J1711

REGIONAL DEVELOPMENT OF SPECIFICATION AND EMPLOYMENT DEVELOPMENT IN SABAH AND SARAWAK: AN ANALYSIS WITH SHIFT SHARE TECHNIQUES

BY

CHEW PEI SHAN
CHEW YI TAU
MOK JIA YING
SIM SHI YING
WONG SHIN CHET

A research project submitted in partial fulfillment of the requirement for the degree of

BACHELOR OF ECONOMICS (HONS)
FINANCIAL ECONOMICS

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE
DEPARTMNET OF ECONOMICS

AUGUST 2017

DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is 24, 144 words.

Name of Student:	Student ID:	Signature:
1. Chew Pei Shan	14ABB07520	_____
2. Chew Yi Tau	14ABB07190	_____
3. Mok Jia Ying	14ABB06905	_____
4. Sim Shi Ying	14ABB06674	_____
5. Wong Shin Chet	14ABB07366	_____

Date: 30th August 2017

ACKNOWLEDGEMENT

First and foremost, we would like to thank Universiti Tunku Abdul Rahman (UTAR) for giving us this opportunity to carry out this research and also providing us the sufficient reading materials for us to refer while doing our research.

We would also like to express our sincere gratitude to our research supervisor, Dr. Au Yong Hui Nee for her patient guidance, enthusiastic encouragement and useful critiques of this research. Despite her packed schedule, she is always available for consultation and we are grateful for her great sense of responsibility. Besides, she has also been generous to share her knowledge in the field of economics and has been supportive throughout our research. This research would not be completed without her constant encouragement and guidance. Apart from that, we would also like to thank our FYP coordinator, Ms. Thavamalar for providing us the guidelines for our FYP. We also appreciate her for being patient in listening and answering our questions regarding the guidelines.

Besides, we would also like to thank Dr. Vikniswari and Ms. Tan Ai Lian, our examiners for spending their time in reading our research and giving us precious advices to improve our research.

We are also appreciative for all the hard works and efforts contributed by every members in completing this Final Year Project. The time that we shared in completing this research together will be the most memorable moment in our university life. Lastly, we would like to extend our special thanks to our families for their support both mentally and financially throughout the research.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF ABBREVIATIONS

11MP	Eleven Malaysia Plan
ADF	Augmented Dickey- Fuller
AOR	Average Occupancy Rates
BHEP	Bakun Hydro Electrical Project
BIMP-EAGA	Brunei, Indonesia, Malaysia and Philippines- East ASEAN Growth Area
BLUE	Best Linear Unbiased Estimator
CS	Competitive Share
DF	Dickey-Fuller
DOSM	Department of Statistics Malaysia
EPU	Economic Planning Unit
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
GDP	Gross Domestic Product
GLS	Generalized Least Square
GMM	Generalized Method of Movement
GST	Goods and Service Tax
ILP	Industrial Training Institute
IM	Industrial Mix
IME	Industrial Mix Effect
IMS	Industrial Mix Share
IPS	Im, Pesaron and Shin
KPJ	Kuching Specialist Hospital
KPP	Kimanis Power Plant
KPSS	Kwaitkowski, Phillips, Schmidt and Sh

LFPR	Labour Force Participation Rate
LM	Lagrange multiplier
LSDV	Least Square Dummy Variable
MARDI	Malaysia Agriculture Research and Development Institute
MHTH	Malaysia Healthcare Travel Council
MPOB	Malaysia Palm Oil Board
NG	National Growth
NS	National Growth Share
OLS	Ordinary Least Square
POIC	Palm Oil Industrial Cluster
PP	Phillips-Perron
R&D	Research and Development
RAS	Rural Air Services
REM	Random Effect Model
RS	Regional Shift
SAC3	Sabah Animation & Creative Content Centre
SAMUR	Sabah Ammonia and Urea project
SCB	Sarawak Convention Bureau
SCORE	Sarawak Corridor of Renewable Energy
SOGT	Sabah Oil and Gas Terminal
SSGP	Sabah and Sarawak Gas Pipeline
UCSF	University College Sabah Foundation
UITM	Universiti Teknologi Mara
UMS	Universiti Malaysia Sabah
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIMAS	Universiti Malaysia Sarawak
UNITAR	Universiti Tun Abdul Razak

ABSTRACT

The aim of this research is to investigate the employment competitive advantages in five sectors which are agriculture, hunting, forestry and fishing, mining and quarrying, manufacturing, construction, and services in Malaysia, Sabah and Sarawak from 2005 to 2015. The employment across sectors in Sabah and Sarawak has been the major concern that urges us to conduct this research. Specifically, this research studies the effect of sector gross domestic product (GDP) on regional employment conditions. In analysing toward the employment competitive advantages, shift share analysis was utilized. The result shows that from 2005 to 2015, Sarawak has its competitive advantage shift from manufacturing to construction and services sector while maintain in mining and quarrying sector. Whereas in Sabah, the employment competitive advantage appears in almost all sector while competitive disadvantage shift from manufacturing to mining and quarrying from 2005 to 2015. The finding recommends that government should emphasis in improvement of infrastructure for better regional development. Other than that, it is suggested that government should has efficient capital allocation in expansion of high value added industries, goods and services while promote tourism development

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

The overview of this research explained the employment condition in Sabah and Sarawak from past to present. Consequently, the transformation of economic condition on the region itself is a significant factor in analysing the changes of employment condition. For more information, data and facts were attached in providing knowledge and evidence in estimation of objectives and hypotheses of this research.

1.1 Research Background

1.1.1 Malaysia Background

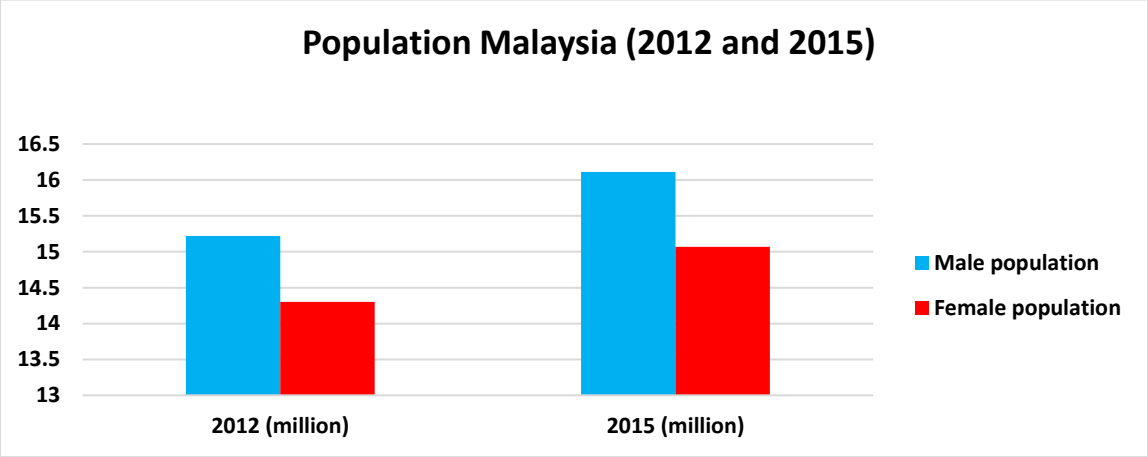
Based on the Department of Statistic Malaysia, the total area of Malaysia is 330,323 square kilometers. The highest percentage of ethnic population among the Malaysia citizens is Bumiputera (68.6%) followed by Chinese which consists the percentage of (23.4%), Indians (7.0%) and others (1.0%).

Table 1.1: Population of Malaysia in year 2012 and year 2015

Population	2012	2015
Male population (million)	15.22	16.11
Female population (million)	14.30	15.07
Total population (million)	29.52	31.19
Population growth (annual %)	1.60	1.50

Source: *Department of Statistics, Malaysia*

Figure 1.1: Population of Malaysia in year 2012 and year 2015



Source: Department of Statistic, Malaysia

Based on the Table 1.1 and Figure 1.1, it shows that the population of Malaysia increase over the years while the average annual population growth rate shows a drop of 01.10% from 2012 (1.60%) to 2015 (1.50%). The male population in Malaysia (16.11 million) is higher compared to female population (15.07 million) in 2015.

Table 1.2: Employment of Malaysia (Labour Force), 2012 and 2015

	2012 ('000)	**2015 ('000)**
Labour force	13,221.70	14,667.80
Employed	12,820.50	14,163.70
Unemployed	401.20	450.30

Sources: Department of Statistics, Malaysia

Table 1.3: Labour Force Participation Rate and unemployment rate, 2012 and 2015

	2012 (%)	2015 (%)
Labour Force Participation rate	65.60	67.90
Male	80.50	80.60
Female	49.50	54.10
Unemployment rate	3.00	3.10

Sources: Department of Statistics, Malaysia

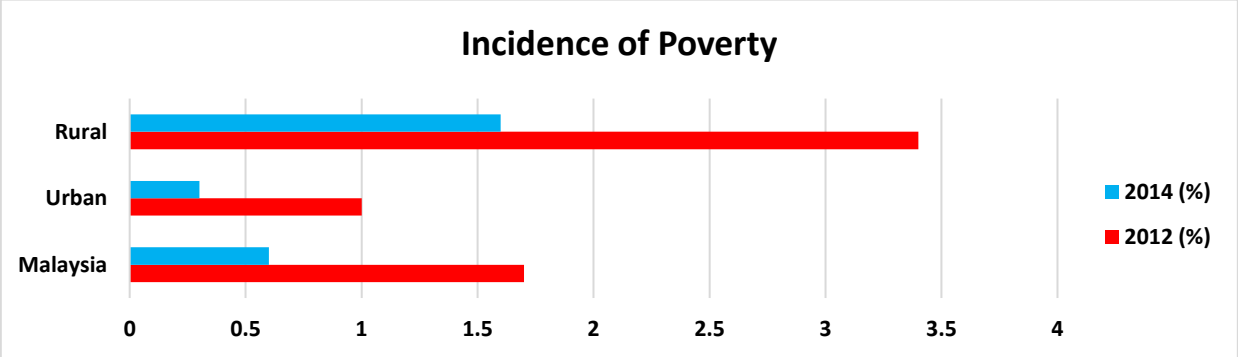
Other than that, Table 1.2 and 1.3 shows the employment of Malaysia in 2012 and 2015. The labour force participation rate (LFPR) shows an increase in 2015, which is 67.90%. It also shows that the male LFPR (80.60%) was still higher than the female LFPR (54.10%) in 2015. Based on the Department of Statistic Malaysia stated the unemployment rate in 2015 shows an increase, which is 3.10%.

Table 1.4: Incidence of Poverty in Malaysia, 2012 and 2014

	2012 (%)	2014 (%)
Malaysia	1.70	0.60
Urban	1.00	0.30
Rural	3.40	1.60

Sources: Department of Statistics, Malaysia

Figure 1.2: Incidence of Poverty in Malaysia, 2012 and 2014



Source: Department of Statistic, Malaysia

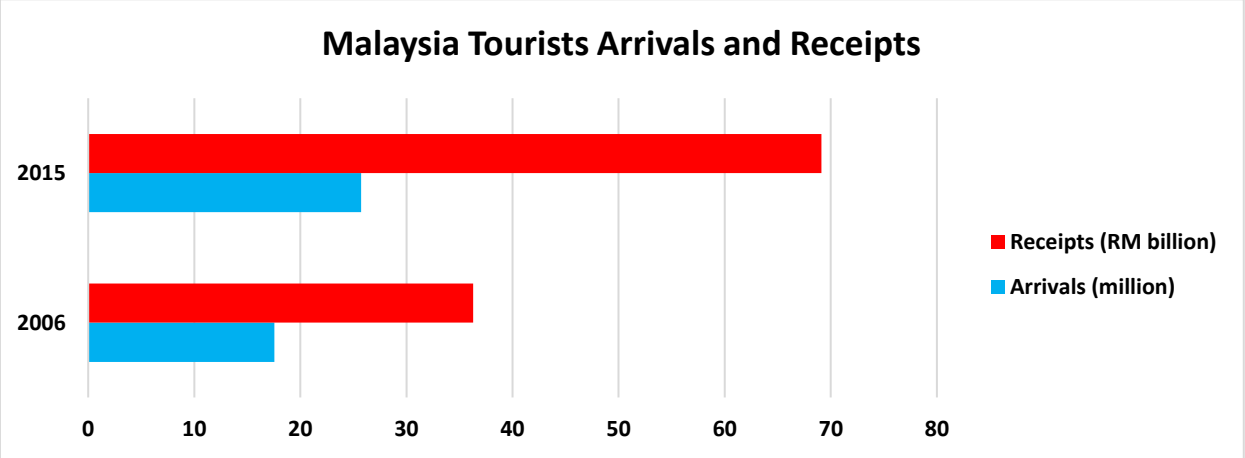
Besides that, Table 1.4 and Figure 1.2 shows the incidence of poverty in Malaysia in 2012 and 2014. At Malaysia level, the rate of poverty has showed a drop, which is 1.7% in 2012 to 0.6% in 2014. In the same time, the incidence of poverty in urban and rural area also shows a dropped of 0.7% and 1.8%. That is a drop in poverty incidence in Malaysia may because of some formulated some policies that been used to promote the economic development or to provide government grants and etc.

Table 1.5: Malaysia Tourists Arrivals and Receipts, 2006 and 2015

Tourist	2006	2015
Arrivals (million)	17.55	25.72
Receipts (RM billion)	36.30	69.10

Source: Tourism Malaysia Statistics

Figure 1.3: Malaysia Tourists Arrivals and Receipts, 2006 and 2015



Source: Tourism Malaysia Statistics

Table 1.5 and Figure 1.3 above shows the tourist arrivals and receipts to Malaysia in 2006 and 2015. In 2015, the tourist arrivals and receipts show an increase of 25.72 million and RM69.10 million respectively. Tourism plays an important role for improving the Malaysia economy. In related to that, the transportation industry helps to improve the Malaysia's tourism statistics, for example the low-cost airlines (AirAsia) which began its first international flight in 2003. Other than that, international meetings, incentives, conventions, trade exhibitions and

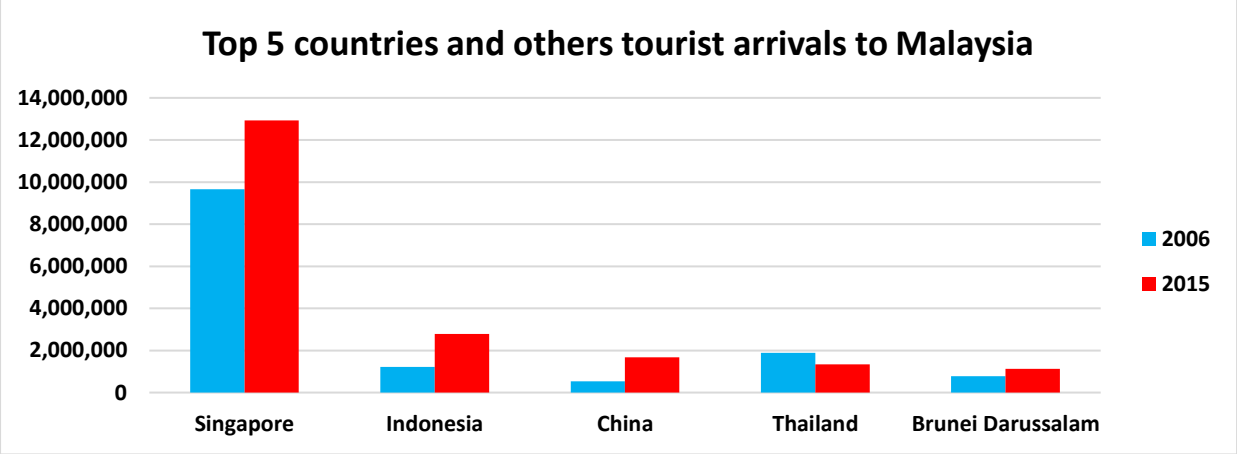
some major business events would also lead to an increment in tourist arrivals and receipts in Malaysia (Malaysia Convention & Exhibition Bureau, 2017).

Table 1.6: Top 5 countries and others tourist arrivals to Malaysia, 2006 and 2015

Countries	2006	2015
Singapore	9,656,251	12,930,754
Indonesia	1,217,024	2,788,033
China	532,914	1,677,163
Thailand	1,891,921	1,343,569
Brunei Darussalam	784,446	1,133,555

Source: Tourism Malaysia Statistics

Figure 1.4: Top 5 countries and others tourist arrivals to Malaysia, 2006 and 2015



Source: Tourism Malaysia Statistics

Table 1.6 and Figure 1.4 above shows the top 5 countries (Singapore, Thailand, Indonesia, Brunei Darussalam and China) of tourist arrivals to Malaysia in year 2006 and 2015. Singapore shows the highest amount of tourist arrivals to Malaysia (12,930,754) in 2015 among other countries. Majority of these countries are neighbour countries of Malaysia.

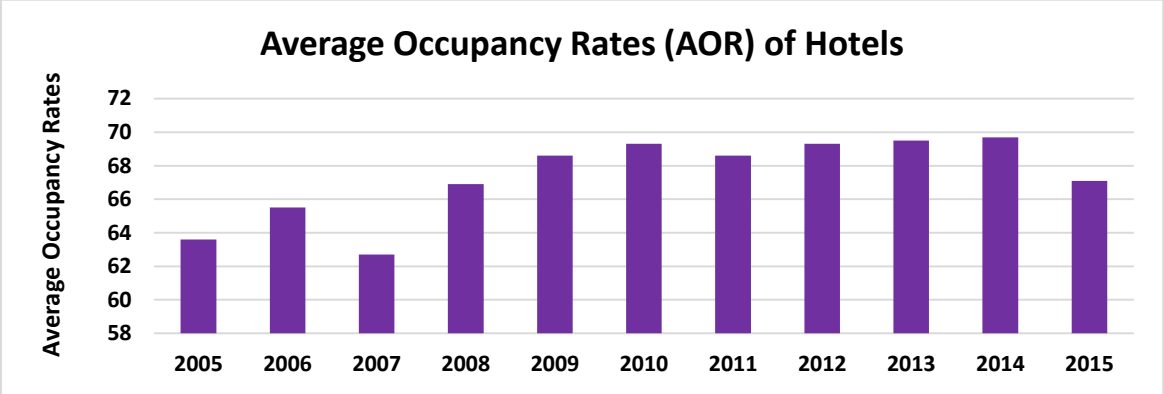
Table 1.7: Average Occupancy Rates (AOR) of Hotels, 2005-2015

Year	2005	2006	2007	2008	2009	2010
AOR (%)	63.60	65.50	62.70	66.90	68.60	69.30

Year	2011	2012	2013	2014	2015
AOR (%)	68.60	69.30	69.50	69.70	67.10

Source: Tourism Malaysia (Based on Hotel Survey)

Figure 1.5: Average Occupancy Rates (AOR) of Hotels (2005-2015)



Source: Tourism Malaysia (Based on Hotel Survey)

Table 1.7 and Figure 1.5 shows the average occupancy rates (AOR) of hotels from 2005 to 2015. In the period between 2007 and 2008, global recession occurred and eventually lead to slow down of economics. Hence in 2007, it shows a dramatic drop in the average occupancy rates (AOR) of hotels. Besides that, it also shows a slightly decrease in 2015 because of the petrol price. The petrol price dropped suddenly and this leads to the decrease in demand, therefore cause the global economic to slow down and eventually the AOR of hotels dropped.

Based on Malaysia Healthcare Travel Council (MHTH) (2016), it stated that the revenue of healthcare travel generated in Malaysia between January and September 2015 is RM588.6 million. It also mentioned that the primary market of Malaysia which consists of larger percentage of total healthcare revenue is Indonesia (62%). Followed by, Middle East (7.4%), India (3%), China (2.6%), Japan (2.6%) and Australia, New Zealand and United Kingdom (2.5%) and others (19.9%). Hence, the markets of China, ASEAN and Central Asia are progressively important as medical tourist suppliers.

In Sabah, KPJ Sabah and KPJ Damai (Gleaneagle Hospital and Jeddelton Hospital) are the private hospitals that provide services to medical tourists from Southeast Asian nations and aims to turn Malaysia into a healthcare tourism destination (The Star Online, 2017). On the

other hand, Sarawak also offers international-class of medical treatment with private hospitals such as Timberland Medical Centre, Kuching Specialist Hospital (KPJ), Borneo Medical Centre and Rajang Medical Centre Sibu which have reported an increase in the number of medical tourists. According to New Sarawak Tribune (2017), it stated that foreign patients who came to seek for medical treatment were approximately 21,603, and they brings in RM27.36 million revenues in 2016. In record, most of the Sarawak medical tourists are came from Indonesia (16,225 patients).

1.1.2 Sarawak Background

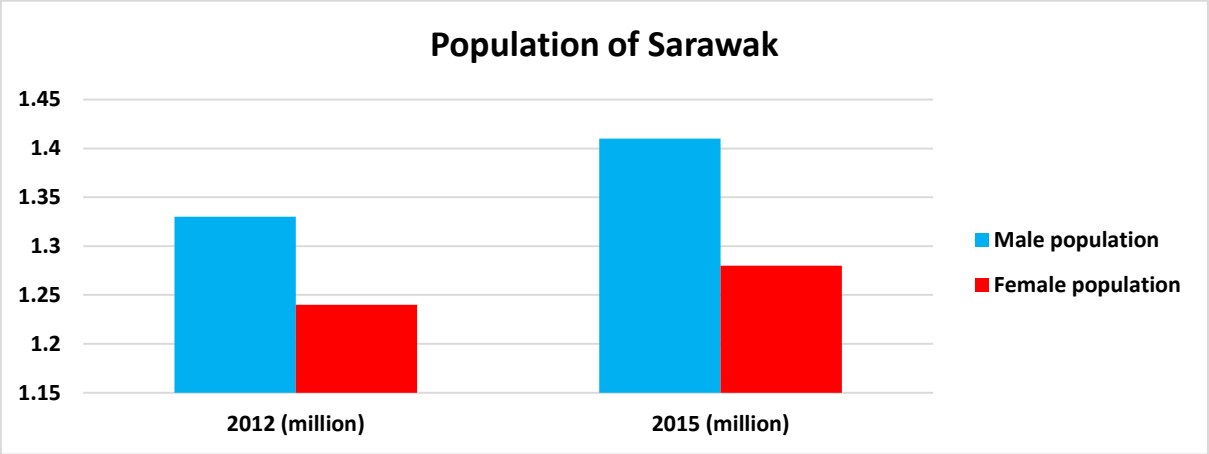
Sarawak joined Malaysia in 1963 and located on Borneo Island as well as contiguous the neighbor country Sabah. The land coverage area in Sarawak is about 124,450 km^2 (Department of Statistic Malaysia, 2015). The population of Sarawak is varied, which consist of many races and ethnic groups. There are more than 40 ethnic groups in Sarawak which consists of their particular distinct ethics, language and customs. Apart from Bahasa Malaysia, English is the official language of main national administration in Sarawak (Tawie, 2015).

Table 1.8: Population of Sarawak (2012 and 2015)

Population	**2012 (million)**	**2015 (million)**
Male population	1.33	1.41
Female population	1.24	1.28
Total population	2.57	2.70
Population growth (Annual %)	1.60	1.40

Sources: *Department of Statistic, Malaysia*

Figure 1.6: Population of Sarawak, 2012 and 2015



Source: Self computed

Table 1.8 and Figure 1.6 shows an increase of total population in Sarawak from 2012 (2.57 million) to 2015 (2.70 million). The male population are higher compared to female population in Sarawak. According to Malaysia Human Development Report (2013), the largest population of Sarawak and the major ethnic groups are Ibans (29%), followed by Chinese (25.4%), Malays (22.2%) and others (23.4%).

