country's competitiveness in its total E&E exports to the selected   E&E importing countries)*, and

b. Specific competitive effect *(the change in exports due to the change of an exporting country's competitiveness in its exports of specific commodities to specific world markets).*

(6) Second order effect is divided into

a. Pure second-order effect *(the change in exports due to the interaction of an exporting country's export competitiveness and the selected   E&E importing countries).*

b. The dynamic structural effect (the change in exports due to the interaction of an exporting country's export competitiveness and imports of specific commodities in specific world markets).

2.1.2 The CMS formula:

The first level:

$$\Delta \bar{E} = \Sigma_i \Sigma_j S^o{}_{ij} \Delta Q_{ij} \quad + \quad \Sigma i \Sigma j \, Q^o{}_{ij} \Delta S_{ij} \quad + \quad \Sigma_i \Sigma_j \Delta S_{ij} Q^o{}_{ij}$$

  (Structural effect)   *(competitive effect)*   *(Second-order effect)*

The formula can be further decomposed into the following components:

$$\Delta \bar{E} \;=\; S^o \Delta Q \;+\; (\Sigma_i \Sigma_j S^o{}_{ij} \Delta Q_{ij} \;-\; \Sigma_i S^o{}_i \Delta Q_i \;) + (\Sigma_i \Sigma_j S^o{}_{ij} \Delta Q_{ij} \;-\; \Sigma_j S^o{}_j \Delta Q_j)$$

    growth effect   *Market effect*   *commodity effect*

$$+ \, [\, (\Sigma_i S^o{}_i \Delta Q_i \;-\; S^o \Delta Q) - (\Sigma_i \Sigma_j S^o{}_{ij} \Delta Q_{ij} \;-\; \Sigma_j S^o{}_j \Delta Q_j] + \; \Delta S Q^o$$

      structural interaction effect   *General competitive effect*

$$+ (\Sigma_i \Sigma_j \Delta S_{ij} Q^o{}_{ij} \;-\; \Delta S Q^o) \;+\; (Q^1 / Q^o \;-\; 1) \Sigma_i \Sigma_j \Delta S_{ij} Q^o{}_{ij}$$

  specific competitive effect   *Pure Second-order effect*

$$+ (\Sigma_i \Sigma_j \; \Delta S_{ij} \Delta Q_{ij} \;-\; (Q^1 / Q^o - 1) \Sigma_i \Sigma_j \Delta S_{ij} Q^o{}_{ij}]$$

Dynamic structural residual

Whereby;

$\bar{E}$ = is Malaysia export value/volume of commodity $_i$ to destination $_j$

S = is Malaysia's share of the world export of E&E product world market;

S_j = is Malaysia's share of the world export of E&E product in destination $_j$

S_i = is Malaysia's share of the world export of commodity $_i$

S_{ij} = is Malaysia's share of the world export of commodity $_i$ in destination $_j$

Q = is an total world export of E&E products

Q_j = is total world export of E&E product to destination $_j$

Q_i = is the total world export of commodity $_i$

Q_{ij} = is total export of commodity $_i$ in destination $_j$

Δ = represent the change in the two periods; superscript o is the initial year, 1 is the terminal year.

Superscript i = represent export commodities (here, semiconductor); and j represents export destination (here, US, Singapore, Japan, Hong Kong and Netherlands).

2.2 The RCA Model

Revealed Comparative Advantage (RCA) can measure changes in comparative advantage. In theory, it provides an index measure of changes in comparative advantage. Balassa's (1979, 1986) came out with the RCA index that compares the export of a given sector in a country with the export share of that sector in the world market. Competitiveness measured by RCA will denote as one or greater the "underlying competitiveness", measured by comparative advantage. Consequently, if a product is described as competitive, it means that it has a revealed comparative advantage.

