THE IMPACTS OF FREE TRADE AGREEMENTS (FTA)S ON MALAYSIA'S EXPORTS: AN EVIDENCE STUDY FROM GRAVITY MODEL

BY

LAI KWONG MIN
LEE JING YI
SOO JUN WEN
TAN WOEI
WOOI XIN YAN

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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.

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Name of Student:	Student ID:	Signature:
1. LAI KWONG MIN	1304500	
2. LEE JING YI	1302951	
3. SOO JUN WEN	1303580	
4. TAN WOEI	1305140	
5. WOOI XIN YAN	1304817	

Date: _____

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AANZFTA	ASEAN-Australia-New Zealand Free Trade Area
ACFTA	ASEAN-China Free Trade Agreement
ADF	Augmented Dickey-Fuller
AFTA	ASEAN Free Trade Area
AIC	Akaike Information Criterion
AICECA	ASEAN-India Comprehensive Economic Cooperation Agreement
AJCEP	ASEAN-Japan Comprehensive Economic Partnership
AKFTA	ASEAN-Korea Comprehensive Economic Cooperation Agreement
APEC	Asia-Pacific Economic Cooperation
ARIC	Asia Regional Integration Center
ARMA	Autoregressive-Moving Average Model
ASEAN	Association of South-East Asian Nations
BA	Bangkok Agreement
BFTA	Bilateral Free Trade Agreement
BORD	Common Border
BPLM	Breusch-Pagan Lagrange Multiplier
BTA	Bilateral Trade Agreements
CEPII	Centre d'Études Prospectives et d'Informations Internationales
CES	Constant Elasticity Substitution
CGE	Computable general equilibrium
CUSFTA	Canada–United States Free Trade Agreement

DF	Dickey-Fuller
DIST	Distance
ECM	Error components model
ECO	Economic Cooperation Organization
EU	European Union
EU-US FTA	European Union United States Free Trade Agreements
Eviews	Econometric Views
EXP	Export
FEM	Fixed Effects Model
FTA	Free Trade Agreement
FTAAP	Free Trade Area of the Asia-Pacific
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GTAP	Global Trade Analysis Project
IC	Information Criterion
INF	Inflation rate
IPR	Intellectual property rights
JB	Jarque-Bera
JMEP	Japan-Malaysia Economic Partnership
LANG	Common Language
LLC	Levin, Lin and Chu
LSDV	Least Square Dummy Variable
MAFTA	Malaysia-Australia Free Trade Agreement
MCFTA	Malaysia-Chile Free Trade Agreement

MERCOSUR	Mercado Común del Sur, a sub-regional bloc with Argentina, Brazil, Paraguay, Uruguay and Venezuela
MICECA	Malaysia-India Comprehensive Economic Cooperation Agreement
MITI	Ministry of International Trade and Industry
MNZFTA	Malaysia-New Zealand Free Trade Agreement
MPCEPA	Malaysia-Pakistan Closer Economic Partnership Agreement
MTBTA	Malaysia-Turkey Bilateral Trade Agreement
MTFTA	Malaysia-Turkey Free Trade Agreement
MUFTA	Malaysia-US Free Trade Agreement
NAFTA	North American Free Trade Agreement
NKFTA	North Korean Free Trade Agreement
NLS	Non-linear Least Squares
OECD	Organization for Economic Cooperation and Development
OBOR	One Belt One Road
OLS	Ordinary least squares
OPN	Openness of Trade
POLS	Pooled Ordinary Least Square Model
POP	Population
PTA	Preferential trade agreement
PTA-D8	Preferential Tariff Arrangement- Group of 8 Developing Countries
RCEP	Regional Comprehensive Economic Partnership
REM	Random Effects Model
RTA	Regional Trade Agreements
SAARC	South Asia Association for Regional Cooperation
SIC	Schwarz Information Criteria

TPP	Trans-Pacific Partnership
TPS-OIC	Trade Preferential System of Organization of the Islamic Conference
US	United States
VECM	Vector error correction model
WITS	World Intergrated Trade Solution
WTO	World Trade Organization

PREFACE

This Final Year Project is submitted as the fulfillment of the requirement of our course structure. It contains work done from May 2016 until April 2017. Our supervisor for this project is Dr. Eng Yoke Kee from University Tunku Abdul Rahman (UTAR). This project has been solely done by the authors, with the reference of other researchers on this similar topic, and we have cited and provided references for our work.

We choose to study on this topic as we interested to learn and understand more about the issue of free trade and the impacts that it will bring to us especially for Malaysia which has involved in a high number of Free Trade Agreements. We have spent much time to collect the data and employ the suitable methodology. Soon after we have decided the data and methodology, we begin to study different related journals to help us proceed to the works. Each of us has given full commitment throughout the whole process to complete this project.

Throughout the research, we are grateful that Dr. Eng has given us her full support by guiding us and sharing her knowledge with us. Last but not least, we have learned so much and we believed that we are benefited from it.

ABSTRACT

This study investigate the impacts of Free Trade Agreements (FTA)s on Malaysia's export using a theoretically justified Gravity Model, focusing on bilateral and regional FTAs that involved by Malaysia. The model is estimated on a panel data set of Malaysia and 40 partner countries of Malaysia covered a period of 27 years from 1989 until 2015 using aggregated bilateral export data of Malaysia. Multilateral resistance factors and other determinants of trade are included as controlling variables. Panel data analysis is performed to better study the heterogeneity and dynamic pattern between the coefficients. Overall, bilateral FTAs is found to be insignificant to affect the exports of Malaysia while regional FTAs is found to be affect the exports of Malaysia significantly using Gravity Model.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This chapter is an introductory chapter which covers the research background of this study on the liberalization of trade, exports of Malaysia and the Free Trade Agreements (FTA)s that involved by. Next, some problem statements have identified from the research background and help to set the objective and questions of this study. Some hypotheses have made from the authors. Lastly, this study is going to be significant to which party also being covers in this chapter.

1.1 Research Background

Most of all economists think that international trade should be free (Rose, 2007). This consensus in economic theory has been a force that drives the trade liberalization in recent decades. In 1948, the founded of General Agreement on Tariffs and Trade (GATT) has eventually caused the establishment of World Trade Organization (WTO), an organization that handle the worldwide guidelines of trade between countries. After the foundation of WTO, major trade agreements have already signed through a multilateral mechanism between countries (Zhang, Cui & Zu, 2014). Since then, the global tariffs on manufactured goods have approximately dropped from 40% to 4% on average. The import tariff reduction have become the main factor of trade cost reduction which eventually lead to the boost expansion in international trade and integration of the world economy as well (Zhu, 2013).

During the mid-1990s, FTAs began to spread out vigorously when the popularity of regionalism and bilateralism rose up as a complementary settlement at that time. The reason behind is that FTAs has act as the critical role in this trend towards regional

integration. As at 1995, WTO has already notified of 130 FTAs and more than 15 new FTAs joining in each year on average. Today, a total of more than 150 FTAs are already entered into force. While at the same time, approximately 43% of the trade that involved in international trade occurs under FTAs and the share would even reached 55% when the agreements that currently are being negotiated worldwide were to be implemented.

Basically, the fundamental role of FTAs is to eliminate tariffs, allocation of import and export, and also priority on most of the goods and services traded among FTA's member countries. Through tariffs elimination, the FTA's member countries will be exempted from WTO's Most Favoured Nation treatment on tariff. Notably, there are two types of FTA which is bilateral FTAs and regional FTA. For bilateral FTAs, it refers to the FTAs that only involve two parties, where each party could be a country, a trade bloc or even an informal group of nations. For Example, United States has signed a bilateral trade agreement (BTA) with Australia from January 1st 2005 which generated a total of 26.7 Billion Dollar in 2009, while increasing 23% trade, 3.5% increases in imports and 33% increases in goods exports of United States. On the other hand, regional FTAs is refer to multilateral agreement that commonly signed among neighbouring nations like North American FTA (NAFTA) which signed among Canada, United States and also Mexico (Zhu, 2013). WTO (n.d.) stated that regional FTAs have growth in number and reach over the years. All WTO members now have a regional FTA in force after the notification of regional FTA between Mongolia and Japan in June 2016.

Under certain circumstances, FTAs can be used to boost the rivalry in the domestic economy by decreasing local prices level and achieve more efficient factors of production and even expanding exporters' market. In order to maximize the FTAs' benefits, authorities or administration will have to reach an agreement with the countries that enable to boost the rivalry in the domestic import industry and export opportunities abroad at the same time (Griswold, 2003).

According to WTO, Malaysia first involve in trade liberalization by joining GATT in 24th October 1957. Malaysia was praised by the council members of GATT as Malaysia took the first step in achieving open trading system. Besides, they were also impressed by the participation of Malaysia as it brings a significant effect to economic development. By joining GATT, trade in Malaysia shows increment as trade barriers reduced which lead to increase Malaysia's opportunities to target overseas market. Besides, non-discriminatory treatment also helped to increase Malaysia's export of products and services.

On the other hand, involvement of Malaysia in Association of Southeast Asian Nations (ASEAN) economic integration found that integration and multilateral trading system should be complementary and not to create trade barriers with third countries. Therefore, GATT suggested that ASEAN members should take note on ASEAN Free Trade Area (AFTA) under Article XXIV of the General Agreement (Trade Policy Review of Malaysia, 1993).

Apart from giving high preference to the rule-based multilateral trading system under the WTO, Malaysia also engaged in regional and bilateral trade agreements in order to complete the multilateral approach to trade liberalization (MITI Malaysia, n.d.). Hence, Malaysia becomes actively involved in bilateral or regional FTA mechanism during that period of time.

Malaysia signed AFTA in year 1992 and expecting an increase in the export of Malaysia. This is because the purpose of AFTA helps to reduce tariff and lead to increase in foreign direct investment and also to expand intra-ASEAN trade and investment (Ministry of International Trade and Industry (MITI) Malaysia, n.d.). From the Figure 1.1 below, it can be observed that before the joining of AFTA in 1992, the growth of Malaysia's exports is relatively slow. And after signing the AFTA in 1992 and in effect in 1993, the exports of Malaysia indicates a climb and higher growth by the following years. Hence, the impacts of AFTA had become a hot issue to study by the previous researchers.

Figure 1.1: Exports of goods and services (current US$) of Malaysia

Source: The World Bank (n.d.).

According to Siah, Choong and Yusop (2009), they found that Asian countries tend to lower the import from the neighbouring countries and tend to increase the exports to developed countries during financial crisis. Besides that, Khalid (n.d.) also studied the effect on the implication of AFTA in Maritime sector in Malaysia. This researcher found that AFTA able to enhance Maritime sector trade. Furthermore, Cheong's study (2008) on the effect of implication of AFTA has concluded that AFTA can boost the exports of Malaysia. Moreover, research from Malaysian Knitting Association Malaysia (MKAM) found that AFTA help to expand the trade with ASEAN countries from year 1997 to 2002. According to Okabe and Urata (2014), they found that there is a positive and significant effect on trade creation after the elimination of tariff on long range products. Hence, the signing of AFTA stimulates the export growth of Malaysia. It encourages Malaysia to sign more FTAs in order to boost the trade performance and economic growth.

Before Global Crisis in 2008-2009, Malaysia had only participated and entered into force with limited FTAs which are AFTA, Japan-Malaysia Economic Partnership Agreement (JMEP) and ASEAN China Free Trade Area (ACFTA). However, during and after the Global Crisis, Malaysia had been signed and entered into force for a total of 11 FTAs. It seems like Malaysia is trying to minimize the impact of global crisis using the trade liberalization of FTAs.

In year 2005, Malaysia started to sign the first bilateral FTA with Japan which is JMEP but not in effect until year 2006. The reason of signing FTA with Japan is to create more benefits along with the advancement in different dimension and coverage of globalization and economic regionalization (Rahman, Molla & Murad 2008). Next, Malaysia signed an agreement with Pakistan which name Malaysia-Pakistan Closer Economic Partnership Agreement (MPCEPA) in year 2007 but not in effect until year 2008. According to Amir and Anum (2015), it is the first bilateral trade agreement signed by both Muslim country. The purpose of both signing FTA between each other is to promote bilateral trade by providing tariff reduction on few commodities.

In year 2009, Malaysia-New Zealand FTA (MNZFTA) is signed by Malaysia and New Zealand but not in effect until year 2010. The objectives of signing FTA between both countries are to enhance the partnerships of economic and trade between both parties, improve socio-economic cooperation by exchanging the information, skills of workers and technology in each kind of fields and others (MITI Malaysia, n.d.). In the next year, Malaysia has signed an agreement with Chile which is name as Malaysia-Chile FTA (MCFTA) but not in effect until year 2012. The purpose of signing FTA between both countries is to create more opportunities for trade, investment, bring in more innovation and do more research and development. Besides, it also could help to improve in the development of socio-economic, increase economic competitiveness and so on (MITI Malaysia, n.d.).

In year 2011, Malaysia signed an agreement which is Malaysia-India Comprehensive Economic Cooperation Agreement (MICECA) with India and in effect in the same year. In year 2012, Malaysia signed Malaysia-Australia FTA (MAFTA) with Australia but not in effect until year 2013. Lastly, Malaysia-Turkey FTA (MTFTA) is signed by Malaysia with Turkey in year 2014 but not in effect until year 2015. The purpose of signing FTA between both countries is to slowly remove the restrictions and difficulties on trade in order to let their respective sectors to be more efficient and competitive. Besides, it also helps to create trade expansion such as bilateral trade and also trade in services by broadening the environment (MITI Malaysia, n.d.). However, most of these bilateral FTA partner seems not to be the major export partner of Malaysia.

According to World Integrated Trade Solution (n.d.), only three bilateral FTA partner countries which are Japan, India and Australia are top 10 trading countries with Malaysia in 2015. The export share of them in 2015 total up of 17.12% while the other four countries only consists a total of 1.62% export share of Malaysia. Besides that, that three partner countries also involved in regional FTA with Malaysia. Hence, the impact of bilateral FTA might be questioned compare to the impact of regional FTA. Table 1.1 shows the list of partner countries that in involve in trade agreement with Malaysia.

Table 1.1: Partner Countries That Involved in Trade Agreement with Malaysia

Countries	FTAs That Involved and In Effect With Malaysia							
		Regional FTA						
	Bilateral FTA	AFTA	AANZFTA	ACFTA	AICECA	AJCEP	AKFTA	PTA-D8
Brunei		1993	2010	2005	2010	2008	2007	
Indonesia		1993	2010	2005	2010	2008	2007	2011
Philippines		1993	2010	2005	2010	2008	2007	

Singapore		1993	2010	2005	2010	2008	2007	
Thailand		1993	2010	2005	2010	2008	2007	
Myanmar		1997	2010	2005	2010	2008	2007	
Cambodia		1999	2010	2005	2010	2008	2007	
Laos		1997	2010	2005	2010	2008	2007	
Vietnam		1995	2010	2005	2010	2008	2007	
Australia	2013		2010					
New Zealand	2010		2010					
China				2005				
India	2011				2010			
Japan	2006					2008		
Republic of Korea							2007	
Bangladesh								2011
Pakistan	2008							2011
Egypt								2011
Iran								2011
Nigeria								2011
Turkey	2015							2011
Chile	2012							

Note: Year indicated the year the country joined the same FTAs with Malaysia that are in effect.

Source: Asia Regional Integration Center (n.d.)