Table 1.9: Employment of Sarawak (Labour force), 2012 and 2015

	2012 ('000)	**2015 ('000)**
Labour force	1,184.90	1,258.30
Employed	1,143.90	1,214.80
Unemployed	41.00	43.50
Labour force participation rate (%)	69.4	68.4

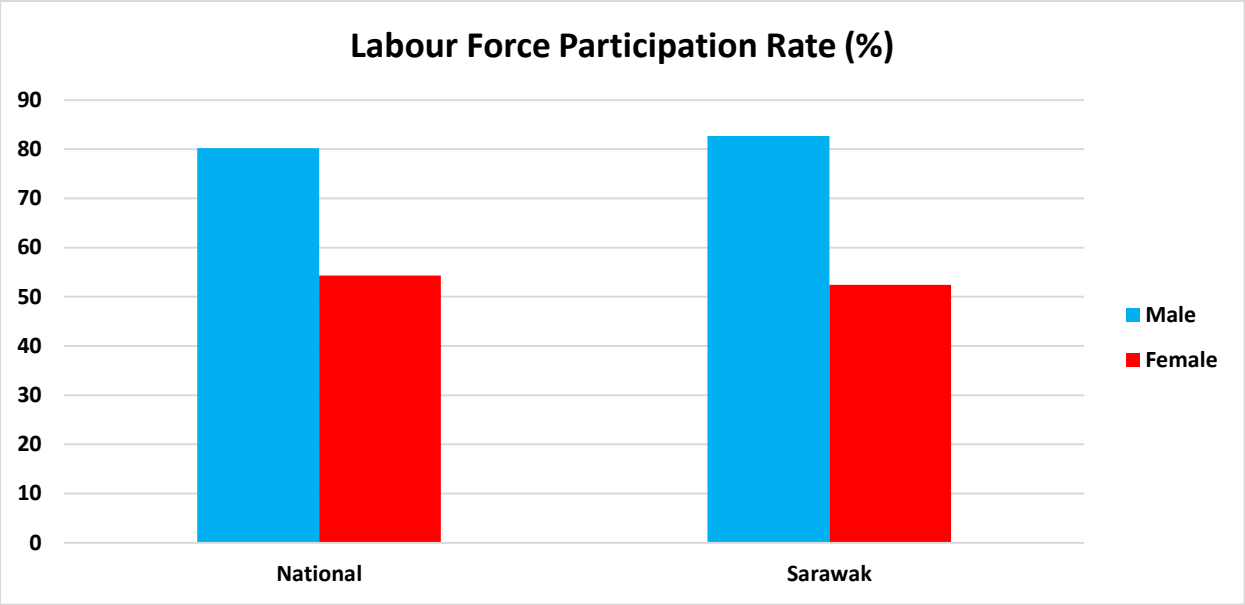
Source: *Department of Statistic, Malaysia*

Table 1.10: Labour Force Participation Rate (%) of National and Sarawak, 2015

	Male (%)	**Female (%)**
National	80.2	54.3
Sarawak	82.7	52.4

Source: Department of Statistic, Malaysia

Figure 1.7: Labour Force Participation Rate (%) of National and Sarawak (2015)



Source: Self computed

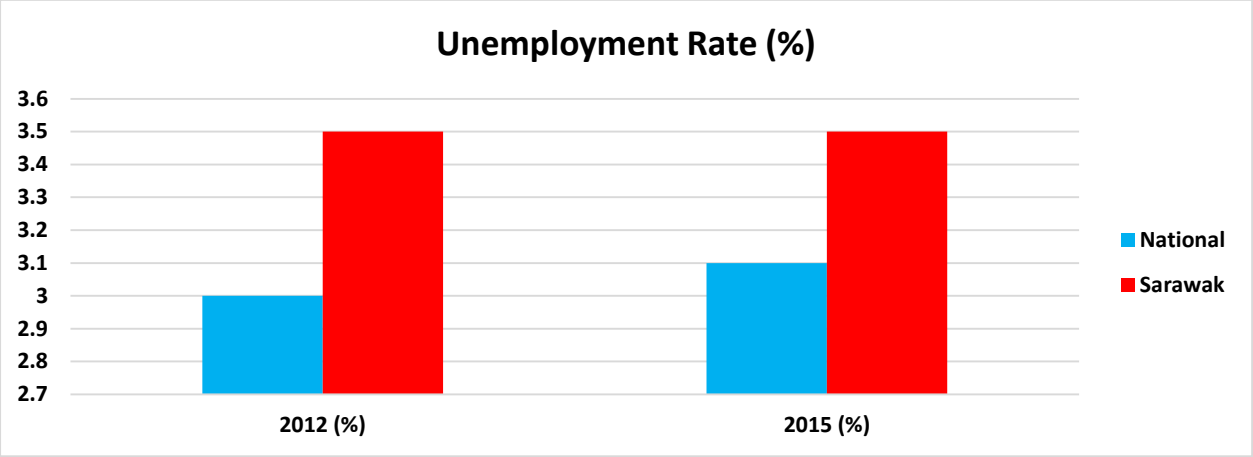
As shown in Table 1.10 and Figure 1.7, there are the labour force participation rate, LFPR (%) of National and Sarawak. It shows that the Sarawak male LFPR (82.7%) is higher compared to in National (80.2%) in 2015 while female LFPR in National (54.3%) is much higher compared to Sarawak (52.4%). In related to the increment of labour force in Sarawak which has increased in 2015 (Refer to Table 1.9), citizens are assumed actively looking for jobs. Hence, the LFPR in Sarawak (68.4%) shows higher percentage as compared to National (67.9%) in 2015.

Table 1.11: Unemployment Rate of National and Sarawak (2012 and 2015)

	2012 (%)	**2015 (%)**
National	3.00	3.10
Sarawak	3.50	3.50

Source: Department of Statistic, Malaysia

Figure 1.8: Unemployment Rate of National and Sarawak (2012 and 2015)



Source: Self computed

Table 1.11 and Figure 1.8 above shows the Sarawak unemployment rate (3.5%) was higher compared to National (3.1%) in 2015. This shows a lack of job opportunities in Sarawak compared to Peninsular Malaysia in 2015. With a great labour force participation rate in Sarawak, it shows a highly competitive labour force of Sarawak. And so, the unemployment rate in Sarawak is more higher compared to National.

1.1.3 Sabah Background

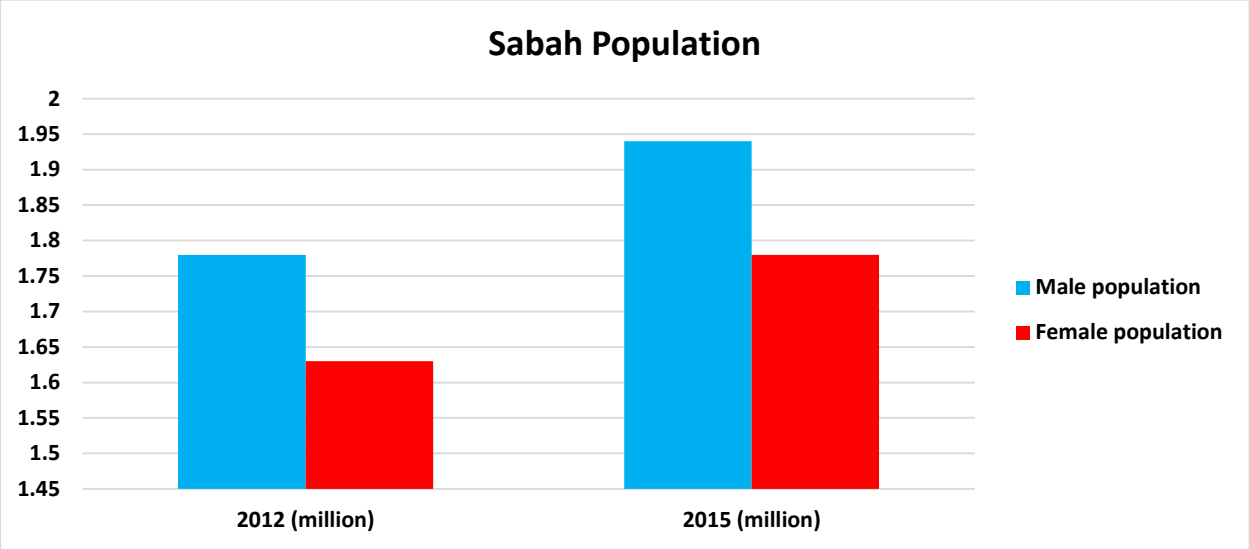
Sabah is also located on the Borneo Island which is the northern portion. Based on Department of statistic Malaysia, Sabah land area is approximately 73,902 km^2 excluding the Labuan Island. Sabah also known as one of the largest rainforests which consists of numerous species of flora and fauna. Approximately, there are 32 ethnic groups which consist of their own culture, customs and languages respectively. Three main ethnic groups in Sabah are Kadazan-Dusun (25%), followed by Bajau (15%), Murut (3%) and others (57%).

Table 1.12: Population of Sabah, 2012 and 2015

Population	2012 (million)	2015 (million)
Male population	1.78	1.94
Female population	1.63	1.78
Total population	3.42	3.72
Average annual population growth rate (%)	2.10	1.40

Source: Department of Statistic, Malaysia

Figure 1.9: Population of Sabah, 2012 and 2015



Source: Department of Statistic, Malaysia

Table 1.12 and Figure 1.9 above shows an increase of the total population of Sabah from 2012 and 2015. Male population in Sabah was higher compared to female population in both 2012 and 2015. However, the average annual population growth rate shows a decrease of 1.4% in year 2015 based on the Department of Statistics, Malaysia.

Table 1.13: Employment of Sabah (Labour Force), 2012 and 2015

	2012	2015
Labour force ('000)	1,627.9	1,863.4
Employed ('000)	1,537.4	1,771.1
Unemployed ('000)	90.5	92.3
Labour force participation rate (%)	67.6	69.5

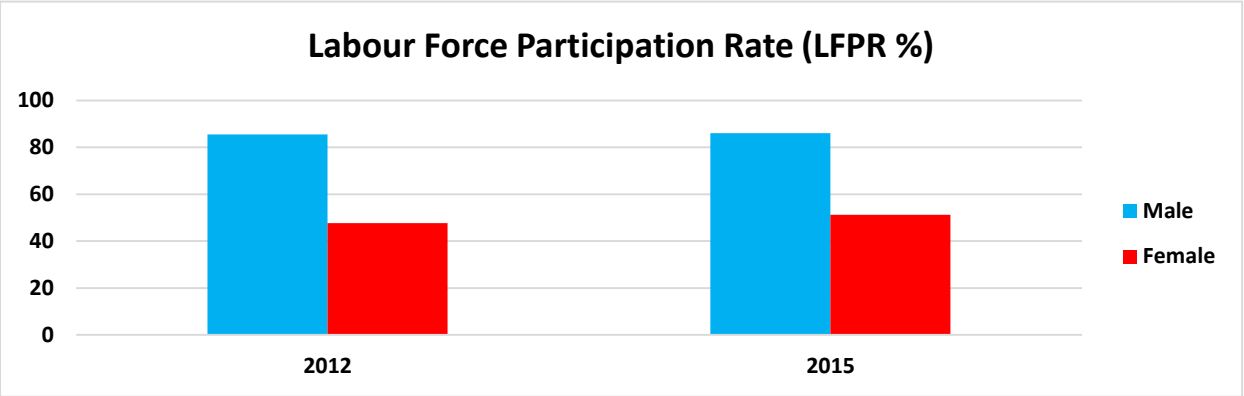
Source: Department of Statistic, Malaysia

Table 1.14: Labour Force Participation Rate (%) of National and Sabah, 2015

LFPR	Male (%)	Female (%)
National	80.2	54.3
Sabah	86.1	51.2

Source: Department of Statistic, Malaysia

Figure 1.10: Labour Force Participation Rate (LFPR) of National and Sabah in 2015



Source: Department of Statistic, Malaysia

The Table 1.14 and Figure 1.10 above shows the labour force participation rate, LFPR (%) of National and Sabah in 2015. The male LFPR in Sabah (86.1%) was higher compared to National (80.2%) while the female LFPR in Sabah (51.2%) was lower compared to National (54.3%). Overall, based on Table 1.13 shows the labour force participation rate (LFPR) in Sabah (69.5%) is higher compared to National (67.9%). This is mainly because of the high populations in Sabah which eventually leads to the competitiveness between the labour force

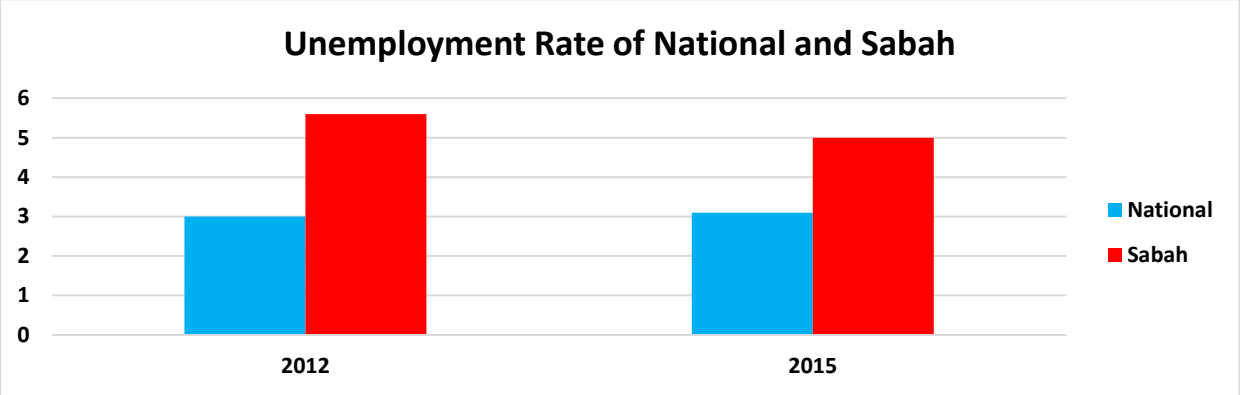
of Sabah. In order to survive, the citizens are actively compete with others in searching for a job. Hence, the LFPR in Sabah shows a higher percentage as compared to National.

Table 1.15: Unemployment Rate of National and Sabah, 2012 and 2015

Unemployment	2012 (%)	2015 (%)
National	3.0	3.1
Sabah	5.6	5.0

Source: Department of Statistic, Malaysia

Figure 1.11: Unemployment Rate of National and Sabah, 2012 and 2015



Source: Self computed

Table 1.15 and Figure 1.11 above shows the National and Sabah unemployment rate in 2012 and 2015. The Sabah unemployment rate is higher compare to National in 2012 and 2015, which is 5.4% and 3.4% respectively. However, with the labour participation rate in Sabah, which is 69.5% in 2015, the one of the reason of high unemployment rate in Sabah is because of the high population in Sabah (Department of Statistic, Malaysia). This situation leads to more competitiveness between the labour force. Hence, the unemployment rate of Sabah (5.0%) was higher compared to National (3.1%) as shown..

1.1 Economic Development

According to Department of Statistics Malaysia (Refer Table 1.16 and Figure 1.12

below), the Gross Domestic Product (GDP) growth of Malaysia shows an increase from 2005 to 2015. It means that Malaysia has increase the amount of production which takes place in the economy.

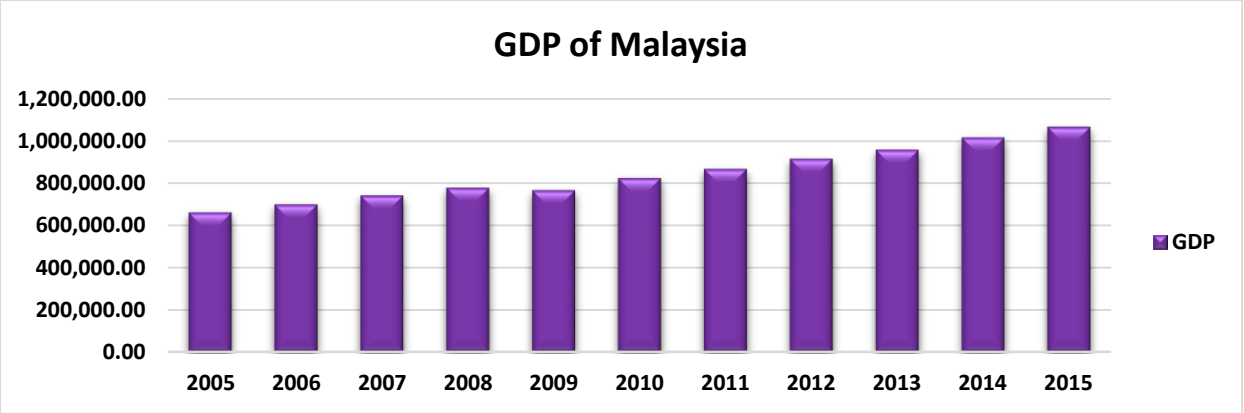
Table 1.16: GDP Malaysia, 2005-2015 (RM Million)

Year	2005	2006	2007	2008	2009	2010
GDP	659,885.42	696,739.01	740,625.11	776,410.41	764,659.22	821,434.00

Year	2011	2012	2013	2014	2015
GDP	864,052.72	912,822.60	956,133.28	1,013,710.49	1,062,805.00

Source: Department of Statistics, Malaysia

Figure 1.12: GDP of Malaysia from 2005-2015) (RM Million)



Source: Department of Statistic, Malaysia

Table 1.17: Planted area of main crops in Malaysia from 2012-2015

Malaysia ('000 Hectares)	2012	2013	2014	2015
Oil palm	5,076.9	5229.7	5,392.2	5,639.6
Cocoa	11.7	13.7	16.1	18.2
Rubber	1,041.2	1,057.3	1,056.6	1,078.6

Source: Department of Statistics, Malaysia/ Malaysia Palm Oil Board Website/ Malaysian Cocoa Board Website/Malaysia Rubber Board Website/ Department of Agriculture, Sarawak/ Malaysian Pepper Board

Table 1.17 above shows the Malaysia planted area of main crops in 2012 and 2015. The oil palm shows the highest hectares, which is 5,639,600 hectares in 2015. The oil palm

plantation has been increased over the years as shown in Table 1.17. The plantation of rubber also shows an increment from 2012 to 2015. Even though the cocoa beans have the lowest hectares (18,200 hectares), the sector has showed an increasing amount from 2012 to 2015.

Table 1.18: Sector Contribution of Malaysia, 2005 and 2015

	2005 (%)	**2015 (%)**
Primary sector	21.67	17.63
Secondary sector	29.70	27.82
Tertiary sector	48.62	54.54

Source: Department of Statistic, Malaysia

Table 1.18 shows the Malaysia sector contribution (primary, secondary and tertiary). The amount contributed by primary sector (agriculture sector) and secondary sector (manufacturing sector) show a decrease in volume in 2015 compared to 2005 while tertiary sector (tourism, education and services sectors) increases from 48.62% to 54.54%. Nowadays, Malaysia is highly focusing on the tertiary sector, hence it shows the highest percentage of 54.54% among the other sectors (Department of Statistic, Malaysia). Therefore, based on the table above, it was concluded that there was a changing of economy production from the primary sector and secondary sector to the tertiary sector in Malaysia.

In related to economic development in Sabah and Sarawak the two states in Malaysia, according to the Eleven Malaysia Plan (11MP) (2016-2020), it stated that the Pan Borneo Highway which consist a length of 2,239 km of the road connectivity development between Sabah and Sarawak which presently under construction is expected to fully done by 2023. Besides that, the government is aiming to achieve the one Malaysia Youth City with three pilot programmes in Peninsular Malaysia, Sabah and Sarawak. It has been distributed with a total of RM100 million which publicized by Economic Planning Unit (EPU) in the Budget 2015. In Sabah and Sarawak, the essential facilities such as road are continues to have improvement so that the urban and rural area can complement to each other. For educational purposes, some primary and secondary schools will be built in Sabah and Sarawak. Other than that, a huge infrastructure programme consists of construction airports in Mukah and Lawas of Sarawak will be applied as stated in 11MP.

Besides that, state budget Malaysia, stated that the activity of local investment will strengthen the GDP contribution. In aspect of investment distribution, Samalaju Industrial Part in Sarawak was distributed with RM142 million distribution and Palm Oil Jetty in Sandakan, Sabah with a distribution of RM20 million (Ministry of Finance Malaysia, 2016). There were also agendas of development that will be implemented to enhance Sabah and Sarawak development which are:

(i) By 2021, Pan-Borneo Highway in Sarawak is expected to be finished by the distance of 1,090 km with an approximately cost of RM16.1 billion. The highway from Sindumin to Tawau in Sabah will be preliminary the construction work spanning of 706 km in year 2016 with approximately RM12.8 billion and toll-free in Pan-Borneo Highway in Sarawak.

(ii) Air transportation is the main transportation in Sabah and Sarawak in the inner area as well as Labuan. The local air transportation, RAS (Rural Air Services) airline, is excluded from Goods and Services Tax (GST) for the passengers of economy class.

(iii) Bank Simpanan Nasional offered RM70 million to implement a new project, with the cooperation between state government in Sabah and Sarawak due to the interest free loan. It is aimed for longhouses construction with a maximum loan up to RM50,000 each unit in the longhouse.

(iv) The state government in Sabah and Sarawak will offer a subsidy of RM70 million for fertilizing the hill paddy so as to increase food supply and the income of the hill paddy farmers. This project will cover 65,000 hectares of land in Sarawak and 11,000 hectares of land in Sabah.

(v) Upgrading the service of One Malaysia Mobile Clinics in Sabah and Sarawak for the interior areas consist of new boats and vehicles procurement.

1.2.1 Sarawak Economic Development

The findings of free industrialized areas has bring a large number of high-tech industries into Sarawak. As the Sarawak government follows a policy of economic change, it provides

gorgeous inducements for all the country's investors. Due to the rich assets of natural resources and massive competitively priced land, make Sarawak has become an attractive investment opportunity for investors. Table 1.19 and Figure 1.13 below shows an increase in the Sarawak's GDP growth over the years from 2005 to 2015.

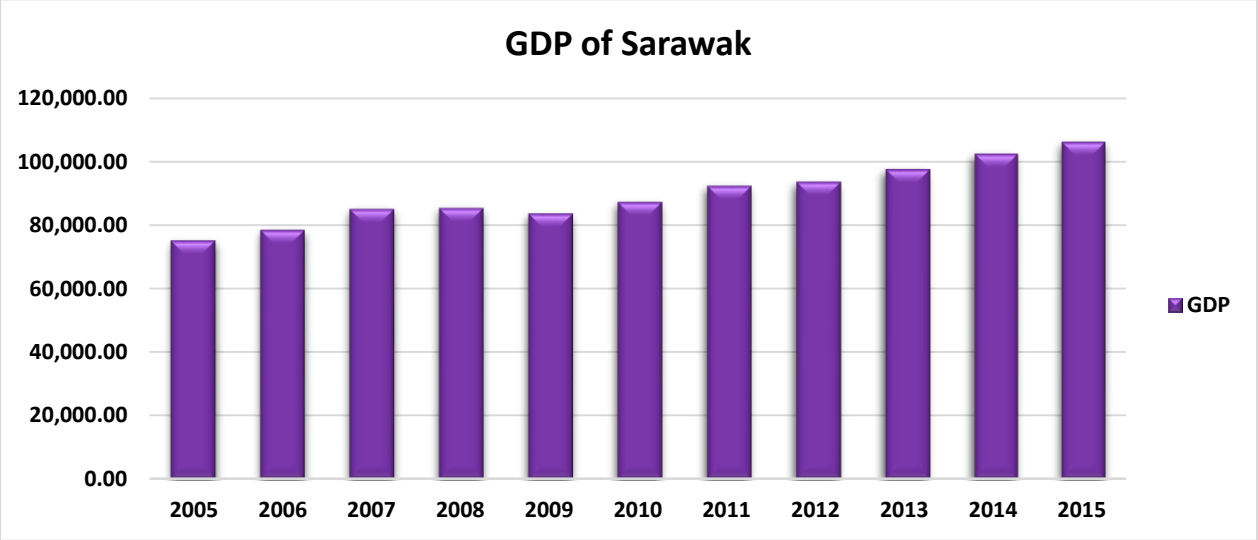
Table 1.19: GDP of Sarawak (RM Million), 2005-2015

Year	2005	2006	2007	2008	2009	2010
GDP	75,096.10	78,434.43	84,965.32	85,208.70	83,520.66	87,131.00

Year	2011	2012	2013	2014	2015
GDP	92,209.42	93,549.96	97,464.85	102,318.00	106,063.00

Source: Department of Statistic, Malaysia

Figure 1.13: GDP of Sarawak (RM Million), 2005-2015



Source: Department of Statistic, Malaysia

Table 1.20: Sector Contributions of Sarawak to Malaysia, 2005 and 2015

Sector Contributions	2005 (%)	2015 (%)
Primary sector	54.62	38.11
Secondary sector	24.36	16.76
Tertiary sector	7.23	5.63

Source: Department of Statistic, Malaysia

Table 1.20 shows the sector contribution of Sarawak to Malaysia of 2005 and 2015. As shown in the data obtained, sector contributions of Sarawak (primary, secondary and tertiary) to Malaysia economy in 2015 has been declining over the years. It resulted that Sarawak still more rely on the primary sector since it shows the highest sector contribution (38.11%) among the other sectors in 2015. As the GDP was improving over years with decreasing sector contributions, it shows a slow improvement in economic development of Sarawak.