The Revealed Comparative Advantage (RCA$_{ij}$) expresses the share of country i's export of product j in the total world export of product j, as a ratio of the share of country i's total export of the world. In other words, the Revealed Comparative Advantage (RCA$_{ij}$) measures the share of countries (Malaysia, Thailand, Indonesia, China) export of SITC 776, 772, 764, 759, 752 in the total world export. SITC 776, 772, 764, 759, 752, was a ratio of the share of country's export of E&E in the total world export of E&E product. The Revealed Comparative Advantage for four countries was collected from year 1990-2004. The Revealed Comparative Advantage of one indicates that, the export performance of SITC 776, 772, 764, 759, 752 relative to the size of the specific country as an exporter of E&E is normal . If it is *less than one* means that of low performance and abnormal.

RCA=(C_{ij} / Q_{ij})   (C_i / Q_i)

     Whereby:

     C_{ij} = Country export of commodity i to destination j

     Q_{ij} = World export of commodity i to destination j

     C_i = Country export of commodity i *to the world*

     Q_i = Total World export of commodity i

3. Data Collection

International trade consists of trade in goods and trade in services.   Basically, the transaction of physical goods is defined as trade in goods, while the measurement of trade in services is inherently more difficult than that of trade in goods.   This research anyway focused only on trade in goods; therefore the word 'trade' in this research means trade in goods.

Among various trade classifications, it utilized Standard International Trade Classification (SITC) for data analysis. The SITC has a 5 level hierarchical structure.   Level 1, that is SITC digit 1, consists of 9 sections.   Section 0 to 4 can be defined as the non-manufacturing sector, while sections 5 to 8 are defined as the manufacturing sectors. Section 9 consists of products that cannot be classified into section $0 - 8$.   Most discussion in this research focuses on export products categorized in SITC 7 that is under E&E products.

SITC 7 of Malaysia, China, Thailand and Indonesia were considered for the analysis.   The three countries (China, Thailand and Indonesia) were used as a comparative measure for Malaysia's E&E competitive advantage due to the acknowledgment from many studies (e.g. Wawan and Puji, 2003; Keannil 2004) that these three countries are competing with one another as a major exporter of E&E product to major market such as the US, Japan, Singapore, Hong Kong, etc.

The period chosen for this examination was 1990 to 2004 (15 years) which were divided into three sub periods (i.e. five years per period). This period saw substantial growth of trade in these markets.   The data were obtained from Central Bank of Malaysia (BNM) world report, Comtrade U.N., and MATRADE export performance of E&E in Malaysia. The current (2003) BNM report contains 15 years (1990 –2004) of annual export and import values organized by country and by commodity.   The BNM report based on Standard International Trade Classification

(SITC) provided the data at the total and 1-9 digit SITC levels.   CMS estimated the growth in E&E exports in each of three sub-periods; 1990-94, 1995-99, 2000-2004.   These sub-periods were chosen on the belief they were most homogeneous with the changes in exchange rate regimes and business cycle activity over 1990-2004.   The market share was calculated at the 7-digit level of the SITC nomenclature.

To aid in the interpretation of empirical result later, five Malaysia E&E products were chosen, namely Telecommunication equipment (SITC 764); Disk drives, printers and PCs (SITC 752), Electrical machinery, Electrical machinery, Apparatus, Part and Necessary (SITC 772), semiconductor (SITC 776); Printed Circuit Board (SITC 759)). Based on Malaysia's export in E&E products, individual countries were grouped into four destination markets (United States, Singapore, Japan and Hong Kong,).   The main competitors identified for Malaysia in the world market were China, Thailand and Indonesia.

4. Result and Findings

4.1 Constant Market share

This section presents the empirical result of the Constant Market Share (CMS) procedures used in the study. The main objective of this research is to analyze the export competitiveness of Malaysian electrical and electronics industry. Under CMS technique, the three structural components of the market shares model were calculated under the assumption that base period export shares were maintained in other market periods. For the purpose of this study, Malaysias electrical and electronics export in Period II (1995-1999) was analyzed in comparison to Period I (1990-1994). Next, Malaysia's electrical and electronics export Period III (2000-2004) was analyzed in comparison to Period II. Finally Malaysia's electrical and electronics exports during Period I and III were analyzed. The three periods represent five years average. A five years average is choose in order to avoid year to year fluctuations.