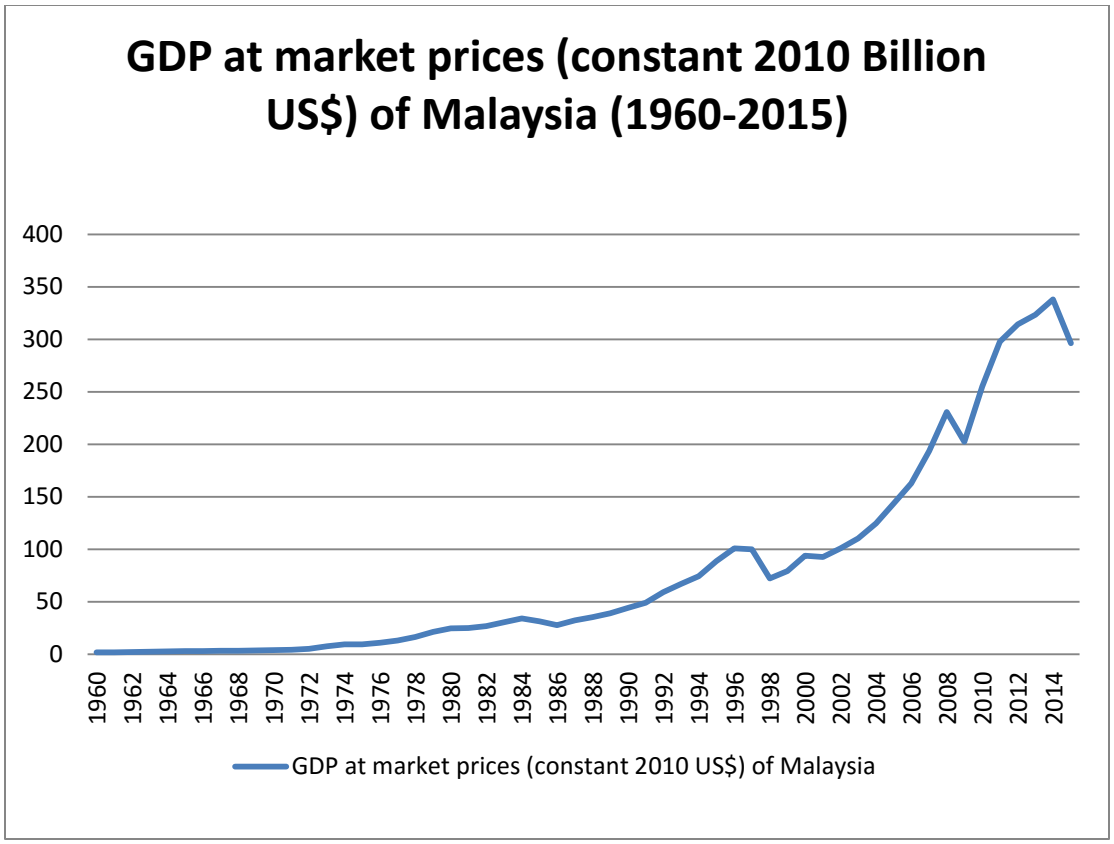
Apart the 14 FTAs that already signed and in effect, Malaysia has also involve another 5 FTAs where only the negotiations had launched and signed another three FTAs but not in effect yet which are Malaysia-Gulf Cooperation Council FTA, Trade Preferential System of the Organization of the Islamic Conference (TPS-OIC), Trans-Pacific Partnership (TPP). After all, Malaysia has involved 22 FTAs as at dated in 2016 (Asia Regional Integration Center, n.d.).

Overall, FTAs are intending to accomplish quicker and higher levels of liberalization that would initiate effective market access among the members of the FTAs (MITI Malaysia, n.d.). Besides that, FTAs nowadays are not only liberalize and improve market access, but also boost the trade facilitation, investment, intellectual property rights (IPR) and economic cooperation in different area at the same time. The purpose of Malaysia in negotiating FTAs is to develop the ability to access the market by addressing tariffs and non-tariff measures, enhance the trade, investment and economic development, build up a more competitive market for the Malaysian exporters and shape the capacity in particular targeted areas through technical coordinated effort and participation (MITI Malaysia, n.d.).

Besides that, MITI Malaysia (n.d.) also stated that international trade is an important force in Malaysia's economic growth and development. Hence, Malaysia has been involved in different trade policy and FTAs in order to expand the economy of Malaysia through the international trade and achieve the vision 2020.

Moreover, ever since Malaysia joined trade liberalization which make it become a more open economy country, gross domestic products (GDP) of Malaysia has indicated a significant increase. The changes can be observed from Figure 1.2 below. This also supported that international trade plays an important role in boosting Malaysia's economy (Yusoff, 2005). Other than AFTA, Malaysia also involved themselves in various FTAs throughout the years such as ACFTA, ASEAN-Korea Comprehensive Economic Cooperation Agreement (AKFTA), and others as well. So, the involvement in various FTA has significantly boosting Malaysia GDP growth rate and Malaysia GDP growth rate has even reached its peak in year 2014.

Figure 1.2: GDP at market prices (constant 2010 US$) of Malaysia



Source: The World Bank (n.d.).

1.2 Problem Statement

Based on our research on the background of our topic, we found out Malaysia just signed the TPP with another 11 countries on 4 February 2016 but not yet in effect. Apart from the latest TPP, Malaysia also signed TPS-OIC with other 40 countries on 1 January 2014 but not yet in effect. Malaysia also launched negotiations with other 15 countries for Regional Comprehensive Economic Partnership (RCEP) in 2013. Even though there are many researchers have conducted study on AFTA, however the problems can arise when Malaysia joined so many FTAs without having sufficient evidence on the impact of other FTAs on Malaysia economy especially bilateral FTAs. Besides that, individuals will start to question, are these FTAs really helping to enhance Malaysia's trade flow or jeopardize it?

TPP is one of the current issue that have been discussed by numerous analysts in their reviews as TPP has accounts a most yearning organized commerce arrangement of the post war time. The original twelve TPP nations are United States, Australia, Brunei, Chile, Canada, Malaysia, Japan, New Zealand, Mexico, Singapore, Peru, and Vietnam which have represent about a 40 percent of the world economy. Fergusson, McMinimy and Williams (2015) stated that a comprehensive and high-standard FTA has use to describe TPP which mainly want to achieve trade liberalization on goods and services by US negotiators and others.

Barack Obama was the one pushing TPP even after the disappointment in achieving a far reaching worldwide exchange bargain by Doha Round under support of WTO. The primary concentration of Barack Obama to "turn" or "rebalance" to Asia was say to well fit by TPP. According to Clinton's study in 2011 (as cited in Fukushima, 2016), a strengthening of bilateral security alliances, advancing democracy and human right, engaging with regional multilateral institutions, deepening in working relationships with emerging powers, forging a broadly-based military presence and expanding of trade and investment was the main element in TPP.

According to Calmes's study in 2016 (as cited in Fukushima, 2016), an expanding of good governance in the Asia-Pacific region through American leadership would also occur with the ratification of TPP. Petri and Plummer (2012) suggested that a complete organized commerce territory in the Asia-Pacific would then happen and there would be an expansive advantage being created which over the desire of WTO worldwide Doha Development Agenda.

Despite the fact that the agreement among the 12 TPP nations has been achieved, confirmation by their assemblies is still pending. Sanction by the US Congress stays dubious because of complex financial and political considers the United States, including the presidential decision of 2016. According to Halbert (2016), President-elect Donald Trump promises that one of his first actions after entered the office is to

pull back United States from the TPP. He mentioned that TPP was unable to limit China's growing dominance in the Pacific Rim region by heightening rivalry between part nations' work strengths. Critics also claimed that the TPP contained arrangements that allowed part governments to execute major changes without voters' information. So the TPP came to be viewed as simply another trade deal that favoured large organization and the administration supports. Hence, Donald Trump wishes to pull out United States from TPP. After he won the election for the president of United States, he announced to withdraw America from TPP. Some individuals claimed that this decision will give a chance to China as China now also proposing one mega link project which is "One Belt One Road" (OBOR) and also the RCEP.

OBOR is a modern equivalent which to create networks of pipelines, roads, utility grids and railways that could connect China and West, Central, and parts of South Asia (Tian, 2016). Besides, there are two main components of OBOR which are the Silk Road Economic Belt which China connects to West, Central, and South Asia (Tian, 2016). Next component will be 21st Century Maritime Silk Road which is to build connections among the regional waterways (Tian, 2016).

Malaysia has joined OBOR where Kuala Lumpur will act as an important geographical location because Kuala Lumpur act as a land link to Singapore and also land and sea link to Malacca strait (InvestKL, n.d.). China will having oil trading using the Pan Asia rail network which the route will be connect from Kunming to Singapore which will pass by Vientiane, Bangkok and Kuala Lumpur (InvestKL, n.d.). These will help to promote the oil trading of Malaysia at the same time.

After the withdrawal of America from TPP, RCEP seems to be one of its alternatives as it is also a new trade agreement that link different regionals together. Malaysia has involved in the negotiations with other 15 countries for RCEP in 2013 but not yet in effect. It was proposed by ASEAN in November 2011 when ASEAN prepared its first proposal on an East Asian regional FTA. The desire for centrality is the biggest motivations for ASEAN to propose RCEP. According to Das and Jagtiani (2014),

they mentioned that RCEP is said to be different from other ordinary bilateral or plurilateral agreements. It serves as a building foundation for the multilateral system of trade as it says to be able to harmonize rules and regulations that have been used across the multiple and overlapping FTAs in the region. Thus, RCEP was said to be able to attract new members and concurrently have the ability to create another worldview for economic regionalism by building the foundation for a Free Trade Area of the Asia-Pacific (FTAAP).

The target of the RCEP is to accomplish a WTO-consistent and transparent which is a mutually positive related and comprehensive economic partnership agreement. It is anticipated to include further engagement amongst ASEAN and also its FTA members and external economic partners also come subsequently. The augmentation of members' participation in regional and worldwide production networks is the more extensive economic ends of the RCEP. A minimization in costs of transaction for businesses inefficiencies have caused by multiple ASEAN-based trade agreements also taken into account. According to Fukunaga (2015), ASEAN are able to deepen the liberalization commitments in trade in goods, services with RCEP as it able to provide a high-level of market access opportunity. Besides that, RCEP able to reduce the effect of 'noodle-bowl' that caused by the diversity of rules and commitments in the ASEAN + 1 FTAs. 'Noodle-bowl' effect is a situation where the rules and regulations are interwoven and overlapping which might hinder the full utilization of preferential schemes.

However, RCEP also faces challenges. Fukunaga (2015) said that people tend to presume that RCEP will be another trade agreement with low standard in the region because of the word of flexibility fundamental and the "ASEAN Way" of decision execution. It also leaves an impression to people that the formation of this agreement is not much different from the existing ASEAN+1 FTAs. If the RCEP looks more likely as ASEAN's least attractive FTA and excluded products that participating countries consider sensitive, it tends to be less attractive to new members. Accordingly, ASEAN must make efforts to achieving an appealing RCEP or leaving

the impression that the region is struggle for a high quality agreement versus other competing regional agreements. In any case, the RCEP agreement can possibly turn into another worldview in the international trading system, to bolster ASEAN's goal of centrality in the regional and global production.

After all, people are seems to question on the impacts of FTAs towards economic Malaysia due to the current issues on TPP, RCEP and OBOP. However, TPP and RCEP are not yet in effect, thus it is essential to study the topic of free trade agreement using the historical data to learn from the past that whether FTAs will enhance Malaysia's export or jeopardize it.

Overall, the free trade policy is increasingly practising in international trade. According to Salvatore (2013), free trade helps each country to specialize the production of the commodities that is most efficient to produce with, and by exporting some of them, it will be able to gain more of other commodities than it could actually produce. However, Salvatore (2013) also stated that most countries will still impose some restrictions on the free flow of trade. These restrictions are mostly to protect some of the domestic producer of the country.

According to Fouda (2012), protectionism is an economic policy that restricts the trade between the nations. Few method such as tariffs apply on imported goods, quotas restriction, restriction of government regulation and anti-dumping laws which designed by the government in order to reduce imports and protect local industries from being take over by the foreign competitors. They aim to improve the position of a domestic relative to foreign producer (Fouda, 2012). First of all, tariffs is known as trade restriction which normally imposed by the nations in order to restrict the international trade's free flow (Salvatore, 2013). For example, Malaysia imposes an excise duty which from 60% to 105%, import duty of 30% and also 6% GST on the product which classified as cars and motocycles (Pitney Bowes, n.d.). This is because government wants to protect domestic infant industry which is Proton. Next, quota represents an important non-tariff barrier which it can be used to restrict the amount

of imported or exported product. Besides, an implementation of import quota can give protection in domestic industry, agriculture, and for balance of payments (Salvatore, 2013).

An expansion in domestic production to ensured enterprises, profiting the owners, workers and suppliers assets is the particular objective of protectionism trade policies. Coughlin, Chrystal, and Wood (2000) found that with protectionism trade policies, the trade activities will not across the national borders and hence reduce the problem which might face during international trade A foreign cultural and difficulty in obtain foreign information also able to be avoided lead a nation to prefer in enjoying home industries' goods and products. Besides, protectionism trade policies also able to reduce a nation exposure to the exchange rate risk. A country would worst of all if the protectionism is smaller than the exchange rate variation.

However, Kaempfer, Tower and Willett (2002) stated that the proponents of protectionism trade policies argue that these policies have reduced the economic well-being of a nation by the restrictions on trade. The negative effect of protectionism trade policies is not only from the restricted consumption of foreign goods and excessive domestic production, but also from the cost of enforcement the protectionist legislation. Low income consumers were seems to be highly adversely affected. Overall, the impacts were ambiguous. Hence, whether Malaysia will be benefited from the free trade policies instead of protectionism trade policies, the impact of free trade policies will be study in this research by including dummy variables of FTAs in the gravity model.

Overall, it is crucial to examine whether those FTAs really brings advantages to the country especially the trade flow. The formations of the FTAs not only bring opportunities to Malaysia, it can also be threats. There are many researchers study the impacts of different FTAs in the past, either in the context of Malaysia or other countries. However, we found that the research on Malaysia is limited and most of them focused on the first FTA that involved by Malaysia which is AFTA and the

ASEAN countries only. For example, Okabe and Urata's study (2014) on the impact of AFTA on intra-AFTA trade, Hapsari and Mangunsong's study (2006) on the determinants of AFTA members' trade flow and potential for trade diversion and Siah et al.'s study (2009) on the AFTA and the intra-trade patterns among ASEAN-5 economics.

According to Elliott and Ikemoto (n.d.), after AFTA was signed in year 1993, ASEAN-5 which included Malaysia showed a lower degree of trade creation than the earlier period from 1988 to 1992 before signing AFTA due to the new existing of industrial and exporting powers of South American, China and Eastern Europe. Nevertheless, the long term effect of AFTA on trade creation was ambiguous. A similar study of Siah et al. (2009) on ASEAN-5 concluded that AFTA may jeopardize the ASEAN countries trade if there is a trade deflection.

