

UNIVERSITI PUTRA MALAYSIA

REGIONAL AND INTER-REGIONAL INPUT-OUTPUT MODEL AS A PLANNING TOOL FOR ECONOMIC DEVELOPMENT IN MALAYSIA

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By

MOHD KHAIRUL HISYAM HASSAN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirement for the Degree of Doctor of Philosophy

January 2015

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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MOHD KHAIRUL HISYAM HASSAN

January 2015

Chairman: Zaleha Mohd Noor, PhD Faculty: Economics and Management

This study examines the importance of regional development planning to economic growth through the construction of regional and inter-regional input-output tables for East and West Malaysia. It is particularly important because only limited past studies have been conducted on the construction of regional and inter-regional input-output tables at the regional or state level in Malaysia and also, the usage of input-output model has received much attention in many countries as a planning tool for economic development. With East and West Malaysia as case studies, the LQ and RAS techniques were employed to construct regional input-output tables for both regions for the year 2005. These tables were used to construct the inter-regional input-output tables for the regions applying the model of Miller and Blair (2009). The spillovers and feedback analyses describe the interdependency on trade either inter-regional or foreign, while those of linkages and multipliers help to determine the key or potential sectors in each region which affect economic growth. The spillovers and feedback, linkages and multipliers were calculated. Several important conclusions can be drawn from the study. The 2005 output of East and West Malaysia was contributed mainly by the mining and quarrying, and electronics and non-electronic sectors respectively. In addition, the calculated spillover and feedback coefficients show the reason why the dependency on foreign trade recorded the higher value compared with each other's trade for both regions. The main reason for this scenario is because most of the raw materials for production and final consumption were satisfied by foreign trade and this also created very huge leakages for both regions. Lastly, based on the linkages and multipliers analysis in this study, we found that the agriculture and livestock; forestry and logging; food manufacturing; petroleum products; and motor vehicles and other transport; sectors were among the sectors with the highest backward linkage and multiplier coefficients in the East and West Malaysia regions. So, putting additional investment into these sectors will generate more output to the overall economic performance of these regions because of the ability of these sectors to attract the other sectors in the economy.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

MODEL INPUT-OUTPUT WILAYAH DAN ANTARA WILAYAH SEBAGAI ALAT PERANCANGAN PEMBANGUNAN EKONOMI DI MALAYSIA

Oleh

MOHD KHAIRUL HISYAM HASSAN

Januari 2015

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Kajian ini menguji kepentingan perancangan pembangunan wilayah kepada pembangunan ekonomi melalui pembinaan jadual input-output wilayah dan antara wilayah untuk Malaysia iaitu Malaysia Timur dan Malaysia Barat. Kajian ini penting terutamanya kerana hanya beberapa kajian lepas yang melibatkan pembinaan jadual input-output wilayah dan antara wilayah di peringkat wilayah atau negeri di Malaysia dimana penggunaan model input-output telah diterima oleh banyak negara sebagai alat perancangan pembangunan ekonomi. Dengan menggunakan Malaysia Timur dan Malaysia Barat sebagai kajian kes, teknik yang dinamakan LQ dan RAS digunakan untuk membina jadual input-output bagi kedua-dua Wilayah untuk tahun 2005. Jadualjadual ini seterusnya akan digunakan untuk membina jadual input-output antara wilayah bagi kedua-dua wilayah dengan mengaplikasikan model oleh Miller and Blair (2009). Analisis limpahan dan maklum balas menerangkan tentang kebergantungan ke atas perdagangan sama ada perdagangan antara wilayah ataupun perdagangan asing, manakala hubungan dan pengganda akan membantu untuk menentukan sektor utama atau berpotensi dalam setiap wilayah dimana ianya mempengaruhi pertumbuhan ekonomi. Limpahan dan maklum balas, hubungan dan pengganda adalah diukur. Beberapa penemuan penting daripada kajian ini dapat disimpulkan seperti berikut. Output bagi Wilayah Malaysia Timur dan Wilayah Malaysia Barat pada tahun 2005 masing-masing disumbangkan oleh sektor perlombongan dan kuari, dan sektor elektronik dan bukan elektronik. Dalam pada itu, pengiraan pekali limpahan dan maklum balas menunjukkan sebab mengapa kebergantungan kepada perdagangan asing mencatatkan nilai yang tinggi berbanding perdagangan dengan wilayah di kedua-dua wilayah. Keadaan ini berlaku disebabkan oleh kebanyakan barang mentah untuk pengeluaran dan penggunaan akhir dipenuhi oleh perdagangan asing, dan ianya juga menghasilkan kebocoran pada kedua-dua wilayah. Akhirnya, berdasarkan analisis hubungan dan pengganda dalam kajian ini, kita dapati sektor pertanian dan penternakan; perhutanan dan pembalakan; pembuatan makanan; keluaran petroleum; dan kenderaan bermotor dan pengangkutan lain; antara sektor yang mencatatkan nilai yang tinggi dalam hubungan ke belakang dan pekali pengganda di dalam Wilayah Malaysia Timur dan Wilayah Malaysia Barat. Oleh itu, sebarang pertambahan pelaburan dalam sektor ini akan menyebabkan lebih banyak lagi output dijana kepada keseluruhan ekonomi dalam wilayah ini kerana keupayaan sektor ini untuk menarik sektor-sektor lain di dalam ekonomi.