1.2.1.1 Primary Sector in Sarawak

Primary sector is known as the agriculture sector. Sarawak has a wealth of natural resources for example natural gas and oil palm. In majority, the purpose of Sarawak agricultural policies is to reduce the poverty in rural areas, increase the food manufacturing and income for the state. In related to the palm oil plantation, the Malaysia Palm Oil Board (MPOB) has stated that top 5 Sarawak palm oil export destinations are India, China, Netherlands, Pakistan and USA.

Table 1.21: Planted area of main crops in Sarawak, 2012-2015

Sarawak ('000 Hectares)	2012	2013	2014	2015
Oil Palm	1,076.2	1,160.9	1,263.4	1,442.1
Cocoa beans	4.8	5.6	6.0	2.5
Rubber	158.0	157.3	159.3	158.2
Paddy (Wet & Dry/ Hill)	129.0	134.3	123.5	122.2
Pepper	14.6	14.9	15.8	16.1

Source: Department of Statistics, Malaysia/ Malaysia Palm Oil Board Website/ Malaysian Cocoa Board Website/Malaysia Rubber Board Website/ Department of Agriculture, Sarawak/ Malaysian Pepper Board

Based on the Table 1.21 above shows the planted area of main crops in Sarawak from 2012 to 2015. In 2015, the planted area of oil palm in Sarawak was over 1,442,100 hectares, which shows an increase over the years and it is highest among the other crops (cocoa, rubber, paddy and pepper). It also shows an increase from 2012 to 2015. The pepper in Sarawak also shows an increase. However, the cocoa beans, rubber and paddy planted area shows a decrease in 2015.

Table 1.22: Major Agriculture Production of Sarawak, 2012-2015

Commodity	2012	2013	2014	2015
Crude Palm Oil ('000 tonnes)	2,922.6	3,112.0	3,439.3	3,702.1
Cocoa Beans (raw/roasted) ('000 tonnes)	0.6	0.5	0.6	0.3
Rubber ('000 tonnes)*	27.3	20.0	10.2	7.4
Pepper (White & Black) ('000 tonnes)	25.8	26.2	27.2	28.0

Source: Department of Statistics, Malaysia/ Malaysia Palm Oil Board Website/ Malaysian Cocoa Board Website/ Malaysian Pepper Board

The Table 1.22 above shows the major agriculture production of Sarawak from 2012 to 2015. The major agriculture productions of Sarawak are crude palm oil, cocoa beans, rubber and pepper (white and black). The crude palm oil and pepper shows an increase from 2012 to 2015 while in the same time, the production of cocoa beans and rubber have been reduced. Among the agriculture production, crude palm oil seems to be the major agriculture product in Sarawak, followed by pepper. The reason will be the global warming or there is a shift from primary sector industry to secondary or tertiary sector.

Table 1.23: Log Production and Forest Revenue, 2005 and 2015

	2005	2015
Total Production (M^3)	12,036,153	9,079,040
Total Forest Revenue (RM)	759,694,461	608,603,322

Source: Forest Department Sarawak

Furthermore, based on the Forest Department of Sarawak, the log production and total forest revenue has showed a drop in 2015 compared to 2005 (Refer to Table 1.23 above). One of the reason is due to the strict compliance with timber where its production may be further reduced due to forest certification and sustainable forest management, hence (The Star Online, 2016).

1.2.1.2 Secondary Sector in Sarawak

The secondary sector which also known as the manufacturing sector. The Malaysia Investment Performance Report (2016), stated an improvement of total investments in Sarawak which is RM11, 817 million. The Star Online (2017), mentioned that the Bintulu Sarawak Petronas LNG Train 9 project value RM35.3 billion. It also further stated that the Sarawak capital-intensive projects shall distributed a "multiple effect" which can increase the Sarawak job opportunities, research and development (R&D), skills, local sourcing and the generation of the foreign-exchange earnings.

Sarawak Corridor of Renewable Energy (SCORE) developed the Bakun Hydro Electrical Project (BHEP) on Balui River in Sarawak in order to deal with the increasing electricity demand in Malaysia. With the Bakun hydroelectric Dam electricity supply, Japan's Tokuyama Corporation was one of the Japan's largest heavy industries. It has built two polycrystalline silicon plants in Samalaju Industrial Park (Borneo Post Online, 2011). The park is now mainly supportive to numerous energy-intensive industries in Sarawak such as aluminium, manganese smelters and ferrosilicon. This eventually boost the Sarawak economy and provides more high-tech and high-paying jobs for the Sarawak citizens.

China investors have play an important role in changing of economic in Sarawak by expanding the economy from consistent agriculture, forestry and mining, into a state of high-tech industries, infrastructure and renewable energy source. According to Marilyn (2017), stated that China's is the important partner and the main sources of Sarawak's Foreign Direct Investment (FDI). The most recently China's investments in Sarawak is from Comtec Solar Systems Group Ltd. It has invested approximately RM1.2 billion to manufacture the wafer slices and solar ingots. Besides, Xi'an Longi Materials has invested RM1, 066 million in the integrated manufacturing facilities in Kuching's Sama Jaya Hi-Tech Park to solar ingot, water cells and modules. Longi (Kuching) Sdn. Bhd. mentioned that this project can improve the Sarawak current E&E solar industry ecosystem, expanding the scope and the value chain of front-end activities (MIDA, 2016).

1.2.1.3 Tertiary Sector in Sarawak

Tertiary sector which also known as the tourism, education and services sectors has been increasingly important in Sarawak. Based on Table 1.24 below shows the Sarawak tourism statistic of 2002 and 2015 shows a dramatic increase over the years. The Sarawak total foreign tourism (2,497,016) is recorded to have more than the total of domestic tourism (2,020,163) in 2015.

Table 1.24 Sarawak tourism statistics, 2002 and 2015

	2002	**2015**
Total foreign tourists	207,900	2,497,016
Total domestic tourists	187,092	2,020,163
Grand total tourists	**394,992**	**4,517,179**

Source: Immigration Department of Sarawak

In where the foreign tourists increase dramatically over the years, it may because of the business event, meeting, incentives and exhibitions which held in Sarawak (Sarawak Convention Bureau, 2016). In 2016, Sarawak State Government has established Sarawak Convention Bureau (SCB) in 2016 to provide professional advisory services for the meeting planners. It also recognized as a non-profit group and it provides the services such as conferences, awards, exhibition, tender and accessories meeting, business events (meetings, incentives, conventions & exhibitions). According to the article, this would attract the potential investors, policy makers and world leader in the industry to the country and thus increase the tourist arrivals and foreign exchange income (Sarawak Convention Bureau, 2016).

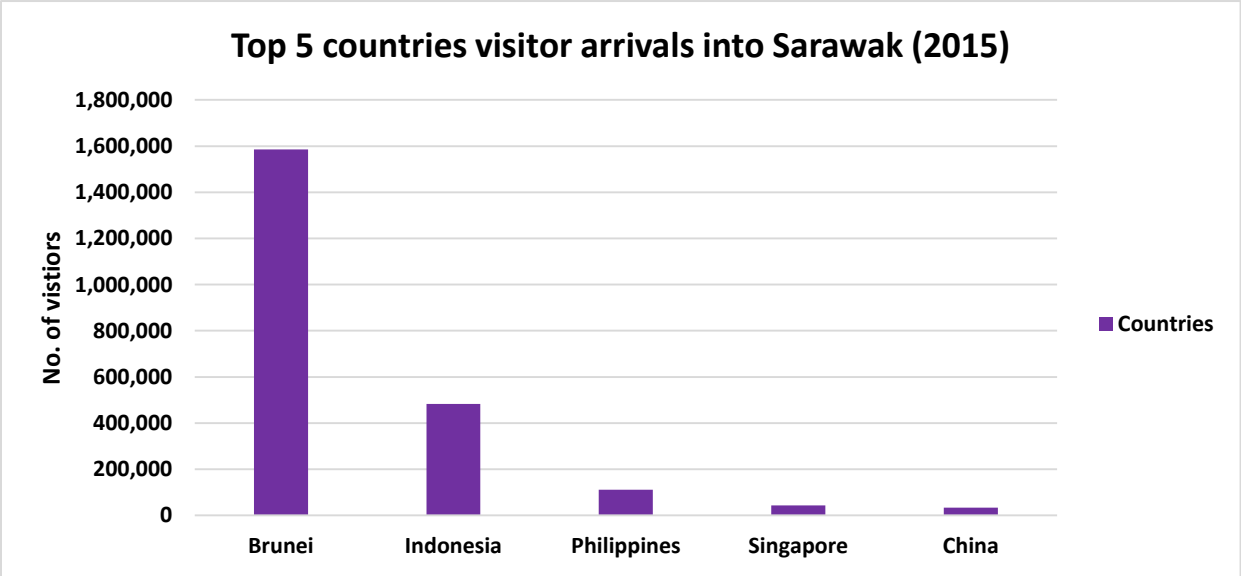
Moreover, Niah National Park and Gunung Mulu National Park in Sarawak were well-known and unique of richness in biodiversity. It also consists of the world's largest cavity, the limestone cave (Sarawak Chamber). In 2001, Mulu National Park was professed a UNESCO (United Nations Educational, Scientific and Cultural Organization) World Heritage Site. This eventually attract more tourists especially eco-tourists to visit in Sarawak hence can beneficial the state and boost the economy. Besides that, Kuching Borneo Housing Museum, Sibu Heritage Museum and recently event, Borneo Jazz Festival in Miri are becoming the main focus of tourist arrivals too.

Table 1.25: Top 5 countries visitor arrivals into Sarawak in 2015

Countries	2015
Brunei	1,585,997
Indonesia	483,171
Philippines	111,616
Singapore	42,827
China	32,916

Source: Sarawak Tourism Statistics

Figure 1.14: Top 5 countries visitor arrivals into Sarawak in 2015



Source: Sarawak Tourism Statistics

Besides that, Table 1.25 and Figure 1.14 below shows the top 5 countries visitor arrivals into Sarawak in 2015. Brunei shows the highest among the other countries because it is a neighbour country of Malaysia. There is a short distance between Brunei and Miri city, hence Brunei citizens can easily enjoy the goods and services in Malaysia.

BIMP-EAGA with the members of Brunei, Indonesia, Malaysia and Philippines was officially established in Davao, Philippines on 26 March 1994. BIMP-EAGA is wealth in natural resources and essential for sustained growth and development. The BIMP-EAGA

project will help to increase the cross-border trade in investment, tourism, and growth zones. West Kalimantan and Sarawak are considering its regional energy interconnection project which is expected to fully operational in 2016. Sarawak also have agricultural cooperation between Brunei such as halal industries, rice, fisheries and animal husbandry to expand trade in line and sub-regional value chains with the BIMP-EAGA Food Basket Strategy (Davao, 2015).

In aspect of service of education, Sarawak also consists both public and private higher education institutions such as Universiti Malaysia Sarawak (UNIMAS), Universiti Putra Malaysia Bintulu Campus, University Teknologi Mara (UiTM) Sarawak, Swinburne University of Technology Sarawak, Curtin University Sarawak and others. According to Ariff and Subramaniam (2006), Malaysia-EAGA is more industrialized than other EAGA. As a result, this becomes the chief attraction of other EAGA students choose to study in Malaysia. Swinburne University of Technology Sarawak and Curtin University of Technology Sarawak are the foreign universities in Malaysia-EAGA, which provide variety tertiary education.

1.2.2 Sabah Economic Development

Table 1.26 and Figure 1.15 below shows that Sabah GDP growth increase by years 2005 to 2015.

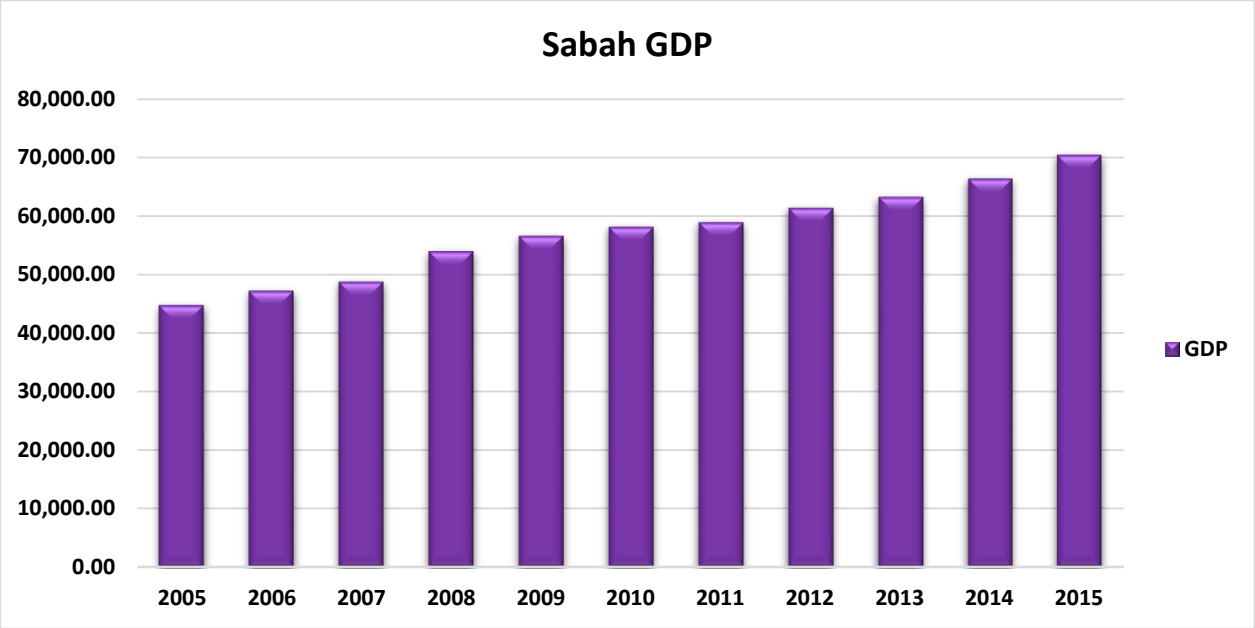
Table 1.26: GDP of Sabah, 2005-2015

Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
GDP	44,770.53	47,247.43	48,762.01	54,002.98	56,587.57	58,127.00

Year	**2011**	**2012**	**2013**	**2014**	**2015**
GDP	58,926.40	61,396.39	63,221.62	66,376.00	70,421.00

Source: Department of Statistic, Malaysia

Figure 1.15: GDP of Sabah, 2005-2015



Source: Department of Statistic, Malaysia

Table 1.27: Sector Contribution of Sabah to Malaysia (2005 and 2015)

	2005 (%)	**2015 (%)**
Primary sector	19.76	16.83
Secondary sector	3.84	2.44
Tertiary sector	5.82	4.58

Source: Department of Statistic, Malaysia

Table 1.27 above shows the Sabah economic development by sector contribution (primary, secondary and tertiary) in Sabah. Overall all sectors show a decrease in 2015 compared to 2005. Since the primary sector shows the highest sector contribution (16.83%) among other sectors in 2015, Sabah is said to be more rely on production of primary sector.

1.2.2.1 Primary Sector in Sabah

Sabah also contains many forests and natural resources, which is more likely to Sarawak. According to POIC (Palm Oil Industrial Cluster) Lahad Datu, Sabah the forests cover

an approximately 3.5 million hectares or 48% of its area. The geographical location and favourable conditions are suitable for plantation of palm oil, especially in Lahad Datu Sabah. Besides, oil and gas, cocoa, rubber and timber are also the main commodities of production and as commodities of exports in Sabah to increase the regional economy performance. The table 1.28 shows the Sabah planted area of main crops (oil palm, cocoa beans and rubber) from 2012 to 2015. As shown in the table, the three main crops in Sabah shows increase in plantation area from 2012 to 2015.

Table 1.28: Planted area of main crops in Sabah, 2012-2015

Sabah ('000 Hectares)	**2012**	**2013**	**2014**	**2015**
Oil Palm	1442.6	1,475.1	1,511.5	1,537.6
Cocoa beans	4.1	5.1	6.3	7.2
Rubber	115.3	110.0	131.2	-

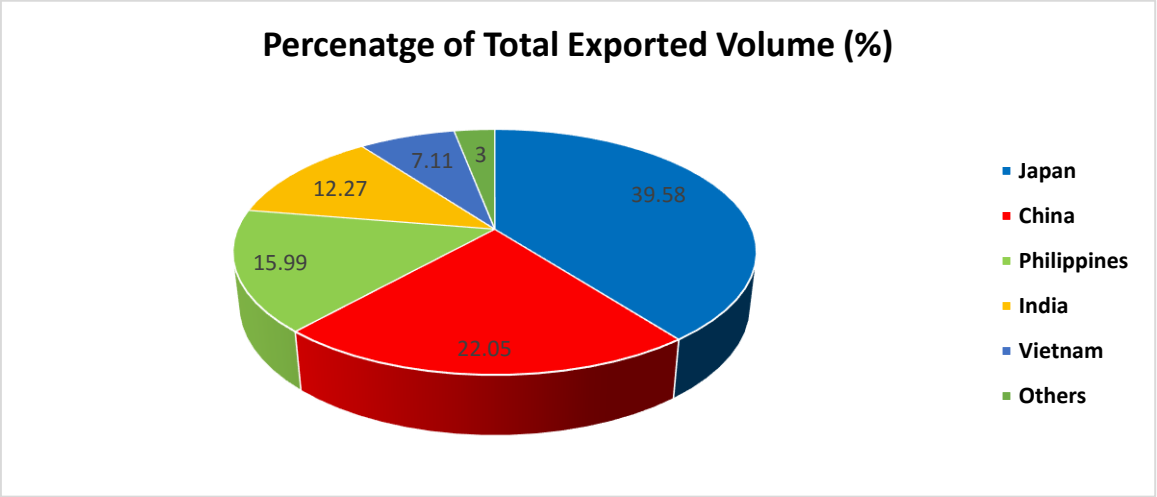
Source: Department of Statistics, Malaysia/ Malaysia Palm Oil Board Website/ Malaysian Cocoa Board Website/Malaysia Rubber Board Website/ Department of Agriculture, Sarawak

Table 1.29: Top 5 Destinations of Log Export of Sabah in 2015

Destination	**2015**		**% of Total Exported Volume**
	Volume (M^3)	**Value RM (FOB)**	
Japan	106,078.8500	80,559,911.73	39.58
China	59,080.6600	44,229,270.95	22.05
Philippines	42,844.8600	20,498,588.08	15.99
India	32,883.8600	22,378,495.67	12.27
Vietnam	19,044.3500	8,632,870.96	7.11
Others	8,065.6100	5,876,630.35	3.00
Total	**267,998.2100**	**182,175,767.74**	**100**

Source: Sabah Forestry Department

Figure 1.16: Top 5 Destinations of Log Export of Sabah in 2015



Source: Sabah Forestry Department

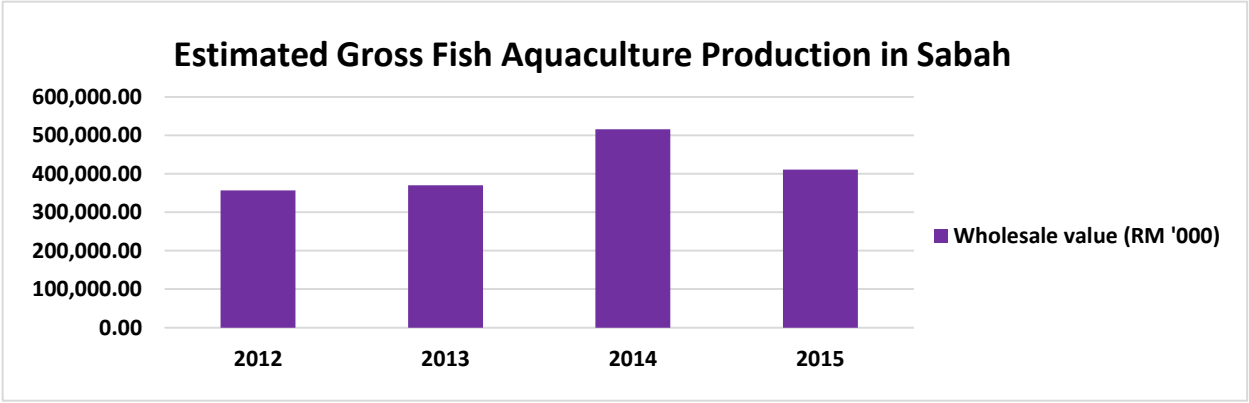
Based on the Table 1.29 and Figure 1.16, it shows the top destinations of log export of Sabah in 2015. The highest among the countries is Japan with 39.58% of total exported volume of log export and followed by China (22.05%), Philippines (15.99%), India (12.27%), Vietnam (7.11%) and others (3%).

Table 1.30: Estimated Gross Fish Aquaculture Production in Sabah, 2012-2015

	2012	2013	2014	2015
Wholesale value (RM '000)	356,940.41	369,575.13	515,327.69	411,072.23

Source: Department of Fisheries, Sabah

Figure 1.17: Estimated Gross Fish Aquaculture Production in Sabah (2012-2015)



Source: Department of Fisheries, Sabah

Moreover, Sabah is also focusing on the fisheries sectors by producing fish products. The seafood in Sabah is well-known and attractive for many local and foreign investors to visit. It enjoys a substantial trade surplus and increase in the foreign exchange. Fisheries exports are valued at around RM230 million. Table 1.30 and Figure 1.17 above shows an increasing trend from 2012 to 2014 in Sabah. However it decreases in 2015 for the estimated gross fish aquaculture production in Sabah in 2015 mainly due global warming change or other relevant reasons.

1.2.2.2 Secondary Sector in Sabah

Sabah has the abundant of agricultural land, marine capitals and forests in providing extreme potential in resource-based manufacturing activities such as the timber and wood-based industry, food and agro-based as well as biotechnology industries. The BIMP-EAGA has a population of 55 million and provides a wealth of resources for trade and transportation (POIC Lahad Datu Sabah, 2017). Richness in natural resources such as oil and gas in Sabah provide the opportunity for the investors to invest in the gas and petrochemical industry. Numerous of oil, natural gas, energy and other industries projects have been carried out in recent years, such as the Sabah Oil and Gas Terminal (SOGT) in Kimanis, Sabah and Sarawak Gas Pipeline (SSGP) Kimanis Power Plant (KPP) projects, a 30MW Geothermal power plant in Tawau, and Sabah Ammonia and Urea project (SAMUR) in Sipitang.

Furthermore, a solar hybrid systems which use both solar panels and a diesel generator as backup, were introduced in Semporna, Sabah in 2015. The achievement in Semporna as well as Bario Sarawak was a main factor in determining and aiming to bring the solar hybrid systems into the other rural areas. This action will lead to an increase in business activities, boost economic growth and also provide information technology to the citizens.

Based on the Borneo Post Online (2017), most of the China investors were engrossed in the government projects and developments in Sabah, mainly those involved in high value added technology and activities. However, as compared with Sarawak, which the investors are more concern on primary sector and secondary sector, the investors of Sabah are giving more incentive on the tertiary sector of Sabah.

1.2.2.3 Tertiary Sector in Sabah

The tertiary sector consists of services sector and tourisms sectors. The Table 1.31 below shows the Sabah tourism statistics in 2005 and 2015. The grand total of tourists in Sabah shows an increase in 2015 (3,176,226) compared to 2002 (1,107,356). It also stated that the total of domestic tourists (2,197,990) is higher compared to the total of foreign tourists (978,426) in 2015.

Table 1.31: Sabah tourism statistics, 2002 and 2015

Tourism	2002	2015
Total foreign tourists	528,264	978,426
Total domestic tourists	579,092	2,197,800
Grand total tourists	**1,107,356**	**3,176,226**

Source: MASB, Sabah, Immigration Dept, Sabah, Malaysia Airlines, KL, AriAsia, Fax, MasWings

Kinabalu Park and Mount Kinabalu in Sabah are well-known travel destination. The highest peak, Mount Kinabalu with the 4,095 meters in South East Asia and consists more than 2,000 flora species. Rafflesia is the world's largest flower, which located in Sabah. The surrounding of the Kinabalu park consists of beautiful natural scenery with varied range of environments. Other than that, Kinabalu also awarded as United Nations Educational by the Scientific and Cultural Organization (UNESCO) heritage site status because of its fertility in plant variety joint with its unique geological circumstances. Kinabatangan River is the second longest river in Sabah. All of these places attract more tourist, especially eco-tourism to visit in Sabah, hence it will boost the Sabah economy.