Besides that, Ramasamy (1995, as cited in Siah et al., 2009) found that Malaysia's and Singapore's trade diversion are greater than trade creation due to the misallocation of resources. In contrast, Indonesia's, Philippines's and Thailand's trade creation are greater than trade diversion after the FTAs between them are in force. The win-win situation may not be existed as some countries may gain trade creations and some may gain trade diversion even though they are under the same trade agreement. According to Clausing (2001), trade creation known as the reduction of tariffs after joining FTAs which will encourage partner country to import lower-cost domestic production and also enhance the economic welfare. Besides, trade diversion known as the remove of tariffs causes diversion of trade from a third nation to the partner nation.

Furthermore, there are many researchers such as Starck (2012), Yang and Martinez-Zarzoso (2014), Elshehawy, and Shen and Ahmed (2014) pointed out that Gravity model is a relatively successful empirical model to study the impact of determinants of trade. Elshehawy et al. (2014) and Yang and Martinez-Zarsoso (2011) also stated that there are researchers added FTA dummy variables to study the impact of FTAs

on trade using gravity model. However, we find there is limited study on the impact of FTAs on the export of Malaysia using gravity model.

As a result, we address the above problems by using Gravity model to examine the impacts of FTAs but not only AFTA in the context of Malaysia. Besides that, other determinants of trade should not be ignored and taken count into the gravity model.

1.3 Research Objectives

Malaysia has involved in a high number of FTAs which is 22 FTAs including those bilateral FTAs and regional FTAs that only launched the negotiation but not yet signed, signed but not yet in effect and signed and in effect. Besides that, the impact of bilateral FTAs is ambiguous and the impacts of TPPA and RCEP have been argued nowadays. However, there is limited study on the impacts of FTAs on the exports of Malaysia using gravity model.

Hence, the purpose of this study is to examine the impacts of signing the bilateral FTAs or the regional FTAs on the bilateral trade flow between Malaysia with its host countries using Gravity Model and panel data analysis.

1.3.1 General Objective

The general objective of this study is to evaluate the impacts of the FTAs on the bilateral trade flow between Malaysia and other countries using Gravity Model and panel data analysis. Earlier researchers had yield ambiguous result on the relationship between FTAs on the trade flow of a country especially bilateral FTAs. Furthermore, there is rather limited study this topic on Malaysia using Gravity Model and panel data analysis. Hence, this study is aimed to find out is FTAs bringing positive impact or negative impact on the

bilateral trade flow of Malaysia with its partner countries using Gravity Model and panel data analysis. This includes the partner countries which have signed the FTAs with Malaysia that in effect and Top 40 partner trading countries with Malaysia in 1989 and 2015.

1.3.2 Specific Objectives

This study is specifically aimed to:

i. Examine the impacts of Bilateral FTAs on the bilateral trade flow between Malaysia and its partner countries using gravity model and panel data analysis.
ii. Examine the impacts of Regional FTAs on the bilateral trade flow between Malaysia and its partner countries using gravity model and panel data analysis.
iii. Examine other determinants of the bilateral trade flow between Malaysia and its partner countries using gravity model and panel data analysis.

1.4 Research Questions

Malaysia is a unique country that practices trade liberalisation and protectionism on some commodities industries at the same time. However, based on our research, there are limited studies that examine on the effects of Bilateral FTAs and Regional FTAs that participate by Malaysia on its bilateral trade flow with its partner country. Hence, in the context of Malaysia, there are some research questions that have been asked in order to achieve the research objectives:

i. After signing Bilateral FTAs with a partner country, will it help to enhance the bilateral trade flow of Malaysia to the host countries or jeopardize the bilateral trade flow to the host country?
ii. After signing Regional FTAs that involved more than 2 countries, will this help to enhance the bilateral trade flow of Malaysia with those countries or jeopardize the bilateral trade flow to those partner countries that involved in the Regional FTAs.
iii. What are the other determinants that will affect the bilateral trade flow from Malaysia to other host countries?

1.5 Hypothesis of the Study

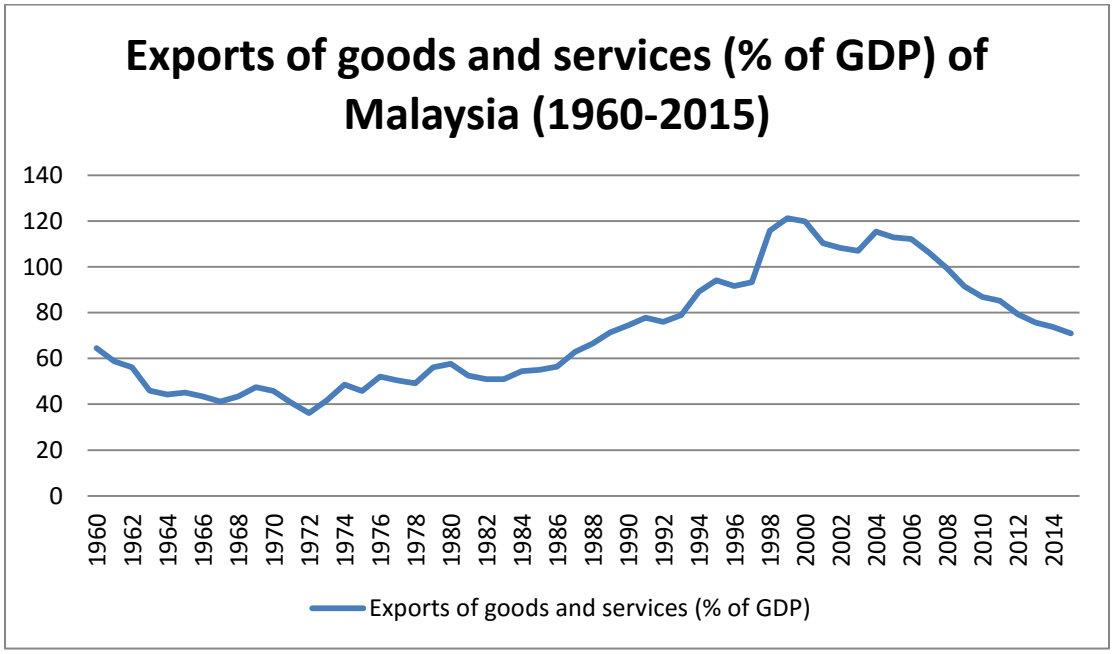
We hypothesize that bilateral and regional FTAs that involved by Malaysia have impacts on its exports. We also hypothesize that the impact of FTAs on exports of Malaysia is able to study through gravity model and panel data analysis. We will be able to know FTAs are either enhancing the trade or jeopardizing the trade of Malaysia. Besides that, we hypothesize that apart from FTAs, there are other determinants are affecting the exports of Malaysia significantly. We hypothesize that using gravity model, we able to study on how those determinants of trade affects the exports of Malaysia along with impacts of FTA at the same time. For examples, the economy size of the country, the population size of the country, the degree of openness of the countries towards trade and the purchasing power of the country.

1.6 Significance of the Study

Throughout the past 10 years, Malaysia has been drastically increased the number of FTAs signed and entered into forced from only 3 FTAs in 2006 to total of 14 FTAs in 2016 (Asian Regional Integration Center, n.d.). Numerous of previous studies have

been conducted to examine the impact of FTA on trade flow, however, there is limited researchers been studied on the impact of bilateral and regional FTAs on the bilateral trade flow of Malaysia with it partner countries especially using Gravity Model. Therefore, this study which focuses on impacts of bilateral and regional FTAs that involved by Malaysia using Gravity Model is relatively new and would be beneficial to a few parties especially the government, policymakers, economists and academicians by telling them the impacts of FTAs on Malaysia's exports using gravity model and panel data analysis. Other determinants of the trade will also be discussed in this study at the same time. Besides that, the data collected on the year of bilateral and regional FTAs that signed by Malaysia and its partner country will be one of the significance and contribution of this study.

Figure 1.3: Exports of Goods and Services (% of GDP) of Malaysia



Source: The World Bank (n.d.).

Furthermore, the role of foreign trade sector plays an important role in the Malaysian economy. Figure 1.3 indicates that the exports of goods and services in the percentage of GDP of Malaysia are growing during 1990s until 2000s. Even though the exports portion in GDP is dropping since 2004, it still consists around 70% of GDP of

Malaysia which is more than half. Hence, the purpose of this study is important for the government and policymakers to implement an effective and successful trade policy in order to improve the bilateral exports from Malaysia towards its partner countries.

Hence, this study will be able to tell whether the FTAs are significantly affect the bilateral trade flow of Malaysia towards other partner countries and bringing trade creation. Besides that, this study result will be able to provide additional information to policymakers and the government when they are considering the importance of the FTAs or the side effects of it. It also helps to answer the questions. For examples, by signing these FTAs, the benefits are on the Malaysia sides or vice versa? Is the FTAs are significantly affects the bilateral trade flow of Malaysia?

Apart from the FTAs, there are also other determinants and factors to be studied in this study which also able to tell the government and policymakers which variables could significantly affect the bilateral trade flow from Malaysia towards other partner countries and should be considered and prioritize by the government. For examples, whether the economy size, population, degree of openness of trade and purchasing power of the home country and partner countries will have impacts on the bilateral trade flow from Malaysia to its partner countries.

On the other hands, this study will generate an additional academic evidence on the topic of FTAs and bilateral trade flows and thus beneficial to the academicians and economists. The result of this study will be useful to be applied as academic materials related to Malaysia's bilateral trade flow and FTAs. Besides, this study will be able to present a clearer picture on how the FTAs influence the bilateral trade flow of Malaysia by using the reliable historical data in Malaysia. Overall, this study will give the economics learners a more essential guidance and updated knowledge investigated of FTAs and bilateral trade flow.

1.7 Chapter Layout

This research study is done and organized as below:

Chapter 1: Research Overview

This chapter is an preliminary chapter which covers the introduction, research background of the topic, problem statement of the topic, research objectives that set by the authors to be achieved, the research questions that asked by the authors to be answered, the hypotheses of the authors and the significance of this study to other parties.

Chapter 2: Literature Review

This chapter consists of the documentation of a comprehensive review of previous studies that conducted on this topic. Objectives, findings, methodologies and implications of the previous studies will be highlighted in this Chapter.

Chapter 3: Methodology

This chapter covers the reviews on the theoretical framework of gravity model, empirical framework of gravity model, variables that we choose to use, expected sign, econometrics method and the data that going to use in this study. Method of how to collect data, types of data, sources of data and method of data analysis will be discussed.

Chapter 4: Data Analysis

This chapter analyses and presents the pattern empirical results using the data collected in the previous chapter.

Chapter 5: Discussion, Conclusion and Implications

This chapter uses the analyses of the results to answer the research questions and hypotheses that proposed out in the Chapter 1 and Chapter 2 and compared with the results that obtained by the past researchers to draw out a conclusion. Besides that, the policy implications and recommendations will be proposed out in this chapter using the results of the analysis.

1.8 Conclusion

After the topic of our study is decided, we begin to have a deeper research on the background of our topic. From the research background of our topic, we identify the problem statements that are underlying, objective of our research study and the significance of our study.

What differentiate us from previous researchers is that we will look more in depth of the gravity model using panel data analysis to study the impact of FTAs on bilateral trade of Malaysia and also other underlying determinants. We believe that our study will be useful to the future researchers in this area of research.

In order to have a deeper research on our study, we will proceed to the literature reviews in Chapter 2.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter is a documentation of a comprehensive of review of the published and unpublished information from secondary data sources on this study topic. This chapter will provide an empirical literature review on the relevant constructs, methodologies and findings related to the impact of FTAs on the bilateral trade between the home country and host countries.

2.1 Empirical Literature Review

The impacts of international trade have always been undergoing intense study by economists and researchers all around the world for decades. Based on our research, there are numerous of researchers have used gravity model as their empirical approaches to study the impact of FTAs on trade. According to Elshehawy et al. in 2014, gravity model has been widely used in the worldwide trade literature over past half-century. Gravity model nowadays can be treated as a classic procedure to analyse the country's export. However, there are also some researchers used other model as their empirical approaches to study the impact of FTAs on trade. For example, Vector error correction model (VECM), Global Trade Analysis Project (GTAP) model, Computable general equilibrium (CGE) and Partial equilibrium model.

As stated by Frankel, Stein and Wei (1997), the effect of trade creating and trade diverting on RTAs has always being investigated by using the gravity model and it has become a favourite tool used by most of the researches. The previous researches, Carrere's study in 2006 was using gravity model which include 133 countries such as Organization for Economic Cooperation and Development (OECD) countries, Sub-

Saharan Africa, Latin America and the Caribbean, Asia and the Pacific and others with the panel data from year 1962 to 1996 in analysing the impacts of RTAs on trade. She concluded that RTAs have led to significant rise in trade between members countries compared to others partner countries. The rise in trade between members' countries also resulted in a reduction trade with the rest of the world.

Same to Liu (2007) who also investigate the effect of RTAs on China's trade with its trading partners using a gravity model. The author revealed that the RTA could enhance the intraregional trade between China and other member countries, while obstruct extra regional trade between China and other non-member countries. NAFTA members tend to have lesser exports to China, but maintaining same import volume with China as China is their main labour supply. Besides, the result showed that China experiences a trade diversion with CER, NAFTA, Canada–United States Free Trade Agreement (CUSFTA) and MERCOSUR. Nevertheless, ASEAN and Asia-Pacific Economic Cooperation (APEC) do not impede the China's export and import. In another word, RTA stimulates members to trade more with other members, but trade less with non-members. The author also concluded that larger population may force China to trade within the domestic region.

Furthermore, according to Kurihara (2011), a gravity model was used to investigate the impacts of RTA on international trade. The result point out that the RTA would create more international trade opportunities in OECD countries than non-OECD countries. Meanwhile, the effect of RTA on bilateral trade would alter based on the fundamental law of the countries involved and the constitution of the pair of countries. Besides that, Ries (2010, as cited in Starck, 2012) study the trade pattern between ex-colonies and their authorizing countries using gravity model and revealed that trade flow during colonialism have strong evidence to prove that better than after independence.

However, Dembatapitiya and Weerahewa (2015) capture the impact of different type of trade agreements on bilateral trade of South Asia using gravity model which

including cross sectional data that cover 2555 bilateral of trade for year 2012 and they found that EU was the only RTA of South Asia that is significant and negative to the bilateral trade. The negative effect is due to the financial crisis faced by Europe in recent past and it leads to the undercapitalization of financial institution in Europe zone. Because of that, a declination of economic growth in Europe happened and the exports value of world has decline. They also found that BTAs are all positive and significant to bilateral trade. They confirmed that the BTAs within South Asia countries would benefit more than BTAs with other countries. In other word, BTAs within South Asia countries would encourage the regional trade of South Asia countries.

Besides, Ekanayake, Mukherjee and Veeramacheneni (2009) also used a gravity model covered with the data from year 1980 to 2009 to determine the trade diversion and trade creation effect of RTA on trade flow among Asian countries. There are four types of RTA which included Association of Southeast Asian Nations (ASEAN), Bangkok Agreement (BA), Economic Cooperation Organization (ECO), and South Asia Association for Regional Cooperation (SAARC). Among all these RTAs, they indicated that ECO leads to trade diversion, due to only 2 out of 19 Asian countries are involved in this agreement.

