IDENTIFYING MALAYSIA'S POTENTIAL EXPORTS TO CHINA

ABSTRACT

Identifying and developing new international export markets is a high priority in the 21ˢᵗ century since competition has intensified with new developments in the international arena. This study attempts to screen the potential market opportunities for Malaysia in China by using the shift-share analysis. Realizing that China may promise new opportunities, this study focuses on identifying the potential manufactured product exports to the Chinese market. In addition this study also assesses the level of competition among the selected ASEAN members exports to the Chinese market. It has been identified that Malaysia would benefit from China's expansion in a number of products particularly machinery and transport equipments (SITC 7). In relation to the export competition, evidence suggests that Malaysia has the competitive advantage in machinery and transport equipments (SITC 7) compared to the other ASEAN member countries. However, the other manufactured products of Malaysia, particularly semi manufacturers (SITC 6) and clothing and other consumer products (SITC 8), experience stiffer competition from the ASEAN members.

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1. INTRODUCTION

The world has witnessed remarkable trade expansion in the past 30 years, with active participation from the developing nations. World export trade has increased rapidly by about 5.5% per year, in real terms from 1978 to 2001 and the developing countries have accounted for about 6% per year. In addition, the surge for Foreign Direct Investment (FDI) flows has expanded where in the late 1990s FDI flows accelerated to $331 billion and the share of developing countries was equal to $160 billion (World Bank 2003). Trade with the contribution of FDI has become the vital element of growth for developing countries as it helps to boost productivity, allocate resources efficiently, and transfer technology and skills. Malaysia is no exception to the above scenario. The structural change in the Malaysian economy from an exporter of primary products to high value-added manufactured products has been the main impetus for the noticeable economic growth. Since the 1970s, Malaysia like the other first-generation tigers such as Korea, Taiwan, Singapore and Hong Kong has used exports as its engine of growth and development.

This has indeed promised Malaysia a remarkable economic performance. Malaysia made a shift from the largely import-substitution prior to the 1970s to liberal outward oriented trade regime (Shazali and Alias 2000). The most prominent sector contributing to the export earnings was manufacturing which accounted for 79% of the total export earning and nearly 29% of Malaysia's Gross Domestic Product (GDP). (Chandran 2003a) Indeed, Malaysia has had a very strong growth in manufacturing value added in the past two decades, as a result of the establishment of local suppliers' networks based on foreign ownership. Nevertheless, based on the Technology Achievement Index, Malaysia has been identified to have the first mover advantage in certain high technology products.

Recent developments in trade flows and foreign direct investment (FDI) have a remarkable impact on the Malaysian direction of trade and structure. The major advancement was the rise of China to a position of economic dominance in Asia as well as the world. Many have viewed China as a threat to the other nations due to China's cost advantage in manufacturing industries. However with the huge market in China, one could also view China as potential market to boost exports especially with the rapid growth of per capita income of the Chinese population. For

instance findings showed that China has passed the US as the most important destination for South Korea in July 2003. In addition, numerous studies have also shown that industrial countries are likely to benefit from China's accession into the World Trade Organization (WTO).

Many studies have shown that China's comparative advantage lies between the resource base and low technology based products (Xiaming et al. 2000) and (Changjun Yue 2001). Since China embarked on its open door policy many companies have congregated in China especially to take advantage of the low cost labor and the huge domestic market potential. As such one may wonder as to whether Malaysia would be able to use this opportunity to expand its market to China especially for its manufactured products. The answers for the survival of Malaysia in the global markets are to identify the niche product, which has the potential for growth in the Chinese market. In line with this, Malaysia could also play a significant role if its export serves as a complement to the ever-growing industries in China.

The above scenario warrants an examination of the present status of export performance as it will provide an idea of the potential of Malaysia's export trade in accessing this new market. This examination will indeed serve as indicator to exploit the economic opportunities offered by the creation of new export market access. Indeed many managers are also in a dilemma due to limited knowledge and insufficient information on the new opportunities arising in global trade. For instance, it is found that the major weakness and challenges arising from liberalization for the Chinese business in Malaysia are the over reliance on the domestic market. For these purposes this study tries to assess the potential export products to the Chinese market. Apart from this, the study has also been extended to analyse the level of competition among the ASEAN members since many of the members share the same factor endowments and export profile.

This paper is organised in the following manner. Firstly, past literature relating to the performance of the export market of Malaysia is presented. The second part gives a brief description of the methodology adopted namely

the shift-share analysis. The next section examines the Malaysian opportunities and the degree of competition among the selected ASEAN members to the Chinese market.

2. PAST LITERATURES

Trade expansion has been the topic of discussion for many years however very limited studies have emphasized on the Malaysian position to the Chinese market. The existence of past literatures is somehow more focused on the major markets such as the US, the European Union and Japan. In addition abundant literature can be found on the issue of assessing the degree of competition between China and ASEAN members.

For instance, Wen Chen (2000) investigated the export competition between Thailand, Malaysia and China in the US market to narrowly defined product categories of electrical and electronic (E&E) between 1995-1999.The finding reveals that China enjoyed a competitive advantage for the E&E products in the US market compared to the reference economy. However it was found that China has an unfavourable export structure relative to Malaysia and Thailand although these two nations suffered competitive disadvantage.