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I certify that a Thesis Examination Committee has met on 21 January 2015 to conduct the final examination of Mohd Khairul Hisyam bin Hassan on his thesis entitled "Regional and Inter-Regional Input-Output Model as a Planning Tool for Economic Development in Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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LIST OF ABBREVIATIONS

CILQ	Cross Industry Location Quotients
CHARM	Cross-Hauling Adjusted Regionalization Method
CMOD	Modified Cross-Industry Quotients
DC	Developed Countries
DOS	Department of Statistics
DOSM	Department of Statistics, Malaysia
ECER	East Coast Economic Region
EPU	Economic Planning Unit
FLQ	Flegg Location Quotients
GDP	Gross Domestic Product
GRAS	Generalization RAS
GRIT	Generation of Regional Input-Output Table
GRITSSIS	Generalized Regional Input-Output Tables with Survey Based Sums of
	Intermediate Coefficient
HES	Household Expenditure Survey
Ю	Input-Output
IM	Iskandar Malaysia
LDC	Less Developed Countries

LQ	Location Quotients
NCER	Northern Corridor Economic Region
POLQ	Purchases-Only Location Quotients
RAS	RAS Technique
RMOD	Modified Logarithmic Cross-Quotients
RND	Logarithmic Cross-Quotients
ROW	Rest of the World
RPC	Regional Purchase Coefficients
SAM	Social Accounting Matrix
SDC	Sabah Development Corridor
SCORE	Sarawak Corridor of Renewable Energy
SDP	Supply-Demand Pool
SLQ	Simple Location Quotients
TDA	Table Disaggregation and Adjustment
TNE	Total National Employment
TRE	Total Regional Employment
UPEN	State Economic Planning Unit

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In regional and inter-regional economic analysis, regional planning is an important effort to provide a useful tool for the development of a region, while regional development as the process of development in a particular area for future economic development and economic growth (Glasson, 1978). Meanwhile, Tjokroamidjojo (1990) mentioned that regional development process as a one of the holistic development approach of the region as a whole for future economic growth and development. In Malaysia, the objectives or goals of initiation of the regional economic development corridors, mainly concentrating on the reduction in cost of living and achieving the balanced socio-economic development across regions and states. This is in line with Robock (1966) which stated that the importance of regional development were improving the regional income disparities, achieving balanced regional growth and providing the special assistance to lower economic growth areas. So, systematic planning through the creation of employment, efficient economic management and the use of a new technology as well as having strategic locations for investors are amongst the main factors that contributed to the regional economic development in East and West Malaysia in the last decade. In year 2006, East Malaysia recorded growth of 4.8 per cent. The biggest contributor to its gross domestic product (GDP) was the resourcebased sectors that included agriculture, and mining and quarrying, which contributed about 40.8 per cent. West Malaysia recorded growth of 5.7 per cent in 2006 with the manufacturing sector as the main sector that contributed to the growth (29.2 per cent).

Even though the contributions from the other sectors were slightly lower than those from agriculture, mining and quarrying, and manufacturing, the former sectors still plays an important role in supplying raw materials and providing employment in the economy. According to the Department of Statistics (2014), East Malaysia would have an economic growth rate at 2.5 per cent in 2012 which is slightly lower compared with 2006 while West Malaysia would continue its performance as the main contributor to the national's economic growth with a growth rate of 6.2 per cent in the same year. Apart the reduction in East Malaysia's growth, the development in the main sectors of both regions need to be strengthened in order to give a conducive investment environment to the private sector for the high technology industry, diversification of exports and markets as well as the development of the support industry. As Malaysia has several state and local governments, by knowing this basic economic structure for both regions (East and West Malaysia), decisions in one state or district can have an impact throughout the whole country and state. Hence, input-output model at regional or state level would enable analysis to be carried out for smaller geographic areas with particular reference to the potential sectors in the economy that should be given more attention by the policymakers for the future economic growth in these regions (Saari and Rashid, 2009).

1.2 Background of the Study

Malaysia is a federation of 13 states consisting of 11 states in Peninsular Malaysia (West Malaysia), and two states, Sabah and Sarawak, in East Malaysia, with the Federal Territory of Labuan, which lies off the coast of Sabah. East Malaysia is less populated than West Malaysia, having a population of 5,672,200 people that is almost 20.5 per cent of the total population of Malaysia (Department of Statistics, 2008). In economic structure, its huge natural resources, particularly crude oil and natural gas, have rendered these sectors as the main sources of growth and revenue for this region. For West Malaysia, however, with a population of 22,057,800 people representing 79.5 per cent of the total population of Malaysia, the main economic activities depend mostly on the manufacturing and services sectors as its major engine of growth without ignoring the importance of the resource-based sectors. The following sub-sections will explain the sectors that provide greater job opportunities for the people in these regions (East and West Malaysia). Besides that, some general background information on the economic structure of these regions is given in terms of GDP, and export and import, as well as on the inter-regional trade (export and import) between these regions.