The CMS technique decomposes the change in export value into eight components; growth effect, market effect, commodity effect, interaction effect, general competitive effect, Specific competitive effect and pure second order effect, dynamic effect. The study selected four importing countries namely USA, Singapore, Japan, Hong Kong. They are the most significant importers of Malaysia's electrical and electronics industry.

The average result of yearly decomposition of the change in Malaysia's export value of Electrical and Electronics (E&E) selected products for the period 1990-1994, 1995-1999 and 2000-2004 are provided in Table 1. Table1 shows the decomposition of Malaysia Electrical and Electronics export gain or loss between periods. This table presents the relative contribution of each effect on the change in the E&E exports between the three sub-periods.

4.1.1 Change in Export Value

Change in Export value was defined as an increased or a decreased in export in conjunctions to the contribution of structural effect, competitive effect and second order effect.

4.1.2 Structural Effect

Structural effect encompasses of growth effect, market effect, commodity effect and interaction effect.   Growth effect measures the change in export for Malaysia's E & E products due to the change in the total world import of E & E products. It means any increment in the total world import of E & E products will cause the total export of Malaysia's E & E products increase too. Over the period 1990-1994 the growth effect accounted for 62.02 %, that is the highest growth effect among the three sub period studied. But its dropped to 0.29% in 1995-1999 (*may be due to Asian Financial Crisis*) and improved to 38.26% in the sub period between year 2000-2004. In other words, the increase in Malaysia's export of E & E products in period one and two mainly attributed by the general increase in the total world import of E & E products.

Table 1. Result of yearly decomposition of change in Malaysia's export value of E&E products

(US$)					
Periods	**1990 - 1994**		**1995 - 1999**		**2000 - 2004**	
	Value	**%**	**Value**	**%**	**Value**	**%**
Change in Export Value	109,238,792,420.94	100%	16,264,746,520,774.50	100%	$26,428,872,820,103.70	100%

Structural Effect	-$45,609,401,124.59	-41.75%	$16,370,536,425,856.30	100.65%	$20,913,297,807,582.50	79.13%
Growth Effect	$67,752,384,708.73	62.02%	$46,425,640,522.99	0.29%	$10,111,816,238,234.70	38.26%
Market Effect	-$65,972,641,857.35	-60.39%	-$48,860,790,706.00	-0.30%	$245,377,632,674.43	0.93%
Commodity Effect	-$209,315,753,006.91	-191.61%	-$30,475,420,918.56	-0.19%	-$161,313,506,161.37	-0.61%
Structural Interaction Effect	$161,926,609,030.94	148.23%	$16,403,446,996,957.90	100.85%	$10,717,417,442,834.70	40.55%

Competitive Residual	$113,672,297,073.41	104.06%	-$74,505,795,473.88	-0.46%	$5,468,290,330,181.15	20.69%
General Competitive Effect	$40,807,364,902.08	37.36%	$22,453,164,985.70	0.14%	$5,441,645,405,195.83	20.59%
Specific Competitive Effect	$72,864,932,171.33	66.70%	-$96,958,960,459.57	-0.60%	$26,644,924,985.32	0.10%

Second Order Effect	$41,175,896,472.12	37.69%	-$31,284,109,607.96	-0.19%	$47,284,682,340.05	0.18%
Pure Second Order Effect	$47,352,396,534.28	43.35%	-$18,807,865,340.30	-0.12%	$25,842,973,572.69	0.10%
Dynamic Structural Residual	-$6,176,500,062.15	-5.65%	-$12,476,244,267.67	-0.08%	$21,441,708,767.36	0.08%

Market effect is referring to the change in export due to the market distribution of an exporting country's of E & E products. It shows either Malaysia exporting their E & E products to the market or destination which experience high import growth of our products. In 1990-1994, the market effect registered -60.39% which means that Malaysia exporting their E & E products to the countries which experience low import growth market (U.S.A., Singapore, Japan, Hong Kong). But it was slightly improved to -0.30% in year 1995-1999 and 0.93% in 2000-2004.