Besides, Okabe (2015) studies the issue of ASEAN+1 Free Trade Agreement by using gravity model covering with the data of trade sector from year 2002 to 2012. They suggested that trade facilitation, law coordination and modification of FTA would provide greater trade welfare compared to tariff elimination under AFTA. Besides, developed of production and sales networks among members has the potential to positively affect the FTA on trade. This is due to the diminution of cost of service link and cross-border production sharing. Siah et al. (2009) analyse the effect of ASEAN economic integration on trade among ASEAN countries by using a gravity model. They conclude that the formation of AFTA might not bring benefit on intra-ASEAN trade due to trade deflection in regional market that will reduce the tariff revenue of members' countries.

However, Rose (2007)'s study used a panel data set in gravity model to study the effect of multilateral trade agreements on the international trade flow by taking account of the impact of WTO membership at the same time found that there is only weak evidence to prove that membership of WTO will affect the trade patterns.

As stated, there are many researches using gravity model in their study and there are also many using other model. Based on our research, we found that the previous researches Jafari and Othman (2013) used GTAP model to investigate the relationship between the bilateral FTA of Malaysia and United States (US) which is Malaysia-US FTA (MUFTA) and the volume of export. They stated that the bilateral FTA of MUFTA will increase the volume of export among them due to the removal of trade barriers. However, the export of Malaysia and US to the rest of the world would be reduced.

Furthermore, Olatunji (2015) employed a partial equilibrium model approach to study on the relationship between bilateral FTA of Malaysia-Turkey Bilateral Trade Agreement (MTBTA) on the palm oil sector. The result shows that the bilateral trade agreement among Malaysia and Turkey will increase the export revenue of 10% and 56% of crude palm oil and refined palm oil respectively for Malaysia. A trade creation of 99% for crude palm oil and 33% of refined palm oil would incur in Malaysia.

Other than that, Patricio (2011) applied CGE model with the result shows that Australia-China FTA has increased the growth in merchandise trade between two countries which had previously hinder by trade barriers. The result from the study shows the bilateral FTA able to improve market access conditions and raise the commercial opportunities for both countries. The study mentioned that bilateral agreements allow both countries to obtain to opportunities to gain from the differences in comparative advantage.

Moreover, Francois, Norberg and Thelle (2007) study the impact of trade liberalization between the European Union and South Korea by using a CGE model with the most recent GTAP database. They concluded that the bilateral trade between both countries increase with the liberalization of trade. But the level of trade liberalization taking place in the sector of both countries is the main impact of the outcome for trade liberalization.

Other than that, Liu and Jiao (2006) also used partial equilibrium model covering estimated data period from year 1992 to 2004 to study on the impact of regional trade agreement between trades of China with Australia. They mentioned that China was affected by the implementation of regional trade agreement as a major exporter to USA. Therefore, China was trying to enlarge its trade by diverting to other countries and thus making Australia one of the major trading partners. They conclude that the involvement in bilateral FTA will definitely encourage trade in both countries.

Besides, Othman and Yaghoob (2009) used a GTAP model with the use of latest GTAP7 database. Their study included a multiple country to examine the impact of intra-ASEAN trade liberalization (AFTA) with special focus on Malaysia. The result stated that textiles and processed food will incur an increase in outputs and exports but there will be a marginal contraction occurs on other sectors. They mentioned that agricultural sector seems to be able to obtain the highest welfare gains followed by processed food. They conclude that AFTA is beneficial to Malaysia.

Plaisier, Berden, Francois and Mulder (2009) also performed CGE model in their study on the impact of FTAs in OCED area. Their study included an EU-US FTA, an EU-Japan FTA and an EU-Australia/New Zealand FTA. The study shows that the trade flows of the participating partners in all three FTAs have been significantly and positively affected. This impact is mainly because of the comparative advantages across sectors.

2.2 Conclusion

In this chapter, a review has been made on various approaches for studying the FTA effect on trade flows, which are Gravity model, GTAP model, partial equilibrium model and CGE model. For this research, a gravity model that proposed by Jan Tinbergen in 1962 will be applied in our research in order to estimate the trade diversion and the trade creation effect of FTA on Malaysia' bilateral trade. This model will be future explain in Chapter 3.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter explains the theoretical framework of gravity model and the econometrics method that going to use in this study. It discusses on how this study will be conducted which including the reviews on what theoretical framework that underlying in the Gravity Model, model specifications of this study model and the expectation of signed based on previous researchers empirical results, econometrics method, the data collection methods, sources of data, sampling design and data progressing.

3.1 Theoretical Framework: Gravity Model

Based on our literature research, majority of the researchers have used gravity model as their empirical approaches to study the importance of FTAs on trade. According to Anderson in 2010, gravity model is one of the most outstanding empirical models in economics study, which astoundingly suitable in observing the variation in economic interaction between both trade and determinants impact. However, most economists chose to ignore gravity model at the beginning due to the absence of an accepted connection to economic theory. Hence, throughout the years, different theoretical approaches have tried to apply by different researchers to explain the theoretical foundation of gravity. They tried to distinguish and develop the hidden theories and assumptions of gravity that make it so successful today (Starck, 2012).

3.1.1 Origins of the Gravity Model

According to Anderson in 2010, the traditional gravity model was developed on analogy with Newton's Law of Gravitation which was developed in 1687. Isaac Newton used it to explain the gravitational force between two masses in relation to the distance that lies between these two mass (1687, as cited in Starck, 2012), which is as follows:

$$F_{ij} = G\frac{M_i M_j}{d_{ij}^2} \tag{1}$$

The gravitation force, F_{ij} relates corresponding to the product of two masses M_i and M_j which inversely corresponds to the distance d_{ij}^2 between these two masses away from each other. The gravitational intercept G is an empirically determined value. This equation is suitable to any situation that is modelling demanded flows or movements. Hence, the F_{ij} is assumed as $X_{ij,}$ the movement of goods or labour between countries i and j. and thus economic masses is stated as Y_i and Y_j which is represented the characteristics of both countries i and j. Lastly, D_{ij} is the geographical distance between both countries i and j capital cities. The equation for the trade flows can be characterized as below:

$$X_{ij} = A\frac{Y_i Y_j}{D_{ij}} \tag{2}$$

According to Starck in 2012, equation (2) is a completely simplified formation of the gravity model that practiced in the international trade and was first introduced by Tinbergen in 1962. Tinbergen applied it to analyse the determinants of trade flow. According to Starck (2012), X_{ij} is often expressed by other researchers as the volume of export from country i to j, while the economic masses are described by each nation's GDP.

3.1.2 Standard Specification of the Gravity Model

Tinbergen first introduced the gravity model in 1962 and expressed the relationship as equation below after modification:

$$X_{ij} = A\frac{Y_i^{\beta_1} Y_j^{\beta_2}}{D_{ij}^{\beta_3}} \tag{3}$$

Tinbergen (1962, as cited in Starck, 2012) stated that the volume of exporter *i* is able to supply is depending on its economic size (Y_i). Same for the volume of goods to be sold to the importer *j* is also depending on its income level (Y_j). They also stand as an indicator for the production capacity and market potential of sales for each country. For example, when the production capacity of the home country is high, the export of that country will also high. While when the market potential for the host countries is high, the demand for the goods and services will also increase. By putting in together, economic size variables are able to explain the characteristics of the supply and the demand determinant that affecting each nation's market in a positive relationship. In the end, these determinants are essential during examining the trade flows.

However, Tinbergen also declared that the explained direct proportional relationship between dependent variable and the independent variables is not necessarily appropriate. The coefficients β_1, β_2, and β_3, can thus take values other than 1. They refer to the exporter's GDP's elasticity (β_1), the importer's GDP's elasticity (β_2) and the distance's elasticity (β_3). While correspond to the universal gravitation model of Isaac Newton, the $\beta_1 = \beta_2 = 1$ and $\beta_3 = 2$, due to the square of the d_{ij} (as cited in Starck, 2012).

Besides, distance is represented as the geographical distance between capital cities measured in land miles or nautical. The impact of barrier that brought by distance are comparable with the function of a tariff. This is because trade barriers costly to remove and mostly related to transportation costs. Hence, these factors mostly indicate a negative relationship with equilibrium trade flows.

According to Tinbergen in 1962, the factor of distance can also be explained as an index of information about export markets. (as cited in Starck, 2012) Overall, distance is usually used as a proxy for vary determinants that can affect the volume of trade flow. For example, cost of transportation, time used during shipment, costs of communication, cost of transaction, costs of synchronization, or cultural distance (Head, 2003, as cited in Starck, 2012).

Throughout the years, previous researchers have specified a collection of determinants that expected to influence trade. Past topics of discussion are whether being members of the WTO have advantages in trading, same currency union's nations or sharing the common borders (Rose and van Wincoop, 2001; McCallum, 1995; Rose, 2004, as cited in Starck, 2012). According to Elshehawy et al. (2014), dummy variables are also added in the equation to take in to consideration the FTA as a factor between *i* and *j*.

Besides that, ordinary least squares (OLS) regression analysis is often performed to estimate gravity models. Hence, natural logarithms and an error term (μ_{ij}) are adding into equation (3) to obtain linear relationship which allows to interpret coefficients as elasticity. The linear-log equation is stated as below:

$$logX_{ij} = logA + \beta_1 logY_i + \beta_2 logY_j + \beta_3 logD_{ij} + \mu_{ij} \quad (4)$$

Where Y_i represents the characteristics of the home country while Y_j represents the characteristics of the partner countries and D_{ij} represents the characteristics of both countries shared together. X_{ij} is the volume of trade flow from country i to country j. A is the constant while u_{ij} is the residual of the equation.

Multiple researchers have applied the log-linear gravity model in their study (Carrere, 2004; Elshehawy et al., 2014; Hapsari & Mangunsong, 2006; Kurihara, 2011; Yang & Martinez-Zarzoso, 2014). Hapsari and Mangunsong (2006) used augmented linear-log gravity model to study the factors of AFTA members' trade flow and possible trade diversion. They included the variables such as the GDP per capita of importer and exporter, tariff rate and four dummy variables of whether the country is landlocked and island, border and common language that shared by both countries. Other three dummy variables that represented the effects of RTA also included. They suggested that the reduction of tariff found to be significantly increases the ASEAN member's bilateral export but increasing trade liberalization among ASEAN may cause increasing trade diversion and negative impact in welfare of non-member countries.

Elshehawy et al. (2014) included population of importer, openness of importer's trade, three dummy variables of common language and common border shared by both countries and RTA that involved in both countries in the linear-log gravity model. They used this model with the panel data analysis to study determinants that impacting Egypt's exports.

Yang and Martinez-Zarzoso's study in 2014 also used and augmented linear-log gravity model with panel data analysis to study the trade creation and trade diversion impacts. They included variables such as the population of importer and exporter, two dummy variables of common language, common border and three dummy variables of specific trade effects in the ACFTA

which named as FTA_1_{ijt}, FTA_2_{ijt} and FTA_3_{ijt}. FTA_1_{ijt} represented trade creation impacts, FTA_2_{ijt} represented the export diversion impacts and FTA_3_{ijt} represented import diversion impacts. Both of the study also suggesting that fixed effect model (FEM) is a better model to interpret the gravity model on the impacts of FTA.

3.1.3 Theoretical Foundation of Gravity Model

Deardorff (1998) and Starck (2012) both pointed out that even this model has been an empirical success in studying the trade flows between nations as gravity relationship can appear in almost every trade model that includes trade costs which usually increase with distance, but the theoretical foundation for the gravity equation is claimed to be rather insufficient by the past researchers. However, this statement could be unreasonable as theoretical foundations for the gravity equation have been proposed by different researchers and economists. According to Pacheco, Sen and Srivastava (2013), studies of Anderson (1979), Bergstarnd (1985) and Anderson and Van Wincoop (2003) have improved upon its theoretical foundations.

Anderson and Van Wincoop (2003, as cited in Yang & Martinez-Zarzoso, 2014) used a Non-linear Least Squares (NLS) model which able to estimate the endogeneity of trade costs to improve the theoretical foundations for the gravity model based on a Constant Elasticity Substitution (CES). They also proved that border is affecting the trade. They concluded that the bilateral trade costs between two nations are influenced not just by the costs of bilateral trade like being landlocked, distance, common border or language, it also influenced by the relative weight of these cost of trade in comparison to the other partner countries which is also stands as multilateral resistance terms. The multilateral resistance factors are advised to be added into the empirical

study to prevent a biased estimation of the model parameters (Anderson & Van Wincoop, 2003, as cited in Yang & Martinez-Zarzoso, 2014).

Apart from the development of multilateral resistance term into the gravity model, the three classical international trade models are used to explain the gravity model by different researchers. The three classic trade models in international trade which are Ricardian model, Hecksher-Ohlin model and Helpman and Krugman approach (Starck, 2012). Gravity model is derived from a Ricardian framework by Eaton and Kortum in 1997 while Deardoff (1997), Evenett and Keller (1998) derived the gravity equation from Hecksher-Ohlin(as cited in Rahman, 2004; Starck, 2012). Starck (2012) also demonstrate the underlying theoretical foundation of gravity model on the basis of these three classical models.

Ricardian model focuses on the opportunity cost of production and comparative advantages, whereas Heckscher-Ohlin model focused on the factor of production and differences in factor endowment to explain the inter-industry trade. Lastly the Helpman and Krugman model focused on the monopolistic competition and intra-industry trade. These models are focusing on different assumptions. Yet, they still able to improve the theoretical foundation of gravity model as they did not restrict the derivation of gravity equation to any selected classical trade model. Therefore, the assumptions, plausibility and consideration of different theories give credibility to the gravity model (Starck, 2012).

3.2 Empirical Framework: Gravity Model

3.2.1 Model Specification

The generalized standard gravity model is restated as below:

$$logX_{ij} = logA + \beta_1 logY_i + \beta_2 logY_j + \beta_3 logD_{ij} + \mu_{ij} \quad (5)$$

Based on the generalized standard gravity model, the relationship between bilateral trade flow of from country *i* to country *j* and the characteristics of both countries and the common characteristics of both countries which stands as a proxy of multilateral resistance term that restrain the bilateral trade flow is explained. Previous researchers have including different variables into this model in order to examine different factors on the flow of trade.

In our study, the log-linear gravity model is specified as below and all variables are expressed in natural logarithms except dummy variables:

$$\begin{aligned} \log EXP_{ijt} = {} & \alpha + \beta_1 \log GDP_{it} + \beta_2 \log GDP_{jt} + \beta_3 \log POP_{it} + \beta_4 \log POP_{jt} \\ & + \beta_5 \log OPN_{it} + \beta_6 \log OPN_{jt} + \beta_7 \log INF_{it} + \beta_8 \log INF_{jt} \\ & + \beta_9 \log DIST_{ij} + \beta_{10} BORD_{ij} + \beta_{11} LANG_{ij} + \beta_{12} BFTA_{ijt} \\ & + \beta_{13} RFTA_{ijt} + \mu_{ij} \end{aligned} \quad (6)$$

Where the dependent variable of the model, EXP_{ijt} represents the bilateral exports from Malaysia (*i*) to host countries (*j*).

In order to achieve the main objective of the study which is to examine the impacts of bilateral and regional FTAs on Malaysia's export, two dummy variables which are $BFTA_{ijt}$ and $RFTA_{ijt}$ is included into the modified gravity model. $BFTA_{ijt}$ and $RFTA_{ijt}$ are the dummy variables that investigate the effects of FTA on Malaysia bilateral trade flow which is to achieve the main objective of the study which is to examine the impacts of bilateral and regional FTAs on Malaysia's exports. $BFTA_{ijt}$ takes the value of 1 when both

countries *i* and *j* in year *t* signed bilateral FTA and in effect, otherwise 0. $RFTA_{ijt}$ takes the value of 1 when both countries *i* and *j* in year *t* signed regional FTA and in effect, otherwise, 0.