The Sipadan Island and Marine Park are also the main tourism destination in Sabah. Sipadan Island contains more than 3,000 species of fish and hundreds of coral species which have been classified in these wealth ecosystems. Sipadan is well known for its remarkably large numbers of green and hawksbill turtles which fold there to companion and nest. There are 12 dive sites in Sipadan which are famous and recommended, such as Turtle Cavern, South Point and Hanging Gardens. It is common for a diver to have seen more than 20 turtles on each dive.

Sabah also consist varies of learning and training institutions such as Universiti Malaysia Sabah (UMS), Universiti Teknologi Mara (UiTM), Kota Kinabalu Polytechnic, Industrial Training Institute (ILP), Malaysia Agriculture Research and Development Institute (MARDI), Universiti Tun Abdul Razak (UNITAR), University College Sabah Foundation (UCSF), INTI College and others. Hence, Sabah has the potential to market its education sector to international students, such as Central Asia, Indonesia, China and Philippines. Other than that, Sabah also been served as a research and education centre in management and research of environmental.

1.3 Problem statement

As in corresponding to New Economic Model (NEM) unveiled in 2010, Malaysia aspires to achieve with high income level and become as a developed-nation status by 2020. In transformation of Malaysia, the National Transformation Programme (NTP) was unveiled to implement the NEM. The NTP comprises two components and one is the Economic Transformation Programme (ETP) (Performance Management & Delivery Unit (PEMANDU), 2017). By having commitment of large infrastructure projects and great amount of investment capital, Economic Transformation Programme helps improve and provide impetus for Malaysia's economy, said by Leong (2013) in his article. In result the transformation plan brought to a greater average income for citizens meanwhile created more job opportunities as promised. As mentioned in article by The Star Online (2017), Malaysia’s economy grown at an average of 5.1% per year since 2010, twice the average growth of the world economy in the same period.

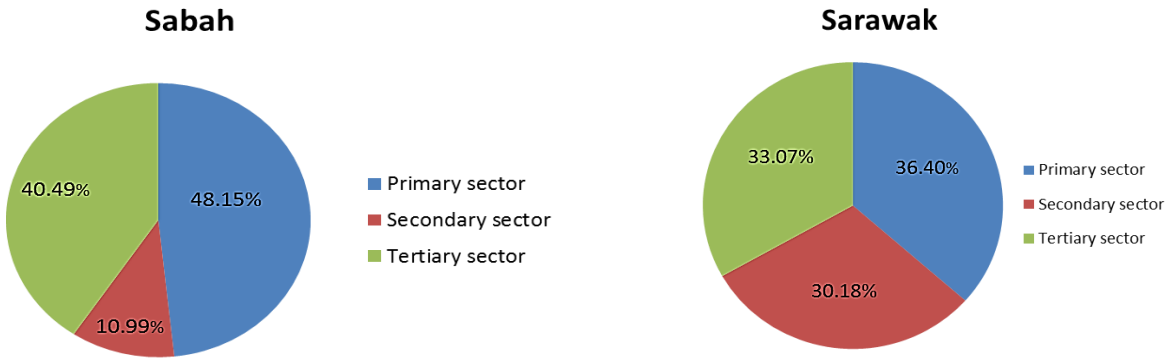
However, Furuoka (2014) mentioned in his work said that despite to follow to Malaysia economic transformation plan, Sarawak development of economy did not transform to industry-based economic and its economy remains being driven by export of primary commodities, such as liquefied natural gas (LNG) and crude petroleum. By then, it is known that Sarawak is still concentrate on the production in primary sector. And so in corresponding to job opportunities, the workforce is involving themselves in primary sector since primary sector is playing an important role in Sarawak economy.

Table 1.3.1 Sector contribution of Malaysia, Sabah and Sarawak

	Malaysia (%)	Sabah	Sarawak
Primary sector	18.96	48.15	36.40
Secondary sector	29.91	10.99	30.18
Tertiary sector	58.63	40.49	33.07

Source: Department of Statistic, Malaysia

Figure 1.3.1 Sector contribution of Sabah and Sarawak



Source: Department of Statistic Malaysia

Based on the table and figures shown, the contribution of primary sector in Sabah had the highest GDP of 48.15% which approximately half of the state total contribution of GDP. As compared to Malaysia which primary sector contributed only 18.96%, Sabah had higher GDP contribution from primary sector. It is clearly to be seen that economic activity in Sabah mainly rely on primary sector. Therefore, workforce would be mainly concentrate on primary sector. The same situation occurred in Sarawak where the primary sector is recorded as the main economic sector with GDP contribution of 36.40%.

Other than primary sector, tertiary sectors in Sabah and Sarawak play an important role as the second largest sector contribution of GDP regionally. The tertiary sector had contributed 40.49% in Sabah and 33.07% in Sarawak respectively. In comparison, the tertiary sector of

Malaysia had contributed about 58.63% of GDP. It was known as the largest sector which drive the nation economy and believe that it has provides most of the job opportunities. However according to the data obtained, economy of Sabah and Sarawak were relied on primary sector. In related to employment opportunities, most of the workforce would involve themselves in primary sector. This causes some arguments regarding the workforce development of Sabah and Sarawak in relation to in Malaysia. Therefore in order to analyse towards the regional employment competitive advantages, shift share analysis is used in this research.

1.4 Research Questions

i. How was the relationship between employment rate and economic growth in Sabah and Sarawak?
ii. How was the economic development of Sabah and Sarawak differ from the nation?
iii. How was the employment condition in respective industrial development in Sabah and Sarawak?
iv. How was the regional shift of Sabah and Sarawak?

1.5 Research Objectives

The objective of this research was to utilise Shift-share analysis in analysing the industrial mix characteristics and its local competitiveness potential factors for employment condition in corresponding to respective sectoral development in the state of Sabah and Sarawak, and to compare against the national development.

1.5.1 General Objectives

The problem statement that stated provides a better understanding and inspiration in analysing towards the workforce competitive advantages in corresponding to regional development in term of sectoral development in Sabah and Sarawak. The study could contribute to reveal the structural change of employment in the primary, secondary and tertiary

industries as well as the nation share of Sabah and Sarawak based on the theories and the empirical studies.

1.5.2 Specific Objectives

i. To analyse the relationship between sectoral development and employment.
ii. To determine the Nation Share of Sabah and Sarawak.
iii. To determine the Industry Mix of Sabah and Sarawak.
iv. To determine the Regional Shift of Sabah and Sarawak.

1.6 Hypothesis of the study

i. When there is positive industrial mix, the industry is growing faster in region than in nation.
ii. When there is a positive regional shift, the industry enjoys a locational comparative advantage.
iii. The employment rate and GDP has positive relationship.

1.7 Significance of study

Both Sabah and Sarawak are knowing as the biggest states in Malaysia. By combining two states together, the total area of East Malaysia is 198,352km^2; covers approximately 61 percent of total area in Malaysia. As the largest states in Malaysia, Sabah and Sarawak should have experienced to a high level of production with great economic advantages. However, instead of becoming as a developed state, Sabah and Sarawak had shown a low level economic development in term of low level quality of production due to primary sector dependency economic activities. According to Razak (2015), Sabah is the major producer of palm oil in Malaysia. Other than that, the economic activities are mainly focus on agro-based economy, create a low skill workforce which would mainly filled by foreign workers. He further added that in Sabah, a 54 percent of population would stay in rural area. This means most of the citizens are happening to live in a low standard living lifestyle. As both states are having similarities in relevant factors, the same situation happens to be occur in Sarawak too. As

mentioned in chapter 1, economic activity of Sarawak is mainly focus on primary sector which are palm forestry and pepper plantation.

In analyse towards the workforce structure in Sabah and Sarawak, the unemployment rates were to have 3.3 percent and 5.4 percent respectively during the year of 2015. In corresponding to Malaysia unemployment rate of 3.4 percent, Sarawak tends to have a better employment condition than in nation whereas Sabah seems to be encountered to a great unemployment problem. Many studies which conducted in the past would have concluded to have a positive relationship of GDP in relation to employment. When GDP goes up, employment would have increase due to great job opportunity.

As in literature review, many research were found to be focused on a nation and eventually that is a lack of literature analysed the factor with a shift share analysis. Therefore, this research is significant as the shift share analysis was been used in analysis; contribute to have an accurate and precise evaluations on the relationship between sectoral GDP and employment regionally. By examining to the current situation of regional economy in Sarawak and Sabah, the study able to provide an identification of the economy dynamic in the state. Readers will eventually have ideas about which sector was the main sector of contribution in relation to the employment. In addition, the study able to provide information and advises in supporting to policy implication where the government was concerning about workforce development in Sabah and Sarawak. Thus, suggestion of improvement can be provided.

Lastly this research is hoped to be beneficial in a form of regional economic development planning and strategy as more people will be aware of the importance of an economic decision on employment.

1.8 Chapter Layout

There are five parts in the study as follows: Chapter 1 Research overview, Chapter 2 Literature review, Chapter 3 Methodology, Chapter 4 Result and interpretations and Chapter 5 Discussion, conclusion and implications.

1.9 Conclusion

The research studies about the workforce competitive advantages with GDP in relation to employment regionally in Sarawak and Sabah by using shift share analysis and some empirical tests. In Chapter 1, the background of economic sector and employment condition in nation, Sarawak and Sabah were briefly elaborated before proceeding into next chapter.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In order to investigate the effect of regional development condition towards employment status in Sabah and Sarawak, several variables for estimation were been identified and analyzed in this research. In addition to provide accurate information, relevant findings described by expertise researchers in the past were been studied and reviewed in providing a framework for further research.

2.1 Shift-Share Model

In the study on growth of regional and employment, aggregate information was used to explain the GDP growth and employment in a particular regional. This study aims to determine using shift share analysis in growth of regional analysis to decompose the GDP growth or employment to describe the competitiveness and special region (Hassan, Rashid, & Hamid, 2011).

Shift-share model was introduced by Dunn in 1960. It was used shift share analysis to work on data that relates to employment and job. It was also used as a measure on employment and regions of the data to describe different gaps between regional growths. In Malaysia, it has used the same method to define alternative export market while Zakaria (2011) also utilised this method to approach Kelantan on the data GDP to analyse the performance of Kelantan economy with the national economy (Hassan, Rashid, & Hamid, 2011).

According to the studies of Hassan, Rashid, & Hamid (2011), the shift share model can be divided into three components. They are the national growth, industrial mix and competitive share. The national growth is a baseline value for growth of expected output. The industrial mix is computed by GDP value of change in addition or subtraction in the country special industrial mix. Competitive share GDP change addition or subtraction to determines the competitiveness of the local firm to their unique sector. The total of these three components is same to the sum change of GDP in the country during a given period. The benefit of using this

method is easier to understand because it has a simple and straight forward calculation. It also can determine the gain and loss in each market compared to the total market.

In a regional analysis, shift share model is used to determine the growth of GDP or employment to explain the differences in level of development in every region (Hassan, Rashid & Hamid, 2011). Shift share is similar with the location quotient where both of the model are indicated the regional development. However, location quotient performs the analysis in term of total jobs in an industry while shift share concern on the job growth (Sentz, 2011).

From the studies of Mondal (2009) imply that the employment growth uses aggregate variables to explain the growth of GDP or employment in association with the population migration and real income due to local initiatives and the community of a special structure regional. The shift-share analysis revealed that growth of employment depends on the effect of a region special industrial structure is isolated. The employment growth in a particular sector can be divided into three components which are national growth (NG), industrial mix (IM), and competitive share (CS) or also define as regional shift (RS) (Mondal, 2009).

The NG component refers to determine the determinants of local employment by predict the national economies are same as the local economies. It can be calculated by multiplying the national average growth rate of employment with each sector base year on employment and sum up all the sectors. The results predict the number of job opportunities will be created based on the trend of national economy (Mondal, 2009).

The IM component is computed by multiplying the local employment in each sector on distinct growth rate of national in the sector and total economy growth rate. It revealed that the industrial mix is positive and leads to more local employments in sector are greater than the total national employment (Mondal, 2009). In contrary, a negative industrial mix effect will boost up the sector at a slower rate compared to the economies of national. In the studies, the sector farm employment indicated that the negative relationship at a slower rate of growth compared to the growth of employment national (Herath, Gebremedhin, & Maumbe, 2012).

RS component determines the capability of the local economy to assume the rise or decline share of a unique growth of sector. It can be calculated by multiplying the local employment in each sector with the distinct growth rate of local and national sector (Mondal,

2009). If the RS shows positive sign, then the sector is enjoyed the comparative advantage and vice versa (Hassan, Rashid & Hamid, 2011).

Table 2.1: Malaysia's NG and IM Component by Industrial Origin by 2000-2005

Sector	Base Year (2000) GDP[1]	Growth Rate (%)	NG	IM
Agriculture, forestry and fisheries	18,662	15.88	4,574.06	-1610.53
Mining and quarrying	15,385	13.77	3,770.86	-1,652.35
Manufacturing	67,250	23.01	16,482.98	-1,008.75
Construction	6,964	2.43	1,706.88	-1,537.65
Services	113,408	34.53	27,796.30	11,363.48
Electricity, gas and water	8,278	31.35	2,028.94	566.22
Wholesale and retail trade, hotels and restaurant	31,116	23.60	7,626.53	-283.16
Transport, storage and communications	16,858	36.70	4,131.90	2,054.99
Finance, insurance, real estate and business services	26,755	50.42	6,557.65	6,932.22
Other services[2]	16,070	26.61	3,938.76	337.47
Government services	14,331	39.48	3,512.53	2,145.35

Source: Ministry of Finance and Department of Statistics, Malaysia

The shift-share results in Table 2.1 done by Mondal (2009) are used for further discussion. NG and IM components may be described as potential contribution with respective sectors of GDP in Malaysia due to the national growth and special industrial structure of specific sectors. The 11 sectors in Figure 2.1 have 5 negative sectors in IM component because the 5 sectors growth rate was lower than the growth rate of national average. The NG component is always positive assuming that the growth of sector is attributable to the national growth.

The manufacturing sector contributed RM 15,474 million of GDP in Malaysia from 2000 to 2005 and RM 16,482.98 million to the national growth of the economy. The sector lost RM 1,008.75 million because the industrial mix of the aggregated sector. These two components were responsible for the total growth as the third data point. For example, the loss of either automobile tire manufacturing or a regional economy component will be unable to calculate the regional shift component (Mondal, 2009).

CS component of the Shift-share model is often considered as the "competitive advantage" of a region in its contribution to the national GDP or a sub-sector within a broad sector to the total growth of that sector (Mondal, 2009).

Hassan, Rashid & Hamid (2011) and Zakaria (2011) are using the shift-share analysis to determine the competitive advantages of East Malaysia Economic Region and Malaysia. The result shows that the East Malaysia Economic Region is less attractive compare with the West Malaysia. However, the primary and secondary sectors of East Malaysia Economic Region are able to grow as same level with West Malaysia. In Europe area, Goschin (2014), Blien, Eigenhuller, Promberger & Schanne (2013), Fritz & Streicher (2004), and Blien & Wolf (2002) had analyzed the regional development in Romania, Bavaria, Austria, and Eastern Germany respectively by using shift-share approach.

2.2 Gross domestic product (GDP)

Gross domestic product (GDP) can be defining in three ways. Firstly, GDP is the value of the final goods and services produced in the economy during a given period of time. A final good is a good destined for final consumption whereas an intermediate good is a good used in the production of another good. Secondly, GDP is the sum of values added in the economy during a period. The value added is equal to the value of a firm's production deduct the value of the intermediate goods it uses in production. Thirdly, GDP is the sum of incomes in the economy during a given period. It can be explained by aggregate production and aggregate income. Aggregate production is the GDP which equal to GDP that is the value of the final goods and services produces in the economy during a given period. Aggregate income GDP is the total of income during a given period (Blanchard, & Johnson 2013). They are two ways to calculate GDP:

i. Expenditure approach

It is a method that measures the amount spent on all final goods and services during a given period.

GDP= C+ I + G + (EX-IM)

- C (personal consumption expenditures): households spending on consumer goods.
- I (private domestic investment): spending by firm and households on new capital.

- G (government spending good and service): Expenses spent by the government on the expenditure and investment in infrastructure that provide welfare to resident such as public telephone.
- EX- IM (Net export expenditure): net spending by the rest of the world.

ii. Income approach

It is a method that measures the income such as wages, rents, interests and profits received by all factors of production in producing final goods.

- GDP = income received by factors of production + indirect taxes - subsidies + net transfer payments + depreciation + payments of factor income to the rest of the world – receipts of factor income from the rest of the world.

The GDP can be divided into real GDP and nominal GDP if total spending rises from one year to the next will lead to the economy is producing larger output of goods and service or the good and service are being sold at higher prices. Real GDP is constructed as the production of good and service value at constant prices. It measures the sum of the quantity of good and service the economy that is not affected by changes in the prices. Nominal GDP is the production of good and service valued at current price. It shows both the changes in quantities and prices (Blanchard, & Johnson 2013).

According to the economists, the concern about the performance every year of the economy is known as growth rate of real GDP or GDP growth (Blanchard, & Johnson 2013).

$$\textbf{GDP growth (g)} = rGDP_{t+1} - rGDP_t / rGDP_t \times 100\%$$

The positive economic growth is called expansion which will rise in the output. The negative economic growth is called recession (Blanchard, & Johnson 2013).

Gross domestic product (GDP) is the measure of aggregate output in the national income account. The GDP estimated for each state is the sum of gross domestic product in the industries of state. A few authors have indicated an employment for many countries. It revealed that the growth of employment to GDP growth did not decrease in industries countries according to International Labour Organization Report (1996) (Seyfried, 2005).

The previous studies show that in the 1980s, Malaysia GDP achieved USD 24.94 billion. In the end of 1990, GDP in Malaysia rose significantly by USD 79.15 billion. From 2000 to 2008, GDP in Malaysia increased rapidly from USD 93.79 billion to USD 230.99 billion. By 2009, GDP had decreased slightly to USD 292.25 billion due to the global financial crisis. It had led to the lowest GDP growth in the manufacturing sector. GDP increased back from USD 247.53 billion to USD 312.44 billion from 2010 until 2013 (Umar, & Tunggal, 2015).

The agriculture sector contribution was the second largest sector contribution after service sector in Malaysia and it accounted for 28.8% of the GDP growth since 1980. By 1985 to 2010, this sector contribution had slowly declined from 28.8% to 7.3%. The main factor which led to agriculture sector slowdown was the Asian Financial Crisis (1998-1999) and the Global Financial Crisis (2007-2009) (Umar, & Tunggal, 2015).

It suggested that the government should be concerned on the service sector because this sector plays the main role in the GDP growth of Pakistan. It shows that the share of service sector is 50.7% of GDP by year 1999 to 2000 and further increased 53% by 2007 to 2008. The enhancement of the agriculture sector can improve the other sector economy (Nazish, Iqbal & Ramzan).

2.3 Employment

Employment is the number of people who have jobs (Blanchard, & Johnson 2013). Employment also can be defined as an employer offering a certain job to the employee based on the employment contract (Heathfield, 2017). The diverse number of employed workers over the period is known as employment change. It can measure the workers demand due to impact of economic change (Ministry of Manpower, 2015).

The employment to population ratio is also called as employment rate which looking for population of labour ages in employed people. It can be measure of participation activity in worker productivity market (Ministry of Manpower, 2015).

Employment can be divided into a part time work and full time work. Part time job is received a salary based on working hour. Full time job is paid by employer which performing a whole work based on salary in month and benefit (Heathfield, 2017). They provide benefit like retirement fund, health insurance and educational opportunities. Employee has higher skilled will have power to negotiate term of employment.

Based on macroeconomic perspective, level of employment depends on levels of economic activity (Piana, 2001). They have three types of employment status which is employee, worker and self-employed. Employee will do the job within employment contract and will work personally. The term of contract includes pay, working hours and holiday agreed. A worker will work in terms of employment contract agree and carry out work personally. Some of worker can send someone to carry out the work like sub-contractor. Workers include such as casual work, agency worker and others. A self-employed people will take responsibility to their own business. It more likely offers a service to the customer and no receives the salary as employee.

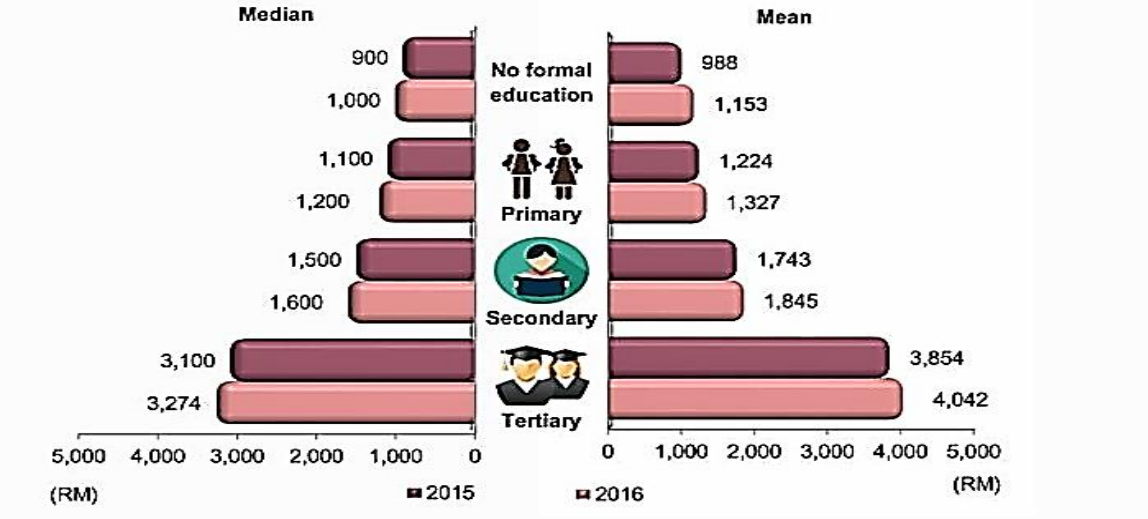
In Malaysia, about 160,000 people at the tertiary level of education are unemployed based on Department of Statistics. In order to improve the student employability, Higher Education Ministry has implemented a project known as Higher Education or Malaysia Education Blueprint 2015 to 2025 (Rahman, 2016).

According to the salaries and wages survey report Malaysia 2016 done by DOSM (Department of Statistics Malaysia), the percentage of median wage male employees has risen 7.3% as compared to the data in 2015. On the other hand, the percentage of female employees has risen by 5.2%. In the report, the salary of the median wage female employee was RM1, 685 which was lower than that of the male employee (RM1,721) in year 2016 (Department of Statistic Malaysia, 2017).

Based on the education level perspective, the monthly wage of employees with tertiary level of education will be accepting twice the more than twice amount accepted by the workers with secondary level education between year 2015 and 2016. Employees who have tertiary level education received monthly wage of RM3,247 compared to those who have secondary level education (RM1,600). The employees with primary level of education received a mean

monthly wage of RM1,327. It was the lowest amount of salary among the workers with primary level education (Department of Statistic Malaysia, 2017).

Figure 2.1: Median and mean monthly salaries and wages of employees by educational attainment in Malaysia, 2015 – 2016



Source: Department of statistic, Malaysia

Employment, in term of economy, is one of the key macroeconomic variables and it is also the main concern of the government either developed countries or developing countries. Employment is the main mechanism which its advantages of the growth can be distributed to the poor areas of the society. It also stated that there is a decline in poverty and income inequality. The opportunity provision of the employment is based on the resources, technological base and advancement. Economic growth sustained can be driven and it depends on the human resources, employment technical competency.

In term of shift-share theory, the industrial mix effect (IME) determines the local employment in each sector growth compared to the growth rate of national employment. It indicates the fast or slow sector growth in the economies. A positive IME depicts that the local employment sector is growing faster than the national economy. On the other hand, if the national economy is boosting faster than the local employment, a negative IME will be shown (Herath, Gebremedhin, & Maumbe, 2012).

The example of negative industrial mix can be shown in the case of West Virgina. Growth of employment is negative in the farming sector because of the growth of non-farm sector. The farming sector in West Virginia does not have competitive advantage in economy growth (Herath, Gebremedhin, & Maumbe, 2012). However, the case in Ceara shows that the rural areas are enjoyed economic growth in agricultural sector and benefited from overall employment (Nogueira & Lopes, 2009). In Alberta, Canada, growth in services sector is lower than average but the oil and gas sector is growing faster than average (Andrikopoulos, Brox & Carvalho, 1990).

Goh (2013) provided the evidence in Singapore about the effect of sectoral development on employment. Although the employment of less productive sectors is rises, compared to the higher productive sectors, the overall productivity growth didn't grow up. Thus, to increase the productivity of labour, the restructuring of economy toward productive sectors is important.