Yean (2001) on the other hand, conducted a study to assess the impact of China's impeding accession on the Malaysian manufacturing sector. According to her, Malaysia has a relatively low comparative advantage for textiles and higher comparative advantage for high-technology products. For resource-based products such as wood and wood products Malaysia has relatively better prospects to export to the Chinese market as the tariff rate for this sub-sector is estimated to decline over the years. However, Malaysia will face stiff competition from within ASEAN countries especially Thailand and Indonesia when China reduces the tariff protection for resource-based products. It has been suggested that in the long term Malaysia should enhance its skilled labor force, diversify exports and export markets and develop indigenous research and development capabilities in order to face challenges posed by China's accession into the WTO.

Herschede F. (1991) has done an analysis which is based on the regional economic issue of direct export rivalry among the Newly Industrialized Countries (NICs), ASEAN and China using single digit trade data for the period of 1982 to 1987. The shift-share analysis results indicated that China enjoyed a significant competitive advantage compared to Asia while ASEAN suffered the most since the entrance of China into the Japanese import market. However, it is found that the NICs performed quite well in their exports to Japan particularly in manufactured goods.

A subsequent study was conducted by Wilson P. (2000) to compare the changes in competitiveness between six dynamic Asian economies (DAEs) which consist of Singapore, Malaysia, Thailand, Korea, Taiwan and Hong Kong on the exports to USA, Japan and the European Union (EU). The findings suggested that Malaysia and Thailand were more competitive in manufacturing products compared to older DAEs.

Wilson and Mei (1999), in turn, analyzed the export competitiveness of ASEAN countries economies for the period of 1986 to 1995 by employing the shift-share methodology. Their findings indicate that Singapore posed a challenge in manufactured exports to the USA and Japan from other ASEAN countries for all product categories except office and data machines where Singapore remains very strong in both markets over this time period. Malaysia has been identified as the strongest rival for Singapore in key manufacturing products where it has significant positive export differentials. In addition, the Philippines and Indonesia have their own strengths in the export market.

Voon (1998) investigated the export competitiveness of China and ASEAN in the US market. The finding reveals that China has become more prominent in labor-intensive manufacturing compared to the ASEAN members. Indeed the study proposed policy changes to include an outward-looking stance, encouraging trade liberalization, changing structures and competitive positions of different industries within the region and internationally, increasing foreign direct investment and utilizing relatively cheap labor cost.

Based on the studies above, it can be concluded that China is becoming competitive in a range of labor-intensive products. This may indeed, provide an opportunity for Malaysia to expand its exports to the Chinese market, which is enjoying a lower comparative advantage in other manufactured products. In addition, many of the studies also indicated the emergence of Malaysia as an important exporter especially in the skilled and technology intensive industries. Moreover, this study will attempt to fill the research gap on the opportunities that China holds for Malaysia.

3. METHODOLOGY

This study employs the shift-share analysis to screen the market opportunities in China. Two versions of the shift share analysis were used in this study. The first version of shift share follows the national average growth rate and the second version follows the modified version of the Esteban-Marquillas model, which can be found in Herschede F. (1991) (Refer to Appendix A). The second version compares changes in Malaysia's exports with the corresponding exports of a selected group of reference economies to the Chinese market.

Shift-share analysis requires measurements on exported products for a specific market (imported country) at the beginning and end of a specific period of analysis. For each of the export markets an expected growth figure known as share effect is computed based on the average national growth. The share effect shows the value of export of a particular market as if the market has grown at the rate of the overall export of Malaysia. The share effect figure will then be compared with the actual growth of a market to identify the differences. The differences will then be labelled as net shift (positive net shift indicates market gains and negative indicates market loss). If a country gains market shares over the period then the net shift will be positive and vice versa for a country losing market share. The net shift may have been caused by three source of divergence know as Industry Mix Effect, Regional Effect and Interaction Effect.

Industry Mix Effect (IME) shows the difference between the products or composition of export to a market and the composition of the Malaysian total exports. If a particular export market is growing faster than the national average it may be due to the concentration of a rapid growth in certain products. A positive effect will occur when the proportion of the export to a market in a fast growing product is greater than the proportion of Malaysia's overall export in these products, whereas a negative effect will result if the slow growing products to the proportion of the total exports dominate the export to a market

Regional Effect (RE) shows the divergence in growth of various export products to a market compared to other markets. The difference in growth rate of individual products between the markets can contribute to overall growth in the export market share. Positive regional effect means that the rate of growth in individual products to a market are higher than the country's overall export growth in these products and vice versa for the negative regional effect.

Interaction Effect (IE) combines both the industry mix effect and regional effect. It measures the differences in a mix of products to various markets interacting with difference in growth of product exports to these markets. A positive effect results when exports are either concentrated on fast moving products or not concentrated on slow moving products.

4. DATA AND TIME FRAME

The estimation of the shift-share analysis for the Malaysian export market requires data on exports of Malaysia for the Chinese market. Export data was obtained from the Department of Statistics. The export data included in this study was at 2 digit Standard International Trade Category (SITC) level. The time frame selected for the study is from 1990 to 2001.In analyzing the potential product exports to China two time frames were captured namely 1990-1996 and 1996-2001. This is due to the fact that a very long time period may conceal meaningful trends within the life cycle (Green, 1985). In addition data was also obtained from the International Trade Center

(COMTRADE), United Nations in order to make a comparison on the export competitiveness of Malaysia and the reference economies. The time frame applied for this purpose was from 1993-2001. Indeed the growth rates were calculated yearly in order to capture the level of competition. This allows the analysis to provide a continuous trend of the evolution of the net shift, which in return overcomes the problem of static shift share analysis. Moreover only by applying the annual growth rate the share effect can be measured more accurately.

