



**UNIVERSITI PUTRA MALAYSIA**

**INTRA-INDUSTRY TRADE BETWEEN MALAYSIA AND  
SELECTED ASEAN COUNTRIES**

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**INTRA-INDUSTRY TRADE BETWEEN MALAYSIA AND  
SELECTED ASEAN COUNTRIES**

**By**

**ADRIAN DAUD**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of the Requirement for the Degree of Master of Science**

**December 2002**



Abstract of thesis presented to the Senate of University Putra Malaysia in fulfilment  
of the requirements for the degree of Master of Science

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This study analyses the intra-industry trade (IIT) in selected manufacturing sector, the SITC 7 classification under the Standard International Trade Classification (SITC) between Malaysia and four ASEAN countries (Indonesia, Philippines, Singapore, and Thailand). The share of SITC 7 in Malaysia's exports today is more than 40% and we seek to measure the level of IIT between Malaysia and those ASEAN countries from 1970 to 2000. At the same time, we are interested in analysing the volume, growth, and flow of trade among these countries. Some product groups (728, 759, 764, and 776) within the SITC 7 that contributed significantly within this classification in trade since 1980 are analysed. The method of analysis involves calculating the G-L index; the volume of trade in terms of total trade (TT), intra-industry trade (IIT), and net trade (NT); changes in the volume of trade; and the graphical illustration of trade composition by using the industry trade box (ITB).



It is found that the level of IIT was very low for the case of Indonesia and the Philippines during the 1970s and slowly increased in the 1980s. The level of IIT was already high for Singapore and Thailand in the 1970s, but decreased for Singapore in the 1990s and slightly decreased for Thailand in the late 1980s. Thailand has replaced Singapore as the country with the highest IIT level with Malaysia in the 1990s. Trade in the selected product groups shows that Malaysia traded heavily with Singapore in all of the groups and then followed by Thailand in most of the groups. Thailand shows more flows in both directions in all of the groups and although this happened in the other groups with the other countries, the norm is that goods flow mostly in one direction. In the 1980s IIT level was low for Indonesia and Philippines but high for Singapore and Thailand. IIT level in 1990s decreased for Singapore in all groups but increased for Thailand in all groups, except product 728. So it can be concluded that Singapore and Thailand have been the more active IIT partner with Malaysia.

Although time series analysis on IIT is rare, the influence of income (PCI) and country size (GDP) on IIT is analysed in this study and it is found that PCI has a positive influence on IIT. GDP also affect IIT positively for Indonesia and Philippines, but negatively for Singapore and Thailand. Thus, this simple model gives us a consistent result for PCI but not for GDP. This is because IIT level for Singapore decreased in the 1990s and the decrease in IIT for Thailand during the second half of the 1980s.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PERDAGANGAN INTRA-INDUSTRI DI ANTARA MALAYSIA DAN  
NEGARA ASEAN TERPILIH**

Oleh

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Kajian ini menganalisa perdagangan intra-industri atau *intra-industry trade* (IIT) di dalam sector pembuatan terpilih, iaitu SITC 7 di antara Malaysia dan empat negara ASEAN (Indonesia, Filipina, Singapura, dan Thailand). Jumlah eksport Malaysia dari kategori SITC 7 melebihi 40% dan adalah menjadi hasrat kami untuk menganggarkan kadar IIT dari tahun 1970 ke 2000. Pada masa yang sama, kami juga berminat untuk menganalisa nilai dagangan, pertumbuhan dagangan, dan aliran dagangan di antara Malaysia dan empat negara ASEAN ini. Beberapa kumpulan produk (728, 759, 764, dan 776) di dalam SITC 7 yang mana kesemuanya banyak mempengaruhi dagangan sejak tahun 1980 juga dikaji. Corak analisa membabitkan pengiraan indeks G-L; nilai dagangan dalam bentuk jumlah dagangan atau *total trade* (TT), dagangan antara industri atau *net trade* (NT), dan dagangan intra-industri atau IIT; perubahan dalam nilai dagangan tersebut, dan ilustrasi grafik yang menunjukkan komposisi dagangan dengan menggunakan kotak perdagangan industri atau *industry trade box* (ITB).