2.4 Employment and GDP in Malaysia

Nixon, Asada, and Koen (2017) investigated that the regional inequality in Malaysia were remained large and even wider in recent years. Peninsular Malaysia is benefited from the factors of historical, geographical, and social economic, hence speed up the growth of its economy. While in East Malaysia, the economy is more rely on the primary industries. In addition, East Malaysia is growing slower in infrastructure and human capital, and these will limit the growth of employment and GDP of East Malaysia.

By 1970 to 2005, Malaysia had achieved high and full employment. It indicated that the economy of Malaysia has expanded rapidly in the past three decades. By the year 1997, Malaysia had a strong economic growth which enabled the creation of job opportunities that over passed the rate of labour force expansion. This resulted in a tight labour market and a lower unemployment rate that reduced to 2.5%. Subsequently, Malaysia economy was operating under full employment situation in 1996 and there was a stronger dependence on foreign labour and increase on wages (Abdullah, Naim, & Long, 2011).

Generally, GDP and employment are used to measure the economy of sector contribution. Based on the Bank Negara Malaysia 2010 of the data, it showed that the main sector contribution in Malaysia comes from the service sector. By 2008, this sector had a GDP of 55% and a total employment of 52.2%. In 2010, the GDP of service sector achieve to a higher percentage of 58.5% (Bank Negara Malaysia, 2010).

Sabah achieves the lowest growth of GDP at 2.4% compared to the other states in Malaysia which accounted the GDP growth by 7.2% on national level in year 2010. The unemployment rate in Sabah is high. Its unemployment rate is 5.6% higher than the 3.5% at the national level. However, the participation rate of labour force in Sabah is a little higher in national level (Razak, 2015).

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter discuss about the models and methods used in the research. For the analysis of regional development, shift-share model is appropriate to be chosen. As the data used in the research includes both cross-section and time series, panel data analysis is been selected for the following diagnostic checking. First, to determine whether the model is Random Effect or Fixed Effect, Hausman test is performed. After that, to test the stationarity of the statistic, unit root test is been used. Cointegration test also been performed to examine the long-run relationships between the variables. Lastly, Granger Causality test is performed to test the causality of the variables.

3.1 Data collection

This paper is using secondary data for the analysis. The data used, which is total number of employment of Sabah, Sarawak, and Malaysia, total gross domestic production (GDP) of Sabah, Sarawak, and Malaysia, number of employment of Sabah, Sarawak, and Malaysia based on five sectors (agriculture, mining and quarry, manufacturing, construction, and services), GDP of Sabah, Sarawak, and Malaysia based on five sectors, are taken from Department of Statistic Malaysia. The time period used for the analysis is from 2005 to 2015. In addition, compare to current price GDP, constant price GDP could reflect more accurate picture of a country's growth rate, while current price GDP is affected by the inflation (The World Bank, 2017). Therefore, constant price GDP is been chosen. However, because of the nature of data, this paper has rescaling the data with base year of 2005 into 2010.

3.2 Shift-Share Model

Shift-share model is a standard model used in regional analysis. It was first developed by Daniel Creamer in 1943 then summarized by Edgar S. Dunn in 1960 (Shi, 2007). It is able to determine the factors of employment growth (whether it is growing or declining) in a

regional industry based on three components, which are national growth share (NS), industrial mix share (IMS) and regional shift (RS) (Sentz, 2011). The relationship is shown as below:

Shift-share = National growth share (NS) + Industrial mix share (IMS) + Regional shift (RS)

National growth rate (NS)

National growth rate means the rate of economy would grow if it performed in exactly the same way as the national economy. The calculation is shown as below:

$$NS_i = e_i^{t-i}(\frac{E_i^t}{E_i^{t-1}})$$

Industrial mix share (IMS)

Industrial mix share can be explained as the local economy made up if different sectors from the national economy. The calculation is shown as below:

$$IMS_i = e_i^{t-1}\left[\left(\frac{E_i^t}{E_i^{t-1}}\right) - \left(\frac{E^t}{E^{t-1}}\right)\right]$$

Regional shift (RS)

Regional shift has been divided into two share where it is local share and competitive share. Local share explained as the employment change that is due to favourable local conditions and actions that support particular sector. The calculation is shown as below:

$$CS_i = e_i^{t-1}\left[\left(\frac{e_i^t}{e_i^{t-1}}\right) - \left(\frac{E_i^t}{E_i^{t-1}}\right)\right]$$

Where,

e: Community employment

i: Sector

E: National employment

t: Time period

3.3 Econometric Method

3.3.1 Panel Data Analysis

Panel data is the combination of a cross-section of observations which contain one or more explanatory variables with a given time period (Akbar, et al, 2011). There are two patterns of panel data: Balanced panel and unbalanced panel. Balanced panel is the data that contain balanced number of observations or cross-section data with the number of period. Balanced panel data also distributes into short panel, which means that the number of cross-sections is more than the number of time period and long panel is means that the number of time period is more than the number of cross-sections. Unbalanced panel data consist of missing data or the data set does not have equal number of cross-sections and time period.

Panel data analysis is important because of several reasons. Gujarati (2004) had listed the advantages of using panel data in research, which are related to specific units over time-bound to be heterogeneity, more degree of freedom and informative, better suited to study the dynamic of change, can detect and measure effects that pure cross-sectional and pure time series can't be detected, study more complicated behavioral model, and minimize the bias. The advantages are shown below.

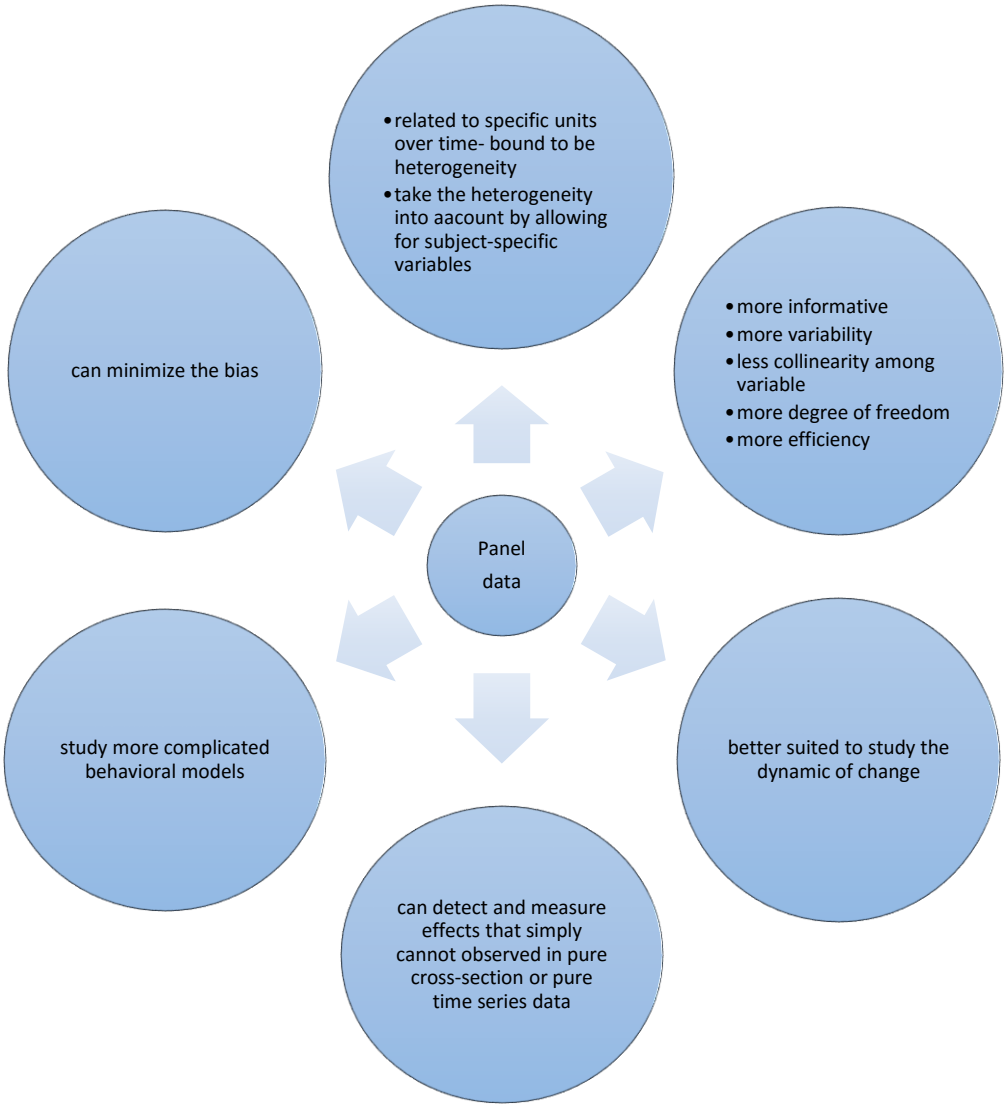


Figure 3.2.1: The advantages of using panel data

Since this paper is analyze the relationship of number of employment and GDP for three cross-sections data (Sabah, Sarawak, and Malaysia) and time series data for period 2005 to 2015, the panel data analysis is recommended. The equation is shown as follow.

$$EMP_{it} = \beta_0 + \beta_1 GDP_{it} + u_{it} \qquad \text{(equation 1)}$$

Where

EMP= number of employment

GDP= gross domestic production (GDP)

β_0= intercept

β_1= coefficient

i= Sabah, Sarawak, Malaysia

t= time period from 2005 to 2015

3.3.2 Fixed Effect Model (Least Square Dummy Variable Model)

Fixed Effect Model (FEM), also known as Least Square Dummy Variable (LSDV) Model is one of the types of panel data regression model. It is used as an estimator for a panel regression model. It has several characteristics such as the intercept of FEM is allowed to differ among individuals and take into account the differing intercepts, one can use dummy variable. FEM is appropriate when the individual-specific intercept may be correlated with one or more regressors.

FEM has three scenarios that have difference assumptions. The first scenario assumes that intercepts are different across states, slopes are constant across states, and time invariant (no time effect). The equation is shown as follow.

$EMP_{it} = \alpha_1 + \alpha_2 STATE_{2i} + \alpha_3 STATE_{3i} + \beta_1 GDP_{it} + u_{it}$ (equation 2)

i= Sabah, Sarawak, Malaysia

t= time

$STATE_{2i}$= 1 if the state is Sarawak; 0 if other

$STATE_{3i}$= 1 if the state is Malaysia; 0 if other

The second scenario has similar assumption with the first scenario, the only difference is it has time variant (time effect). The time effect may occur when there is technological change, policy change or other external effect. The equation is shown below.

$EMP_{it} = \alpha_1 + \alpha_2 STATE_{2i} + \alpha_3 STATE_{3i} + \lambda_1 YEAR_{2005} + \lambda_2 YEAR_{2006} + \lambda_3 YEAR_{2007} + \ldots + \lambda_{11} YEAR_{2014} + \beta_1 GDP_{it} + u_{it}$ (equation 3)

$YEAR_{2005}$= 1 if it takes a value of 1 for observation in year 2005; 0 if other

$YEAR_{2006}$= 1 if it takes a value of 1 for observation in year 2006; 0 if other

$YEAR_{2007}$= 1 if it takes a value of 1 for observation in year 2007; 0 if other

$YEAR_{2008}$= 1 if it takes a value of 1 for observation in year 2008; 0 if other

$YEAR_{2009}$= 1 if it takes a value of 1 for observation in year 2009; 0 if other

$YEAR_{2010}$= 1 if it takes a value of 1 for observation in year 2010; 0 if other

$YEAR_{2011}$= 1 if it takes a value of 1 for observation in year 2011; 0 if other

$YEAR_{2012}$= 1 if it takes a value of 1 for observation in year 2012; 0 if other

$YEAR_{2013}$= 1 if it takes a value of 1 for observation in year 2013; 0 if other

$YEAR_{2014}$= 1 if it takes a value of 1 for observation in year 2014; 0 if other

The third scenario assumes that intercepts and slopes are different across states and time invariant (no time effect). The slope coefficients and intercept are varies over individuals (states) as well as no time effect. The equation is shown as:

$$EMP_{it}= \alpha_1+ \alpha_2 STATE_{2i}+ \alpha_3 STATE_{3i}+ \beta_1 GDP_{it}+ \gamma_1(STATE_{2i}GDP_{2it})+ \gamma_2(STATE_{3i}GDP_{3it})+ \gamma_3(STATE_{4i}GDP_{4it})+u_{it} \quad \text{(equation 4)}$$

Based on the equation, the intercepts and slopes are varying with the state.

In the usage of FEM, researcher should take caution that FEM may not be able to identify the impact of time invariant variables. The subject-specific intercept absorb all heterogeneity that may exist in the dependent and independent variables. These will lead to the loss of degree of freedom.

3.3.3 Random Effect Model

Random Effect Model (REM) sometime also known as error components model, similar with FEM, it is used to estimate the panel data regression model. However, the selection of FEM or REM always becomes the concern for researches. The difference between REM and FEM is REM assumes that the intercept of an individual unit is a random drawing from a much larger population with a constant mean value. The individual intercept is then expressed as a deviation from this constant mean (Greene, 2002). REM can be used when the (random)

intercept of each cross-sectional unit is uncorrelated with the regressors. The equation is shown as follow.

$EMP_{it} = \beta_{1i} + \beta_2 GDP_{it} + u_{it}$

$EMP_{it} = (\beta_1 + \varepsilon_i) + \beta_2 GDP_{it} + u_{it}$

$EMP_{it} = \beta_1 + \beta_2 X_{it} + \varepsilon_i + u_{it}$ (equation 5)

Where β_1 is mean for intercept term, u_{it} is the combination between time series and cross sectional error component which constant over time. It assumes normally distributed. ε_i is cross-section or individual-specific error component is random or not constant. As this model has separate cross-sectional error term, also known as one-way effect model, it has distinct advantage of allowing for time invariant variables to be included among the regressors (Yaffee, 2003).

Assumption of REM also can be shown as following equation:

$\varepsilon_i \sim N(0, \sigma_\varepsilon^2)$

$u_{it} \sim N(0, \sigma_{it}^2)$

$cor(\varepsilon_i u_{it}) = 0 \qquad cor(\varepsilon_i \varepsilon_j) = 0 \quad (i \neq j)$

$cor(u_{it} u_{is}) = cor(u_{it} u_{jt}) = 0 \qquad (i \neq j;\ t \neq s)$

$E(\omega_{it}) = 0$

$var(\omega_{it}) = \sigma_\varepsilon^2 + \sigma_u^2 \qquad$ where, $\omega_{it} = \varepsilon_i + u_{it}$ (equation 6)

The error term $\varepsilon_i \sim N(0, \sigma_\varepsilon^2)$ is found not constant, the autocorrelation problem will be occurred. Therefore, to obtain best linear unbiased estimator (known as BLUE in short) estimation, Generalized Least Square (GLS) is more appropriate compare with Ordinary Least Square (OLS). According to the equation 6, the individual error components are uncorrelated with each other and not autocorrelated across cross-sections and time series data.

When the model is depended on both the cross-sections and time series within it, it is known as two-way effect model. The equation is shown as follow.

$u_{it} = \varepsilon_i + u_t + \eta_{it}$ (equation 6)

The ε_i is error term for cross-section specific error, which only affects the observation in that panel. u_t is time specific error and η_{it} affects only the particular observation.

Compare with FEM, REM can reduce the number of unknown parameters. REM reduces the possibility of multicollinearity problem as it has less independent variables. However, the selection of using FEM or REM cannot be simply determined only by the assumptions, it can be determined by a specification test devised by Hausman (1978).

3.3.4 Hausman Test

The previous section has been discussed about the features of FEM and REM. If there is no correlation between the intercept of each cross-sectional unit and regressor, the REM can provide more meaningful result. If there is a correlation between individual-specific intercept and regressor, then FEM is more appropriate. To decide whether using FEM or REM, the most common test used is Hausman test (Yaffee, 2003).

The null hypothesis in Hausman test states that REM are consistent and efficient, while the alternative hypothesis states that REM are inconsistent and inefficient, which mean that FEM should be chosen. The test statistic can be calculated as follow:

$$\mathrm{H} = \widehat{\beta^{\mathrm{FE}}} + \widehat{\beta^{\mathrm{RE}}}[\mathrm{Var}(\widehat{\beta^{\mathrm{FE}}}) - \mathrm{Var}(\widehat{\beta^{\mathrm{RE}}})]^{-1}(\widehat{\beta^{\mathrm{FE}}} - \widehat{\beta^{\mathrm{RE}}})$$

Critical value can be obtained by chi square distribution with k degree of freedom. The null hypothesis can be rejected if the test statistic is smaller than the critical value. When the null hypothesis is rejected, it implies that FEM is more appropriate than REM.

Normally, the Hausman test requires one estimator to be efficient under null hypothesis. If the model is heteroscedastic, the least squares estimator is no long efficient. In this situation, several approaches can be used to solve the heteroscedasticity problem such as Generalized Method of Movement (GMM), bootstrapping, and robust artificial regression (Chmelarova, 2007).

3.3.5 Unit root test

First of all, "unit root" is a stochastic trend in a time series and also called as "random walk with drift" (Andele, 2016). If there is a unit root, it means that the model is non-stationary, which might cause the spurious regressions problem to be occurred. Spurious regressions would show a high R-square even if the data is uncorrelated. On the other hand, spurious regressions can prove that the standard assumptions for asymptotic analysis will be invalid. The usual "t-ratios" will not follow a t-distribution, hence the result of hypothesis testing cannot be trusted. To examine whether there is a unit root in the model, there are three common approaches can be used, such as Dickey-Fuller (DF) unit root test (1979), Augmented Dickey-Fuller (ADF) unit root test (1981) and Phillips-Perron (PP) unit root test (1988). If the model is not stationary at the level form, it can be tested again in first difference form. Therefore, in some application, unit root test also can be used to determine whether to use the model in differences or levels form (Diebold & Kilian, 1997).

However, the unit root test used in panel data will be different with the pure time series data. Some of the panel unit root tests are: Levin, Lin and Chu (2002), Beirtung (2000), Im, Pesaran and Shin (2003), Fisher-type tests using ADF and PP tests by Maddala and Wu (1999) and Choi (2001), and Hadri (2000). Choi (2001) has listed the common assumptions that hold by these panel unit root test, which are:

(1) Required the number of groups be infinite to hold the asymptotic normality of the test (N, $T \rightarrow \infty$), where N refers to the number of cross-sections and T refers to the number of time series. This assumption implies that the N should be infinite for asymptotic normality and at same time small enough relative to the T.

(2) All cross-sections data have the same type of non-stochastic component, mean that there should not have specific non-stochastic component within the cross-sections data.

(3) There are same numbers of time series across the cross-sectional data.

(4) The alternative hypothesis is none of the groups have a unit root.

In this paper, only Im, Pesaran and Shin, Fisher-type tests and Hadri would be used and discussed.

Im, Pesaron and Shin (IPS) unit root test

IPS test is denoted by Im, Pesaran and Shin in 1997 and 2003 to examine the presence of unit root in panels. For IPS test, fewer time observations relative to cross-sectional units are required to have power (Abdullah, Bakar & Hassan, 2014). Compare to another panel unit root test, Levin-Lin-Chu test, IPS test has less restriction since it allows for heterogeneous coefficients (Nell & Zimmermann, 2011). The model of IPS specific a separate ADF regression for each cross-section with individual effects and without time trend: $\Delta Y_{it} = \alpha_i + \rho_i Y_{i,t-1} + \sum_{j=1}^{\rho i} \beta_{ij} \Delta Y_{i,t-j} + \varepsilon_{it}$, where *i*=1,…,N and *t*= time series.

The null hypothesis for IPS, H_0: all individual follow a unit root process, $\rho_i = 0 \forall i$; while the alternative hypothesis, H_1: at least one of the individual does not follow a unit root process, $\rho_i < 0$, for *i*=1, 2,…, N_1 or $\rho_i = 0$, for *i*= N_1+1,…, N.

Since IPS is used the separate unit root tests for N cross-sectional units, the test statistic of IPS is based on the average individual unit root test: $\bar{t} = \frac{1}{N} \sum_{i=1}^{N} t_{\rho_i}$, where t_{ρ_i} refers to the test statistic for testing the null hypothesis, H_0: $\rho_i = 0$ for all *i*. If the test statistic is properly standardized, it is asymptotically normal distributed (N, T→∞).

Monto Carlo simulations reveal that the small sample (N and T are small) could make IPS test perform better. In addition, the test will has little power if the trend is included into the test (Nell & Zimmermann, 2011).

Fisher-type unit root test

Besides IPS unit root test for panel data, Fisher-type ADF and PP test also been used in panel unit root test. IPS test uses an average statistic, while Fisher-type test is based on combining the observed significant levels from individual tests (Hurlin & Mignon, 2007). Fisher-type test uses p-values from unit root tests for each cross-section *i*.

The null hypothesis for Fisher-type test is considered same with IPS test, where H_0: $\rho_i = 0$; H_1: $\rho_i < 0$, for *i*=1, 2,…, N_1 or $\rho_i = 0$, for *i*= N_1+1,…, N.

The test statistic of this test is denoted from ADF model, proposed Maddala and Wu (1999):

$P = -2 \sum_{i=1}^{N} ln\, \rho_i$.

The test is asymptotically chi-square distributed with 2N of degree of freedom when T_i is infinite and N is fixed. For large N samples, Choi (2001) has proposed a modified P test statistic:

$$P_m = -\frac{\sum_{i=1}^{N} ln(\rho_i)+N}{\sqrt{N}}$$

Since $T_i \rightarrow \infty$ and followed by $N \rightarrow \infty$, it meets the assumptions of Lindberg-Levy central limit theorem and shows that it is normally distributed under the unit root test hypothesis.

The benefits of using Fisher-type test are the test can use for unbalanced panel data and the lag length of individual ADF tests are allowed to differ. The difficulty of this test is that the p-values have to be obtained by Monte Carlo simulations (Nell & Zimmermann, 2011).

Hadri test

Hadri (2000) proposes Hadri test that further developed from Kwaitkowski, Phillips, Schmidt and Shin (KPSS) stationary test (1992) in the time series context. It is used to examine the stationarity of the panel data. Hadri (2000) derives a residual-based Lagrange multiplier (LM) test where the null hypothesis is stationary for the individual of the panel against the alternative hypothesis of there is non-stationary in the panel (). There are two models proposed by Hadri (2000): $Y_{it} = r_{it} + \varepsilon_{it}$ and $Y_{it} = r_{it} + \beta_i t + \varepsilon_{it}$, where $r_{it} = r_{i,t-1} + u_{it}$ is random walk, $\varepsilon_{it} \sim IID(0, \sigma_\varepsilon^2)$ and $u_{it} \sim IID(0, \sigma_u^2)$. Hence, the model also can be written in: $Y_{it} = r_{i0} + \beta_i t + \sum_{s=1}^{t} u_{is} + \varepsilon_{it} = r_{i0} + \beta_i t + v_{it}$.

The null hypothesis, H_0: $\sigma_u^2 = 0$, means that Y_{it} is stationary; while the alternative hypothesis, H_1: $\sigma_u^2 \neq 0$, means that the Y_{it} is non-stationary. The LM test statistic is shown as: $LM = \frac{1}{n}\left(\sum_{i=1}^{n} \frac{1}{T^2} \sum_{t=1}^{T} S_{it}^2\right) / \hat{\sigma}_\varepsilon^2$, where $S_{it} = \sum_{s=1}^{t} \widehat{\varepsilon_{is}}$ are partial sum of residuals $\hat{\varepsilon}_{is}$ and $\hat{\sigma}_\varepsilon^2$ is a consistent estimator of null hypothesis.

Hadri test is allowed for heteroscedasticity adjustment. The statistic will become: $LM = \frac{1}{n}\left[\sum_{i=1}^{n} \left(\frac{1}{T^2} \sum_{t=1}^{T} S_{it}^2 / \hat{\sigma}_{\varepsilon i}^2\right)\right]$. The test statistic is given as: $Z = \sqrt{n}(LM - \xi)/\varsigma$, where $\xi = \frac{1}{6}$ and $\varsigma = \frac{1}{45}$ if the model is only include a constant; $\xi = \frac{1}{15}$ and $\varsigma = \frac{11}{6300}$ if otherwise.