1.2.1 East Malaysia

Generally, the development of East Malaysia in the early 70s and 80s was contributed greatly by the resource-based sectors with the region's abundance of natural and mineral resources that has accelerated its economic growth. In particular, the main sectors that contributed most to the economic growth and GDP were the mining and quarrying, and agriculture, hunting and forestry sectors. According to the Department of Statistics, mineral fuels, lubricants, etc. were the commodities that gave the highest export earnings amounting to about RM23,802 million, approximately 53.6 per cent of the total value of all export earnings in 2000 and this figure has been continuously growing showing the importance of these sectors to the acceleration of the East Malaysia's economy. Due to that, these sectors also play an important role in providing employment. These sectors employed about 0.662 million people in resource-based related activities (agriculture, hunting and forestry; fishing; and mining and quarrying) in 2005, increasing to 0.663 million people in 2006, and further to 0.714 million people in 2007. The next largest sector that provided job opportunities was wholesale and retail trade (15 per cent) in 2005 with an increasing pattern from 2005 to 2006 and 2007, as can be seen from Table 1.1. The other sectors that significantly provided job opportunities were manufacturing (11.5 per cent), construction (8.7 per cent), public administration and defence (7.4 per cent), and education (5.7 per cent) in 2005. Hotels and restaurants (4.6 per cent) and transport, storage and communication (4.4 per cent) were other sectors with low contributions to the total regional employment but were nevertheless important in accelerating the economic growth of East Malaysia. The total contribution of the region to the national employment in 2005 was 20.4 per cent.

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Industry category	2005	2006	2007
Agriculture, hunting and forestry	604.5	590.5	650.5
Fishing	47.0	60.4	53.1
Mining and quarrying	10.4	12.4	9.9
Manufacturing	235.0	249.0	236.3
Electricity, gas and water supply	10.0	15.4	14.3
Construction	177.2	178.4	179.8
Wholesale and retail trade	307.9	320.8	322.6
Hotels and restaurants	94.3	108.9	115.5
Transport, storage and communication	89.7	94.0	88.9
Finance	27.2	27.3	30.5
Real estate, renting and business activities	53.3	55.8	62.9
Public administration and defence	152.4	152.3	155.0
Education	116.4	113.9	131.8
Health and social work	32.1	36.3	40.5
Other community, social and personal service activities	46.5	45.1	44.3
Private household with employed persons	43.6	47.6	49.0
Extra-territorial organisation and bodies		· ·	0.4
Total	2,047.3	2,108.0	2,185.2

 Table 1.1: Employment by Industry in East Malaysia ('000)

Sources: Yearbook of Statistics, Sabah and Sarawak (various issues)

1.2.2 West Malaysia

According to the Department of Statistics, West Malaysia is the main contributor to Malaysia's economic growth with major economic activities mainly contributed by the manufacturing sector. The three major economic sectors are the primary (agriculture, forestry, fishing and livestock), industrial and services sectors. Over the 1990-2000 period, the economy grew at an average rate of 11 per cent per annum. The growth was accompanied by considerable transformation of the economic structure from resourcebased activities to non-resource-based industrial activities, with expansion in the manufacturing sector, leading to more job opportunities for the people. For instance, this sector employed about 1.75 million people in 2005 increasing to 1.83 million people in 2006, but decreasing to 1.74 million in 2007. The second largest sector that provided job opportunities was wholesale and retail trade with 1.31 million people (16.4 per cent) in the total West Malaysia in 2005 increasing to 1.33 million people (16.6 per cent) in 2006, and further to 1.39 million people (17.4 per cent) in 2007 (Table 1.2). Another sector that was significant in employment creation was agriculture, hunting and forestry with 0.75 million people in 2005 (9.4 per cent of the region's work force). Construction, hotels and restaurants, and public administration and defence were other sectors with high contributions to the total regional employment with 0.73 million people (9.1 per cent), 0.58 million people (7.2 per cent) and 0.58 million people (7.2 per cent) in 2005 respectively. The total contribution of the region to the national employment was 80 per cent in 2005.

Table 1.2. Employment by muust	i y ili west n	Talaysia (00	
Industry category	2005	2006	2007
Agriculture, hunting and forestry	750.7	784.8	786.8
Fishing	68.2	67.8	67.8
Mining and quarrying	25.7	29.6	29.5
Manufacturing	1,754.3	1,833.8	1,741.0
Electricity, gas and water supply	46.6	60.0	46.5
Construction	727.2	730.5	743.0
Wholesale and retail trade	1,312.4	1,329.7	1,389.5
Hotels and restaurants	577.5	612.4	645.2
Transport, storage and communication	455.0	445.7	449.3
Finance	220.2	215.0	251.7
Real estate, renting and business activities	405.7	452.6	495.2
Public administration and defence	576.1	521.8	561.1
Education	490.7	486.2	500.9
Health and social work	180.5	186.9	198.4
Other community, social and personal service activities	188.4	202.0	222.2
Private household with employed persons	217.0	207.1	223.7
Extra-territorial organisation and bodies	1.7	1.2	1.3
Total	7,998.1	8,167.2	8,353.2