5. KEY FINDINGS

Figure 1 presents the values of Malaysia's exports of manufactured products to China for 1990-2001. The general trend of Malaysia's exports to the Chinese market showed an improvement over time. In the period of 1997 to 2001 exports of manufactured products soared dramatically. The total export trade increased from RM 2568 million in 1997 to RM 1,0849 million in the year 2001. This translates to an annual average growth rate of 64.5% between 1997 and 2001. In fact China was the fourth largest export destination for Malaysia in 2003. This is a clear indication that when China moved from a central planned economy to a market oriented one, Malaysia's trade with China expanded. Indeed a lower protection for instance, cut in the average tariff for industrial products from 24.6% to 9.4% by 2005 (Adhikari R. and Yang Y. 2002) will promise more opportunities for Malaysia. With the existing comparative advantage of Malaysia in the machinery and transport equipments especially in semiconductors, telecommunication equipments and machinery, penetrating the Chinese market would be a viable market strategy as to move along with China's prosperities.

[Figure 1 about here]

Decomposing the export data revealed that machinery and transportation equipments (SITC 7) as the major contributor to the overall export improvement to the Chinese market (Figure 2). This indicates that there is a higher demand for the machinery equipments especially electronic, telecommunication and computer parts of Malaysia. The machinery and transportation equipments (SITC 7) division now constitute the fastest growing component to the Chinese market as well as the world. Indeed increased market globalization and rapid development in

telecommunications and information technology have given a boost to the volume of trade for this division. Based on the percentage contribution within the machinery and transportation equipments (SITC 7), the prominent sectors are electrical machinery (SITC 77), office and data machines (SITC 75) and telecommunications (SITC 76). The second important export of products comes within the semi-manufacturers (SITC 6) followed by chemical (SITC 5). Cork and wood (SITC 63) and organic chemical (SITC 51) and plastic primary forms (SITC 57) respectively contribute to the overall value of SITC 6 and SITC 5 exports to China. However the trend seems to reverse after the year 2000 where chemical overtook the semi-manufacturers exports.

[Figure 2 about here]

6. MARKET ACCESS BY PRODUCT SECTION

6.1 Chemical

Table 1 decomposes Malaysia's net shifts in exports to the Chinese market by a 2-digit product category. As is evident, Malaysia's overall chemical exports recorded strong positive net shift (market gain) of RM 91,578,815 and RM 1,154,905,451 respectively between 1990-96 and 1996-2001. Out of the nine sub-sectors only two contributed negatively to the overall net shift (market loss). Decomposing the products to two-digit level indicates that plastic primary forms (SITC 57), plastic non primary (SITC 58) and chemical material (SITC 59) as the most promising products with high positive improvement of net shift for both the time frame. It is also evident that during 1996-2001, organic chemical (SITC 51) maintained a strong net shift in the Chinese market. The overall positive net shift can be attributed to the structural differences of each industry by decomposing the net shift into the three sources of divergence mentioned earlier. Based on Table 2, it is clear that for the chemical industry the positive overall net shift was a result of Malaysia's favorable industry structure where it concentrated on the fast growing industries contributing positively to the growth of the chemical industry. Indeed the overwhelming positive regional effect has also significantly contributed to the positive net shift as a whole.

[Table 1 & 2 About Here]

6.2 Semi-Manufacturers

Overall semi manufacturers market access gained a positive net shift during 1990-1996 but lose its ground during 1996-2001 with an overall negative net shift of RM -1,396,049,922. The prospects for the export of semi manufactures of Malaysia as a whole were not any brighter especially for soft manufactured products such as leather (SITC 61), rubber (SITC 62), paper and articles of paper (SITC 64) and textile & fabric (SITC 65). This was due to lower price tags, intense competition from other ASEAN countries and cost advantage of other nations in these labor content industries such as India, Bangladesh, and Indonesia. Nevertheless, Malaysia must not neglect the sub sector of textile and fabric (SITC 65) and cork and wood (SITC 63) since it still promised better prospects especially during 1996-2001. Despite China's comparative advantage in these products, China also significantly imports large values of textile and cork and wood products. Indeed by improving the quality, design and brand, Malaysia would be able to capture the Chinese market for exports of textile and cork and wood products. In fact the true competitiveness lies in the nations ability to yield greater value-added. It is also reasonable to say that the situation might change, when the US and the European Union drops all textile quotas (covered under the Multi-Fiber Arrangement) for the World Trade Organization (WTO) members on January 2005 especially in textile industries.

It is evident that after 1996, China's demand for SITC 6 shifted for items like iron, metal and minerals. This was due to the change in China's economic structure as it focuses more on industrialization by emphasizing on developing the medium and high technology industries. Although Malaysia does not have a comparative advantage in products such as iron, metal and minerals, it was found that the prominent exports of Malaysia to the Chinese market included non-feruous metals (SITC 68), textile and fabric (SITC 65), non-metalic minerals (SITC 66), iron & steel (SITC 67) and manufacturers of metal (SITC 69).