3.3.6 Cointegration test

Cointegration test is a method which testing the long-run relationship between two or more variables in the time series analysis. Cointegration refers to a linear combination of non-stationary variables. It holds that all variables must be integrated of the same order. If two series are linked to form an equilibrium relation, then even though the original series are non-stationary, they will nevertheless move closely together over time and the difference between them will be stationary. The concept of cointegration indicates that the existence of long-run equilibrium to which and economic system converges overtime and error term can be interpreted as the disequilibrium error. There are several cointegration test approaches used in time series analysis, the most common test is Engle and Granger (EG) approach (1987). However, because of panel includes both the cross-sections and time series, it become more complicated in examination of cointegration. Therefore, McCoskey and Kao (1998), Kao (1999), and Pedroni (1999 & 2004) have proposed residual based cointegration test. In this paper, Kao (1999) and Pedroni (1999 & 2004) have been selected to perform the cointegration test.

Pedroni Residual Cointegration Test

In Pedroni test, it examines for four panel statistics and three group panel statistics, with holding that the null hypothesis of no cointegration against the alternative hypothesis of cointegration (Ramirez, 2006). Pedroni (1997) considered the model as:

$Y_{it} = \alpha_i + \delta_i t + X_{it}\beta_i + e_{it}$, where Y_{it} and X_{it} are assume as I(1), and under null hypothesis the residual, e_{it} will also be I(1). α_i refers to specific fixed effects for each individual while δ_i refers to deterministic trends. β_i refers to the coefficient of individual, and it allowed to be vary among individual.

The null hypothesis of Pedroni cointegration test, H_0: $\rho_i = 1$; H_1: $\rho_i = \rho < 1$, and H_0: $\rho_i = 1$; H_1: $\rho_i < 1$, where i= 1,2,…,N

Pedroni test proposed two types of tests, the first set is pooling the residuals along the within dimension of the panel. It involves average test statistics for cointegration in the time series across cross-sections. The second set is pooling the residual along between dimensions of the panel. The averaging is done in pieces so that the limiting distributions are based on limit of piecewise numerator and denominator terms. The statistic can be shown as follow.

The first set:

Panel variance ratio statistic: $Z_{\hat{V}NT} = \widehat{L_{11}^2}(\sum_{i=1}^{N}\sum_{t=1}^{T} e_{i,t-1}^2)^{-1}$

Panel-rho statistic: $Z_{\hat{\rho}NT-1} = (\sum_{i=1}^{N}\sum_{t=1}^{T} e_{i,t-1}^2)^{-1}\left[\sum_{i=1}^{N}\sum_{t=1}^{T}(\Delta\hat{e}_{it}\hat{e}_{i,t-1} - \widehat{\lambda_i})\right]$

Panel-t statistic: $Z_{\hat{t}NT} = (\tilde{\sigma}_{NT}^2\sum_{i=1}^{N}\sum_{t=1}^{T} e_{i,t-1}^2)^{-\frac{1}{2}}\left[\sum_{i=1}^{N}\sum_{t=1}^{T}(\Delta\hat{e}_{it}\hat{e}_{i,t-1} - \widehat{\lambda_i})\right]$

The second set:

Group-rho statistic: $Z_{\hat{\rho}NT-1} = \sum_{i=1}^{N}\left[(\sum_{t=1}^{T} e_{i,t-1}^2)^{-1}\sum_{t=1}^{T}(\Delta\hat{e}_{it}\hat{e}_{i,t-1} - \hat{\lambda}_i)\right]$

Group-t statistic: $Z_{\hat{t}NT} = \sum_{i=1}^{N}\left[(\hat{\sigma}_i^2\sum_{t=1}^{T} e_{i,t-1}^2)^{-\frac{1}{2}}[\sum_{t=1}^{T}(\Delta\hat{e}_{it}\hat{e}_{i,t-1} - \hat{\lambda}_i)]\right]$

The asymptotic distribution of each of the above five statistics can be expressed in the following form: $\frac{X_{NT}-\mu\sqrt{N}}{\sqrt{v}} \Longrightarrow N(0,1)$, where X_{NT} is corresponding form of the test statistic, μ is mean and v is variance of the test which are given in the table of Pedroni (1999). Under alternative hypothesis, the panel variance statistic diverges to positive infinity, and hence the right tail of the normal distribution is used to reject null hypothesis. If there is a large positive value, then the null of no cointegration is rejected. For the rest of statistics, they are diverged to negative infinity, therefore the left tail of the normal distribution is used to reject null hypothesis. Consequently, the large negative value will reject the null of no cointegration.

Kao Residual Cointegration Test

Kao (1999) proposed a panel cointegration test, started with the equation as follow: $Y_{it} = \alpha_i + \beta X_{it} + e_{it}$, where $Y_{it} = Y_{i,t-1} + u_{it}$ and $X_{it} = X_{i,t-1} + \varepsilon_{it}$. α_i is the fixed effect varying across the cross sections, while β is the slope parameter. Y_{it}, X_{it}, and e_{it} are I(1). Kao developed two types of test, which is DF-type and ADF-type unit root test for testing the null of no cointegration. The DF-type test can be written as:

$\hat{e}_{it} = \rho\hat{e}_{it} + v_{it}$

The null and alternative hypothesis of Kao test is shown as: H_0:$\rho = 1$; H_1:$\rho < 1$.

There are four statistics in DF-type test:

$$DF_\rho = \frac{\sqrt{N}T(\hat{\rho} - 1) + 3\sqrt{N}}{\sqrt{10.2}}$$

$$\mathrm{DF_t} = \sqrt{1.25} \times \mathrm{t_\rho} + \sqrt{1.875\mathrm{N}}$$

$$\mathrm{DF_\rho^*} = \frac{\sqrt{\mathrm{N}}\mathrm{T}(\hat{\rho} - 1) + \frac{3\sqrt{\mathrm{N}}\hat{\sigma}_\mathrm{v}^2}{\hat{\sigma}_{\mathrm{ov}}^2}}{\sqrt{3 + \frac{36\hat{\sigma}_\mathrm{v}^4}{5\hat{\sigma}_{\mathrm{ov}}^4}}}$$

$$\mathrm{DF_t^*} = \frac{\mathrm{t_\rho} + \frac{\sqrt{6\mathrm{N}}\hat{\sigma}_\mathrm{v}}{2\hat{\sigma}_{\mathrm{ov}}}}{\sqrt{\frac{\hat{\sigma}_{\mathrm{ov}}^2}{2\hat{\sigma}_\mathrm{v}^2} + \frac{3\hat{\sigma}_\mathrm{v}^2}{10\hat{\sigma}_{\mathrm{ov}}^2}}}$$

Among this four statistics, $\mathrm{DF_\rho}$ and $\mathrm{DF_t}$ are based on strong exogeneity of the regressors and disturbances, while $\mathrm{DF_\rho^*}$ and $\mathrm{DF_t^*}$ are for the cointegration with endogenous relationship between regressors and disturbances.

For the ADF-type test, the equation for estimated residual can be written as:

$\hat{e}_{it} = \rho\hat{e}_{i,t-1} + \sum_{\mathrm{j}=1}^{\mathrm{P}} \delta_\mathrm{j}\Delta\hat{e}_{i,t-j} + v_{it}$

Under the null hypothesis, the ADF-type test statistic is shown as:

$\mathrm{ADF} = \frac{\mathrm{t_{ADF}} + \frac{\sqrt{6\mathrm{N}}\hat{\sigma}_\mathrm{v}}{2\hat{\sigma}_{\mathrm{ov}}}}{\sqrt{\frac{\hat{\sigma}_{\mathrm{ov}}^2}{2\hat{\sigma}_\mathrm{v}^2} + \frac{3\hat{\sigma}_\mathrm{v}^2}{10\hat{\sigma}_{\mathrm{ov}}^2}}} \sim \mathrm{N}(0,1)$, where $\mathrm{t_{ADF}} = \frac{(\hat{\rho}-1)[\sum_{\mathrm{i}=1}^{\mathrm{N}}(e\prime_i Q_i e_i)]^{\frac{1}{2}}}{\mathrm{S_v}}$

In addition, Kao finds out that for small time series data and small sample size, the test may has low power.

3.3.7 Granger causality test

The term of "causality" is means the cause and effect relationship between two variables (Awe, 2012). The most common causality test used in research is Granger causality test. Granger (1969) developed Granger causality test that defined as: a variable Y_t is said to Granger-cause X_t if X_t can be predicted with greater accuracy by using past values of the Y_t variable rather than not using such past values, all other terms remain unchanged.

The null hypothesis of Granger causality test is X does not Granger cause Y and Y does not Granger cause X. F-test statistic is used and the equation is shown as: $F = \frac{(SSE_{reduced} - SSE_{full})/(k_{full} - k_{reduced})}{SSE_{full}/(n - k_{full})}$. This follows the F-distribution with (k_{full}- $k_{reduced}$) and (n-k_{full}). If the F-test statistic is exceeded F-critical value or p-value is smaller than significant level, reject the null hypothesis.

3.4 Conclusion

The discussion above has mentioned the characteristics and features of the methods used in this paper, which are shift-share model, panel analysis, Hausman test, unit root test, cointegration test, and Granger causality test. These methods will be used to perform the empirical result. The result will be shown in the Chapter 4 and more specific discussion will be made based on the result obtained.

CHAPTER 4: RESULT AND INTERPRETATION

4.0 Introduction

In complimentary to previous chapter, this chapter provides result estimation of respective shift share analysis and statistical tests. The shift share analysis has provided the details in comparison of employment data by sector in Sarawak, Sabah and Malaysia from year 2005 to 2015. In order to provide detailed information in changes of employment, the data was been tested separately into two periods amounted 5 years per test. Meanwhile in empirical tests, the data of employment and GDP from year 2005 to 2015 were been used. There were Hausman test in least square panel estimation, Unit root test, cointegration test and Granger Causality test. With every result estimated in the paper, each shall be explained with appropriate interpretation.

4.1 Shift-Share Analysis

Table 4.1 shows the change in employment and percent change. The sector can be divide into 5 sector which it is Agricultural, hunting, forestry and fishing, Mining and quarrying, Manufacturing, Construction and Services sector.

Table 4.1: Employment data of Malaysia by sector, 2005-2010.

	2005	2010	Change in employment	Percent change
Total employment	10,045,400	11,899,500	1,854,100	18.46%
Agricultural, hunting, forestry and fishing	1,740,400	1,614,900	144,500	9.83%
Mining and quarrying	36,100	57,200	21,100	58.45%
Manufacturing	1,989,300	2,108,500	119,200	5.99%
Construction	904,400	1,082,700	178,300	19.71%
Services	5,645,200	7,036,200	1,391,000	24.64%

Source: Department of Labor Statistic, Malaysia

Table 4.2: Employment data of Sarawak by sector, 2005-2010.

	2005	2010	Change in employment	Percent change
Total Employment	910,900	1,045,600	134,700	14.79%
Agricultural, hunting, forestry and fishing	276,100	298,500	22,400	8.11%
Mining and quarrying	6,100	10,300	4,200	68.85%
Manufacturing	107,400	139,100	31,700	29.52%
Construction	83,900	98,700	14,800	17.64%
Services	437,400	499,000	61,600	14.08%

Source: Department of Labor Statistic, Malaysia

Table 4.2 shows the change in employment and percent change in employment of Sarawak by sector. As shows in the Table 4.2, the employment percent change in manufacturing sector of Sarawak was higher than the Malaysia (refer Table 4.1) means that Sarawak manufacturing sector is growth faster than the national, Malaysia manufacturing sector between year 2005 and 2010. Sarawak economy from agricultural base economy developed into Manufacturing based economy. Thus, manufacturing sector required more workers for producing electric and electronic, foods, chemical and others. Other than that, Sarawak also a state that have many log productions. Sarawak government encouraged the log company not only product logs, they also can product the log into board, wooden bench, wooden block, tables and other high value added products. The increased of the manufacturing activities required many of the skilled and unskilled workers. This is why the employment percent change for manufacturing sector in Sarawak increased higher than Malaysia.

Table 4.3: Shift share components of Sarawak, 2005-2010.

	National share	Industry Mix	Regional Shift	Actual employment growth change
Agricultural, hunting, forestry and fishing	50,960	-23,827	-4,733	22,400
Mining and quarrying	1,126	2,439	635	4,200
Manufacturing	19,823	-13,388	25,265	31,700
Construction	15,486	1,055	-1,741	14,800
Services	80,732	27,045	-46,177	61,600
Country national growth share/ country industrial mix share/country regional shift	168,127	-6,676	-26,751	134,700

Source: Self computed

Table 4.3 shows the national share, industry mix, regional shift and actual employment growth change. The regional shift of Sarawak in Mining and quarrying and Manufacturing sector have positive sign, which means that these two sectors have faster growth in Sarawak compared to Malaysia. From the discussion above, shows the Manufacturing sector in Sarawak was growth faster than national manufacturing sector between year 2005 and 2010.

National share can be explained as the amount of the regional industry's growth is clarified by the overall health of the national economy. If the country's entire economy is developing, it can be expected have positive change in every industry in the country (Mikissick, 2017). It also indicates employment development that would have happened if a sector in a country or local economy had developed at same rates as the national economy. As to Sarawak, national share in all sectors is positive (Herath, Gebremedhin & Maumbe, 2012). Depend to the result, the services sector's employment have the larger contribution for the total employment compared to the other sectors' employment. If the same rate of national share have been calculated, the change in employment would be larger in those sector in Sarawak.

The general national development component demonstrates that, if the Sarawak's economy was same to the Malaysia's economy, then the number of jobs in Malaysia should have increased by 168,736 between year 2005 and year 2010 (refer Table 4.3). Yet, the data from Table 4.2 indicates that the Sarawak only increased 134,700 jobs during this period. This result also can expect that Sarawak is not performing as well as the Malaysia's average.

The industrial mix measures the amount of local or regional employment sector development compared to the national employment development. It can be utilized as a part of identifying the quick or slow developing sectors or industries in an economy. A positive industrial mix in a specific local employment sector shows that it is developing quicker than the national economy. In the event that the industrial mix is negative, the sector is developing at a slower rate compared to the national economy (Herath, Gebremedhim & Maumbe, 2012). The country industrial mix share of -7,051 means that Sarawak has nearly 7,051 less number of jobs than it would have if its structure were same to Malaysia. Mining and quarrying, construction and services are developing quicker than the Malaysia's average, while the Agricultural, hunting, forestry and fishing and Manufacturing are developing slower.

The regional shift is the most important of the three indicators, as it clarifies the amount of the change in a given industry is because of some extraordinary competitive advantage that the region possesses, because the development cannot be clarified by national tendency in that industry or the economy as entirety. It can be calculated by taking the total regional growth and subtracting the national growth and industrial mix effects. This effect can be higher than actual job growth if national and/ or industry mix effects are negative while regional growth is positive (Mckissick, 2017). In addition, positive regional shift demonstrates the comparative advantage for a region in a particular sector. A positive local share joined with a positive industrial mix demonstrate a potential comparative advantage in that sector. A negative regional shift demonstrates that the local economy is losing its offer to different regions.

As indicated by the country regional shift, -30,375 new jobs in Sarawak are owing to its relative competitive position. Sarawak itself lost larger part of employment development than the Malaysia did overall. Furthermore to overall development, the analysis also can utilized to look at how individual sector have fared competitively. As indicated in Table 4.3, Mining and quarrying and Manufacturing have positive regional shift in Sarawak. It also indicate these two sector have comparative advantage in economic development in Sarawak between 2005 and 2010. The negative regional shift is in Agricultural, hunting, forestry and fishing, Construction and sectors.

The added up of the national share, industrial mix and regional shift equal to the actual employment growth change in a particular region. The national share and industrial mix are determined exogenously and together make the share of economic development of the region while the regional shift shows up as the only endogenous component in the model (Herath, Gebremedhin & Maumbe, 2012). The actual total employment growth in 5 years (2005-2010) is 131,400 in Sarawak. Services sector always the highest contribution in Sarawak economy. The sector created 61,600 jobs in the Sarawak's economy within year 2005 and year 2010. Manufacturing sector reported as the second highest contribution.

Table 4.4 shows the employment data, change in employment and percent change for Malaysia by Agricultural, hunting, forestry and fishing, Mining and quarrying, Manufacturing, Construction and Services sectors between 2010 and 2015.

Table 4.4: Employment data of Malaysia by sector, 2010-2015.

	2010	2015	Change in employment	Percent change
Total employment	11,899,500	14,067,700	2,168,200	18.22%
Agricultural, hunting, forestry and fishing	1,614,900	1,753,900	139,000	8.61%
Mining and quarrying	57,200	104,400	47,200	82,52%
Manufacturing	2,108,500	2,322,700	214,200	10.16%
Construction	1,082,700	1,309,900	227,200	20.98%
Services	7,036,200	8,576,800	1,540,600	21.90%

Source: Department of Labor Statistic, Malaysia

Table 4.5 demonstrate the employment data for Sarawak for year 2010 and 2015. It also shows the change in employment and percent change between the 5 years' time. As shows in Table 4.5, the employment percent change of Sarawak in Mining and quarrying, Construction and Services sectors have higher percent change compared to Malaysia in these 3 sectors (refer Table 4.4). The Mining and quarrying sector have 110.68% of changes between year 2010 and 2015, compare to Malaysia Mining and quarrying sector only 82.52% of changes between year 2010 and 2015. Malaysia have lower growth in Mining and quarrying sector. Mining and quarrying sector in Sarawak include oil and gas. Sabah transport the natural gas to Bintulu, Sarawak for processing. The downstream activity like building a LNG plant can attract more foreign investment into Sarawak economy. Thus, with attracting foreign direct investment, have higher jobs opportunities. Building new LNG plant required more workers to work with the company.

Furthermore, the employment percent change, 36.47% (refer Table 4.5) in Sarawak for Construction sector is higher than Malaysia, 20.98% (refer Table 4.4). For the Construction sector, improving of infrastructures in Sarawak required more workers to build roads. For example, Pan-Borneo Highway that can travel from Sindumin in Sarawak to Tawau in Sabah. Moreover, building of housing also will need a lot of workers to contribute. The housing projects in Sarawak also increased.

The services sector employment percent change in Sarawak also higher compare to Malaysia. It means that Sarawak services sector have growth faster compare to Malaysia.

Malaysia government encourage the local and foreign tourists come to Malaysia travel. Whole Malaysia include Sarawak and Sabah have many beautiful and natural place to travel. For example, Niah National Park and Gunung Mulu National Park in Sarawak are introduce to local and foreign tourists. In 2001, Mulu National Park was professed a UNESCO World Heritage Site. It attracted many tourists come to Sarawak travel. The increased of tourists need more workers in services sector to serve them. The increased of tourists also would increases the hotels and homestay in Sarawak. The required for more workers increased the employment between year 2010 and 2015.

However, Manufacturing sector of Sarawak have -4.96% change (refer Table 4.5) while Malaysia have 10.16% change (refer Table 4.4). The negative change of Manufacturing sector of Sarawak means that the manufacturing sector using high-tech machine to do the assembly and doing the products. Thus, using manpower decreased in manufacturing sectors. Manufacturing depending high-tech machine.

Table 4.5: Employment data of Sarawak by sector, 2010-2015.

	2010	2015	Change in employment	Percent change
Total employment	1,045,600	1,214,800	169,200	16.18%
Agricultural, hunting, forestry and fishing	298,500	304,400	5,900	1.98%
Mining and quarrying	10,300	21,700	11,400	110.68%
Manufacturing	139,100	132,200	-6,900	-4.96%
Construction	98,700	134,700	36,000	36.47%
Services	499,900	621,800	121,900	24.38%

Source: Department of Labor Statistic, Malaysia

Table 4.6 shows the shift share components with national share, Industrial mix, regional shift and actual employment growth change for Sarawak between 2010 and 2015. The result from Table 4.6 shows the Mining and quarrying, Construction and Services sector have positive sign in the regional shift. The positive sign regional shift means that the Sarawak's sectors economy is growth faster than the Malaysia. Therefore, the Mining and quarrying, Construction and Services sectors have growth faster than Malaysia sectors economy.

Table 4.6: Shift share components of Sarawak, 2010-2015.

	National share	Industrial mix	Regional shift	Actual employment growth change
Agricultural, hunting, forestry and fishing	54,390	-28,697	-19,793	5,900
Mining and quarrying	1,877	6,623	2,900	11,400
Manufacturing	25,345	-11,214	-21,031	-6,900
Construction	17,984	2,728	15,288	36,000
Services	90,922	18,335	13,543	122,800
Country national growth share/ country industrial mix share/ country regional shift	190,518	-12,225	-9,093	169,200

Source: Self computed

Between year 2010 and 2015, Sarawak's national share in all sector also positive. It also larger contribution in services' sector. The entire national growth component indicates that, if the Malaysia's economy was same to the Sarawak's economy, then the quantity of jobs in Malaysia should increase by 207,407. Yet, the data from Table 4.5 indicates that Sarawak only increased 169,200 jobs during this period. It also expect that Sarawak is not performing as well as the Malaysia's average.

Basic on the calculation in Table 4.6, the country industrial mix share of -12,225 means that Sarawak has nearly 12,225 less jobs than it would have its structure were same to Malaysia. Agricultural, hunting, forestry and fishing (-28,679) sector in Sarawak indicates a negative industrial mix shows a slower growth rate compared to the Malaysia employment development. Moreover, the Mining and quarrying (6,623), Manufacturing (-11,214), Construction (2,728) and Services (18,335) sector shows a positive industrial mix indicating a quicker development between year 2010 and 2015.

Furthermore, the country national regional shift, -9,093 jobs in Sarawak are owing to its relative competitive position. Sarawak itself lost larger part of employment development than the Malaysia did overall. Sarawak's regional shift in Agricultural, hunting, forestry and fishing and Manufacturing sectors are negative. Mining and quarrying, Construction and Services sectors in Sarawak indicate positive regional shift shows its comparative advantage in economic development.

The actual total employment growth in 5 years (2010-2015) is 136,789 in Sarawak (refer to Table 30). Services sector mainly report as the highest contribution to actual employment growth. The Services sector have created 122,799 jobs in the Sarawak's economy within the last 5 years (2010-2015). The second highest contribution in Construction sector, it's created 36,000 opportunities jobs in Sarawak.

Table 4.7: Employment data of Sabah by sector, 2005-2010.

	2005	2010	Change in employment	Percent change
Total employment	1,106,800	1,398,600	291,800	26.36%
Agricultural, hunting, forestry and fishing	373,600	492,100	118,500	31.72%
Mining and quarrying	2,600	5,000	2,400	92.31%
Manufacturing	123,300	122,000	-1,300	-1.05%
Construction	88,900	115,600	26,700	30.03%
Services	518,400	663,900	145,400	28.05%

Source: Department of Labor Statistic, Malaysia

The next table is table 4.7, it shows the number of employment in the 5 sector of Sabah for 2005 and 2010. The table also demonstrate the change in employment and percent change of Sabah employment. The total employment percent change for Sabah, 26.36% (refer Table 4.7) was higher compare with Malaysia total employment percent change, 18.46% (refer Table 4.1) between year 2002 and 2010. The economy in Sabah is more developed in Sabah. All sector percent change for Sabah is higher than Malaysia except manufacturing sector. Agricultural, hunting, forestry and fishing sector employment percent change (refer Table 4.7) was higher compare to Malaysia (refer Table 4.1). These sector in Sabah have higher percent change means the economy in this sector have growth faster than Malaysia. The fresh sea water in Sabah have produce many type of seafood. The fisherman increase in these 5 years due to Sabah have attracting many local and foreign tourists went to Sabah travel and eat their seafood. Especially the tiger prawn, it is Sabah famous seafood. Malaysia government had some regulation that fisher need to fulfil which are the net holes sizes cannot larger than the sizes that government have been required.

Moreover, the Mining and quarrying employment percent change of Sabah, 92.31% (refer Table 4.7) was greater than Malaysia, 58.45% change (refer Table 4.1). The oil and gas

company required a lot of skilled workers help them to find more places that have oil and gas. For the Construction sector, the employment percent change in Sabah is higher than the employment percent change for Malaysia. The reason of employment percent change in Construction sector is higher because of the building of the house is increasing. More and more of the house built in Sabah, have faster development in built up house compare with Malaysia. The building of house need to be done with manpower, cannot depend on the machine. Thus, these sector need many workers to build the house.

Last but not least, the Services sector employment percent change, 28.05% also higher than the Malaysia employment percent change, 24.64% between year 2005 and 2010. One of the reasons why the Services sector employment increased due to Sabah have Kinabalu Park and Mount Kinabalu as the famous places to travels. The tourists went there need to rent hotels or homestay. It need people to do work in hotel industry, hotels need to hire workers. Other than that, tourists went to Sabah also because of the seafood. So, more and more restaurants had been open in Sabah. Most of them are selling seafood. The restaurants also need to hired workers. Thus, the employment in Services increased.