The commodity effect shows the change in exports due to the commodity composition of exporting country's of E & E products. It measures either Malaysia exporting their E&E products (SITC 776, SITC 772, SITC 764, SITC 759, SITC 752) which experience high import demand in the importing countries (U.S.A., Singapore, Japan, Hong Kong).   Over the period 1990-1994, the commodity effect accounted for -191.61%.   It shows that Malaysia exporting their E & E products to the very low demand importing countries.   Even though a big improved has occurred in 1995-1999 and 2000-2004 to -0.19% and -0.61% respectively, but it still recorded the negative values for the three sub periods.

The interaction effect indicates whether the country is specialized in those sectors in which it also enjoys a competitive advantage. Therefore, the interaction effects will be positive in values if the country specialized on export where it has or enjoy a competitive advantage or produces little of the export in which it has no such advantage (disadvantage). In 1990-1994, the interaction effect account for 148.23 %, which is the highest recorded throughout the period studied. However it's dropped to 100.85 % in year 1995-1999 period and register 40.55 % in the third period between 2000-2004. It indicates that Malaysia specialized in those products which have a competitive advantage.

4.1.3 Competitive Residual

Competitive residual encompasses of specific and general competitive effect. The competitive effect measures the change in export due to the change in the exporting country's competitiveness. Positive sign of competitive effect and interaction effect indicate that Malaysia has strengthen their competitiveness and changing export composition are almost equally important in explaining the increase in Malaysia's export of E & E product over   the period of 1990-1994 and 2000-2004.

Over the period 1990-1994, the competitive residual accounts for 104% of the increment in Malaysia's export value and the general competitive effect account for 37.36%. A positive general competitive effect signals that the general increase in competitiveness contributes positively to the increase in Malaysia export value of E & E products.

The specific competitive effect registered 66.70% over this period. A positive specific competitive effect indicates that the change in Malaysia's export structure show a favorable interaction with the pattern of international demand. In the net term, the increase in general competitive effect and specific competitive effect resulting in an increase in overall competitive residual in the period 1990-1994. In other word increasing in general and specific competitive effects indicate the rising competitiveness and increase in market share of the exporting market (U.S.A., Singapore, Japan, Hong Kong) are almost equally important in explaining the increase in Malaysia export value of E & E products over 1990-1994 period. However, in 1995-1999, the competitive residual dropped tremendously to -0.46%. It indicates that Malaysia's competitiveness of E & E products in the second period appeared to deteriorate rapidly compared to that in the first period. However, in year 2000 to 2004 it is slightly improved to 21%. In this period general competitive effect accounted for 20.59% whereas specific competitive effect registered 0.10% only.

4.1.4 Second Order Effect

The second order effect measures the change in export due to the interaction of the change in an exporting country's competitiveness and the change in the total world import of E & E products. In 1990-1994, the second order effect recorded 37.69% to the change in export value of Malaysia's E & E products. Pure second order effect contributes 43.35% but Dynamic structural effect recorded -5.65% for the period 1990-1994. Dynamic structural effect measure the change in exports due to the interaction of an exporting country's export competitiveness and import of specific commodities in specific world market.