6.3 Machinery and Transportation Equipments

In this category, China was one of the fastest growing markets for Malaysia where significant positive net shift between the two periods of study is reflected. Table 1 shows that the machinery and transportation equipments

(SITC 7) net shift improved from RM 665,349,283 to RM 6,288,210,669. The machinery and transportation equipments (SITC 7) accounted for more than two thirds of the overall net shift. The three main products that accounted for the positive net shift are electrical machinery (SITC 77), office and data machines (SITC 75), telecommunication SITC 76) and general industrial machinery (SITC 74). Within the telecommunication (SITC 76) sub sectors, Malaysia gained market access by exporting high technology products such as other sound reproduction apparatus (SITC 76383), microphones, loudspeakers and amplifiers (SITC 7642), parts, microphones apparatus (SITC 76492) and printed circuits (SITC 7722). In turn, in the exports of computer parts, sub-sectors such as parts, auto data processing machines (SITC 75997), analog or hybrid computers (SITC 7521), storage units & data processing (SITC 7527) and digital computers (SITC 7522) should be given priority since Malaysia has the comparative advantage on those products compared to China. However, decomposing the source of net shift (Table 2) revealed that Malaysia has an unfavorable industry mix effect, which suggests that the proportion of exports to the Chinese market is dominated by the slow growing products than the proportion of the country's overall exports in these products. It can be concluded that the overwhelming regional effect is the main source of contribution to the positive net shift (market gain). This suggests that Malaysia's machinery and transportation equipments (SITC 7) exports to the Chinese market are higher than that of Malaysia's total machinery and transportation equipments (SITC 7) exports.

6.4 Clothing and Other Consumer Products

It can be said that this sector as a whole has maintained a positive net shift of RM10, 698,445 during 1990-96 and RM 260,353,470 during 1996-2001. In total, 5 out of 8 industries performed well in the Chinese market. Furniture parts (SITC 82) and apparel and clothing (SITC 84) still promise a good ground for export despite the advantage of China in these resource-based industries. This may be due to the Malaysia government's effort in shifting the wood based industry from low value raw materials to high value-added products. Indeed the government's effort to promote downstream processing activities especially in the manufacturing of furniture in order to meet the demand from overseas as well as the domestic market has contributed positively for a better market access. Despite the above, it is also evident that China still acts as the main importer of these products.

In addition, it can be noted that increasing share is shifting to professional, scientific and controlling equipments (SITC 87), photographic (SITC 88) and miscellaneous (SITC 89) as shown by the positive net shift during 1996-2001. These more skilled and technology intensive industries have the potential to grow despite the low export value of Malaysia at this moment.

7. EXPORT COMPETITION BETWEEN MALAYSIA AND ASEAN- 4 IN THE CHINESE MARKET

This section summarizes the pattern of export by ASEAN members to the Chinese market and the results of the dynamic shift-share analysis of Malaysian export performance compared with the reference economies namely Singapore, Thailand, Indonesia and the Philippines. The need for this section arose due to the fact that recent developments such as trade liberalization, globalization, China's accession into WTO and the knowledge economy, have forced Malaysia to face increasing competition especially from the ASEAN countries (Chandran et al. 2003b). For example, Singapore has successfully attracted foreign makers of semiconductors and liquid crystal displays. Indonesia serves as an assembly base, highly competitive in most of the labor-intensive industries while the Philippine has jumped onto the bandwagon of technology intensive products. Thailand has also attracted investment recently and become established as a production base for consumer-electronics products. This section will evaluate the level of competition between these countries by analyzing the export performance of each country to the Chinese market. The evaluation is done by examining the evolution over time of the net shift in each one-digit product categories to the Chinese market.

Table 3, shows the proportion of export profile of the ASEAN members by SITC in three intervals namely 1993-95, 1996-98 and 1999-01 to the Chinese market. Singapore has been the largest exporter of SITC 7 to the Chinese market in recent years followed by Thailand and Malaysia. Lately, in 1999-01, the Philippines has shown a drastic shift of export pattern where it has begun to concentrate on the SITC 7 division contributing to nearly 67% of

total exports. Indonesia on the other hand, has concentrated on the SITC 6 resulting from her inability in restructuring export to SITC 7.

[Table 3 about here]

Comparing the export performance of Malaysia to other ASEAN countries based on the shift-share analysis revealed several interesting results. Overall Malaysia's net shift for chemical (SITC 5) exports is below that of other ASEAN members. From 1993-96 and 1998-2000 it maintained a negative net shift (Appendix B). However during 1996-1998 it reduced its net shift gap slightly by contributing to a positive market access compared to the reference countries. Decomposing the source of the divergence it is evident that Malaysia was generally in a strong competitive position. However, this was offset by a high negative industry mix effect and interaction effect especially during the above mentioned years.

On the other hand, in semi manufacturers (SITC 6) and clothing and other consumer goods (SITC 8), Malaysia performed relatively lower compared to other reference economies until 1998 but slightly narrowed the gap during 1998-2001. Thailand has emerged as a leading market gainer in semi manufacturers (SITC 6) and Singapore has a better position than the other reference economies until 1998 in the export of clothing and other consumer goods (SITC 8) to the Chinese market despite their comparative disadvantage in this category.

The only years that Malaysia has maintained a positive net shift are between 1998-2000. A positive net shift for Malaysia after 1998, which is indicated in Appendix B, was mainly contributed by the overwhelming competitive effect of Malaysia. In other words, Malaysia deemed to have a competitive advantage in this particular product after 1998. However it is important that Malaysia looks at how to emphasize on the important industries, as the Malaysian export structure is heavily concentrated on products that are declining across the reference economies.