 Table 1.2: Employment by Industry in West Malaysia ('000)

Sources: Yearbook of Statistics, Malaysia (various issues)

1.3 Overview of the Malaysian Economy

1.3.1 East Malaysia Economic Performance

The economic development of East Malaysia has been defined mainly by the resourcebased industry, particularly the mining and quarrying sector. But in 2007, the manufacturing sector became the dominant sector in contributing to the region's GDP. The annual growth rate for the manufacturing sector was recorded at 6.8 per cent, while the mining and quarrying and agriculture sectors recorded 2.5 per cent and 4.2 per cent respectively. However, the growth rates for other sectors showed steady figures at more than 9 per cent, i.e. wholesale and retail trade, hotel and restaurants (15.1 per cent); finance, insurance, real estate, and business services (13.1 per cent); transport, storage, and communication (9.4 per cent); and electricity, gas and water (9.3 per cent). Despite their growth rates of less than 5 per cent, construction; other services sector; and government services, still played an important role in contributing towards the GDP.

1.3.1.1 Economic Performance by Sector

(i) Agriculture Sector

In East Malaysia, agriculture was for many years the second largest sector in production activities. This is shown by the contribution of this sector to the region's GDP in the early years. But starting from 2005, the importance of this sector to the state's GDP was taken over by manufacturing as the second largest contributor to the state's economy. During 2005, this sector recorded about RM16,925 million (19 per

cent), increasing in years 2006 and 2007 to RM17,107 million (18 per cent) and RM17,820 million (18 per cent) respectively (Table 1.3).

(ii) Mining and Quarrying Sector

The mining and quarrying sector represents the largest economic activity in East Malaysia and provides a large contribution towards the region's GDP. This may be attributed to the rising production of petroleum and natural gas. During 2005, the GDP of East Malaysia contributed by mining and quarrying was RM20,626 million, 22.9 per cent of the total GDP (RM90,128 million). In 2006, the contribution of this sector decreased to 22.7 per cent (RM21,441 million) and then to 21.8 per cent (RM21,976 million) in 2007. This situation might have been caused by the expansion of the manufacturing sector as the largest contributor to the GDP in 2007 (Table 1.3).

(iii) Services Sectors

Services in East Malaysia are provided by six major sectors, i.e. wholesale and retail trade, hotels and restaurants; transport, storage and communication; finance, insurance, real estate and business services; government services; and other services. In 2005, the biggest services sector that contributed to the region's GDP was wholesale and retail trade, hotels and restaurants which recorded 8.9 per cent (RM8,042 million) of the total GDP. The contribution of this sector increased to 9.3 per cent (RM8,754 million) in 2006, and further increased to 10 per cent in 2007 (RM10,077 million) (Table 1.3).

(iv) Industrial Sectors

Three sectors are classified as industrial sectors, i.e. manufacturing; construction; and electricity, gas and water. These sectors work together to drive the region's economy, with the manufacturing sector being one of the main contributors to the region's GDP. In 2005, the manufacturing sector ranked second place recording 21 per cent (RM19,136 million) and increasing to 22 per cent in 2006 (RM20,683 million). In 2007, this sector regained its pole position in the state's GDP at 22 per cent (RM22,107 million) (Table 1.3). The GDP of East Malaysia at constant market prices by industrial origin from 2005 to 2007 is shown in Table 1.3.

2005 Prices-East Malaysia (RM Inniton)							
Economic Activity	2005	2006	2007				
Agriculture	16,925	17,107	17,820				
Mining and quarrying	20,626	21,441	21,976				
Manufacturing	19,136	20,683	22,107				
Electricity, gas and water	2,028	2,081	2,275				
Construction	2,318	2,437	2,463				
Wholesale and retail trade, hotels and restaurants	8,042	8,754	10,077				
Transport, storage and communication	4,732	4,854	5,308				
Finance, insurance, real estate and business services	7,013	7,389	8,398				
Other services	3,339	3,429	3,560				
Government services	5,613	6,011	6,225				
Plus: Import duties	356	301	390				
GDP at purchaser's prices	90,128	94,487	100,599				

Table 1.3:	Gross Domestic Product (GDP) by Economic Activity at Constant
	2005 Prices-East Malaysia (RM million)

Source: Department of Statistics, Malaysia

1.3.1.2 International Trade

In Table 1.4, commodity sections in East Malaysia's trade during 2002-2005 are shown. Total trade almost doubled from RM70,092 million in 2002 to RM117,749 million in 2005. In 2002, the major commodities exported were mineral fuels, lubricants, etc. at RM20,255 million (47 per cent), animal and vegetable oils and fats at RM7,039 million (16 per cent), manufactured goods at RM6,073 million (14.2 per cent), and crude materials, inedible at RM3,736 million (9 per cent). Mineral fuels, lubricants, etc. increased in 2003 to RM26,857 million (50 per cent), in 2004 to RM35,163 million (53 per cent), and again in 2005 to RM44,506 million (58.2 per cent). In the same pattern with mineral fuels, lubricants, etc., crude materials, inedible showed an increasing pattern export trend over the years. In 2002, this section recorded the export value of RM3,736 million (8.7 per cent), increasing to RM4,058 million (7.6 per cent) in 2003, and further to RM5,714 million (7.5 per cent) in 2005.