The second order effect accounted a shape decline to -0.19% in period of 1995-1999 followed by 0.18% in year 2000-2004. In the second period Second order effect and Dynamic structural effect contributed only -0.12% and -0.08% and in the third period recorded 0.10% and 0.08%. Both periods indicate insignificant contribution of the second order effect to the change in Malaysia's export of E & E products but change in export value contributed by interaction effect which accounted for 100.85%. However other effects almost recorded negative sign and if positive, the value is less than 1%. In the third period of 2000-2004, the increase in Malaysia's export of E & E products is mainly attributed to the general increase in the total world import of E & E products and interaction effect. A positive sign of competitive residual and interaction effect indicates that Malaysia has strengthen their competitiveness and changing export composition are almost equally important in explaining the increase in Malaysia's export of E & E products over this period.

Over the period of 1990-1994, Malaysia E&E exports showed their competitiveness. This is due to the fact that the competitive residual have showed 104% of change in Malaysia's export value which comprised the general competitive effect account of 37.36% and specific competitive effect account of 66.70%. A positive general competitive effect signals that the general increase in competitiveness contributed positively to the increase in Malaysia's export value of E & E selected products. A positive specific competitive effect on the other hand indicated that the change in Malaysia's export structure showed favorable interaction with the pattern of international demand. In the net term, the increase in general competitive effect and specific competitive effect resulted in an increase in overall competitive residual between the period of 1990-1994. In other words, increase in general and specific competitive effects indicated a rise in competitiveness of Malaysia E&E selected products in the market of the importing countries (U.S.A., Singapore, Japan, Hong Kong). This is almost equally important to explain the increase in Malaysia's export value of E & E products over the 1990-1994 period. In addition, the first sub-period, also showed that there was a positive 37.69% of second order effect. This shows that Malaysia E&E products experienced an increase in competitiveness and at the same time, the total import of the importing countries (US, Singapore, Japan, Hong Kong) also increased.

In summary, for the second sub-period (1995-1999), structural effect dominated other effects in explaining change in export value as the CMS result showed a positive 100.65% of the effect. This result was contributed by structural interaction effects which was 100.85%. It shows that Malaysia had specialized and exported E&E products which had competitive advantage (i.e. SITC 776,759). For the third sub-period (2000-2004), the result shows a slight improvement for all effects calculated. It shows a positive value of 79.13% for structural effect, 20.69% for competitive residual and 0.18% for second order effect. Therefore the change in export value was contributed only partly by competitive residual and mainly by structural effect – that is, from the specialization of highly value added products (SITC 776, 759) and highly demanded products (US and Singapore market).

4.2 Revealed Comparative Advantage (RCA)

For comparison, the current study used RCA model to measure export performance of Malaysia E&E selected product. RCA value of more than 1 indicate that, the E&E product produced by one country has comparative

advantage. The result shows that Malaysia E&E export to the world generally has comparative advantage over other competitors namely Indonesia, Thailand and China. However, Malaysia E&E export performance ratio to the studied destination was fluctuate over the years of the study. Table 2a-2e below is the summarization of the RCA results.

Table 2a. Summarization of RCA results for SITC 776

Export Destination	SITC 776 – semiconductor											
	Sub-period 1 (1990-1994)				Sub-period 2 (1995-1999)				Sub-period 3 (2000-2004)			
	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong
Malaysia	1.67	2.54	0.43	1.11	**2.54**	3.88	0.70	2.44	0.82	2.09	0.47	1.80
China	0.23	0.06	0.34	**7.72**	0.73	1.01	1.22	**17.43**	0.49	0.79	0.77	**4.69**
Thailand	1.44	**3.66**	0.39	0.49	1.82	3.90	**1.49**	2.33	0.50	0.43	0.81	0.96
Indonesia	**1.79**	3.50	0.19	0.66	1.80	**7.51**	1.00	1.91	0.24	**2.08**	**1.22**	1.14

Table 2a above summarizes the Export Performance Ratio of SITC 776 or semiconductor product. Malaysia E&E product has comparative advantage for almost all export destinations except for Japan. However, for all three sub period, Malaysia only dominated USA import of E&E for the second sub period.