The analysis also suggests that Malaysia's machinery and transport equipments (SITC 7) exports performed exceptionally well between 1997-2001 and gained positive net shifts compared with the other reference economies

such as Singapore, Thailand, Indonesia and Philippines. (Appendix B) This may indicate Malaysia's capability in exploring the Chinese market especially with the ever growing demand for electrical and electronics products to supplement the other industries. Thus, the ability to capitalize on this opportunity is important to enable Malaysia to gain a foothold as an important export center for machinery and transportation equipments (SITC 7) to the Chinese market. Indeed at this moment, high technology based industries like electronic-telecommunication and office machines could gain more market access in China due to their low competitiveness and high concentration of China's production on low-level manufacturing.   In comparison, Indonesia was the worst performer in machinery and transportation equipments (SITC 7) during the entire period of study. The close competitors of Malaysia to the Chinese market are Singapore and Thailand, which also showed a positive net shift except in the year 1995-96, and beyond for Singapore and 1998-1999 for Thailand. Another rivalry that may threaten Malaysian's position is the Philippines that enjoyed a sudden positive net shift during 1997-2001.

The decomposition of the overall net shift (net shift) into its source of divergence helps to identify the sources of changes in export competitiveness of machinery and transportation equipments (SITC 7). Malaysia's positive net shift during 1997-2001 is mainly due to the contribution of the competitive effect (refer to Figure 3) that means Malaysia's growth rate in machinery and transportation equipments (SITC 7) is more dynamic and Malaysia has the competitive advantage in machinery and transportation equipments (SITC 7) relative to the reference economies.

[Figure 3 about here]

8. CONCLUSION

As discussed above, China's prosperity would definitely provide Malaysia with a new market opportunity that is not to be missed. Indeed Malaysia should be more proactive and capitalize on China's interest for multilateral agenda settings, which has proposed a free trade agreement with ASEAN. Presently the destination for Malaysian investors are concentrated on Singapore, the United States, the United Kingdom, Northern Ireland and Hong Kong.

Investment in China constituted 1.5% of total Malaysian investment abroad in 1992 and 6.8% and 1.9% in 1996 and 1999 respectively. A way to improve the performance of Malaysian export is to tap the opportunity in China by seeking cooperation with the Chinese government. Cooperation should be established by identifying the degree of complementarities between Chinese and Malaysian industries. Focus for the manufactured products should be directed to machinery and transportation equipments (SITC 7) especially in high technology based industries such as electronics and telecommunication as it will take China several years to fully calibrate its policies and enjoy the benefits of WTO. However, Malaysia should be cautious in accessing the Chinese market since China still has many of its own problems. For instance China's disadvantages such as barriers to the distribution of goods, regulatory issues and difficulties in establishing joint ventures with local partners, and domination of State Owned Enterprises (SOE) should be studied well before entering the newly established market. Nevertheless, Malaysia's competition could intensify within the ASEAN countries, particularly Singapore, Thailand and the Philippines, to gain market share in China.

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APPENDIX A

This appendix provides a simplified equation of the **first version** of shift share analysis which analyses product and market growth.

$$\begin{array}{ccccc} \mathbf{1} & \mathbf{2} & \mathbf{3} & \mathbf{4} & \mathbf{5} \\ AC = & SE & + IME & + RE & + IE \end{array}$$

Note:

1- Actual Export Change
2- Share Effect
3- Industry Mix Effect
4- Regional Effect
5- Interaction Effect

Mathematical exposition of the above is;

$$\underbrace{X_t^{ij} - X_{t-1}^{ij}}_{\mathbf{1}} = \underbrace{X_{t-1}^{ij}\left(\frac{X_t}{X_{t-1}}-1\right)}_{} + \underbrace{X_{t-1}^{ij}\left[\left(\frac{X_t^i}{X_{t-1}^i}\right)-\left(\frac{X_t}{X_{t-1}}\right)\right]}_{\mathbf{2}} + \underbrace{X_{t-1}^{j}\cdot\frac{X_{t-1}^i}{X_{t-1}}\cdot\left\{\left(\frac{X_t^{ij}}{X_{t-1}^{ij}}\right)-\left(\frac{X_t^i}{X_{t-1}^i}\right)\right\}}_{\mathbf{3}} +$$

$$\underbrace{\left\{X_{t-1}^{ij} - X_{t-1}^{j}\cdot\frac{X_{t-1}^i}{X_{t-1}}\right\}\cdot\left\{\left(\frac{X_t^{ij}}{X_{t-1}^{ij}}\right)-\left(\frac{X_t^i}{X_{t-1}^i}\right)\right\}}_{\mathbf{4} \qquad\qquad \mathbf{5}}$$

Where

X_t^{ij} = Export of product i to market j.