The major imported commodities in 2002 were machinery and transport equipment at RM10,198 million (37.4 per cent), manufactured goods at RM4,373 million (16.1 per cent) and chemicals at RM3,086 million (11.3 per cent). In 2003, machinery and transport equipment experienced an expansion in import value at RM11,190 million (36.7 per cent) and kept increasing in 2004 and 2005 at RM12,945 million (35.7 per cent) and RM14,620 million (35.4 per cent) respectively. The same pattern was also shown by manufactured goods at RM4,653 million (15.3 per cent), RM4,987 million (13.8 per cent) and RM5,553 million (13.4 per cent) in 2003, 2004 and 2005 respectively. The values of exports and imports by commodity section in detail for East Malaysia for the years 2002-2005 periods are presented in Table 1.4.

Commodity Section		Exp	Import						
	2002	2003	2004	2005	2002	2003	2004	2005	
Food	1,280	1,411	1,394	1,363	2,815	3,228	3,411	3,723	
Beverages and tobacco	143	134	146	135	569	670	743	730	
Crude materials, inedible	3,736	4,058	4,722	5,714	571	657	828	875	
Mineral fuels, lubricants, etc.	20,255	26,857	35,163	44,506	2,531	3,272	5,474	7,770	
Animal and vegetable oils and fats	7,039	9,187	10,631	10,456	137	133	252	270	
Chemicals	785	1,166	1,507	1,731	3,086	3,592	4,312	4,479	
Manufactured goods	6,073	6,310	8,363	8,121	4,373	4,653	4,987	5,553	
Machinery and transport equipment	3,053	3,752	3,442	3,649	10,198	11,190	12,945	14,620	
Miscellaneous manufactured articles	391	421	688	634	2,376	2,557	2,794	2,824	
Miscellaneous transactions and commodities	96	72	69	99	586	523	489	497	
Total	42,851	53,367	66,124	76,408	27,241	30,474	36,235	41,341	

 Table 1.4:
 Export and Import Values by Commodity Section-East Malaysia (RM million)

Source: Department of Statistics, Malaysia

1.3.2 West Malaysia Economic Performance

The annual growth rate for the manufacturing sector was recorded at 2.5 per cent in 2007. This sector was the highest contributor to West Malaysia's GDP at 28.8, 29.2 and 28.2 per cent in 2005, 2006 and 2007 respectively. Another sector which also showed positive growth was mining and quarrying, which recorded 1.9 per cent. The growth rates for the other sectors were steady at more than 9 per cent, i.e. Government services (11.2 per cent); other services (10.8 per cent); transport, storage and communication (10.1 per cent); electricity, gas and water (10.1 per cent); construction (9.9 per cent); finance, insurance, real estate and business services (9.6 per cent); and wholesale and retail trade, hotels and restaurants (9.4 per cent). Despite its negative growth rate at only -0.2 per cent, agriculture still played an important role in contributing towards the GDP (Table 1.5).

1.3.2.1 Economic Performance by Sector

(i) Agriculture Sector

Agriculture is not a main sector in West Malaysia production activities. Despite the rapid development of the non-agriculture sectors, especially the manufacturing and services sectors over the past several decades, the agriculture sector remains significant, especially for food security and rural development, and still contributes a small amount to West Malaysia's GDP. It includes oil palm, rubber, live stocks, logging, fishery and other crops. In 2005, the agriculture sector contributed around 6.2 per cent (RM27,987 million) to West Malaysia's GDP, increasing to 6.3 per cent (RM30,426 million) in 2006, but slightly dropping to 5.9 per cent (RM30,368 million) in 2007 (Table 1.5). The growth in contribution to the GDP was inconsistent over the years.

(ii) Mining and Quarrying Sector

The mining and quarrying sector, though one of the economic activities in West Malaysia, provides a small contribution towards the region's GDP compared with the manufacturing sector. In 2005, this sector contributed 11.4 per cent (RM51,485 million) to the whole GDP in the West Malaysia region. However, this sector recorded a decline at 10.4 per cent (RM49,835 million) in 2006, and at 10 per cent (RM50,782 million) in 2007. The increasing output created in this sector in 2007 was probably because of the expansion of manufacturing sector, particularly the cement industry.

(iii) Services Sectors

West Malaysia has five major services sectors, i.e. wholesale and retail trade, hotels and restaurants; transport, storage and communication; finance, insurance, real estate and business services; government services; and other services. In 2005, the biggest services sector that contributed to the region's GDP was wholesale and retail trade, hotels and restaurants, which recorded 13.5 per cent (RM61,268 million) of the total GDP of West Malaysia, increasing to 13.7 per cent (RM65,525 million) in 2006, and further to 14.1 per cent (RM71,663 million) in 2007 (Table 1.5).