The other main objective of our study is to examine other determinants of bilateral exports of Malaysia. Hence, different determinants of bilateral exports is included into the modified gravity model as the characteristics of both countries *i* and *j*. These determinants are GDP, population, openness of trade and inflation.

GDP_{it} and GDP_{jt} is the real GDP of Malaysia (*i*) and host countries (*j*) in period *t* illustrated the economy size of the observed country. POP_{it} and POP_{jt} are the populations of countries *i* and *j* in period *t* illustrated the market size for the observed country. OPN_{it} and OPN_{jt} are the percentage of trade in GDP of countries *i* and *j* in period *t* as the proxy of degree openness of trade for the observed country. INF_{it} and INF_{it} are the inflation rate of countries *i* and *j* in period *t* as a proxy of purchasing power for the observed country.

Furthermore, multilateral resistance terms that will restrain the trade flow are also included in the study. $DIST_{ij}$ is the most common multilateral resistance which is the weighted great-circle distance between capital cites of countries *i* and *j*. However, there is not only one factor will restrain the trade flow, others factors such as common border shared by both countries and the common language shared by both countries are also included. $BORD_{ij}$ is the dummy variables which represents common border that shared by countries *i* and *j*. It takes a value of 1 when both countries *i* and *j* shared the common land border, otherwise 0. $LANG_{ij}$ is the dummy variables that represents the common language that used by countries *i* and *j*. It takes a value of 1 when both countries *i* and *j* shared the common official or national languages and languages spoken by at least 20% of the population of the country, otherwise 0

Lastly, μ_{ij} is expected to be a log-normally distributed error term.

3.2.2 Empirical Evidence from Past Researchers and Expected Sign

Many researchers have introduced dummy variables, namely FTA_{ijt} to study the specific effects of the trade agreements. According to Pacheco, Sen and Srivastava (2013), Aitken's study in 1973 is the first to include a dummy variable to investigate the impact of a preferential trade agreement (PTA). Similar research such as Okabe & Urata (2014) used FTA dummy variable in a gravity model to investigate the effects of tariff elimination on intra-ASEAN trade under AFTA. They concluded that there is trade creation after the implementation of AFTA.

Yang & Martinez-Zarzoso in 2014 also used FTA dummy variables in gravity model to examine the impact of the ACFTA on exports and conclude that ACFTA leads to substantial and significant trade creation, focusing on trade creation and diversion effects. Same to Elsehawy et al. (2014), FTA dummy variables is included in the gravity model to study the determinants that influence Egypt's bilateral export to its major trading partner and indicates that regional FTA is highly significant and positively affect Egypt's exports. Hence, two FTA dummy variables are added into the linearized gravity model as our important variables to study the impacts of bilateral FTA and regional FTA on the bilateral export from Malaysia (*i*) to its partner countries (*j*). The expected sign for the FTA dummy variables is positive.

Timbergen, Abidin and Shalan (2013), Yang and Martinez-Zarzoso (2014) stated that GDP is positively related to the trade flow of a country. Besides that, the proxy of GDP in this study is the economy size of the countries.

Hence, we suggest that larger economy size will encourage the trade flow either export or import. Thus, the expected sign for GDP is positive.

Matyas (1997, as cited in Nuroglu, 2010) stated that the population is most likely to increase trade and also level of specialization by producing gains from specialization. Brada and Mendez (1995, as cited in Yang & Martinez-Zarzoso, 2014) also supported that the coefficient for importer's population can be positive. This is because larger importer's population allows imported products to rival with domestic products. It also indicates that economies of scale and encourages the international specializations.

However, Nuroglu (2010) found out that population have positive impact on bilateral trade for exporter country but negative impact on importer country. The positive effect for exporter is due to the fact that higher population means that more production, better specialization opportunity, also more goods to be exported and a higher demand for the imports. On the other hand, the negative sign for importer is because of the higher population will decreases GDP per capita in a country, making everyone less rich and therefore it decrease the level of exports and also the need for imports.

Atici and Furuya (2008) also suggested that a larger domestic market due to economies of scale and therefore may cause to a lower trade flow. Yang and Martinez-Zarzoso (2014) also supported that population should be negatively influence the trade flows, where larger populations means larger domestic market, richer factor of production endownment and more diversified products, as well as lower dependency on international specialization.

In this study, the population stands as the proxy of market size, thus we suggest that a larger market size indicates higher capacity to supply and demand will lead to high trade flow either in export or import. The expected sign for Malaysia's and host countries population variables is positive.

The openness of trade indicates how open the country toward trade. According to Elshehawy et al. (2014), the more open the country towards trade, the more the trade activity will be happened in that country. A higher degree of openness mostly implies a lower barrier to trade and thus, higher trade flow between the source country and host countries. Hence, we expect a positive sign for both source country and host countries in this variable.

According to McConnell, Brue and Flynn (2009), inflation defined as the rising level of prices of goods and service in an economy over a period of time. High inflation will usually accompany by reducing the purchasing power of incomes. Low purchasing power will reduce the purchase of import. Aslanov, Gasimov and Isayeva (2010) states the increase in inflation will cause export goods to sell cheaper in the international markets and lead to an increase in exports. Dexter, Levin and Nault (2002) reported that inflation has a positive influence on export, while a negative impact on import. Thus, the expected sign for Malaysia's inflation variables is positive and negative for host's countries.

According to Rahman (2004), transportation cost is an important factor of trade and transport cost is mostly proxy by the distance between two countries. However, apart from distance, Anderson and Van Wincoop (2003) had point out that multilateral resistance factor such as common language and common border should also be taken into account to prevent biased estimation.

The expected sign for distance is negative as the farer the country; the transportation cost will increase and hence reduce the trade flow between the source country and host country. The expected sign for common language is positive as if both countries have common language, it will simplified the process of trade and lower the barrier of trade. Same to border, common

border will simplified the process of trade as it is nearer and the barrier of trade also lower.

Table 3.1: Independent Variables and Expected Sign Included in the Gravity Model

	Variables	Description	Expected Sign
Home Country (Malaysia)	**$\ln(GDP_{it})$**	GDP at market prices (constant US$ 2010) of Malaysia in logarithms formation	+
	$\ln(POP_{it})$	Total population of Malaysia in logarithms formation	+
	$\ln(OPN_{it})$	Openness of Trade(Trade (% of GDP) of Malaysia in logarithms formation	+
	$\ln(INF_{it})$	Inflation, GDP Deflator (annual %) of Malaysia in logarithms formation	+
Host Countries	**$\ln(GDP_{jt})$**	GDP at market prices (constant US$ 2010) of host countries in logarithms formation	+
	$\ln(POP_{jt})$	Total population of host countries in logarithms formation	+
	$\ln(OPN_{jt})$	Openness of Trade(Trade (% of GDP) of host countries in logarithms formation	+
	$\ln(INF_{jt})$	Inflation, GDP Deflator (annual %) of Host Countries in logarithms formation	-
Home and Host Countries	**$\ln(DIST_{ij})$**	Weighted Great-circle distance between capital cities(km) in logarithms formation	-
	$BORD_{ij}$	Dummy variable which takes a value of 1 when both countries *i* and *j* shared the common official or national languages and languages spoken by at least 20% of the population of the country, otherwise 0	+
	$LANG_{ij}$	Dummy variable which takes a value of 1 when	+

	both countries *i* and *j* shared the common land border, otherwise 0	
$BFTA_{ijt}$	Dummy variable which takes a value of 1 when both countries *i* and *j* in year *t* signed Bilateral FTA and in effect, otherwise 0	+
$RFTA_{ijt}$	Dummy variable which takes a value of 1 when both countries *i* and *j* in year *t* signed Regional FTA and in effect, otherwise 0	+

3.3 Hypotheses Development

We have been developed a few hypotheses on our study before we conduct our data analysis.

3.3.1 Free Trade Agreements (FTA)s

H_0: $\beta_{12} = 0$, Bilateral FTA that signed and in effect between Malaysia and host country does not significantly influence the bilateral export of Malaysia toward host country.
H_1: $\beta_{12} \neq 0$, Bilateral FTA that signed and in effect between Malaysia and host country does significantly influence the bilateral export of Malaysia toward host country.

H_0: $\beta_{13} = 0$, Regional FTA does not significantly influence the bilateral export of Malaysia toward host country.
H_1: $\beta_{13} \neq 0$, Regional FTA does significantly influence the bilateral export of Malaysia toward host country.

3.3.2 Other Determinants

H_0: $\beta_1 = 0$, GDP of Malaysia does not significantly influences the bilateral export of Malaysia country toward host country.
H_1: $\beta_1 \neq 0$, GDP of Malaysia does significantly influences the bilateral export of Malaysia country toward host country.

H_0: $\beta_2 = 0$, GDP of host countries does not significantly influences the bilateral export of Malaysia country toward host country.
H_1: $\beta_2 \neq 0$, GDP of host countries does significantly influences the bilateral export of Malaysia country toward host country.

H_0: $\beta_3 = 0$, Population of Malaysia does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_3 \neq 0$, Population of Malaysia does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_4 = 0$, Population of host country does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_4 \neq 0$, Population of host country does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_5 = 0$, Openness of trade of Malaysia does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_5 \neq 0$, Openness of Trade of Malaysia does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_6 = 0$, Openness of trade of host country does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_6 \neq 0$, Openness of Trade of host country does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_7 = 0$, Inflation of Malaysia does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_7 \neq 0$, Inflation of Malaysia does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_8 = 0$, Inflation of host country does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_8 \neq 0$, Inflation of host country does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_9 = 0$, Great-circle distance between capital cities of Malaysia and host country does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_9 \neq 0$, Great-circle distance between capital cities of Malaysia and host country does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_{10} = 0$, Common border of Malaysia and host country does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_{10} \neq 0$, Common border of Malaysia and host country does significantly influences the bilateral export of Malaysia toward host country.

H_0: $\beta_{11} = 0$, Common language of Malaysia and host country does not significantly influences the bilateral export of Malaysia toward host country.
H_1: $\beta_{11} \neq 0$, Common language of Malaysia and host country does significantly influences the bilateral export of Malaysia toward host country.

3.4 Econometric Method

This study used panel data analysis to analyse and estimate the effects of FTAs on the Malaysia's export in Gravity Model. Hence different test and econometric method is performed in order to get the best fitted panel data model to estimate our gravity model.

3.4.1 Panel Data Analysis

Panel data is also recognized as cross-sectional time series data. Panel data set involves observations on various phenomena over a period of time. There are two types of panel data which is balanced panel data and unbalanced panel data. Balanced panel data consists of identical number of observations for every individual (cross-sectional) while unbalanced panel data refer to the value of observation is missing at the certain time of period.

Panel data is able to control individual that is unobserved and even time-specific heterogeneity that might correlated with the included independent variables. Klevmoarken (1989), Woolridge (2002), Hsia (2003) and others researchers stated that panel data can even enhance the precision of parameter estimates. It also allows to study the temporal effects of the model without any aggregation bias and provide additional informative data. These will lead to a lower collinearity among the variables, increases efficiency and so on (as cited in Akbar, Imdadullah, Ullah, & Aslam, 2011).

Hence, this method was chosen as it able to sort out all the time-invariant that is unobserved and time-varying heterogeneity between the export partner countries and giving unbiased and consistent estimates. We will be able to study the impacts of FTAs on exports by comparing with the partner countries that involved in the same FTAs with Malaysia and partner countries that do not involved in any FTA with Malaysia. Besides that, FTAs takes time to

show its influences on exports of Malaysia. Hence, we need to account the time dimension of FTA into the gravity model.

3.4.2 Panel Unit-Root Test

Panel unit-root test is performed before we estimate our gravity model using the traditional method of panel data analysis.

As cited in Ramirez (2006), researcher like Levin, Lin and Chu (2002), Hadri (1999), Breitung (2000) and Im, Pesaran and Shin (2003) have proved that panel unit-root tests are more effective and persuasive as compare to unit-root tests that applied in individual series. This is because the information from the time series will be boosted by the additional information from the cross-section data. In addition, researcher Baltagi (2001, as cited in Ramirez, 2006) also stated that individual unit root tests would also result in complicated limiting distribution while panel unit root tests would result in normal distribution in limit (Ramirez, 2006).

Apart from testing the stationary of the series, panel unit-root test is also familiar as a tool to determine the cointegrated relationship that potentially happened between the variables in the model. If all variables appear to be absent of unit-root, it means that the variables are stationary which also indicates that the panel regression will not suffer from spurious regression problems. Conversely, it may suffer spurious problem if there

There are various types of panel unit-root test. However, in this study, only two panel unit-root tests will be performed to examine the stationary of the variables. They are the Levin, Lin and Chu (LLC) method and the Augmented Dickey-Fuller (ADF) method.

3.4.2.1 Levin, Lin and Chu (LLC) Test

LLC test is to estimate and test the pooled first-order autoregressive parameter. In other words, LLC test hypotheses that an individual series contains a unit root while alternatively, the series is stationary. Researchers like Maddala and Wu backed the test by stated that Levin, Lin and Chu Test is effective when the cross section is identical with the autoregressive roots (as cited in Bai & Ng, 2010). However, LLC Test also has been criticized for being only valid when there is no cross sectional correlation present and for formulation of hypothesis referring to the identical individuals (Krenz, 2012).

3.4.2.2 Augmented Dickey-Fuller (ADF) - Fisher Chi-square Test

Dickey-Fuller (DF) test also known as tao statistic or tao test. DF is used to test the unit root in the time series data. DF testing technique involves OLS to find the coefficients of the model. The DF test can be estimate through hypothesis testing. Its null hypothesis is the series is non-stationary. Therefore, when the null hypothesis is being rejected, it shows that the series is stationary with zero mean. (Zivot & Wang, 2006).

Furthermore, the model is augmented and known as ADF test. Dickey and Said have augmented the test to accommodate the general Autoregressive-Moving Average Model (ARMA) with unknown orders (Zivot & Wang, 2006). In other words, ADF is augmented by adding the lagged dependent variable into the test model. By doing so, the error term in the model will be serially uncorrelated as enough term has been bought in to the model (Gujarati and Porter, 2009).

However, ADF also come along with some of the problems. Firstly, ADF is weak in distinguish stationary processes that is greatly persistent from non-stationary processes. Furthermore, the power of unit-root test also diminished when additional deterministic terms are including into the test regressions. In short, the test that include an individual intercept and trend effect in the test model will lead to less effective compared to the tests that only included an individual intercept in the test model (Zivot & Wang, 2006).

3.4.2.3 Automatic Lag Length Chosen

The Information Criterion (IC) is one of the common and popular ways to determine the appropriate order of the model in time series analysis. There are many different types of criteria. However, all criteria's objective is similar which is minimizing the residual sum of squares and imposing a penalty for involving an increasingly large number of regressors (lag values). The two famous IC are Akaike Information Criterion (AIC) and Schwarz Information Criteria (SIC).

The AIC is used to estimate and evaluate the suitability of the model. The advantage of AIC is that AIC is efficient for sample data as well as forecast the performance of sample that out of a model. Furthermore, AIC is also used to minimize the error variance to occur during the forecasting (Ayalew, Babu & Rao, 2012).