$X_t^{j} = \sum_i X_t^{ij}$ = Exports of all product to market j

X_t^{i} = Export of product i to all markets

X_t = Total Exports

The simplified **second version** of shift share analysis follows the reference economies growth rate, which is the modified version of the Esteban-Marquillas shift-share model. It is defined as:

$$AC = SE + IME + CE + IE$$

AC = Actual Change
Share Effect: SE = $X_{0j} P_{ir} G_{ir}$
Industry Mix Effect: ISE = $X_{0j}(P_{ij} - P_{ir}) G_{ir}$
Competitive Effect: CE = $X_{0j} P_{ir} (G_{ij} - G_{ir})$
Interactive effect: IE = $X_{0j} (P_{ij} - P_{ir}) (G_{ij} - G_{ir})$

Where

X_{0j} = total exports to US from competitor (country) j
P_{ij} = proportion of total exports to the specific market from country j accounted for by exports in industry category i of country j

G_{ij} = growth rate of exports from industry category i in country j

P_{ir} = proportion of total exports to specific market from the reference economies (combined Malaysia, China, and ASEAN-4)

G_{ir} = growth rate of exports to specific market from industry category i of the reference economies

AC= actual exports change of country j during the period

Share effect is the change in a particular export product that would have been experience if these exports had grown at the same rate as the reference economies (Total exports of Malaysia, China and ASEAN-4). Any difference in the actual export growth and the share effect is the attributed to three possible source of export divergence; The Industry Mix Effect (IME), Competitive Effect (CE) and Interaction Effect (IE). The summation of these three sources of divergence is called as **Net Shift or Export Differential. IME** shows how much of the export differential is due to a divergence between the competing economy's structure compared to the reference economies. **CE** shows how much of the export differential is due to a difference between the export growth rate of the particular country and the reference economies. **IE** shows how much of the export differential is attributed to a combination of the IME and CE. In short IME measures economic structure of a nation and CE measures the competitiveness of a nation compared with the reference economies.

APPENDIX B

ONE-DIGIT SITC MANUFACTURED EXPORTS NET SHIFT to CHINA 1993-2001
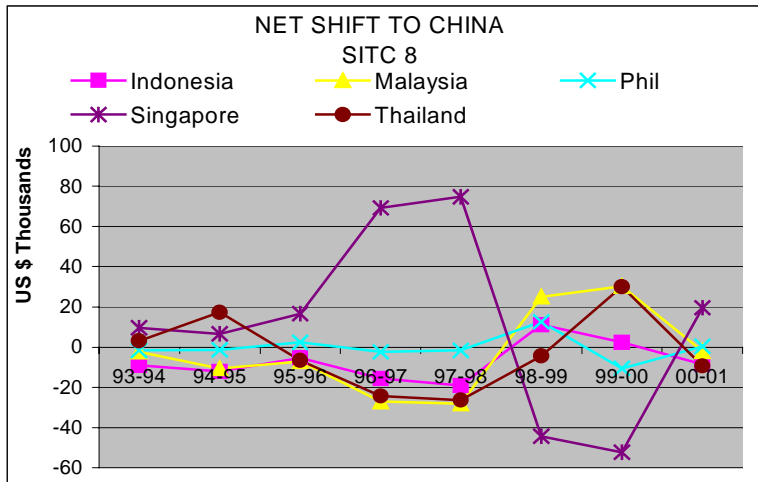
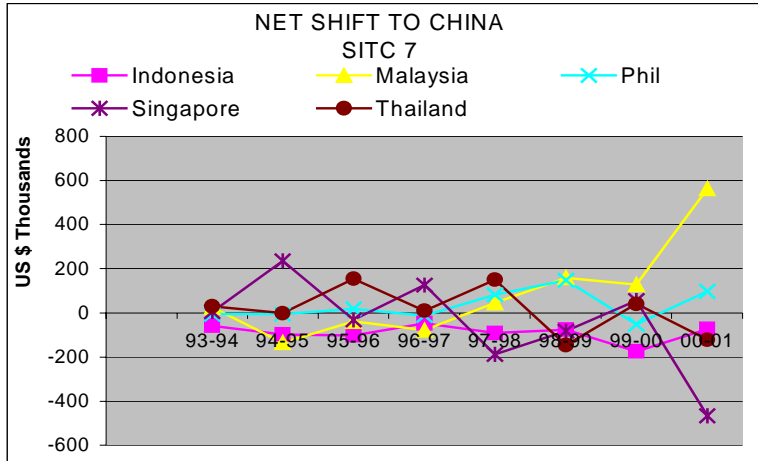NET SHIFT TO CHINA
SITC 7
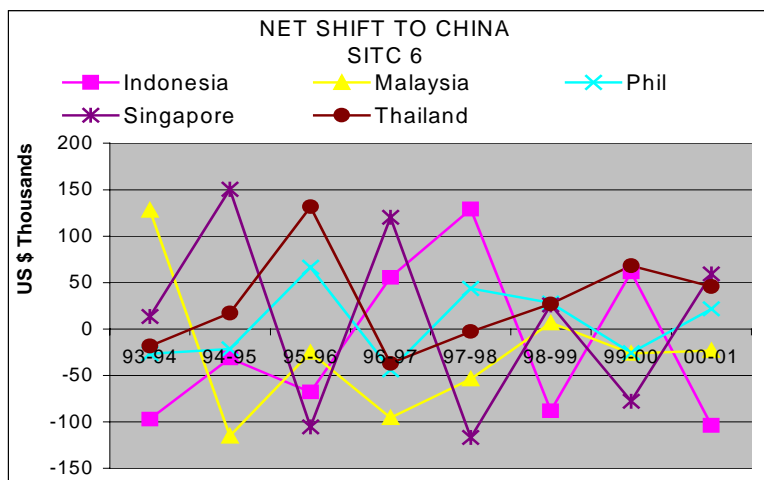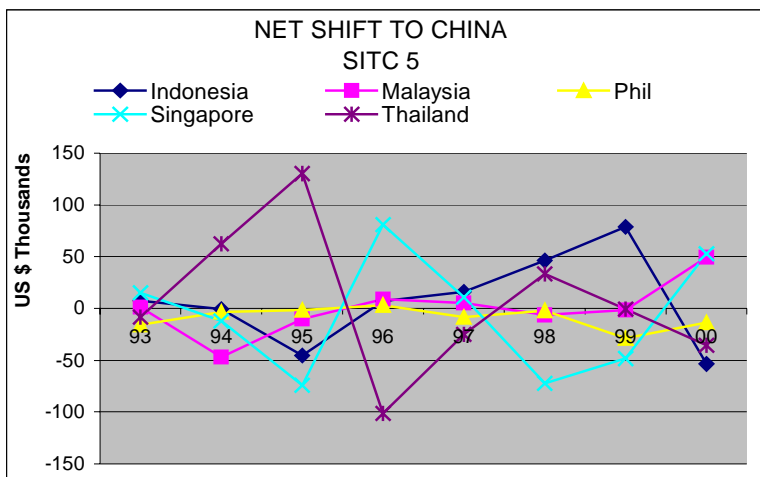
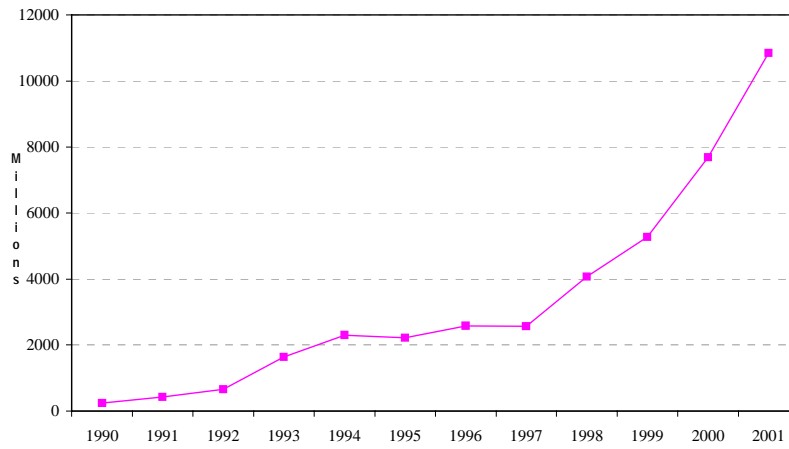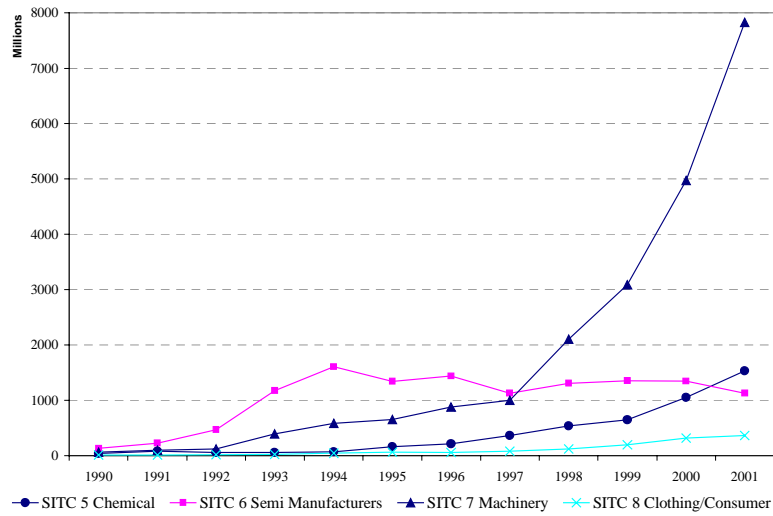NET SHIFT TO CHINA
SITC 8