(iv) Industrial Sectors

The three major industrial sectors are manufacturing; construction; and electricity, gas and water. These sectors have worked together to stimulate West Malaysia's economy, with the manufacturing sector being the main sector. The contribution of this sector to the economy in each of the years from 2005 to 2007 was 28 to 29 per cent (Table 1.5).

2005 Trices- west Malaysia (RM Inniton)								
Economic Activity	2005	<mark>2</mark> 006	2007					
Agriculture	27,987	30,426	30,368					
Mining and quarrying	51,485	49,835	50,782					
Manufacturing	130,618	140,197	143,772					
Electricity, gas and water	12,897	13,914	15,326					
Construction	13,789	13,585	14,928					
Wholesale and retail trade, hotels and restaurants	61,268	65,525	71,663					
Transport, storage and communication	32,747	35,312	38,892					
Finance, insurance, real estate and business services	61,040	65,543	71,860					
Other services	25,352	27,319	30,276					
Government services	30,249	32,422	36,069					
Plus: Import duties	6,016	5,370	5,547					
GDP at purchaser's prices	453,448	479,448	509,483					

 Table 1.5: Gross Domestic Product (GDP) by Economic Activity at Constant 2005 Prices-West Malaysia (RM million)

Source: Department of Statistics, Malaysia

1.3.2.2 International Trade

The total trade for West Malaysia expanded from RM590,428 million in 2002 to RM851,358 million in 2005. In 2002, the major commodities exported were machinery and transport equipment at RM212,239 million (67.5 per cent), miscellaneous manufactured articles at RM30.062 million (9.6 per cent) and manufactured goods at RM18,772 million (6 per cent). In 2003, machinery and transport equipment recorded RM222,326 million, increased to RM259,046 million in 2004, and then to RM285,918 million in 2005. The second largest commodities exported by West Malaysia were miscellaneous manufactured articles which experienced the same increasing pattern as machinery and transport equipment. Export from this sector increased from RM30,062 million in 2002 to RM33,216 million in 2003, to RM40,669 million in 2004, and further to RM44,600 million in 2005. The main contributor to the expansion in manufactured goods export came mostly from the electronics industry as well as the electrical machinery, appliances and parts industries. On the other side, the major imported commodities in 2002 were machinery and transport equipment with value of RM177,771 million (64.4 per cent), manufactured goods at RM25,946 million (9.4 per cent), and chemicals at RM18,676 million (6.8 per cent). In 2003, machinery and transport equipment experienced expansion in import value with value of RM184,139 million (64.4 per cent). The same pattern was also experienced by chemicals with import value of RM19,172 million (6.7 per cent) in 2003 (Table 1.6).

Commodity Section		Import						
	2002	2003	2004	2005	2002	2003	2004	2005
Food	6,197	7,012	8,632	9,392	9,625	9,499	13,071	14,057
Beverages and tobacco	1,152	1,358	1,497	1,576	568	473	648	733
Crude materials, inedible	4,683	6,095	7,878	8,382	<mark>6,2</mark> 51	6,724	9,648	9,621
Mineral fuels, lubricants, etc.	10,390	13,375	20,655	27,380	11,837	14,247	19,644	27,168
Animal and vegetable oils and fats	10,887	15,039	15,905	14,237	1,129	1,226	2,659	1,825
Chemicals	15,885	19,384	25,574	29,381	18,676	19,172	27,474	29,417
Manufactured goods	18,772	21,672	28,706	30,977	25,946	25,827	38,331	42,411
Machinery and transport equipment	212,239	222,326	259,046	285,918	177,771	184,139	219,546	234,148
Miscellaneous manufactured articles	30,062	33,216	40,669	44,600	14,811	15,570	20,952	19,778
Miscellaneous transactions and commodities	4,314	5,040	6,567	7,984	9,235	9,186	11,424	12,373

 Table 1.6:
 Export and Import Values by Commodity Section-West Malaysia

 (RM million)

Source: Department of Statistics, Malaysia

Total

314,579 344,517 415,129 459,827 275,849 286,063 363,397 391,531

1.4 Inter-regional Trade

1.4.1 Trends and Performances of Inter-regional Exports

Figures 1.1 to 1.4 show the principal inter-regional exports from East Malaysia to West Malaysia from 2002 to 2005. East Malaysia economic structure depended mostly on the resource-based sectors, particularly mining and quarrying and agriculture. Thus, the exported resource-based goods were mainly from mineral fuels, and animal and vegetable oils and fats, with significant export shares from machinery and manufactured goods. In 2002, the total value of exports to West Malaysia recorded about RM7,224 million (16.9 per cent) from the total of RM42,851 million. The big export markets for East Malaysia were mainly Japan, United Kingdom and ASEAN. The most exported goods were mineral fuels which recorded RM4,152 million (57.5 per cent), manufactured goods RM926 million (12.8 per cent), machinery RM915 million (12.7 per cent), and animal and vegetable oils and fats RM538 million (7.4 per cent).