On the other hands, the advantage of SIC is that SIC is order consistent. The odds of selecting the correct model will converge to unity when the sample size of the observation increases to infinity. As a result, it will lead to the additional parsimonious models. For both AIC and SIC, the lower the value obtained show that the model is better. The

difference between AIC and SIC is that AIC is designed to select model which can predict better and it is less concerned on the model that includes too much parameters which can cause overestimation of true lag length and pick inconsistent correct lag length (Ayalew et al., 2012). Hence, SIC is chosen when the panel unit root test is performed.

3.4.3 Panel Data Model

There are three types of panel data regression models under the traditional method of panel data analysis, which are Pooled Ordinary Least Square Model (POLS), Fixed Effects Model (FEM), and Random Effects Model (REM). In order to select the best model, F-test, Hausman Specification Test and Breusch-Pagan Lagrange Multiplier (BPLM) will be used to determine the best model among the three panel data analysis (Akbar et al., 2011).

3.4.3.1 Pooled Ordinary Least Square (POLS) Model

POLS Model also known as Constant Coefficients Model. Pooled OLS assumed that all coefficients are consistent across time and individuals. The explanatory variables also assume to be non-stochastic which means that the explanatory variables are uncorrelated with the error term (Gujarati & Porter, 2009). However, Pooled OLS do not able to distinguish between the various observation in term of effect and characteristics across period. When there is heterogeneity exist among the observations across periods, the estimated parameter values will eventually become biased, inefficient and even inconsistent.

BPLM test hypotheses that there is no random effect in the model (Gujarati & Porter, 2009). Hence, when the p-value less than

significant level, the null hypothesis is rejected and concluded that model with random effect is better than POLS. Otherwise, do not reject and concluded that POLS model is a better model.

3.4.3.2 Fixed Effect Model (FEM)

FEM allows the constants in the model to be differing among the individuals. Thus, FEM is particularly appropriate to be applied when the individual-specific constant may be correlated with one or more regression. The two ways FEM also refers to Least Square Dummy Variable. (LSDV). However, LSDV Model should be used with caution as the model might lead to some issues. Foremost, LSDV Model should not include too many dummy variables as problem of degree of freedom would rise and there will be lack of enough observations to do a strong statistical analysis. Simultaneously, multicollinearity might also be occurs due to too many dummy variable in the model which might burden the precise estimation of one or more parameters. Furthermore, LSDV may not be able to study the estimation of time-invariant variables. The subject-specific constants would absorb all the heterogeneity that may happen in the dependent and independent variables. Lastly, error term should also be handle with care since heteroscedasticity, autocorrelation and correlation might also be occur in LSDV model (Gujarati & Porter, 2009). However, the panel data analysis that conducted by us is one way FEM as the time period for our data set is too long to conduct a two ways FEM.

Besides, F-test is also used to determine whether POLS or FEM is the best model to be used. Null hypothesis of F-test is that POLS is a

better model compared to FEM. Reject null hypothesis when p-value is less than significant level. Otherwise, do not reject null hypothesis.

3.4.3.3 Random Effects Model (REM)

REM also called error components model (ECM). REM assumed that there is no correlation among the individual error components and also autocorrelation throughout both cross-section and time series units. The advantages of estimating REM is that the numbers of unknown parameter have been reduced as compared to FEM. Besides, the possibility of multicollinearity problem will also be lesser in the model as the number of independent variables has also been reduced. Hausman Test will be performed to find out whether REM or FEM is the appropriate model to be used by testing if the composite error term is correlated with the independent variables.

Null hypothesis of Hausman test is that REM is a better model compared to FEM. Reject null hypothesis when p-value is less than significant level. Otherwise, do not reject null hypothesis.

3.5 Research Design

The data that will be used in this empirical research are quantitative data and qualitative data. The data for both independent and dependent variables are collected from different sources, compiled and edited into Microsoft Office Excel before data analysis. The computer programme that used in this study is Econometric Views (Eviews). EViews is an econometrics software that provide handy but yet powerful statistical, forecasting and modelling tools which also provide statistical and econometric tools needed for cross-sectional, time series as well as panel data

analysis (IHS Global Inc, 2015). Since our model is using panel data analysis, this computer software will be used in this study.

3.6 Data

Initially, this study uses a panel dataset of period 27 years from 1989 to 2015 and 51 countries including Malaysia as home country, partner countries that involved in at least one FTA that is in effect with Malaysia, Malaysia's top 40 export partner which consist 94.49% of Malaysia market share in 1989 and 91.12% of Malaysia market share in 2015. However, 10 countries are eliminated from this study data set due to unavailability of data. They are Myanmar, Cambodia, New Zealand, Iran, Belgium-Luxembourg, Iraq, Yemen, Belgium, Angola and Poland.

Hence, the finalized host countries to be examined in this study are 40 countries which are Australia, Austria, Bangladesh, Brazil, Brunei, Canada, Chile, Switzerland, China, Denmark, Germany, Egypt, France, Spain, United Kingdom, Hong Kong, Greece, India, Italy, Indonesia, Ireland, Kenya, Jordan, Japan, Korea, Laos, Sri Lanka, Mexico, Nigeria, Netherland, Pakistan, Philippines, Saudi Arabia, Sweden, Thailand, Singapore, Turkey, United Stated of America, Vietnam, South Africa.

These 40 partner countries consist 89.32% of Malaysia's export share in 2015. A total of 1080 observations (N=40 and t=26, $N \times t = 40 \times 27$=1080). All variables are expressed in natural logarithms except dummy variables.

Table 3.2: List of Countries

Countries that involved at least one FTA (in effect) with Malaysia	**Top 40 Export partners of Malaysia in 1989 (Export % in total product)**	**Top 40 Export partners of Malaysia in 2015 (Export % in total product)**

Brunei (RFTA)	Singapore (19.75)	Singapore (13.91)
Indonesia (RFTA)	United States (18.69)	China (13.02)
Philippines (RFTA)	Japan (16.08)	Japan (9.46)
Singapore (RFTA)	Korea, Rep. (5.02)	United States (9.45)
Thailand (RFTA)	United Kingdom (3.74)	Thailand (5.7)
Myanmar (RFTA)*	Netherlands (3.57)	Hong Kong, China (4.72)
Cambodia (RFTA)*	Germany (3.56)	India (4.06)
Laos (RFTA)	Hong Kong, China (3.07)	Indonesia (3.73)
Vietnam (RFTA)	Thailand (2.46)	Australia (3.6)
Australia (BFTA, RFTA)	Australia (2.28)	Korea, Rep. (3.23)
New Zealand (BFTA, RFTA)*	China (1.92)	Netherlands (3)
China (RFTA)	Indonesia (1.65)	Germany (2.52)
India (BFTA, RFTA)	France (1.51)	Vietnam (2.23)
Japan (BFTA, RFTA)	India (1.33)	Philippines (1.69)
Republic of Korea (RFTA)	Philippines (1.3)	United Kingdom (1.19)
Bangladesh (RFTA)	Belgium-Luxembourg (1.09)*	Mexico (0.8)
Pakistan (BFTA, RFTA)	Italy (1.01)	France (0.75)
Egypt (RFTA)	Pakistan (0.94)	Pakistan (0.53)
Iran (RFTA)*	Canada (0.75)	New Zealand(0.52)*
Nigeria (RFTA)	Saudi Arabia (0.57)	Bangladesh(0.5)
Turkey (BFTA, RFTA)	Spain (0.47)	Turkey(0.49)
	Egypt, Arab Rep.(0.41)	Belgium (0.48)*
	Turkey (0.35)	Italy(0.47)
	Brunei (0.33)	Saudi Arabia(0.44)
	Sweden (0.29)	Brazil(0.4)
	Iraq (0.22)*	Myanmar(0.39)*
	Brazil (0.22)	Canada(0.39)

	Chile (0.2)	South Africa(0.38)
	Denmark (0.19)	Nigeria(0.35)
	Bangladesh (0.19)	Brunei(0.34)
	Iran, Islamic Rep.(0.18)*	Russian Federation(0.3)
	Jordan (0.18)	Spain(0.3)
	Sri Lanka (0.18)	Egypt, Arab Rep.(0.29)
	New Zealand (0.16) *	Iran, Islamic Rep.(0.25) *
	Yemen (0.15) *	Sri Lanka(0.24)
	Switzerland (0.14)	Angola(0.24)*
	Mexico (0.09)	Switzerland(0.2)
	Austria (0.09)	Poland(0.19)*
	Ireland (0.08)	Sweden(0.19)
	Greece (0.08)	Kenya(0.18)

Notes: * represented the countries that are eliminated from the data set due to unavailability of data.

Source: Asia Regional Integration Center (n.d.) and World Integrated Trade Solution (n.d.)

3.7 Data Collection Methods

The data of Malaysia's bilateral exports to its host countries (*j*) are collected from World Intergrated Trade Solution (WITS). Data of GDP at market price, total population, openness of trade and inflation, GDP deflator are obtained from World development indicator (World Bank). Data of great-circle distance between capital cities and common language of home country and host country are obtained from Centre d'Études Prospectives et d'Informations Internationales (CEPII).

Data of common border of home country and host country is obtained from World Factbook CIA. Lastly, dummy variables such as *BFTA* and *RFTA* are obtained from

Asia Regional Integration Center (ARIC). BFTA is a dummy variable that take a value of 1 when both countries I and j in year t signed Bilateral FTA and in effect, otherwise 0. On the other hand, RFTA is a dummy variable that take a value of 1 when both countries I and j in year t signed Regional FTA and in effect, otherwise 0.

Table 3.3: Source of Data Set

Independent Variable	Description	Data Resources
EXP	Bilateral Export from home country *i* to host countries *j* ('000 current US$)	World Integrated Trade Solution
GDP	GDP at market prices (constant US$ 2010)	World Bank development indicator
POP	Total population	World Bank development indicator
OPN	Openness of Trade (Trade (% of GDP)	World Bank development indicator
INF	Inflation, GDP Deflator (annual %)	World Bank development indicator
DIST	Weighted Great-circle distance between capital cities(km)	Centre d'Études Prospectives et d'Informations Internationales (CEPII)
LANG	Dummy variable which takes a value of 1 when both countries *i* and *j* shared the common official or national languages and languages spoken by at least 20% of the population of the country, otherwise 0	Centre d'Études Prospectives et d'Informations Internationales (CEPII)
BORD	Dummy variable which takes a value of 1 when both countries *i* and *j* shared the common land border, otherwise 0	World Factbook CIA

BFTA	Dummy variable which takes a value of 1 when both countries *i* and *j* in year *t* signed Bilateral FTA and in effect, otherwise 0	Asia Regional Integration Center (ARIC)
RFTA	Dummy variable which takes a value of 1 when both countries *i* and *j* in year *t* signed Regional FTA and in effect, otherwise 0	Asia Regional Integration Center (ARIC)

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

In this chapter, the results are discussed using descriptive analysis and panel data analysis. Descriptive analysis is used to express the characteristics of our data. Panel data analysis is used to investigate the impact of FTAs and other determinants on the Malaysia's exports using gravity model at the same time.

4.1 Descriptive Analysis

Table 4.1: Descriptive Statistics of the Variables Used in Gravity Model

Variables	Obs.	Mean	Std Dev.	Min	Max
$\ln(EXP_{ijt})$	1080	13.2389	2.0401	3.4777	17.3200
$\ln(GDP_{it})$	1080	25.8711	0.4167	25.0413	26.5222
$\ln(GDP_{jt})$	1080	26.5699	1.6962	21.3351	30.4403
$\ln(POP_{it})$	1080	16.9897	0.1615	16.6895	17.2276
$\ln(POP_{jt})$	1080	17.3831	1.6015	12.4282	21.0390
$\ln(OPN_{it})$	1080	5.1603	0.1547	4.8990	5.3955
$\ln(OPN_{jt})$	1080	4.1544	0.6285	2.6666	6.1212
$\ln(INF_{it})$	1080	3.2401	0.1394	2.8382	3.5294
$\ln(INF_{jt})$	1080	3.3321	0.4844	-4.7579	7.9093
$\ln(DIST_{ij})$	1080	8.6557	0.8584	6.2256	9.7202
$BORD_{ij}$	1080	0.075	0.2635	0	1
$LANG_{ij}$	1080	0.1	0.3001	0	1
$BFTA_{ijt}$	1080	0.0278	0.1644	0	1
$RFTA_{ijt}$	1080	0.1981	0.3988	0	1

Table 4.1 presented the summary of descriptive statistics of the variables used in our gravity model. All variables are expressed in natural logarithms formation except for the dummy variables.

This study covers the top 40 export partner countries of Malaysia. Variables were investigated from the respective countries during the period 1989 to 2015 (27 years) with a dependent variable and 13 explanatory variables. Thus, the number of observation for all variable will be 1080 (N=40 and t=26, $N \times t = 40 \times 27=1080$, Malaysia as home country).

Real GDP of Malaysia represents the economy size of the country. For the real GDP of host country, United States has the highest value of real GDP in 2015 which is 30.4403 (in natural log), while Laos has the lowest value which is 21.3351 (in natural log) in 1989. According to our expectation in chapter 3, GDP will positively correspond to trade flow of a country. So, higher GDP indicate that United States has higher trade flow and therefore United States has higher bilateral trade with Malaysia.

For host country, China has the highest value in 2015 while Brunei has the lowest value in 1989. This indicates that China has the largest market size in 2015 and Brunei has the smallest market size in 1989 throughout our data set. From what we expected in chapter 3, larger market size indicate that larger domestic market and richer factor of production. So, large population will tend to achieve self-sufficiency in term of goods and services. Hence, China will have the lower bilateral trade with Malaysia. Meanwhile, the average of host countries' population is higher than Malaysia's population.

For the variable of openness of trade, Hong Kong has the highest value in 2013 while Brazil has the lowest value in 1989. As we proposed in chapter 3, higher openness of trade implies that lower barrier to trade. Since tariff is one of the barriers of trade, lower barrier will lower the tariff to trade which eventually lead to decrease in cost of trade. Thus, Malaysia will incur more bilateral trade with Hong Kong due to higher

openness of trade compared to other country throughout our dataset. The average of Malaysia's openness of trade is higher than the host countries' openness of trade. This indicates that Malaysia has a lower trade barrier compared to host countries.

For the variable of inflation rate, Brazil has the highest value in 1990 while Brunei has the lowest value of inflation in 2009. As we predicted in chapter 3, higher inflation in home country will lower down the bilateral trade with Malaysia. Reason behind is that the inflation would diminish the purchasing power of the country. Thus, the country would have lower purchasing power and causes the import to reduce. Hence, Brazil will import less from Malaysia as the Brazil has to pay more for every purchase of Malaysia's goods and services.

Common border between Malaysia and host countries and common language between Malaysia and host countries are the dummy variable that only have value of 1 as maximum and value of 0 as minimum. According to the Table 4.1, Common border between Malaysia has the mean of 0.075 which indicate that only 7.5% of the country are sharing common border with Malaysia. At the same time, Common language between Malaysia has the mean value of 0.1. This shows that only 10% of all countries in our dataset are having a common language with Malaysia.

BFTA and RFTA are also the dummy variables that only have value of 1 as maximum and value of 0 as minimum. Based on the mean value in Table 4.1, we found out that majority of the host countries does not sign and involve in RFTA and BFTA with Malaysia. For RFTA, there is 19.81% of all countries among our dataset that signed RFTA with Malaysia. Meanwhile, there is only 2.78% countries in our dataset that signed BFTA with Malaysia. Based on our expectation, we suggest that the countries that signed BFTA and RFTA with Malaysia will have higher bilateral export with Malaysia.