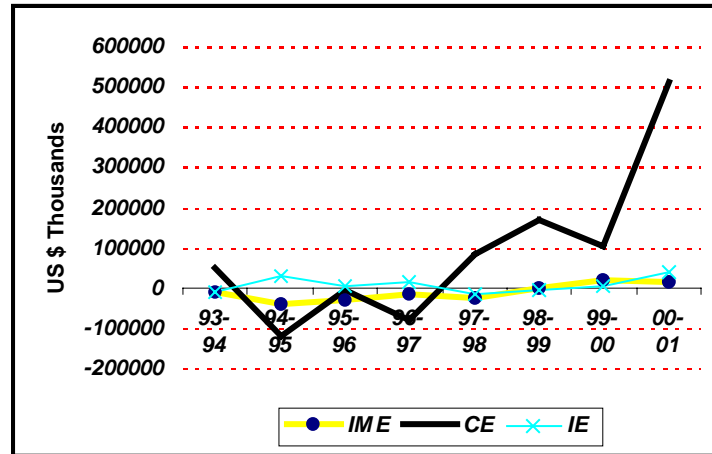**Figure 1: Total Export to China 1990-2001**

Source: Author's Calculation

Figure 2:Disaggregating the export to China (One Digit SITC)

Source: Author's calculation

Figure 3 :Breakdown Of Malaysia's Net Shift To China
(SITC 7: Machinery And Transport Equipments)