Despite the economy being mainly resource-based, the capabilities to export capital goods show the changes in economic structure and the expansion of the manufacturing sector through industrialization. Exported goods such as beverages and tobacco, and miscellaneous transactions and commodities recorded less than 1 per cent export earnings for the East Malaysia region. In the period 2001-2002, mineral fuels at 27.2 per cent recorded the highest growth rate, followed by animal and vegetable oils and fats at 26.6 per cent, machinery at 16.1 per cent and manufactured goods at 4.6 per cent. Manufactured goods recorded the highest growth rate in the period 2003-2004 at 37.8 per cent, followed by animal and vegetable oils and fats at 23.2 per cent, and machinery at -16.9 per cent. An increasing trend for exported goods was also recorded in the period 2004-2005 and with the same commodities. Despite the small contribution to the export earnings for East Malaysia, export to West Malaysia region has played a vital role in the expansion of the economic growth for East Malaysia.





Source: Estimated by the author based on the External Trade Statistics, Malaysia, Sabah, and Sarawak

1.4.2 Trends and Performances of Inter-regional Imports

Figures 1.5 to 1.8 show the principal inter-regional imports to East Malaysia region from West Malaysia from 2002 to 2005. Since 2002, East Malaysia imports of intermediate and capital goods have increased as a result of its strong export-driven economic growth. In 2002, the total value of imports from West Malaysia recorded about RM15,451 million (56.7 per cent) from the total of RM27,241 million, allowing East Malaysia's trade with West Malaysia to expand and making West Malaysia a major market for import. The most imported goods were machinery with value of RM5,532 million (35.8 per cent), manufactured goods RM2,917 million (18.9 per cent), other manufactured goods RM1,683 million (10.9 per cent) and chemicals RM1,498 million (9.7 per cent). But crude materials and edible; and animal and vegetable oils and fats recorded the lowest amounts of imports from West Malaysia at only less than 1 per cent. It is because East Malaysia had an economic structure that depended on the resource-based sectors (mining and quarrying and agriculture).

In the period 2001-2002, manufactured goods recorded the highest growth rate at 21.1 per cent, followed by machinery at 9.6 per cent, chemicals at 8.9 per cent, and other manufactured goods at 7.7 per cent. In 2003, chemicals was taken over by mineral fuels as a major import commodity. But in 2004, chemicals returned to replace other manufactured goods. Mineral fuels recorded the highest growth rate in the period 2003-2004 at 71.5 per cent, followed by chemicals at 12.2 per cent, machinery at 5.4 per cent, and manufactured goods at 5.1 per cent. The increasing trend for imported goods was also recorded in the period 2004-2005 for most commodities. In addition, the increasing imports of East Malaysia from West Malaysia show a significant relationship over the years with the increasing imports particularly of machinery, manufactured goods, food, chemicals and other manufactured goods.



Source: Estimated by the author based on the External Trade Statistics, Malaysia, Sabah and Sarawak

1.5 Problem Statement

Malaysia introduced regional economic growth corridors during the Ninth Malaysia Plan with five regional cities and economic corridors, namely Georgetown and the Northern Corridor Economic Region (NCER); Johor Bahru and Iskandar Malaysia (IM); Kuantan and East Coast Economic Region (ECER); Kuching and Sarawak Corridor of Renewable Energy (SCORE); and Kota Kinabalu and Sabah Development Corridor (SDC). The focus of regional development was on increasing the standard of living and achieving balanced socio-economic development across regions and states. One of the objectives of these initiatives was to transform Malaysia into a high-income nation by 2020. Expansion of economic growth contributes significantly to the development of the country, but it also contributes to a widening of the differences between the regions and states in terms of income, employment and GDP per capita. This situation happens because most of the industrial and commercial economic activities tend to concentrate in certain regions and are not evenly distributed across the regions and states. Thus, in planning economic growth for East and West Malaysia, policymakers should obtain detailed information on the potentials and opportunities in each economic sector that should be emphasized. In addition, to select the potentials of a sector, policymakers must also know the existing interindustry linkages so that any steps to develop the economy can be distributed to the whole industry. Since information at sectoral level is important in regional economic planning, every country should have regional and inter-regional input-output tables. For instance, Indonesia, Japan and China have detailed regional and inter-regional input-output tables, even for districts, but in Malaysia there are no ready-made or published regional and inter-regional input-output tables. Moreover, East Malaysia has had resource-based (mining and quarrying) and West Malaysia non-resource-based (manufacturing) sectors to drive the Malaysian economy during the last decade. So, by developing the regional and inter-regional input-output tables, this study could contribute to the economic planning for both regions. Thus, the first objective of the study was to construct regional and inter-regional IO table for East and West Malaysia.

In addition, similar to the single regional input-output table, the inter-regional inputoutput matrices make it possible to estimate the importance of an external shock on major macroeconomic indicators such as output, value-added, income and employment. Analysis built on the input-output multipliers helps identify how an additional final demand affects not only the output of a given region but also the outputs of other regions through intermediate demand transactions. This approach can also capture the linkages by sector in the supplying region and in the receiving region through interregional spillover and feedback effects (Miller and Blair, 2009). For example, according to the Department of Statistics, during the period 2002-2005, the trading pattern, especially for imported commodities for East Malaysia from West Malaysia showed an increasing trend and significant relationship particularly in machinery, manufactured goods, mineral fuels, chemicals and other manufactured goods. Hence, the second objective was to analyse the inter-regional impacts of the two regions in terms of spillover and feedback effects.