4.2 Panel Unit-Root Test

Before estimating the gravity model using panel data analysis, panel unit-root test is applied to investigate the stationary of the data. Non-stationary data can cause spurious regressions. LLC test and ADF-Fisher Chi Square test is performed in this model. LLC and ADF-Fisher Chi Square both use the null hypothesis of unit-root. LLC test assumes that all cross sections are having an identical autoregressive parameter which indicates that it does not allow that some countries in a series contain unit roots while the others do not. It tests on common unit root in a series. While the ADF test allows individual to have different unit root parameter in which it allows some countries in the series contain unit roots while the others do not.

Automatic lag length of selection is based on Schwarz Info Criterion (SIC) for both tests. All variables are tested with natural logarithm. The results of both tests are presented in Table 4.2.

Table 4.2: Results of Panel Unit-Root Test

Variables	**LLC** H_0**:Unit Root**		**ADF-Fisher Chi Square** H_0**:Unit Root**	
Level	**Constant**	**Constant and Trend**	**Constant**	**Constant and Trend**
ln(EXP_{ijt})	(-8.38183)***	(-2.35393)***	(131.045)***	(161.571)***
ln(GDP_{it})	(-12.9079)***	(-6.85318)***	(107.535)**	(145.548)***
ln(GDP_{jt})	(0.33740)	(-1.60669)*	(64.9225)	(108.107)**
ln(POP_{it})	(-5.18469)***	(-30.9549)***	(232.321)***	(407.338)***
ln(POP_{jt})	(-1.94477)*	(0.98546)	(75.5961)**	(100.997)**
ln(OPN_{it})	(2.60865)	(-4.95393)***	(22.6789)	(12.0806)
ln(OPN_{jt})	(-1.14381)	(-0.11481)	(59.6135)	(121.486)**
ln(INF_{it})	(-46.5384)***	(-45.8505)***	(1154.40)***	(1122.61)***
ln(INF_{jt})	(-8.85618)***	(-9.59873)***	(283.760)***	(255.032)***

Note: */**/***Significant at level of 10%/5%/1%.

At level and constants effect, the results for LLC and ADF-Fisher Chi Square test both indicate that all variables are stationary except for the GDP of host countries and degree of openness of Malaysia and host countries. At level with constant and trend effect, LLC test indicates that all variables are stationary except for the population size of host countries and the degree of openness of host countries while ADF-Fisher Chi Square test indicates that only degree of openness of Malaysia is non-stationary. This study uses a rejection of unit root by at least one test at level to conclude that all variables are stationary. Since the variables are stationary according to both tests, it indicated that the panel regression will not suffer from spurious regression problem.

4.3 Panel Data Analysis and Discussions

Panel data analysis is performed to estimate the impact of FTAs on Malaysia's export. The estimations results of are presented in Table 4.3.

Table 4.3: Estimations Results of Gravity Panel Data Model

Variables	**POLS**	**REM, *t, ij***	**FEM, *ij***	**Residual, *t***
Constant	-3.6025	-7.6277	-25.9028	$5.02x10^{-16}$
	(-0.2966)	(-0.9659)	(-3.2674)***	($2.09x10^{-15}$)
ln(GDP_{it})	2.4156	2.3260	2.3024	
	(3.6853)***	(5.7428)***	(5.7256)***	
ln(GDP_{jt})	0.9799	1.0579	1.0207	
	(35.9579)***	(11.9270)***	(7.4096)***	
ln(POP_{it})	-4.2275	-3.8571	-4.4831	
	(-2.5009)**	(-3.6547)***	(-4.1973)***	
ln(POP_{jt})	0.1683	0.1306	1.3060	
	(5.3459)***	(1.2447)	(3.6742)***	
ln(OPN_{it})	0.5954	0.5800	0.6048	
	(2.9624)***	(4.6200)***	(4.8258)***	

ln(OPN_{jt})	0.8052	0.5018	0.5923	
	(10.9072)***	(4.5362)***	(4.8898)***	
ln(INF_{it})	0.2525	0.2057	0.1884	
	(1.1255)	(1.4757)	(1.3598)	
ln(INF_{jt})	-0.2773	-0.1141	-0.0971	
	(-4.1482)***	(-2.4945)**	(-2.1240)**	
ln($DIST_{ij}$)	-1.0615	-1.1153		-5.70×10^{-17}
	(-16.0082)***	(-4.8542)***		(-2.12×10^{-15})
$BORD_{ij}$	0.1834	-0.0503		-7.11×10^{-17}
	(1.3246)	(-0.0869)		(-9.15×10^{-16})
$LANG_{ij}$	0.6535	0.7926		1.88×10^{-16}
	(5.1370)***	(1.4791)		(2.74×10^{-15})
$BFTA_{ijt}$	0.8776	0.0366	0.0210	
	(4.5744)***	(0.2708)	(0.1557)	
$RFTA_{ijt}$	-0.0838	0.2887	0.2654	
	(-0.7599)	(3.4678)***	(3.0943)***	
N	1080	1080	1080	1080
R^2	0.7775	0.6613	0.9193	0.0167
Adjusted R^2	0.7748	0.6571	0.9155	-0.0105
F-test			80.3532	
			(0.0000)***	
BPLM test	4881.348			
	(0.0000)***			
Hausman		17.3504		
		(0.0081)***		

Notes: */**/***Significant at level of 10%/5%/1%. The values in parentheses are t-statistics.

Instead of using cross-sectional data analysis which applied by Anderson and Van Wincoop in 2003, a panel data analysis is performed to differentiate the specific effects across nations and capture the integration effect's characteristics of export

over time. Three techniques of panel data analysis that performed are POLS, FEM and REM.

The second column in Table 4.3 is the estimations results of POLS, third column showed the estimations results of REM and fourth column indicated the estimations results of FEM. In order to select which model is the best fitted model to investigate the impacts of FTAs on Malaysia's export, three tests was performed which are BPLM test, restricted F-test and Hausman test.

Firstly, the null hypothesis of BPLM test was rejected at the significance level of 1% since the p-value is less than 0.01. This indicated that REM is a better model compared to POLS. Secondly, the null hypothesis of restricted F-test was rejected at the significance level of 1 % since the p-value is less than 0.01. This showed that FEM is a better model to explain this gravity model compare to POLS in which model with individual effects is a more efficient model compare to POLS. Lastly, Hausman test was performed to compare between REM and FEM. Null hypothesis of REM is a better model compared to FEM is rejected at significance level of 1% since p-value is smaller than 0.01. In conclusion, the FEM is a better model to explain the impact of FTAs on Malaysia's export using the gravity equation. Hence, FEM will be used to interpret the coefficients of the estimations.

From the Table 4.3, FEM seems to be good with high R^2 of 91.93% and adjusted R^2 of 91.55%. Most of the estimators are highly significant and fits with the expected sign. This indicates that this gravity model is suitable for explaining the impacts of FTAs and other determinants on Malaysia's export when there is fixed effect across the countries. Since FEM is selected as the best model for the panel data analysis, a second stage regression using the residual was performed in the fifth column of Table 4.3. This is because FEM approach is unable to investigate the effects of the time-invariant variables on bilateral export of Malaysia due to inherent transformation combs out such variables. Firstly, the subject-specific intercepts will absorb all the heterogeneity that may occur in the dependent and independent variables. To put this

differently, a second stage regression was performed with considering the residual of FEM as the dependent variable whereas the time-invariant variables as independent variables. The estimated equation of the second stage regression is specified as below:

$$Residual = \gamma_0 - \gamma_1 logDIST_{ij} + \gamma_2 BORD_{ij} + \gamma_3 LANG_{ij} + \mu_{ij} \quad (7)$$

Table 4.4: Summary of Findings

Variables	Significant	Expected Sign	Estimated Sign	Decision
$ln(GDP_{it})$	***	+	+	Consistent
$ln(GDP_{jt})$	***	+	+	Consistent
$ln(POP_{it})$	***	+	-	Inconsistent
$ln(POP_{jt})$	***	+	+	Consistent
$ln(OPN_{it})$	***	+	+	Consistent
$ln(OPN_{jt})$	***	+	+	Consistent
$ln(INF_{it})$		+	+	Consistent
$ln(INF_{jt})$	**	-	-	Consistent
$ln(DIST_{ij})$		-	-	Consistent
$BORD_{ij}$		+	-	Inconsistent
$LANG_{ij}$		+	+	Consistent
$BFTA_{ijt}$		+	+	Consistent
$RFTA_{ijt}$	***	+	+	Consistent

Based on our estimation results, we found out that the bilateral exports of Malaysia will decrease by 25.9028 percent point by holding other variables constants.

According to our estimation result, one of our important independent variable which is regional FTA showed to be highly significant to increase Malaysia's bilateral export at 1% significance level. It is also found to be consistent with the previous studies empirical result. According to Zhu (2013), regional FTA refers to multilateral

agreement that commonly signed by countries among a region. Our result indicates that the regional FTA could enhance the intraregional trade between both countries and creates more international trade opportunities. When there is a Regional FTA signed and in effect between Malaysia and host countries j, the bilateral export from Malaysia to host countries j will increase 0.2654 percent point ceteris paribus. Otherwise, it will decrease 0.2654 percent point ceteris paribus. In other words, regional FTA does bring a significant impact on Malaysia's bilateral trade. Thus, regional FTA is encouraged in the trade policies of Malaysia.

However, Bilateral FTA showed to be insignificant in affecting Malaysia's bilateral export which implies that bilateral FTA that involved by Malaysia did not cause the trade diversion but rather trade creation. When there is a Bilateral FTA signed and in effect involved by Malaysia and host countries *j* at the same time, the bilateral export from Malaysia to host countries *j* will increase 0.0210 percent point ceteris paribus. Otherwise, it will decrease 0.0210 percent point ceteris paribus. We can observe that it does not bring much impact on Malaysia's bilateral export. This may cause by the characteristic of the host countries that signed bilateral trade with Malaysia.

The estimated sign for the coefficient of bilateral FTAs is fitted with our expected sign that developed in Chapter 3. According to Zhu, 2013, bilateral FTA refers to the FTAs that only involve two parties, where each party could be a country, a trade block or even an informal group of countries. From our result, it shows that the bilateral FTA will enhance the volume of export due to the removal of trade barriers. Bilateral FTA enables Malaysia to obtain opportunities to gain from the differences in comparative advantage although it is insignificant.

Furthermore, the estimated coefficient of Malaysia's GDP is 2.3024. In other words, an increase of 1 percent point in Malaysia's GDP will lead to an increase of 2.3024 percent point in Malaysia's bilateral export to host countries *j,* ceteris paribus. Whereas, the coefficient of host countries GDP is estimated to be 1.0207 which means that, ceteris paribus, an increase of 1 percent point in host countries GDP will

lead to an increase of 1.0207 percent point in Malaysia's bilateral export to host countries. The estimated sign for both coefficients are fitted with our expected sign and they are both significant in affect the export of Malaysia. Yang and Martinez-Zarzoso (2014) stated that GDP can be denotes as the consumption level of a country in the gravity model while Tinbergen (1962) denotes GDP as the production and the demand level of the observed country. Bhagwati (1988) also mentioned that increased in GDP is commonly corresponded by an expansion of trade. The reason behind is because when a country produces more products, their exporting capacity will also be increased as well (Ramos, 2001).

From our result, we concluded that when the economic size of Malaysia is bigger, the production level of Malaysia is higher, thus the exports of Malaysia also higher. There is a positive relationship between them. On the other hands, when the economic size of the host countries of Malaysia is big, it indicates a higher consumption level and thus Malaysia's export will increase relatively. We concluded that GDP of Malaysia and its host countries positively and significantly affect the export of Malaysia using gravity model. From our descriptive analysis, we found out that United States have the highest value of GDP among Malaysia's 40 host countries. Hence, we suggest that when United States withdraws from TPP, it may have a significant impact on Malaysia's bilateral trade flow.

Besides that, we found that the estimated sign for the coefficient of population of Malaysia does not fit with our expected sign while population of host countries fitted. Both of them are significantly affecting the export of Malaysia. The result shows a negative sign for the coefficient of Malaysia population. By holding other variables constant, a rise of 1 percent point in Malaysia's population size will lead to a decrease of 4.4831 percent point in Malaysia's bilateral export to host countries *j*.

This may be caused by the internal exchange has replace external trade in a country with large population. As stated by Gylfason (1998), a country with larger population is more likely to have a lower export because an increasing in domestic market tends

to replaces exports. Furthermore, Oguledo and Macphee (1994) suggested that a large population may suggest that large resource endowment, self-sufficiency and therefore less reliance on international trade While reseacher like Linnemann (1966), Sapir (1981) and Bikker (1987) also stated that majority of the general equilibrium studies also discover that the population sizes of the exporting countries are having a negative and statistically significant effect on trade flows (as cited in Rahman, 2007).

This indicates that the large population of Malaysia is more likely to increase their internal exchange and lead to a reduction in external trade. While the result of host countries' population fits with Brada and Mendez's study in 1995. The larger population size of the host countries will boost the competitive between Malaysia products with their domestic products. It will leads to international specializations at the same which boost the export of Malaysia.

Whereas, the coefficient of population size of host countries *j* is estimated to be 1.3060 which indicates that a rise of 1 percent point in population size of host countries *j* will lead to an increase of 1.3060 percent point in Malaysia's bilateral export. It consistent with Brada and Mendez's study (1995, as cited in Yang & Martinez-Zarzoso, 2014) which explained that larger importer's population allows imported products to rival with domestic products. It also indicates that economies of scale and encourages the international specializations. Hence, when the population size of host countries is larger, it will likely to increase the rivalry of Malaysia goods with its domestic products.

From our descriptive analysis, it indicates that China has the largest population size among Malaysia's host countries. We suggest that population size of China will like bring a significant positive impact on Malaysia's export. Besides that, along with the regional FTA positive impact, the RCEP which included China may have a positive impact on Malaysia's export after signed and in effect.

The openness of trade indicates how open the country toward trade. According to Elshehawy et al. (2014), the more open the country towards trade, the more the trade activity will be happened in that country. A higher degree of openness mostly implies a lower barrier to trade and thus, higher trade flow between the home country and host countries. High openness of trade also increases the openness of the political and economic environment which cause greater the ease of accessing into the world market (Kruegar, 1974; Bhagwati, 1991; Isham & Kaufmann, 1999; Rene & Mollick, 2012, as cite in Chou, Chen & Mai, 2015).

The estimated coefficient of Malaysia's trade of openness is 0.6048 which suggesting that an increase of 1 percent point in Malaysia's trade of openness will lead to an significant increase of 0.6048 percent point in Malaysia's bilateral export to host countries *j*, ceteris paribus. Whereas, the estimated coefficient of host countries' trade of openness is 0.5923 which suggesting that, holding other variables constant, a 1 percent point rise in host countries' trade of openness will lead to an significant increase of 0.5923 percent point in Malaysia's bilateral export to host countries. Based on our descriptive analysis, Hong Kong has the highest degree of openness of trade among the host countries of Malaysia. Hence, there is a lower barrier between Malaysia and Hong Kong which encourage export between them.