Source: Author's Calculation based on COMTRADE database

TABLE 1: NET SHIFT TO CHINA BETWEEN 1990-96 and 1996-2001

SITC	1990-96	%	1996-01	%
51-Organic Chemical	-26,737,814	-1.52	603,325,479	**9.57**
52-Inorganic Chemical	2,590,875	0.15	8,736,294	0.14
53-Dyeing & Tanning	19,054,243	1.08	15,640,561	0.25
54-Medicinal	1,549,193	0.09	-425,303	-0.01
55-Essential Oils	-9,213,728	-0.52	26,330,395	0.42
56-Fertilizers	69,309,230	3.94	-161,516,716	-2.56
57-Plastic Primary Forms	17,573,058	**1.00**	499,393,908	**7.92**
58-Plastic Non Primary	14,511,834	**0.83**	60,842,022	**0.96**
59-Chemical Materials	2,941,924	**0.17**	102,578,811	**1.63**
Total Chemical Net Shift	91,578,815		1,154,905,451	
61-Leather	6,394,612	0.36	-12,241,366	-0.19
62-Rubber	1,240,727,103	**70.58**	-2,144,663,511	-34.00
63-Cork & Wood	-349,474,602	-19.88	307,020,694	4.87
64-Paper & Articles of Paper	35,963,461	2.05	-28,680,976	-0.45
65-Textile & Fabric	-26,502,671	-1.51	122,972,071	**1.95**
66-Non-Metalic Minerals	28,917,942	1.64	77,517,912	**1.23**
67-Iron & Steel	4,001,450	0.23	79,415,025	**1.26**
68-Non-Feruous Metals	23,088,855	**1.31**	132,212,885	**2.10**
69-Manufactures of Metal	27,250,918	**1.55**	70,397,344	**1.12**
Total Semi-Manufacturers Net Shift	990,367,068		-1,396,049,922	
71-Power Generating Machinery &Eq.	157,794,599	8.98	-186,265,178	-2.95
72- Machinery Specific Purpose	11,889,608	0.68	183,438,018	2.91
73- Metal Working Machinery	187,944,374	10.69	-304,189,960	-4.82
74- General Industrial Machinery	47,992,980	**2.73**	201,426,526	**3.19**
75- Office and Data Machines	49,545,633	**2.82**	2,938,197,146	**46.58**
76- Telecommunications	224,631,845	**12.78**	503,714,239	**7.99**
77- Electrical Machinery	-83,880,018	-4.77	3,053,450,721	**48.41**
78- Road Vehicles	76,901,173	4.37	-107,019,867	-1.70
79- Other Transport Eq.	-7,470,911	-0.42	5,459,024	0.09
Total Machinery Net Shift	665,349,283		6,288,210,669	
81- Prefabricated Build, Sanitary & Plum	7,913,639	0.45	-8,963,990	-0.14
82- Furniture & parts	-2,559,990	-0.15	12,992,300	0.21
83- Travel Goods, Handbags	6,427,488	0.37	-11,554,135	-0.18
84- Apparel & Clothing	-3,826,327	-0.22	7,585,125	0.12
85- Footwear	15,076,683	0.86	-26,445,017	-0.42
87- Professional, Scientific, Controlling	3,298,636	0.19	144,243,806	**2.29**
88- Photographic	13,840,257	0.79	42,236,953	0.67
89- Misc	-29,471,941	-1.68	100,258,428	1.59
Total Clothing Net Shift	10,698,445		260,353,470	
Total All Industry Net Shift	**1,757,993,610**	**100**	**6,307,419,669**	**100**

Source: Author's Calculation based on COMTRADE database

Percentage net shift is calculated based on the following formula

Pi = (Ni/S)100 where, Ni is the net shift and S is the absolute net shift

TABLE 2: DECOMPOSING NET SHIFT INTO THE SOURCE OF DIVERGENCE

Duration	Net Shift	Industry Mix Effect	Regional Effect	Interactive Effect
Chemical				
1990-1996	Positive	Positive	Positive	Negative
1996-2001	Positive	Positive	Positive	Negative
Semi-Manufactured				
1990-1996	Positive	Positive	Positive	Negative
1996-2001	Negative	Negative	Positive	Negative
Machinery and Transportation Equipment				
1990-1996	Positive	Negative	Positive	Negative
1996-2001	Positive	Negative	Positive	Negative
Clothing & Other Consumer Goods				
1990-1996	Positive	Negative	Positive	Negative
1996-2001	Positive	Positive	Positive	Negative

Source: Author's Calculation based on COMTRADE database

TABLE 3: PROPORTION OF COUNTRIES EXPORTS BY SITC TO CHINA (IN PERCENTAGE)

Product	Malaysia			Thailand			Singapore			Philippines			Indonesia		
	93-95	96-98	99-01	93-95	96-98	99-01	93-95	96-98	99-01	93-96	96-98	99-01	93-95	96-98	99-01
SITC 5	3.2	7.9	12.3	25.9	29.8	22.2	25.1	15.6	17.1	22.2	4.7	3.2	5.3	13.0	25.0
SITC 6	71.6	54.7	25.7	47.8	28.7	17.0	11.2	16.7	7.8	73.8	67.6	25.7	90.7	81.9	68.1
SITC 7	23.79	34.77	58.46	20.55	37.51	58.49	59.17	61.6	63.95	2.2	24.7	66.96	3.65	4.34	5.08
SITC 8	1.3	2.6	3.6	5.7	4.0	2.3	4.5	6.1	11.1	1.7	3	4.1	0.3	0.8	1.8

Source: Author's calculation based on COMTRADE database