Adalah didapati bahawa kadar IIT bagi kes Indonesia dan Filipina adalah rendah dalam tahun 1970-an dan mula meningkat sedikit sekitar 1980-an. Kadar IIT bagi Singapura dan Thailand sudah pun tinggi pada tahun 1970-an, tetapi Singapura mengalami penurunan dalam tahun 1990-an manakala Thailand mengalami sedikit penurunan sekitar akhir 1980-an. Thailand telah menggantikan Singapura sebagai negara yang mempunyai kadar IIT tertinggi dengan Malaysia pada tahun 1990-an. Dagangan dalam beberapa kumpulan produk pula menunjukkan Malaysia mempunyai nilai dagangan yang tertinggi dengan Singapura dalam kesemua kumpulan tersebut dan diikuti oleh dagangan dengan Thailand dalam beberapa kumpulan. Aliran dagangan dengan Thailand menunjukkan ianya sentiasa berubah-ubah (dua-hala) dari masa ke semasa manakala dagangan dengan negara lain menunjukkan ianya sering kali sehala walaupun ada kalanya ianya juga berubah-ubah. Dalam tahun 1980-an, kadar IIT bagi Indonesia dan Filipina adalah rendah, tetapi tinggi bagi Singapura dan Thailand. Kadar ini menurun pada tahun 1990-an bagi dagangan dengan Singapura tetapi meningkat bagi Thailand, kecuali dalam produk 728. Maka bolehlah dirumuskan bahawa Singapura dan Thailand merupakan rakan dagangan IIT utama kepada Malaysia berbanding Indonesia dan Filipina.

Walaupun analisa siri masa untuk IIT jarang dilakukan, kajian ini telah menganalisa bagaimana kadar pendapatan (PCI) dan saiz sesebuah negara (GDP) mempengaruhi IIT di Malaysia. Adalah didapati bahawa PCI mempengaruhi IIT secara positif. GDP juga mempengaruhi IIT secara positif bagi Indonesia dan Filipina, tetapi secara negatif bagi Singapura dan Thailand. Model yang digunakan ini menunjukkan keputusan yang konsisten bagi PCI tetapi tidak bagi GDP. Ini

disebabkan oleh penurunan IIT bagi Singapura dalam tahun 1990-an dan penurunan IIT bagi Thailand pada akhir 1980-an.

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I certify that an Examination Committee met on 24<sup>th</sup> December 2002 to conduct the final examination of Adrian Daud on his Master of Science thesis entitled "Intra-industry Trade Between Malaysia Selected ASEAN Countries" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follow:

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## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



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## LIST OF ABBREVIATIONS

ACF	Autocorrelation Function
ADB	Asian Development Bank
ADF	Augmented Dick-Fuller (Test)
AFTA	ASEAN Free Trade Area
AR	Autoregressive
ARIMA	Autoregressive Integrated Moving Average
ASEAN	Association of South East Asian Nations
BJ	Box-Jenkins (Methodology)
CLRM	Classical Linear Regression Model
ECM	Error-Correction Model
EEC	European Economic Community
GDP	Gross Domestic Product
GL	Grubel-Llyod (index)
HDI	Human Development Index
HIIT	Horizontal Intra-industry Trade
IFS	International Financial Statistics
IIT	Intra-industry Trade
ITB	Industry Trade Box
IV	Instrumental Variables
M	Imports
MA	Moving Average
MIIT	Marginal Intra-industry Trade
NAFTA	North America Free Trade Area
NT	Net Trade
OECD	Organisation of Economic Cooperation and Development
OLS	Ordinary Least Square
PCI	Per Capita Income
r	Trade ratio
R & D	Research and Development
SIC	Standard Industrial Classification
SITC	Standard International Trade Classification
TT	Total Trade
UN	United Nations
UNCTAD	United Nation Conference on Trade and Development Cooperation
UV	Unit Values
VECM	Vector Error-correction Model
VIIT	Vertical Intra-industry Trade
WDR	World Development Report
X	Exports



## CHAPTER 1

### INTRODUCTION

#### 1.1 Introduction

International trade has been in existence for almost as long as economic theory itself. The traditional theory of international trade is dated back to the classical era of Adam Smith, who introduced the idea of absolute advantage. David Ricardo, later improved it through his book "*The Principle of Political Economy and Taxation (1817)*" where he introduced the concept of comparative advantage (Appleyard & Field (1998)). Trade theory has then been further developed and refined. Perhaps one of the most famous is the Hecksher-Ohlin theory. We can classify those trade theory as the classical or traditional trade theory. Historically, the idea is that nations or countries will engage in international trade because they are endowed with different factors and they specialize in different industry. Since countries specialize in different industries, classical trade theory like Hecksher-Ohlin explains the phenomenon of inter-industry trade, where trade is based on comparative advantage.