The economic structures for East and West Malaysia are different in terms of generating output, income and employment. Thus different production functions produce different inter-dependencies between the sectors; the sector with strong or high inter-dependency on other sectors might be affected more and the sector which has low inter-dependency on other sectors might be not affected if there are any changes in economic policy or a crisis in the economy. Though the resource-based and nonresource-based sectors are important sectors which make major contributions to the economy of East and West Malaysia, the degree of inter-relatedness or interdependency of the resource-based and non-resource-based sectors on others is yet to be known. On the other hand, the multiplier effects are also important in identifying the impact of any changes in demand on the regional economy and are most frequently used to estimate the effects of final demand changes on output, value-added, import, taxes (domestic and import) and employment as a result of the level reached by new demands. Therefore, the third objective was to identify regional key sectors and multiplier effects. Specifically, this study examined the following questions: What was the quantitative relationship between the sectors in the economy of East and West Malaysia? Which sectors contributed to the sources of growth in the economy of East and West Malaysia? Which sectors in the economy of East and West Malaysia's were most important to developing the linkages? Which sectors contributed most to the output for East and West Malaysia?

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1.6 Objectives of the Study

The main purpose of this study was to analyse the economic structures of East and West Malaysia and their inter-dependence for the year 2005. Specifically, this study aimed:

- i. To construct regional and inter-regional IO tables for East and West Malaysia;
- ii. To analyse the inter-regional impacts of the two regions in terms of spillover and feedback effects;
- iii. To identify regional key sectors and multiplier effects.

1.7 Significance of the Study

The significant economic growth for East Malaysia has largely been due to the achievements of the resource-based sectors (especially mining and quarrying), while that for West Malaysia has been driven by the rapid expansion of the non-resource-based sectors (especially manufacturing). The roles of mining and quarrying and manufacturing as major sectors in the economic growths for East and West Malaysia respectively can be seen from their increasing shares in the GDP and total export. However, in terms of annual growth, the patterns were inconsistent (Tables 1.3 and 1.5). From 2002 to 2005, mineral fuel, lubricants, etc. showed the highest export earnings for East Malaysia, while machinery and transport equipment gave the largest export earnings for West Malaysia (Tables 1.4 and 1.6).

However, for planning purposes, the large dependency for economic growth on the mining and quarrying sector for East Malaysia and the manufacturing sector for West Malaysia needs regional and inter-regional input-output tables. The construction of these tables is important in understanding the economic structures of East and West Malaysia and determining the contribution of each sector to the economy. Generally from this study, we could observe how the development of the major sectors for each region has impacted the other sectors in that region.

Moreover, estimating the inter-regional spillovers and feedback is essential to examine the regional economic impacts between East and West Malaysia. Inter-regional feedback is defined as the secondary trade effects in the output of one region from an increase in that same region's final demand. Lastly, identifying the key sectors and multiplier effects in the economy through forward and backward linkages, output, income and employment multipliers would provide a guide for the development planning for each region.

The information on the effects of the major sectors on the least sectors contributing to the economic growth will be a significant useful policy guide for the planning purposes for East and West Malaysia. In the case of Malaysia as a whole, not many studies have been made to construct regional and inter-regional input-output tables to use as tools for planning purposes.

1.8 Scope of the Study

This study focused on East and West Malaysia using data from the national accounts for Malaysia and Sabah and Sarawak for the year 2005. The data for Malaysia were used as a control in the estimation for the West Malaysia regional input-output table. So this study tried to highlight possible differences between the development processes in East and West Malaysia. The selection of those two regions was based on two considerations. Firstly, the data for inter-regional trade (export and import) were to focus completely only on the East and West Malaysia regions. Secondly, the structures of the economies under consideration should not be too different among themselves. Also, more emphasis was to be given to resource-based activities of the East Malaysia region, namely Sabah and Sarawak, which make their economic structures different from that of the West Malaysia region.

1.9 Organization of the Study

The organization of this study is presented in five chapters. The first chapter provides an introduction to the study with the background which includes some information on job opportunities in East and West Malaysia and the economic structures of East and West Malaysia divided into two parts: economic performance, particularly in GDP and export, import and inter-regional trade (export and import) between the two regions focusing on the main commodities. This is followed by the problem statement, objectives, significance and scope of the study. The second chapter provides reviews of the theoretical framework and empirical studies in constructing the regional and interregional input-output coefficients (single region and two regions), and regional economic impact analysis focusing on the spillover and feedback effects in these two regions, key sectors and multiplier effects. Detailed information about the methodology of the study, which includes a discussion on the framework of the study, is presented in the third chapter. It deals with the estimation techniques for single and two regions, spillover and feedback effects, key sectors and multiplier effects, and the sources of data. Chapter four gives the results of the analysis and discussion on the results. Finally, the last chapter provides the summary and conclusions, policy implications, limitations of the study and suggestions for future research.

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