Table 4.8: Shift share components of Sabah, 2005-2010.

	National share	Industrial mix	Regional shift	Actual employment growth change
Agricultural, hunting, forestry and fishing	68,956	-32,241	81,785	118,500
Mining and quarrying	480	1,040	880	2,400
Manufacturing	22,758	-15,370	-8,688	-1,300
Construction	16,408	1,118	9,174	26,700
Services	95,682	32,054	17,764	145,500
Country national growth share/ country industrial mix share/ country regional shift	204,284	-13,399	100,915	291,800

Source: Self computed

Table 4.8 shows the shift share components of Sabah between year 2010 and 2015. The shift share components include national share, industrial mix, regional shift and actual employment growth change. As shown in Table 4.8, Agricultural, hunting, forestry and fishing,

Mining and quarrying, Construction and Services sector have positive sign regional shift in Sabah between year 2005 and 2010. These 4 sectors have positive development in Sabah compare to Malaysia economy.

Sabah's national share in all sector indicate positive between year 2005 and year 2010. It also indicate that Services sector have higher contribution in Sabah's economy. The country national growth share indicates that, if Sabah's economy was same to the Malaysia's economy, then the number of jobs in the Malaysia should have increased by 204,284 between year 2005 and 2010. Yet, the data from Table 8 indicates that Sarawak only increased 291,800 jobs during this period.

The entire country industrial mix share component of -13,399 means that Sabah has nearly 13,399 more jobs than it would have if its structure were same to Malaysia. Agricultural, hunting, forestry and fishing (-32,241) and Manufacturing (-15,370) sectors are developing slower than the Malaysia's average. These two sectors have negative industrial mix. In addition, Mining and quarrying, Construction and Services sectors have positive industrial mix means that Sarawak's economy developing faster than Malaysia average.

As shows in Table 4.8, all sectors in Sabah have positive regional shift except the Manufacturing sector have negative regional shift between year 2005 and 2010. The sectors with positive regional shift are Agricultural, hunting, forestry and fishing, Mining and quarrying, Construction and Services sectors. Moreover, the sectors with positive regional shift indicates the comparative advantage for the Sabah region.

The actual total employment growth in 5 year from year 2005 to year 2010 is 291,797 in Sabah as refer to Table 4.8. Manufacturing sectors have negative growth in Sabah's economy. The Services sector reported as the highest contribution to actual employment growth. The services sector created 145,500 jobs in the Sabah's economy in the last 5 years (2005-2010). In Sabah, Agricultural, hunting, forestry and fishing sector have the second highest contribution. These sector created 118,497 jobs opportunities to Sabah's economy. Moreover, the Manufacturing sector have negative growth, it's reduce 1,300 jobs.

Table 4.9 illustrated the number of employment in 2010 and 2015, change in employment between year 2010 and 2015 and the percent change of Sabah by divided into 5 sectors. From Table 4.9, the percent change of total employment in Sabah, 26.63% (refer Table 4.9) overall is greater than the Malaysia total employment percent change, 18.22% (refer Table 4.4) between year 2010 and 2015. Agricultural, hunting, forestry and fishing, Manufacturing, Construction and Services sectors of Sabah (refer Table 4.4) have higher employment percent change compare with Malaysia (refer Table 4.9). These means that these 4 sectors in Sabah have growth faster than Malaysia. Agricultural, hunting, forestry and fishing sector in Sabah employment percent change, 27.15% (refer Table 4.9) have greater than Malaysia, 8.61% (refer Table 4.4) between year 2010 and 2015. These change is because of the logs exports is increased in these 5 years. It need workers to check the trees conditions whether it is suitable to be cutting down. In this sector also need workers to do the research and development (R&D).

Table 4.9: Employment data of Sabah by sector, 2010-2015.

	2010	2015	Change in employment	Percent change
Total employment	1,398,600	1,771,100	372,500	26.63%
Agricultural, hunting, forestry and fishing	492,100	625,700	133,600	27.15%
Mining and quarrying	5,000	6,400	1,400	28.00%
Manufacturing	122,000	146,900	24,900	20.41%
Construction	115,600	149,300	33,700	29.15%
Services	663,900	842,800	178,900	26.95%

Source: Department of Labor Statistic, Malaysia

As shown in Table 4.9, the Manufacturing sector have increased by 24,900 employment due to the manufacturing development in these related years. Between year 2010 and 2015, Sabah have just started to develop manufacturing sector. Government encourage doing more manufacturing in own countries. The development of manufacturing sector required more workers to do the assembly.

Furthermore, Construction sector increased the percent change due to the increased of the infrastructure by building the solar hybrid system to reduce the use of electricity. Solar

hybrid system which using solar panels and a diesel generator backup. Improved the infrastructures by introducing solar hybrid system into the rural areas. These need more workers to spread this information to all rural areas.

Moreover, for the Services sector, employment percent change of Sabah, 26.95% (refer Table 4.9) have increased higher than the Malaysia employment percent change, 21.90% (refer Table 4.4) between year 2010 and 2015. Tourism sector in one of the services sector, Sabah is one of the state that suitable to travel. But due to the terrorist appear in the Sabah. Some of the tourists fell scare will this things will happen in their body. They will don't want to travel to Sabah. Sabah government should maintain the safe security to the local people and foreign tourists. When this problems decreased, it can attract more foreign and local tourists. To increase the employment in Services sector of Sabah, Sabah Animation Creative Content Centre corporate with the Sabah government training the young generations to learn about how to make creative animation. There have some university that teach the students do this kind of things. They are using some apps to develop. The foreign investor will continue to invest in Sabah. The continuous of investment come in Sabah, it can have more jobs opportunities. If the country or states become more safe and secure, it can attracting more investment from local and foreign investors.

Table 4.10 demonstrated the shift share components of Sabah between year 2010 and 2015. The shift share components include national share, industrial mix, regional shift and actual employment growth change. As shown in Table 4.10, Agricultural, hunting, forestry and fishing, Manufacturing, Construction and Services sector in Sabah have positive sign regional shift means these four sectors have growth faster than Malaysia in these 4 sectors between year 2010 and 2015.

Table 4.10: Shift share components of Sabah, 2010-2015.

	National share	Industrial mix	Regional shift	Actual employment growth change
Agricultural, hunting, forestry and fishing	89,665	-47,308	91,243	133,600
Mining and quarrying	911	3215	-2,726	1,400
Manufacturing	22,230	-9,836	12,506	24,900
Construction	21,063	3,195	9,442	33,700
Services	120,969	24,394	33,537	178,900
Country national growth share/ country industrial mix share/ country regional shift	254,838	-26,340	144,002	372,489

Source: Self computed

Between year 2010 and 2015, the entire country national growth share indicates that, if the Sabah's economy was same to the Malaysia's economy, then the number of jobs in Malaysia should have risen by 254,838. However, the result from Table 10 indicates that Malaysia only grown 372,500 jobs during this period.

Moreover, the entire country industrial mix share of -26,340 means that Sabah has nearly 26,340 less jobs than it would have if structure were same to Malaysia. Refer to Table 34, Mining and quarrying, Manufacturing, Construction and Services sectors are developing quicker than the Malaysia's average, while the Agricultural, hunting, forestry and fishing sector are growing slower between year 2010 and 2015. The positive industrial mix means that the Sabah's economy increased faster than the Malaysia's average.

As indicated in Table 4.10, only Mining and quarrying sector have negative regional shift while other sectors including Agricultural, hunting, forestry and fishing, Manufacturing, Construction and Services sectors have positive regional shift. The sectors with positive regional shift indicates the comparative advantage for Sabah. The negative regional shift indicates that the Sabah's economy is losing its share to other state.

The actual total employment change last 5 years (2010 to 2015) is 372,489 in Sabah shows in Table 4.10. All sectors in Sabah have positive increasing in employment. In Sabah, Services sectors always reported as the highest contribution to actual employment growth. The Services sectors have created 178,900 jobs in Sabah's economy between year 2010 and 2015.

The second highest contribution as the last period is in Agricultural, hunting, forestry and fishing sectors. This sector have created 133,600 jobs to the Sarawak's economy.

4.2 Empirical Tests

Other than shift share analysis, the research was further developed with application of several empirical tests. There were least square panel estimation test, Hausman test, Unit root test, cointegration test and Granger causality test. This section provides the results decision and interpretation of respective empirical tests.

4.2.1 Least Square Panel Estimation

According to Osman, Gachino and Hoque (2016), there are two techniques which use extensively in estimation of a panel data model in economic literature, include the fixed effect and random effect estimators.

4.2.1.1 Fixed Effect and Random Effect Models

A fixed effect usually been used to analyse the impact of variables that vary over time in order to capture whether an individual characteristics would influence the predictor variable. As in this paper, the model had been used to discover the relationship between GDP and employment in Sarawak, Sabah and the nation. Unlike the fixed effect model, random effect model is assuming the entity's variation to be random and uncorrelated with the independent variable which it means to test the influence of differences across GDP on employment the dependent variable.

Table 4.11 Result from fixed effect test and random effect test

Variables	Coefficient	Statistic (P-value)
(1) Fixed effect model		
Constant	1033153.0000	6.9840 (0.0000) ***
GDP	11.3936	26.0118 (0.0000) ***
(2) Random effect model		
Constant	883303.9000	2.4722 (0.0191) **
GDP	11.8478	29.9775 (0.0000) ***

Note: *, ** and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Source: Self computed

As in this paper, the fixed and random effects were first been tested in order to provide evidence in estimation of model by Hauman test later.

4.2.2 Hausman Test

In correspond to panel estimation, Hausman test was then been tested to decide the most appropriate panel regression model whether Random Effect Model (REM) or Fixed Effect Model (FEM) in estimation of this paper. Given that the null hypothesis stated that REM are consistent and efficient; REM are preferred. In contrast, alternative hypothesis stated that REM are inconsistent and inefficient, then FEM are preferred. As described earlier, if the null hypothesis is rejected; it means that FEM is consistent and REM shouldn't been used. Vice versa.

Table 4.12: Result from Hausman Test

Hausman Test	**Chi-Sq. statistic (P-value)**
Cross-section random	5.7886 (0.0161) **

Cross-section random effect test comparison

Variable	**Fixed**	**Random**	**Var(Diff)**	**P-value**
GDP	11.3935	11.8478	0.03565	0.0161

Note: *, ** and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Source: Self computed

Based on the result obtained, Hausman Test shows that the null hypothesis has been rejected. By obtained a 0.00 p-value which lower than 5% significant level, the decision described that the feature of Fixed Effect Model (FEM) was more appropriate to be used in this research instead of using Random Effect Model (REM).

The usage of FEM in the estimation described the net effect of the independent variable of GDP on the dependent variable of employment. By taking the assumption excluding effect of those time-invariant characteristics, the error term and constant are said to be not correlated with in other time period. According to Clark and Linzer (2015), they have stated that the decision in deciding whether to use FEM or REM is mainly determine by the amount of data and the underlying correlation relationship between independent variable and the regression coefficient. As in his work, in a sluggish case with a few units but many observations, he indicates that FEM was only to be chosen if that is a great correlation.

4.2.3 Unit Root Test

In this research, panel unit root test was used in determine the feature of unit root. When there is a unit root, it means that the statistic is non stationary and the value is meaningless. A non-stationary condition describes that mean is not constant and with a time independence variance fluctuate over time, indicates that a persistence of shock will be infinite and

explosively large influence carry time to time. The stationarity is important in time series data as to prevent the impact of shocks.

Table 4.13: Result from unit root test

Tests name	**Statistic (P-value)**	
	Level form	First difference
(1) Panel unit root test		
Levin, Lin & Chu t	0.9759 (0.8354)	-3.8049 (0.0001)***
Im, Pesaran and Shin W-stat	2.6727 (0.9962)	-1.8455 (0.0325)**
ADF - Fisher Chi-square	0.3518 (0.9992)	13.8193 (0.0317)**
PP - Fisher Chi-square	0.3026 (0.9995)	13.6884 (0.0333)**
(2) Hadri Test		
Hadri Z-stat	3.4910 (0.0002)***	-0.0026 (0.5010)*
Heteroscedastic Consistent Z-stat	3.4522 (0.0003)***	-0.0361 (0.5144)*

Note: *, ** and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Source: Self computed

In level form, both Im, Pesaran and Shin (IPS) and Fisher-type unit root test had concluded that the null hypothesis had not been rejected because p-value was greater than significance level of 10%. This means that the variables were followed to a unit root process and there was no stationarity. Therefore, the empirical test was further processed to first difference analysis. In first difference unit root analysis, the null hypothesis was finally rejected due to lower p-value than 5% significance level. The statistic has no unit root and achieved to stationarity in first difference level.

In level form, Hadri test has provided evidence that the null hypothesis was been rejected because of p-values which smaller than 5% significant level. The result described that the statistic was non-stationary since the p-value was close to zero. In order to obtain stationarity, first difference analysis was proceed and the finally the p-values are greater than 5% significant level, null hypothesis was therefore had not been rejected. It has concluded that the statistic was achieved to stationarity at first difference.

4.2.5 Cointegration Test

In this section, Pedroni cointegration test and Kao cointegration test were been selected in detecting the existence of panel cointegration relationship among employment and GDP.

Table 4.14: Result from panel cointegration test of employment and GDP.

Test name	Statistic (P-value)
(1) Pedroni Residual Cointegration Tests	
Panel v-Statistic	0.1221 (0.4514)
Panel rho-Statistic	0.8935 (0.8142)
Panel PP-Statistic	0.0760 (0.5303)
Panel ADF-Statistic	-1.4916 (0.0679)*
Group rho-Statistic	1.2613 (0.8964)
Group PP-Statistic	-0.2758 (0.3914)
Group ADF-Statistic	-0.1597 (0.4366)
(2) Kao Residual Cointegration Tests	
ADF Statistic	-3.3742 (0.0004)***

Note: *, ** and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Source: Self computed

As shown in the table, only one test out of seven tests by Pedroni reject the null hypothesis (no cointegration) at 10 percent significant level. The specific one indicates the existence of cointegration relationship was imply with panel ADF statistic condition. Whereas in Kao test, it seems to reject the null hypothesis of no cointegration and agree to have cointegration at 10 percent significant level.

With all the information given, it was concluded to have cointegration relationship between employment and GDP at 10 percent significant level.

4.2.5 Granger Causality Test

Lastly, Granger causality test was computed in order to determine the cause and effect relationship between variables. In short, the test is aiming to test whether there is a

correlation by analyse if a variable comes before another variable. By taking example of X and Y, correlation happens among variable when the lagged X values eventually influence the variation in Y. The result was presented as follows:

Table 4.15: Result from Granger causality test

Null hypothesis	F-Statistic (P-value)
(1) GDP does not Granger Cause EMPLOYMENT	17.8039 (0.00003)***
(2) EMPLOYMENT does not Granger Cause GDP	3.1757 (0.0614)*

Note: *, ** and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively.

Source: Self computed

As shown in the table, the causality relationship between variables was clearly defined. The first null hypothesis for the test stated that the lagged GDP does not granger cause employment in expectation while the another vice versa, where the lagged employment does not ganger cause GDP in future. In a decision making, a null hypothesis will only been rejected when the p-value is lower than the significant level.

In interpretation, at 10 percent significant level, both null hypotheses as stated in the table were been rejected. It has resulted that GDP granger cause employment as well as employment granger cause GDP. Meanwhile, in 5 percent significant level, GDP was found to be granger causes employment but employment has not granger causes GDP. Lastly to achieve a more specific result, 1 percent significant level was then been tested. At 1 percent significant level, the result was same as in 5 percent significant level, provided that GDP granger causes employment; employment does not granger causes GDP. It was concluded that at 1 percent significant level, the GDP has a stronger effect on employment.

4.3 Conclusion

The chapter had provided brief interpretation for each result generated. The results were been performed and detailed in form of tables. Next in following chapter, there will be a discussion of major findings, policy recommendations, limitations and recommendations for future research**.**

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

In this research, relationship between GDP and employment were been investigated in compliance to analyse the competitive advantage of employment in respective sectors representing regional development by using data from year 2005 to 2015. Sarawak and Sabah were the two regions focused in this research.

In term of analysing strategy, shift share model was been used to illustrate the employment condition in sectors respectively. By providing a clear picture in determining the flow of employment condition in relative to economic condition of an area, readers are able to gain a deeper understanding towards the economic transformation in both states. This research would also act as a guideline for investor and policy maker in consideration to pump in more capital investment for further development in order to achieve a sectoral effective employment competitive advantages. In addition, some panel regression empirical test were also been used to provide evidence about the relationship between variables. There were panel regression estimation Hausman test, unit root test, cointegration test and granger causality test.

This chapter would have combine all result and information gathered in this research and to be presented in a summary of major findings. In related to the findings available, some policies were been suggested in the following section. Also, the following sections would include the limitation encountered during the completion of research as well as the recommendations for future research.

5.1 Summary of major findings

From the shift share analysis of Sarawak by sectors shows the Manufacturing sector regional shift have positive value between year 2005 and 2010. These means that

Manufacturing sector for Sarawak have positive growth economy is higher than Malaysia. Between year 2005 and 2010, Malaysia government encourage Sarawak forestry sectors increased producing high value added products. For example, logs company can cut the trees by their own and producing some finished goods like wooden tables and chairs.

Between year 2010 and 2015, Sarawak Mining and quarrying, Construction and Services sectors have positive sign in regional shift in shift share analysis. Thus, these 3 sectors economy in Sarawak is much better compare with Malaysia in these 3 sectors. For the Mining and quarrying sector, Sabah transport their natural gas to Bintulu, Sarawak for processing as finished goods. Moreover, the employment increased in Construction sector due to the improvement of infrastructures in Sarawak. One of the improvement of Sarawak infrastructure is building Pan-Borneo Highway that can travel form Sindumin, Sarawak to Tawau, Sabah. It can boost the economy of Sabah and Sarawak by shorten the time that drive from Sarawak to Sabah.

Sarawak Services sector have positive value in regional shift between year 2010 and 2015 because government have promoting the travel places of Sarawak to local and foreign tourists. For example, Niah National Park and Gunung Mulu National Park are the places that introduce to tourists. The introduction of travel places can attract tourists come and visit Sarawak. Thus the services sector would increases by increased the numbers of hotels. However, Manufacturing sectors in Sarawak between year 2010 and 2015 have negative regional shift value due to these sector are more depending of high-tech machine. So the Manufacturing sector less using manpower.

Furthermore, for the Sabah shift share analysis all of the sector have positive regional shift expect Manufacturing sector have negative value. The sector with positive regional shift are Agricultural, hunting, forestry and fishing, Mining and quarrying, Construction and Services sectors. Between year 2005 and 2010, the employment change for Agricultural, hunting, forestry and fishing sector in Sabah is growth faster than Malaysia due to the Sabah have many fresh seafood, increased the number of people being fisherman. While the Mining and quarrying sector in Sabah also develop faster than Malaysia. In Sabah, they still have some oil and gas. They need more workers work in the mining and quarrying sector. They not only have natural gas, they also have copper, coal, gold, iron and others.

Other than that, Construction sector of Sabah also develop faster than Malaysia between year 2005 and 2010 because Sabah have development in housing and resort. Sabah also have some development to build the roads to increase the infrastructures for more development. Malaysia government also promoting the Sabah travel places to local and foreign tourists. For example, Kinabalu Park and Mount Kinabalu have been introduce to the tourists. Government have put some advertisement in the airport television to attract more tourists. Sabah have some famous seafood like tiger prawn and seaweed also introduce to tourists. The increased of tourists would increase the number of hotels and seafood restaurants. It need more workers to be work in the hotels and restaurants industry.

Between year 2010 and 2015, Agricultural, hunting, forestry and fishing, Manufacturing, Construction and Services sector in Sabah have positive sign of regional shift. The plantation of palm oil in Sabah have been increased due to the high demand of palm oil. The export of logs is increased in these 5 years, it required more workers to work in forestry industry. These sector need worker to check the tress conditions whether it is suitable to be cutting down and also need workers to do R&D. Therefore, Agricultural, hunting, forestry and fishing sector in Sabah have increased in employment. Between year 2010 and 2015, manufacturing sector in Sabah have just started to develop. Thus, Sabah required more worker to develop and employment in Sabah Manufacturing sector have increased.

Moreover, Sabah Construction sector increased the employment due to the increased of the infrastructure by building up the solar hybrid system to reduce the use of electricity between year 2010 and 2015. The rise of tourists to Sabah have increased the employment in Services sector. However, due to the terrorist appear in the Sabah have causes the tourists decreased. Therefore, Malaysia government should maintain the safe security of Sabah.

In hypotheses testing, the variable of regional GDP and regional employment data tends to have correlation to each other. Based on the interpretation of fixed effect model (FEM) and first difference stationarity, the result able to offer an unbiased result by eliminated omitted variable in estimation. Next, the variables tend to have cointegration in panel ADF statistic at 10 percent significant level. Lastly in estimation of Granger causality test, at 10 percent significant level, that is a two way causality effect. For a more strictly result in respective 5

percent and 1 percent significant level, the GDP has a stronger effect on employment in Sarawak and Sabah; thus provided a one way cause and effect relationship.

5.2 Policy Recommendations

Below discussed some of the appropriate policies in recommendation to improve a regional competitive advantage in case to decrease unemployment in Sarawak and Sabah.

a. Sarawak

i. Expansion in high tech manufacturing supply chain cluster and high tech industries

In Sarawak, solar energy applications were been heavily invested by China investors. For example, Sarawak Energy Berhad (Sarawak Energy) as one of the energy development company and a vertically integrated electricity utility is comprising about 4500 employees (Sarawak Energy, 2013). Therefore in order to continue develop Sarawak into an developed state meanwhile provide job opportunities for local citizens, solar panel production is encouraged to be focused in development plan.

ii. Expansion in higher value added goods and services

The services sector in Sarawak was nicely developed, however that is still space for improvement. Therefore, hereby encouraged to have more focus on higher value added on goods and services in Sarawak such as medical tourism. As been analysed in Oxford Business Group (2015), the international health travel sector in Malaysia continues to grant a worthy income to nation. The state government of Sarawak should well aware of this opportunity, and have more action on work together with hospitals and hotels to grant a better services for health tourists and their families. Besides that, medical tourism can also be promoted with UNESCO (United Nations Education, Scientific and Cultural Organization) sites, national park and museum in order to gain a higher revenue when more and more family members of patient travel to Sarawak while having their medical services in local hospitals.

iii. Promote business tourism

In related to the service sector, it had suggested that Sarawak to promote about business event. In Sarawak, the Sarawak Convention Bureau (SCB) is the centre connecting all the

association in organization of a business event. In related to that, the Sarawak state and federal government should have more effort in well planning and achievement in development of the business event facilities with modern technology and corporate culture. In compliance to that, action to upgrade and improve tourism products such as hotels and Entertainment Park are important too. Thus increase the reputation of business tourism local and internationally and been a place to attract more tourism opportunity.

iv. Promote interactive experience tourism

In aspect to tourism, tourists can be treat with a regional experiential tourism. The state government and related parties are encouraged to able to provide a satisfying, fun and interesting experiential learning for tourists by combining modern technology and local culture. Basically, they will need to improve and upgrade the action of preservation and protection toward the cultural heritage, such as the long house, 'Kampung Budaya' and museum. Besides that, the related heritage places can have more advancement in technological equipment as so to provide a special experience for tourists in their journey. Globally, the trend of experiential learning has grown rapidly especially in among western people. This is an opportunity to boost the economy in tourism sector into a higher level of development. In addition, the organizational of event festival is a good choice to be implemented in perfect the tourism sector. An event festival usually will attract more tourists in choose to travel to the place.

v. Exploration towards high value industries such as oil and gas

As in result obtained, the mining and quarrying sector in Sarawak continues to have high employment competitive advantage during year 2005 to year 2015. In complimentary to that, the state government is encouraged to explore upstream and downstream oil and gas operations.

b. Sabah

i. Expansion in higher value added industry

In respective to economic development in Sabah, the education and training services are seems as a good opportunity to open into a new market as well as develop human talent in Sabah. For example, the Sabah Animation & Creative Content Centre (SAC3). In related to that, we are confidence to believe in that these industries able to provide job opportunities (for

example, apps development) for citizens even they may not meet to have a high education level and qualification. Therefore, we strongly suggest state government and related parties to have focus on the industry by giving chance of development and improvement in sufficient budget allocation.

ii. Expansion in higher value goods and services

Similar to in Sarawak, medical tourism is suggested to be promoted with UNESCO sites, national park, Marine Park and more. As medical tourism is a trend nowadays, Sabah state government is encouraging to have more effort on this.

iii. Telecommunication improvement

In analysis, there are still some rural area deep inside of Sabah were still having their infrastructure facilities far fall behind as compared to other area. To promote an area's economic development, infrastructure perfection is always one of the factor contribution. Hereby, the state government of Sabah is suggested to have consideration to have their facilities upgraded. For example, a greater coverage area with a speed up Wi-Fi connectivity and broadband.

iv. Basic infrastructure improvement

In this point, we were discussed about the solar energy implementation in Sabah. According to information, the solar hybrid system was only been introduced into rural areas in Sabah by year 2015. As compared to in Sarawak which been heavily invested by China investors, solar system in Sabah was still in a space of development. Therefore, the state government is suggested to have more capital invest in solar system development.

v. Increase development in mining and quarrying

In findings, Sabah had its employment competitive advantage shift from manufacturing sector to mining and quarrying sector from year 2005 to year 2015. However before that, the mining and quarrying activity seems to be an important sector in contributing towards the regional GDP. Despite to depend on private company, the state government is encouraged to explore the high value mining activity such as oil and gold as such activity able to generate high income and thus provides employment opportunities.