After the World War II the patterns of trade began to change and empirical studies conducted by Balassa (1966) and Grubel (1967) reveals that intra-industry trade (IIT) is taking place. This is the export and import of products that belong to the same industry or "the simultaneous export and import of products belonging to the same industry"



among economists since the traditional theory of trade like Heckscher-Ohlin does not explain IIT. Since the concept of IIT was born, we could see that there were many literatures that discussed the subject of IIT (Balassa 1986a).

The studies by Balassa (1966) and Grubel (1967)) have found that there is an increase in the amount of trade between the member of the European Economic Community (EEC) through the specialization in production and export of products that belong to the same industry. Balassa (1966) came across the phenomenon of IIT although the study focused on the effects of tariff reduction on trade in the EEC market. Nevertheless, he found that trade liberalization has a positive influence on intra-industry specialization. Perhaps what is more interesting to note is the fact that not only trade has taken place in the form of IIT, but it was also on the increase. Grubel and Llyod (1975) found that the level of IIT among the Organisation of Economic Cooperation and Development (OECD) countries accounted for more than 60 percent of the total trade. They also found that there was a significant level of IIT in all of the industries and that the “phenomenon [is] worth further analysis” (p. 37). Earlier than that however, trade in manufactures for manufactures was found to be quite substantial and this could be equivalent to the phenomenon of IIT that we have today. As reported in Hirschman (1945), the pre-World War II trade in manufactures was higher among themselves compared to trade in foodstuffs and raw materials (Grubel and Llyod (1975)).

### 1.1.1 The Manufacturing Sector and Intra-industry Trade

The level of IIT is relatively high in the manufacturing sector as shown by Grubel and Llyod (1975) in their study involving ten developed countries. By using the Standard International Trade Classification (SITC) index, industries are classified into ten different categories. Basically what is being considered as the manufacturing sector covers SITC 5 to 8. The *Handbook of International Trade and Development Statistics*, published by the United Nation Conference on Trade and Development Cooperation (UNCTAD) used this categorization for manufacturing sector less SITC 68<sup>1</sup>. Table 1.1 shows the unweighted average of the level of IIT among the OECD countries<sup>2</sup> (at the 3-digit level), which has been reproduced into 1-digit section. The average level of IIT for the manufacturing sector (SITC 5-8) is about 57 percent. With the exception of SITC 9, the other industries have IIT level of less than or equal to 40 percent.

IIT has also been found to be more prevalent in the developed countries as compared to the developing countries. This makes perfect sense since the developed countries have been experiencing the process of industrialization where the manufacturing sector played an important role, meanwhile most of the developing countries tend to focus more on the production of agricultural products. IIT level among developed countries is more likely to be higher than IIT level between them and the developing countries (Grimwade (1989)).

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<sup>1</sup> SITC 68 refers to mining products or minerals.

<sup>2</sup> There are ten countries, which are Canada, United States, Japan Belgium-Luxembourg, Netherlands, Germany, France, Italy United Kingdom, and Australia.



**Table 1.1: Ranking of Industries by Percentage of Intra-Industry Trade in the OECD Countries**

<b>Rank</b>	<b>SITC Class</b>	<b>Description</b>	<b>Percentage</b>
1	5	Chemicals	66
2	7	Machinery and transport equipment	59
3	9	Commodities and transactions	55
4	8	Miscellaneous manufactured articles	52
5	6	Manufactured goods classified by material	49
6	1	Beverages and tobacco	40
7	4	Animal and vegetable oils and fats	37
8	0	Food and live animals	30
9	2	Crude material, edible, except fuel	30
10	3	Mineral fuels, lubricant and related materials	30

Source: Grubel and Lloyd (1975), p.37.

### **1.1.2 The Manufacturing Sector in ASEAN**

Economic integration has been an integral subject to the concept of IIT as shown by Balassa (1966). Since economic integration serves as a catalyst for international trade, it seems to be natural to assume that the study of IIT will involve the subject of economic integration to a certain extent. There have been several instances of economic integration and today we have the North American Free Trade Agreement (NAFTA), the European Union (which began with the EEC), the Association of Southeast Asian Nations (ASEAN), etc.

ASEAN was established in 1967 with five member countries. Presently there are ten member countries of ASEAN and for the objective of measuring the level of



III for Malaysia this paper will focus on the five original member countries (Indonesia, Malaysia, the Philippines, Singapore, and Thailand)<sup>3</sup>. The term “ASEAN” will be used specifically to refer to these five countries in this paper. This paper will track down the bilateral trade relations between Malaysia and the other members since 1970.