China on the other hand has comparative advantage only in Hong Kong. For Thailand, good performance shows in the second sub period. For the first sub period, their E&E product shows positive comparative advantage only in Singapore but in the third sub period no comparative advantage have shown as the RCA value shown was less than 1. Indonesia also shows good performance in the second and third sub period accept for USA but in the first sub period, Indonesia dominated the USA market.

Table 2b. Summarization of RCA results for SITC 752

Export Destination	SITC 752 - Disk drives, printers and PCs											
	Sub-period 1 (1990-1994)				Sub-period 2 (1995-1999)				Sub-period 3 (2000-2004)			
	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong
Malaysia	**2.37**	1.15	0.11	0.28	2.27	0.62	0.84	1.32	**4.27**	0.63	1.02	0.56
China	1.42	0.30	0.66	**19.90**	**2.53**	0.91	**1.40**	**14.47**	2.32	0.27	**1.70**	**6.30**
Thailand	1.64	1.86	0.16	0.97	1.98	1.81	0.95	0.59	1.50	0.34	1.12	0.46
Indonesia	0.66	**3.44**	0.07	0.48	1.50	**2.17**	0.37	1.20	1.40	**2.33**	1.05	2.40

Table 2c. Summarization of RCA results for SITC 759

Export Destination	SITC 759 - Printed Circuit Board											
	Sub-period 1 (1990-1994)				Sub-period 2 (1995-1999)				Sub-period 3 (2000-2004)			
	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong
Malaysia	**1.04**	7.03	0.30	0.28	**1.23**	2.80	0.42	0.55	**1.55**	2.88	0.68	0.40
China	0.52	0.11	0.18	**3.33**	1.08	0.92	0.73	**2.69**	1.08	0.65	0.64	**3.31**
Thailand	1.00	6.58	0.55	0.18	0.87	2.77	0.57	0.33	0.47	2.37	0.43	0.27
Indonesia	0.36	**8.73**	0.01	0.13	0.05	**4.88**	1.71	0.13	0.08	**7.91**	1.29	0.04

Export performance ratio of SITC 752 (disk drivers, printers, PCs) shows that most competitors recorded positive ratio. Malaysia however, only competitive in the USA market and dominate the market for the first and third sub period. China again still dominate the Hong Kong market and extend their market to Japan with the highest ratio for both sub period two and three. Thailand has recorded no domination but Indonesia has dominated Singapore market for all three sub period.

Export performance ratio of SITC 759 (printed circuit board) recorded less than one for almost all competitors observed. Malaysia shows competitiveness for almost all market accepts Japan, and Hong Kong.   For all the sub period, Malaysia dominated the USA market and China still dominated the Hong Kong market although no competitive advantage shown on other countries.   Thailand showed positive export performance ratio only in the US and Singapore market and Indonesia dominate Singapore market for all three sub period and Japan in the second and third sub period.

Table 2d. Summarization of RCA results for SITC 764

Export Destination	SITC 764 - Telecommunication product											
	Sub-period 1 (1990-1994)				Sub-period 2 (1995-1999)				Sub-period 3 (2000-2004)			
	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong
Malaysia	2.49	**11.47**	0.32	0.47	**1.77**	6.06	1.17	0.78	**3.56**	5.29	1.20	0.68
China	0.74	0.29	0.57	**8.16**	1.26	0.90	**1.95**	**4.34**	1.95	1.23	2.11	**3.50**
Thailand	**3.00**	3.86	0.81	0.29	1.76	2.86	1.53	0.48	1.34	2.26	**2.24**	0.26
Indonesia	2.00	9.58	0.54	0.16	1.34	**10.70**	0.79	0.37	2.82	**11.72**	1.45	0.36

Export performance ratio of SITC 764 (telecommunication equipment) shows that Malaysia dominated US market for the second and third sub period and dominated Singapore market in the first sub period.   China again dominated all Hong Kong market and Japan market for second sub period.   For SITC 764, it shows that China has improved their export performance as in the third sub period; they have show competitive advantage for all export destination. Indonesia still dominated Singapore market and Thailand dominated the US market for the first sub period.