5.3 Limitations of the Study

There were several limitations discovered in the research. The analysis was conducted in only two states in comparison to in Malaysia and thus, the findings of the study can't be generalized in representing any other state in the nation. In order to have comparison towards other area, similar study should be conducted in relevant to its information, facts and factors respectively.

As the data obtained in the study were restrained due to limited resources, it is believing that there are many factors that affect employment in a region such as household and population, foreign direct investment as well as personal factors and expectation. This study, however, only investigates on economic sector contributions and regional gross domestic product as a predictor of the development of employment in Sabah and Sarawak.

In compliment to limited resources of data, there were only year 2005 to 2015 been achieved and analysed in the study. Thus, it was encouraged to involve longer period data of estimation in future study so it could provide more information regarding the development of regional employment condition in complement to regional development processes; as well as the assessment of policy practices by authorities.

Other than that, that was limitation discovered in this research regarding the usage of shift share analysis. As in this research, the analysis was only focused on industry- based employment and to analyse towards the sectoral employment competitive advantages.

5.4 Recommendations for Future Research

For future research, more cross sectional data were been recommended to be obtained and to be included. This action could capture the real world situation in Malaysia as a higher sample size able to provide data which is closer to expectation. Rather than using only Sabah and Sarawak, more state regional data were been recommend to be included as to provide more information in policy decision making. This action able to provide more convenience in regional development processes.

Similar to time series data, longer data of latest time period is recommend to be included in future research. By increasing the number of time series, highly informative result shall be obtained in compliment to provide a truthful prediction of macroeconomic and policy implication in Malaysia.

Whereas in aspect of econometric analysis, it has encouraged to explode and conduct a shift share regression analysis which is unachievable in this paper due to limitation of data. As compared to shift share analysis that had been conducted in this paper, a shift share regression analysis able to conduct a more informative result as it include a much more complex and complete research analysis relevant to the topic.

5.5 Conclusion

In conclusion, we were managed to develop a shift share analysis in analyse towards the local competitiveness factors of regional economy development in Sarawak and Sabah in corresponding to respective employment status. The GDP was in positive relationship to employment where when the economy appeared to be boost in the state, the employment rate increased.

Based on the shift share analysis, the sectoral employment competitive advantages of Sarawak tends to shift from sectors such as agriculture, construction and manufacturing to services sector where the manufacturing sector recorded a dramatic decreases in competitive advantage during from year 2005 to year 2015. The service sector happens to create growing competitive advantage in employment. Overall in total, Sarawak shows a negative regional shift in term of competitive advantage in relation to sectoral employment development from year 2005 to year 2015.

Whereas in Sabah, almost all sectors shows positive competitive advantages of employment in all sectors during the years. In case of competitive disadvantage, it shifts from manufacturing sector to mining and quarrying sector. Sabah has its majority of the workforce competitive advantages continued to focus on agriculture, hunting, forestry and fishing sectors rather than other sectors. Meanwhile, the services sector shows rapid development in Sabah

due to the highest growth in regional share and employment rate. Overall in total, Sabah shows a positive regional shift in term of competitive advantage in relation to sectoral employment development from year 2005 to year 2015.

In aspiration to have higher economic development and employment competitive advantages in respective sectors of Sarawak and Sabah, some strategy recommendations were been provided. Somehow, it needs policy makers to take consideration of cost and impact towards the implementation of policies. Thus, any adjustment of economic sectors should be wisely applied with an appropriate planning strategy.

REFERENCES

Abdullah, H., Bakar, N. A. A., Hassan, S. (2014). Analysis of FDI inflows to China from selected ASEAN countries: A panel cointegration approach. Retrieved from https://editorialexpress.com/cgibin/conference/download.cgi?db_name=paneldata2010&paper_id=52

Abdullah, N., Naim, Z. A. & Long, Y. (2011). Employment and macroeconomic variables: Evidence from Malaysia, Philippines and Singapore. *International Journal of Economic and Finance. 3,* 139-148. Retrieved from http://ccsenet.org/journal/index.php/ijef/article/view/8198

Ahsan, A., C. Gutiérrez, P. Paci, and M. Ranzani. (2010). 'Growth, employment, and poverty trends in India: Unbundling the links'. Paper presented at IZA/World Bank Conference, May. Retrieved from http://www.iza.org/conference_files/worldb2010/paci_p2857.pdf

Ajakaiy, O., Jerome, A. T., Nabena, D., & Alaba, O. A. (2016). Understanding the relationship between growth and employment in Nigeria. Retrieved June 16, 2017 from https://www.brookings.edu/wp-content/uploads/2016/07/growth-employment-nigeria-ajakaiye-jerome-nabena-alaba.pdf

Akbar, A., Imdadullah, M., Ullah, M. A., & Aslam, M. (2011). Determinants of economic growth in Asian countries: A panel data perspective. Retrieved from http://www.bzu.edu.pk/PJSS/Vol31No12011/Final_PJSS-31-1-13.pdf

Ali, H., Er, A. C., Ahmad, A. R., Lyndon, N. & Ahmad, S. (2013). An analysis of the impact of foreign investment on regional disparities: A case of Malaysia. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.834.4649&rep=rep1&type=pdf

Andele. (2016). Unit root: Simple definition, unit root test. Retrieved from http://www.statisticshowto.com/unit-root/

Andrikopoulos, A., Brox, J. & Carvalho, E. (1990). Shift-share analysis and the potential for predicting regional growth Patterns: Some evidence for the region of Quebec, Canada. Baltimore: John Hopkins.

Ariff, M. R. M. & Subramaniam, T. (2006). Human resource development in BIMP-EAGA region: Strengths of Malaysia-EAGA Institutions of higher learning. Retrieved from http://jatidseas.um.edu.my/filebank/published_article/442/Mohd%20Raduan%20Thirunaukarasu-HUMAN%20RESOURCE%20DEVELOPMENT%20IN%20BIMP-EAGA%20REGION.pdf

ASEANUP. (2017). UNESCO world heritage sites in Malaysia. Retrieved from https://aseanup.com/unesco-world-heritage-sites-malaysia/

Awe, O. (2012). On pairwise granger causality modelling and econometric analysis of selected economic indicators. Retrieved from http://interstat.statjournals.net/YEAR/2012/articles/1208002.pdf

Behera, D. K. & Tiwari, M. (2014). Structural transformation in India: An econometric investigation. Retrieved from www.siecon.org/online/wp-content/uploads/2014/10/Behera-Tiwari-56.pdf

Blanchard, O., & Johnson D, R. (2013). *Macroeconomics*. (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

Blien, U., Eigenhuller, L., Promberger, M., & Schanne, N. (2013). The shift-share regression: An application to regional employment development. Retrieved from http://www-sre.wu.ac.at/ersa/ersaconfs/ersa13/ERSA2013_paper_00614.pdf

Blien, U., & Wolf, K. (2002). Regional development of employment in Eastern Germany. Retrieved from http://wuw-ruw.wu-wien.ac.at/ersa/ersaconfs/ersa02/cd-rom/papers/263.pdf

Borneo Post Online. (2017). '20 abduction cases, 5 kidnapping bids between 2000 and 2006 in Sabah'. Retrieved from http://www.theborneopost.com/2017/04/18/20-abduction-cases-5-kidnapping-bids-between-2000-and-2016-in-sabah/

Borneo Post Online. (2017). Boost capability to meet global pepper demand. Retrieved from http://www.theborneopost.com/2017/03/30/boost-capability-to-meet-global-pepper-demand/

Borneo Post Online. (2011). Eyes on Sarawak: From soft to heavy economic development. Retrieved from http://www.theborneopost.com/2011/09/25/eyes-on-sarawak-from-soft-to-heavy-economic-development/

Borneo Post Online. (2012). RM17 mln to develop Bario rice industry. Retrieved from http://www.theborneopost.com/2012/01/20/rm17-mln-to-develop-bario-rice-industry/

Borneo Post Online. (2014). Sabah draws RM 38 bln investment. Retrieved from http://www.theborneopost.com/2014/04/12/sabah-draws-rm38-bln-investment/

Borneo Post Online. (2015). Sarawak's economy to grow at 6.5 pct annually by 2030. Retrieved from http://www.theborneopost.com/2015/08/18/sarawaks-economy-to-grow-at-6-5-pct-annually-by-2030/

Borneo Post Online. (2017). Sarawak's export value of logs, timber products drops. Retrieved from http://www.theborneopost.com/2017/05/20/sarawaks-export-value-of-logs-timber-products-drops/

Borneo Post Online. (2017). State's oil palm set to become second largest in Malaysia. Retrieved from http://www.theborneopost.com/2017/03/02/states-oil-palm-production-set-to-become-second-largest-in-malaysia/

Borneo Post Online. (2017). 140 of 176 North Korean workers in Sarawak without work permit. Retrieved from http://www.theborneopost.com/2017/03/09/140-of-176-north-korean-workers-in-sarawak-without-work-permit/

Brox, J. A. & Carvalho, E. (2008). A demographically augmented shift-share employment analysis: An application to Canadian employment patterns. Retrieved from http://ageconsearch.umn.edu/bitstream/132342/2/08-1-5.pdf

Chmelarova, V. (2007). The hausman test, and some alternatives, with heteroskedastic data. Retrievedfrom http://etd.lsu.edu/docs/available/etd-01242007 165928/unrestricted/Chmelarova_dis.pdf

Choi, I. (2001). Unit root test for panel data. Retrieved from https://www.researchgate.net/publication/222536415_Unit_Root_Tests_for_Panel_Data

Clark, T., & Linzer, D. (2015). Should I Use Fixed or Random Effects? Political Science Research and Methods, 3(2), 399-408. doi:10.1017/psrm.2014.32

Daily Express. (2016). Sarawak beats Sabah in tourist arrivals. Retrieved from http://www.dailyexpress.com.my/news.cfm?NewsID=107308

Davao, S. S. (2015). Joint statement 19th Brunei Darussalam-Indonesia-Malaysia-Philippines East Asean growth area Ministerial meeting. Retrieved from https://www.pressreader.com/philippines/sunstar-davao/20151214/281977491566023

Department of Fisheries Sabah. (2017). Aquaculture statistics. Retrieved from http://www.fishdept.sabah.gov.my/?q=en/aquaculture-statistics

Department of Fisheries Sabah. (2017). The fisheries industry in Sabah- A short profile. Retrieved from http://www.fishdept.sabah.gov.my/?q=en/content/fisheries-profile

Department of Statistics Malaysia, Official Portal. (2011). Population distribution and basic demographic characteristic report 2010. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=117&bul_id=MDMxdHZjWTk1SjFzTzNkRXYzcVZjdz09&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09

Department of Statistics Malaysia, Official Portal. (2017). Sabah statistics. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=dTZ0K2o4YXgrSDRtaEJyVmZ1R2h5dz09

Department of Statistic Malaysia. (2017). Salaries & wages survey report, 2016. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=U3JoKzFiekE5WFFKK0VMRWQ0a2FDQT09

Department of Statistics Malaysia, Official Portal. (2017). Sarawak statistics. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=clJnWTlTbWFHdmUwbmtSTE1EQStFZz09f

Department of Statistic Malaysia, Official Portal. (2017). Malaysia statistic. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=dDM2enNvM09oTGtQemZPVzRTWENmZz09

Diebold, F. X. & Kilian, L. (1997). Unit root tests are useful for selecting forecasting models. Retrieved from http://www.ssc.upenn.edu/~fdiebold/papers/paper27/dk3.pdf

Economic Development in Malaysia (2010). Retrieved from http://www.bnm.gov.my/files/publication/ar/en/2010/cp01.pdf

Eleven Malaysia Plan 2016-2020. (2015). Speech by the Prime Minister in the dewan rakyat. Retrieved from https://www.pmo.gov.my/dokumenattached/speech/files/RMK11_Speech.pdf

Forest Policy of Sarawak 1954. (2017). Retrieved from http://www.forestry.sarawak.gov.my/upload/file_folder/Policy%20and%20Legislation/Forest%20Policy%20Of%20Sarawak%201954.pdf

Franklin, J. Jr. & Hughes, Jr. (1973). A test of shift-share analysis as a predictive device. *Journal of Regional Science, 72*(1), 47-65.

Furuoka, F. (2014). Population and economic development in Sarawak, Malaysia. Munich Personal RePEc Archive, pp.1-19.

Furuoka, F. (2014). Economic development in Sarawak, Malaysia: An overview. *Munich Personal RePEc Archive*, pp.1-12.

Greene, W. (2002). *Econometric analysis*. 5th ed. Upper Saddle River, NJ: Pearson.

Bureau of Economic Analysis. (2006). Gross domestic product by state estimation methodology. Retrieved June 16, 2017 from https://www.bea.gov/regional/pdf/gsp/GDPState.pdf

Gujarati, D. N. (2004). *Basic Econometric*. 4th ed. The McGraw−Hill Companies.

Hadjikhani, S. & Rahman, N. H. (2013). Mulu and niah as ecotourism sites. Retrieved from spaj.ukm.my/jurnalarkeologi/index.php/jurnalarkeologi/article/download/145/84

Hassan, M. K. H., Rashid, Z. A. & Hamid, K. A. (2011). East coast economic region from the perspective of shift-share analysis. *International Journal of Business and Society, 12*(1), 79-88. Retrieved from http://www.ijbs.unimas.my/repository/pdf/Vol12No1(paper6).pdf

Heathfield, S. M. (2017). *What is employment?* Retrieved from https://www.thebalance.com/what-is-employment-1918114

Herath, J., Gebremedhin, T.G., & Maumbe, B. M. (2012). A dymanic shift-share analysis of economic growth in West Virginia. Retrieved from http://rri.wvu.edu/wp-content/uploads/2012/11/Gebremedhin_Dynamic_Shift_Share_Analysis.pdf

Hurlin, C. & Mignon, V. (2007). Second generation panel unit root tests. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00159842/document

Jain, D., Nair, K. S., & Jain, V. (2015). Factors affecting GDP (Manufacturing, services, industry): An Indian perspective. *Annual Research Journal of Symbios is Centre for*

Management Studies, Pune, 3, 38-56. Retrieved from http://www.scmspune.ac.in/chapter/Chapter%203.pdf

Leong, H. Y. (2013, March 20). Economists say economic transformation programme helps improve and provide impetus for Malaysia's economy. *The Star Online*. Retrieved from http://www.thestar.com.my/business/business- news/2013/03/20/economists-say-economic-transformation-programme-helps- improve-and-provide-impetus-for-malaysias-eco/

Jiun, C.H., & Nga, J. L. H. (2011). Economic growth, employment elasticity and poverty: A case of Malaysia. Retrieved from http://www.ukm.my/fep/perkem/pdf/perkemVI/PERKEM2011-1-3B3.pdf

JustReadOnline. (2016). Sarawak draws second highest investment in country last year. Retrieved from http://www.justreadonline.com/2016/06/15/sarawak-draws-second-highest/

Lian, C. & Peter, S. (2017). Mystery of missing workers deepens. Retrieved from http://www.theborneopost.com/2017/03/30/mystery-of-missing-workers-deepens/

Malaysia Convention & Exhibition Bureau. (2017). Business Event. Retrieved from http://www.myceb.com.my/business-events

Malaysia Healthcare Travel Council (MHTC). (2016). Malaysia medical tourism figures 2015. Retrieved from https://www.mhtc.org.my/malaysia-medical-tourism-figures-2015/

Malaysia Human Development Report. (2013). Redesigning an inclusive future. Retrieved from http://www.mhdr.my/files/editor_files//files/MHDR%202013%20(19MB).pdf

Malaysian Investment Development Authority (MIDA). (2016). Malaysia investment performance report: Strengthening the growth momentum. Retrieved from http://www.mida.gov.my/home/administrator/system_files/modules/photo/uploads/20

170302155931_Slides%20Presentation%20Malaysia%20Investment%20Performance%202016.pdf

Malaysian Palm Oil Board. (2017). Production of crude palm oil for the month of December 2015 (Tonnes). Retrieved from http://bepi.mpob.gov.my/index.php/en/statistics/production/159-production-2015/686-production-of-crude-oil-palm-2015.html

Marilyn, T. (2017). *'China still an important trading partner'*. Retrieved from http://www.theborneopost.com/2017/02/24/china-still-an-important-trading-partner/

Mckissick, T. (2017). Quant's Corner- Understanding Shift Share Analysis. Retrieved from https://www.linkedin.com/pulse/understanding-shift-share-analysis-todd-mckissick

Ministry of Finance Malaysia. (2016). *2016 Budget*. Retrieved from http://www.bnm.gov.my/files/Budget_Speech_2016.pdf

Ministry of Manpower. (2015). *Employment*. Retrieved from http://stats.mom.gov.sg/SL/Pages/Employment-Introduction.aspx

Mondal, W. I. (2009). An analysis of the industrial development potential of Malaysia: A shift-share approach. *Journal of Business and Economics Research, 7*, 41-46. Retrieved from https://www.cluteinstitute.com/ojs/index.php/JBER/article/view/2289/2337

National Transformation Programme. (2015). Annual report 2015. Retrieved from https://www.pemandu.gov.my/assets/publications/annualreports/ENG_PEMANDU_NTP_AR2015_260416.pdf

Nazish, A. R., Iqbal, A., & Ramzan, M. (2013). Impact of agriculture, manufacturing and service industry on the GDP growth of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business, 5*, 727-734. Retrieved from http://journal-archieves35.webs.com/727-734.pdf

Nell, C. & Zimmermann, S. (2011). Summary based on Chapter 12 of Baltagi: Panel unit root tests. Retrieved from http://homepage.univie.ac.at/robert.kunst/pan2011_pres_nell.pdf

New Sarawak Tribune. (2017). RM27.36m earned from medical tourism in 2016. Retrieved from https://www.newsarawaktribune.com.my/news/rm27-36m-earned-from-medical-tourism-in-2016/

Nixon, S., Asada, H., and Koen, V. (2017). Fostering inclusive growth in Malaysia. Retrieved from https://www.oecd.org/eco/Fostering-inclusive-growth-in- Malaysia.pdf

Osman, M., Gachino, G., & Hoque, A. (2016). Electrical consumption and economic growth in the GCC countries: Panel data analysis. *Energy Policy*, 98, 318-327. Retrieved from http://www.sciencedirect.com/science/article/pii/S0301421516304116?via%3Dihub

Oxford Business Group. (2017). Major public and private initiatives driving development of key sectors in Malaysia. Retrieved from https://www.oxfordbusinessgroup.com/overview/state-apart-major-public-and-private-initiatives-are-driving-development-key-sectors

Performance Management & Delivery Unit (PEMANDU). Retrieved 20 August, 2017, from http://etp.pemandu.gov.my/

Piana, V. (2001). *Employment*. Retrieved from http://www.economicswebinstitute.org/glossary/employ.htm

POIC Lahad Datu Sabah. (2017). General information: Sabah. Retrieved from http://www.poic.com.my/index.asp?p=info-sabah

Population, Labour Force and Employment. (n.d.). Retrieved from http://www.finance.gov.pk/survey/chapters_16/12_Population.pdf

Rahman, D. (2016). Making Malaysian graduates more employable a reality. The Star Online. Retrieved from http://www.thestar.com.my/opinion/online-exclusive/whats-your-status/2016/07/14/making-malaysian-graduates-more-employable/

Razak, S. M. (2015). The transformation in economic and workforce development in Sabah: An analysis. *Journal of Borneo Social Transformation Studies (JOBSTS), 1*(1), 99-121. Retrieved July 21, 2017

Sabah Forestry Department. (2015). Forest industries and statistics. Retrieved from http://www.forest.sabah.gov.my/images/pdf/publications/AR2015/14.pdf

Sabah Tourism Statistic. (2017). Retrieved from http://www.sabahtourism.com/business/statistic

Sarawak Convention Bureau. (2016). SCB factsheet & the value of business events of Sarawak. Retrieved from http://sarawakcb.com/v2/wp-content/uploads/2016/11/scb-factsheet-2016-30-September-FINAL.pdf

Sarawak Energy (2013). Retrieved August 21, 2017, from http://www.sarawakenergy.com.my/.

Sarawak Score. (2017). Sarawak's economy. Retrieved from http://www.recoda.com.my/inside-sarawak/sarawaks-economy/

Sarawak Statistics. (2016). Visitor arrivals into Sarawak. Retrieved from https://sarawaktourism.com/statistics/

Sentz, R. (2011). Understanding shift share. Retrieved from http://www.economicmodeling.com/2011/12/05/understanding-shift-share-2/

Seyfried, W. (2011). Examining the relationship between employment and economic growth in the ten largest states. *Southwestern Economic Review,* pp.13-23. Retrieved from https://pdfs.semanticscholar.org/71b7/3bcd2ca3bd8f70b2b38f54180aecc9964d7a.pdf.

Shi, C. and Yang, Y. (2008). A review of shift-share analysis and its application in tourism. Retrieved from https://www.researchgate.net/profile/Yang_Yang207/publication/267765154_A_Review_of_ShiftShare_Analysis_and_Its_Application_in_Tourism/links/562afa0708aef25a24404e7d/A-Review-of-Shift-Share-Analysis-and-Its-Application-in-Tourism.pdf.

Tawie, S. (2015). Sarawak makes English official language along with BM. Retrieved from http://www.themalaymailonline.com/malaysia/article/sarawak-makes-english-official-language-along-with-bm

The Stat Online. (2015). Labour shortage in oil palm plantations. Retrieved from http://www.thestar.com.my/metro/community/2015/02/12/labour-shortage-in-oil-palm-plantations-no-choice-but-to-hire-foreign-workers-says-soppoa/

The Star Online. (2016). Lower log output a concern. Retrieved from http://www.thestar.com.my/business/business-news/2016/09/13/lower-log-output-a-concern/#gI0IO0HZbwZgi8xb.99

The Star Online. (2017). Malaysia sees slower investments. Retrieved from http://www.thestar.com.my/business/business-news/2017/03/03/malaysia-sees-slower-investments/

The Star Online. (2017). Promoting medical tourism in Sabah. Retrieved from http://www.thestar.com.my/metro/community/2017/05/22/promoting-medical-tourism-in-sabah-healthcare-group-confident-of-making-the-state-a-major-destinatio/

The World Bank. (2017). What is the difference between current and constant data? Retrieved from https://datahelpdesk.worldbank.org/knowledgebase/articles/114942-what-is-the-difference-between-current-and-constan

Tourism Malaysia. (2015). Malaysia tourist arrivals by country of nationality. Retrieved from http://mytourismdata.tourism.gov.my/wp-content/uploads/2016/03/TOP-45-DEC-2015-website.pdf

Tourism Malaysia. (2017). Total arrivals & receipts to Malaysia by year. Retrieved from http://www.tourism.gov.my/statistics

Umar, M., & Tunggal, N. Z. (2015). The impact of macroeconomic variable toward agricultural productivity in Malaysia. *South East Asia Journal of Contemporary Business, Economics and Law, 8*(3), 21-27. Retrieved from http://seajbel.com/wp-content/uploads/2016/01/Econ-13.pdf

Yaffee, R. A. (2003). A primer for panel analysis. Retrieved from http://web.pdx.edu/~crkl/ec510/pda_yaffee.pdf

Zakaria, M. B. (2011). The competitiveness of manufacturing sector in NCER and ECER regions from the shift-share analysis perspective. Retrieved from http://ir.unimas.my/218/1/Marina_Binti_Zakaria.pdf