The manufacturing sector has played a significant role in the process of development in ASEAN, just as it has been in the case of the western developed nations. The export of manufactured goods has been on the increase in the last thirty years and the share of manufactured goods in the countries’ total export has also increased. Table 1.2 shows the percentage of manufacturing share of GDP, which has increased in ASEAN from 1970 to 1995. The increasing shares of the manufacturing sector (as opposed to agricultural) in a country’s total export shows the vitality of the manufacturing sector in spearheading the ASEAN countries in their process of industrialization. “Manufacturing only” goods makes up on average about two-third of the manufacturing sector in 1980 (ADB (1985)). As shown in Table 1.2, on average the industrial sector share of GDP has increased from about 30% in 1970 to 42% in 1995. Some countries have lower percentage in 1995 compared to 1980 because the increase in the service industry.

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<sup>3</sup> The list of the current members of ASEAN can be found in Appendix B.



**Table 1.2: Manufacturing Share of GDP for the ASEAN Countries (%)**

	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>1995</b>
<b>Indonesia</b>	28.0	41.3	40.6	42.2
<b>Malaysia</b>	24.7	35.8	41.7	47.1
<b>Philippines</b>	33.7	40.5	33.0	35.5
<b>Singapore</b>	36.4	38.8	45.5	42.7
<b>Thailand</b>	25.7	30.14	35.3	42.2
<b>Average</b>	29.7	37.31	39.22	41.94

Source: Asian Development Bank, 1991 & 1996

The level of IIT between Malaysia and the ASEAN countries is expected to follow the pattern of IIT elsewhere, where it is more prevalent in the manufacturing sector. As has been discussed earlier, IIT is higher between the developed countries and we are interested to know whether the level of IIT between Malaysia and the ASEAN countries would on average increase over the years as each country is going through the process of development and the expansion of the manufacturing industry.

## 1.2 Statement of Research Problem

ASEAN was established to encourage free trade and to enhance trade relations among its members, that is, to promote economic cooperation between them beside social and cultural development. This was done through a series of meetings known as the ASEAN Summits and emphasis has been made on strengthening intra-ASEAN economic cooperation during the late 1970s (Cuyvers and Pupphavesa (1996)). It is expected that this policy would contribute to a higher level of trade, including IIT as product differentiation will eventually become the norm and each country markets its product abroad. Product differentiation is an important aspect in today's trade as it is encouraged by diversification. As trade is expanding and involving many countries, we will notice that product differentiation begins to take place. This is because different countries have different GDP level and the people are of many income levels. Thus, this will encourage the production of many different products in the same industry. ASEAN is perhaps at the very early stage of economic integration—a preferential trade arrangement. The formation of ASEAN was a partial movement to free trade and to some degree it has been successful in creating openness between its members and now it continues with ASEAN Free Trade Agreement (AFTA), which is taking place.

As trade in Malaysia continues to grow, we have observed that since the early 1980s there has been a tremendous growth in the electrical and electronic industry. The ASEAN countries began to open themselves to FDI during this time and with the influx of FDI in Malaysia during this period, the share of electrical and electronic



products in Malaysia's exports has increased (Naya and Imada (1990)). The electrical and electronic sector itself plays a significant role in Malaysia's manufacturing industry. Since its expansion was experienced during the 1980s, we have the reason to believe that Malaysia will have a high level of IIT in this sector. These products are being classified under the SITC 7 group. Furthermore, the share of products under SITC 7 in Malaysia's exports today is more than 40% (Department of Statistics (2000)). According to the Department of Statistics, this product group (SITC 7) has been a major export earning for Malaysia followed by SITC 3. This is calculated in terms of the value of the products. For this reason, we have decided to conduct a study on the level of IIT for Malaysia within this product group—SITC 7. Perhaps it can reflect an important part of the manufacturing industry in the country as well as the other ASEAN countries. It was shown earlier by Grubel and Lloyd (1975) (see Table 1) that this product group lies second in its IIT level and they have also found that it has the highest percentage increase in IIT level. Although this category (SITC 7) is characterized by a high G-L index in the developed countries, this does not necessarily mean that it will be high in the developing countries. Having said that, we are reminded to the fact that as the share of the manufacturing sector in a country is increasing, so is the level of IIT.

SITC 7 was also chosen by Bergstrand (1983) to conduct a study on IIT in US, the European Community, and Japan. Therefore, the analysis will be on the pattern of trade in SITC 7 between Malaysia and the four ASEAN countries since 1970. Trade in SITC 7 will be analysed as well as some selected categories under