Table 2e: Summarization of RCA results for SITC 752

Export Destination	SITC 772 - Electrical machinery, Apparatus, Part and Necessary											
	Sub-period 1 (1990-1994)				Sub-period 2 (1995-1999)				Sub-period 3 (2000-2004)			
	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong	USA	Singapore	Japan	HKong
Malaysia	0.96	2.58	0.11	0.07	1.63	1.50	**2.59**	0.10	**2.03**	0.72	0.03	0.05
China	0.44	0.60	0.41	**10.93**	0.86	1.07	1.09	**10.62**	0.91	1.90	0.96	**8.36**
Thailand	**1.54**	1.01	0.18	0.08	**1.75**	0.95	0.11	0.17	0.92	0.39	0.12	0.11
Indonesia	0.47	**17.71**	**1.33**	0.43	0.56	**9.56**	0.70	3.88	0.69	**15.91**	0.99	1.00

Export performance ratio of SITC 772 (electrical machinery, apparatus, parts and necessary) in U.S.A. market for four countries observed show that most competitors recorded less than one RCA value.   Thailand however, has dominated the US market for both first and second sub period.   Indonesia however still dominated the Singapore market for all sub period.   Malaysia have shown poor performance for the third sub period accept for US market as all RCA value for all the destination was less than 1.   China still dominated Hong Kong market at a huge value for all sub period.

Overall RCA results shows that Malaysia E&E export to the world generally have comparative advantage over other competitors namely Indonesia, Thailand and China.   The study also revealed that Malaysia has higher export capacity to other countries besides the USA, Singapore, Japan and Hong Kong.   However, Malaysia E&E export performance ratio to the studied destination fluctuated over the years of the study**.**   Malaysia export performance was competitive for the US and Singapore market.   However, Malaysia E&E export performance ratio was dominant in the US market for SITC 776 for the second and third sub-period.   Similar situation occurred   for SITC 772.   For the first sub-period, export performance ratio of SITC 776 to US was dominated by Indonesia and SITC 772 was dominated by Thailand.   In Singapore market, Malaysia only dominated the E&E products of SITC 776 in the third sub-period, previously dominated by Thailand and Indonesia respectively.   For Japan market, Malaysia export performance ratio was poor and it was mainly dominated by Indonesia.   On the other hand, Malaysia export performance ratio for SITC 772 was also poor in Singapore, Japan and Hong Kong as it was mainly dominated by Indonesia and China.   For SITC 764 and 759 most market was monopolized by Indonesia and China.

Malaysia only dominated the US market in the second and third sub-period for SITC 764, and in all other sub-periods for SITC 759. For SITC 752, Malaysia export performance ratio was good in the first and third sub-periods but in other markets it was mainly controlled by other competitors. Overall, it was found that for all sub-periods, Hong Kong market was one hundred percent monopolized by China.

5. Conclusion

It can be concluded that based on the results from CMS analysis,   the total change in export value was mainly contributed by Competitive residual for period I (1990 -1994) while for period II (1995-1999) and III (2000-2004) were contributed by structural effect.

It indicates that in period I, Malaysia E&E export value increased due to the increase in competitiveness of the E&E products.   On the other hand, increase in export value for Malaysia E&E products in period II was not related to competitive residual but by structural effect, that is, it was due to an increase in the world demand for specific E&E products.   Furthermore, in period III, an increased in Malaysia E&E export value was mainly contributed by structural effect and partly by competitive residual.

In terms of export performance ratio, RCA results show that, in almost all SITC, products of Malaysia E&E highly performed in the US market.   Indonesia was controlled the Singapore market while Hong Kong was monopolized by China.

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