Furthermore, the estimated sign for the coefficient of inflation of Malaysia and its host countries are fitted with our expected sign. However, we found out the inflation of Malaysia is not significant in affect the Malaysia's export but host countries is significant at 5% significance level. The estimated coefficient of Malaysia's inflation is 0.1884 which suggesting that 1 percent point rise in Malaysia's inflation will increase 0.1884 percent point in Malaysia's bilateral export to host countries *j*. Whereas, the estimated coefficient of host countries' inflation is -0.0971 which indicates that 1 percent point increases in host countries' inflation will decrease 0.0971 percent point in Malaysia's bilateral export to host countries, ceteris paribus.

McConnell and Brue (2008, as cited in Semuel & Nurina, 2015) stated that inflation defined as the rising level of prices of goods and service in an economy over a period of time. From our result, we found that when the inflation of Malaysia is high, it will cause export goods to sell cheaper in the international markets and lead to an increase in exports. However, inflation of Malaysia is not significant in increasing Malaysia's export may due to the fact that inflation will also increase cost of production which will eventually cause the manufacturer and exporter to reduce their production of goods and services (Enu, Attah-Obeng & Hagan, 2013). On the other hands, when the inflation is high, it will reduce the purchasing power which thus lead to the reduction of the purchase of importing country and cause a reduction in export of exporting country. We concluded that inflation of Malaysia have a positive but insignificant effect on Malaysia's exports but the host countries have a negative and significant effect on Malaysia's exports using gravity model.

Next, we found that the estimated sign for the coefficient of distance is fitted with our expected sign but it is totally insignificant in affecting Malaysia's export. The estimated coefficient of distance between Malaysia and host countries is -5.70×10^{-17} which indicates that 1 percent point increases in distance (km) between Malaysia and host countries *j* will decrease 5.70×10^{-17} percent point of Malaysia's bilateral export to host countries, ceteris paribus. According to Rahman (2004), cost of transportation is an important force of trade and transport cost is mostly proxy by the distance between two countries. Our result indicate that when the farer the distance, the higher the transportation cost and hence reduce the trade flow between both countries. However, the impact is insignificant.

With the advance of technology of transportation and advance development of logistics, distance may no more a significant issue in international trade nowadays. Moreover, homogeneous products are usually more standardized and competition from rivals which near to destination market is intense than the more unique differentiated products. When the homogeneous products entered the market, the manufacturers of the homogeneous products are more likely to export in large

quantity. Therefore, the distance would be insignificantly influencing the amount of export (Jienwatcharamongkhol, 2014). Thus, we concluded that distance negatively but insignificantly affect Malaysia's exports using gravity model. However, most of our bilateral trade partner having a long distance with Malaysia such as Chile which has the longest distance among the 40 partner countries can be a reason that the impact of bilateral trade is insignificant.

Furthermore, the estimated sign for the coefficient of common border do not fit with our expected sign. The result shows a negative sign for common border instead of positive sign as our prior expectation. Countries that sharing the same border are potentially have the homogeneous product such as rice from Thailand and Malaysia. Hence, the countries would prefer importing goods and services from the country which do not produce homogeneous goods with domestic market. However, the impact of the common border is insignificant. Walsh's study in 2006 even stated that the presence of a common border between the trading countries has little significance to all categories of service exports, except for transport services (as cited in Covaci & Moldovan, 2015).

Common border is said to be insignificantly affect trade because common border would have greater impact on service trade instead of goods trade.
So, the coefficient for common border is smaller than it should as it does not capture the coefficient of the service trade (Kimura & Lee, 2006). When there is a common border between Malaysia and host countries *j*, the bilateral export from Malaysia to host countries will fall 7.11×10^{-17} percent point holding other variables constant.

Besides, if there is a common language between Malaysia and host countries *j*, the bilateral export from Malaysia to host countries will increase 1.88×10^{-16} percent point ceteris paribus. The estimated sign for coefficient of common language is fitted with our expected sign but it is insignificant in affecting Malaysia's export. From our result, we are able to see that a common language used in both countries will simplified the process of trade and lower the barrier of trade, common preferences

and information also able to be generated by capturing common cultural traits and thus enhanced trade between both countries. According to Egger and Lassmann (2015), a different language use in both countries will lead to a higher informational friction and cause a reduction in bilateral trade. However, common language is not actually insignificant on goods trade (Kimura & Lee, 2006). It might be important for service trade but not on goods trade and hence a common language is insignificant in trade in aggregate level. Thus, we concluded that a common language positively but insignificantly affect Malaysia's exports using gravity model.

Overall, our results suggest that partner countries which have a larger population size, higher GDP, higher openness of trade and higher inflation rate which implies higher purchasing power which bring a better positive impacts to sign regional trade agreement with them. With the benefits under the agreement such as tariff reduction, product demand from foreign country which has high population size surely will bring a huge benefit to Malaysia's exportation. On the other hand, distance, border and common language that showed insignificant effect on Malaysia's bilateral trade should not be focus. Same applied to the bilateral FTA.

4.4 Conclusion

In this chapter, the effect of the FTA and other determinants on Malaysia's exports was estimated by both Panel Unit-Root Test and Panel Data Analysis. These estimations have been applied to investigate the Malaysia's exports with 40 trading partner countries from the year 1989 to 2013. This discussion will be further concluded in Chapter 5.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

In this chapter, the major finding for the effect of the FTAs and other determinants of trade using Gravity Model and panel data analysis will be discussed. In additional, the implications and limitation arises in the research will be pointed and the recommendations will be provided for future research.

5.1 Summary

According to WTO, Malaysia has first involve in trade liberalization by joining GATT (which later replaced by WTO in 1995) in 24th October 1957. Since then, Malaysia has become actively involved in numbers of bilateral and regional FTA mechanism. By year 2012, Malaysia has signed and involved in 22 FTAs. Thus, dilemma will occur when Malaysia participates in so many FTAs without having sufficient evidence on the impact of FTAs on Malaysia economy. Meanwhile, individuals will question if FTAs really helping to enhance Malaysia's trade flow or jeopardize it. So, the objective for our studies is to examine the effects of signing the bilateral FTAs or the regional FTAs on the bilateral trade flow between Malaysia with its host countries using Gravity Model and Panel data analysis.

By using Gravity model, we will able to study on how the determinants of trade would affects the export of Malaysia along with the impacts of FTA simultaneously. According to our literature research, majority of the researcher have used gravity model as their empirical approaches to study the importance of FTA. This is because gravity model has proved to be one of the most outstanding empirical models in

observing the variation economic interaction between both trade and determinants impact.

According to Anderson in 2010, the traditional gravity model was developed on analogy with Newton's Law of Gravitation which was developed in 1687. The traditional gravity model was used to explain the gravitational force between two masses in relation to the distance that lies between these two mass (1687, as cited in Starck, 2012). The traditional model is as follows:

$$F_{ij} = G\frac{M_i M_j}{d_{ij}^2} \tag{8}$$

In 1962, Tinbergen first introduced a completely simplified formation of the gravity model that practiced in the international trade. Tinbergen amended the traditional model whereas X_{ij} is expressed as the volume of export from country *i* to *j*, economic masses, Y_i and Y_j are described by each nation's GDP. Simultaneously, distance D_{ij} represents the geographical distance between the two nation's capital cities (Head, 2003, as cited in Starck, 2012). Tinbergen gravity model is as follows:

$$X_{ij} = A\frac{Y_i Y_j}{D_{ij}} \tag{9}$$

Then, ordinary least squares (OLS) regression analysis is performed to estimate gravity model. Therefore, natural logarithms and an error term (μ_{ij}) is added into the Tinbergen gravity model. By doing so, linear relationship would be obtained which allows interpretation of coefficient as elasticity. The linear-log equation is stated as below:

$$logX_{ij} = logA + \beta_1 Y_i + \beta_2 Y_j + \beta_3 D_{ij} + \mu_{ij}$$

(10)

After examines other factors that will influence the bilateral export flow, controlling variable like Gross Domestic product (GDP) of export and import countries, Total Population (POP) of export and import countries, Openness of trade (OPN) of export and import countries, Inflation (INF), Weighted great-circle distance between capital cities of Malaysia and host countries (DIST) are added into the equation. Meanwhile, dummy variable like Common border of Malaysia and host countries (BORD), Common language of Malaysia and host country (LANG), Bilateral Free Trade Agreement (BFTA) and Regional Free Trade Agreement (RFTA) are added into the equation as well. The Modified linear-log gravity model of our study can be specified as below after adding the time dimension.

$$\begin{aligned}\log EXP_{ijt} = \alpha &+ \beta_1 \log GDP_{it} + \beta_2 \log GDP_{jt} + \beta_3 \log POP_{it} + \beta_4 \log POP_{jt} \\ &+ \beta_5 \log OPN_{it} + \beta_6 \log OPN_{jt} + \beta_7 \log INF_{it} + \beta_8 \log INF_{jt} \\ &+ \beta_9 \log DIST_{ij} + \beta_{10} BORD_{ij} + \beta_{11} LANG_{ij} + \beta_{12} BFTA_{ijt} \\ &+ \beta_{13} RFTA_{ijt} + \mu_{ij}\end{aligned}$$

(11)

Furthermore, we have developed the expected sign based on the literature that we studies. The expected sign of our variables are as followed:

Table 5.1: Independent Variables and Expected Sign Included in the Gravity Model

	Variables	Description	Expected Sign
Home Country (Malaysia)	**ln(GDP_{it})**	GDP at market prices (constant US$ 2010) of Malaysia in logarithms formation	+
	ln(POP_{it})	Total population of Malaysia in logarithms formation	+

	ln(OPN_{it})	Openness of Trade(Trade (% of GDP) of Malaysia in logarithms formation	+
	ln(INF_{it})	Inflation, GDP Deflator (annual %) of Malaysia in logarithms formation	+
Host Countries	**ln(GDP_{jt})**	GDP at market prices (constant US$ 2010) of host countries in logarithms formation	+
	ln(POP_{jt})	Total population of host countries in logarithms formation	+
	ln(OPN_{jt})	Openness of Trade(Trade (% of GDP) of host countries in logarithms formation	+
	ln(INF_{jt})	Inflation, GDP Deflator (annual %) of Host Countries in logarithms formation	-
Home and Host Countries	**ln($DIST_{ij}$)**	Weighted Great-circle distance between capital cities(km) of Malaysia in logarithms formation	-
	$BORD_{ij}$	Common border of Malaysia and host country	+
	$LANG_{ij}$	Common language of Malaysia and host country	+
	$BFTA_{ijt}$	Dummy variable that take a value of 1 when both countries *i* and *j* in year *t* signed Bilateral FTA and in effect, otherwise 0	+
	$RFTA_{ijt}$	Dummy variable that take a value of 1 when both countries *i* and *j* in year *t* signed Regional FTA and in effect, otherwise 0	+

Our study has included 40 countries in our panel dataset throughout 27 years from 1989 to 2015. The countries is selected based on the partner countries that involved in at least one FTA that is in effect with Malaysia and Malaysia's top 40 export partner in 2015 and 10 countries are dropped due to unavailability of data. There is a total of 1080 observations (N=40 and t=26, $N \times t = 40 \times 27 = 1080$).

After that, we used panel data analysis and estimate the effects of FTAs on the Malaysia's export in Gravity Model. We have chosen panel data analysis because panel data analysis was able to sort out all the time-invariant that is unobserved and time-varying heterogeneity between the export partner countries and giving unbiased and consistent estimates. Besides, FTAs also takes time to show its influences on export of Malaysia. Hence, we need to account the time dimension of FTA into the gravity model.

Panel unit-root test is applied to investigate the stationary of the data before using panel data analysis to estimate the gravity model The test results indicate that all our variables are stationary and the panel regression will not suffer from spurious regression problem. Therefore, we proceed to the panel data analysis. In order to select the best fitted model among the three panel data analysis, F-test, Hausman Specification Test and BPLM test will be carried out to select the best model (Akbar et al., 2011). As a result, FEM is found to be the better model to explain the impact of FTAs on Malaysia's export using the gravity equation. Hence, FEM is used to interpret the coefficients of our estimations.

It also indicates that gravity model is suitable for explaining the impacts of FTAs and other determinants on Malaysia's export when there is fixed effect across the countries. However, a second stage regression using the residual was performed due to the fact that FEM approach is unable to investigate the effects of time-invariant variables on bilateral export of Malaysia as the inherent transformation combs out such variables.

As for the summary of our findings, we found that most of our variables are consistent with our expected sign except for the coefficient of population of Malaysia and the coefficient of common border. Population of Malaysia is found to be negatively affected Malaysia bilateral export instead of positively affect Malaysia bilateral export. The reason behind might due to increase in Malaysia population will

lead to an increased in their internal exchange and eventually causes a reduction in external trade as Malaysia will less reliance on international trade.

As for common border, countries that sharing the same border are potentially have the homogeneous product such as rice from Thailand and Malaysia. So, the existence of common border might bring negative impact on Malaysia bilateral export. However, we also found out that the Bilateral Free Trade Agreement (BFTA) that involved by Malaysia, inflation of Malaysia and all the time invariant variables are insignificantly affecting Malaysia bilateral export. Which means that BFTA that involved by Malaysia are bringing insignificant positive impact on Malaysia bilateral export while Regional Free Trade Agreement (RFTA) are bringing positive and significant impact on Malaysia bilateral export instead.

5.2 Implications of the Study

Based on our result from major finding, we found that Bilateral FTAs showed a positive but insignificant effect on Malaysia's bilateral trade. This indicates that bilateral FTA does not bring much impact on Malaysia's bilateral trade. Meanwhile, we found that Regional FTA showed a positive and significant effect on Malaysia's bilateral trade. This indicates that regional FTA does bring a huge increase in Malaysia's bilateral trade. In other word, regional FTA is helping to enhance Malaysia's trade performance.

Furthermore, Malaysia can enjoy the benefits by signing regional trade agreement with partner countries. Based on our study, we found that population size and GDP of host countries give a positive and significant effect on Malaysia's bilateral trade. This indicates that larger population size implies larger market size and higher GDP means of better economic performance while helps to increase export of Malaysia. Besides that, inflation of host countries showed a negative and significant impact which

indicates that host countries with a high inflation rate will be likely to reduce their import from Malaysia as their purchasing power reduce.

Therefore, Malaysia can target partner countries which have a larger population size, higher GDP and lower inflation rate to sign regional trade agreement with them. For example, the RCEP now in the phase of negotiations should be focus by Malaysia as China has the largest population size and the second higher GDP after United States. However, the relatively high inflation rate of China should also be a concern for Malaysia.

On the other hand, distance, border and common language showed an insignificant effect on Malaysia's bilateral trade. Besides, our result showed that trade openness in Malaysia and host countries give a positive and significant effect on Malaysia's bilateral trade. This indicates that both Malaysia and host countries reduced the barriers of trade in order to perform trade easily and also to increase the bilateral trade. This also indicates that trade liberalization is a significant determinants on the exports of Malaysia.

Moreover, when the population size of Malaysia increase, its exports will decrease due to expansion of domestic market and domestic demand. In addition, the inflation of Malaysia is having insignificant impact on Malaysia export.

Besides, our study have included all the countries that involve in at least one FTA with Malaysia, top 40 export partners of Malaysia in 1989 and top 40 export partners of Malaysia in 2015 and summarize them in a table form. Malaysia signed quite a number of FTAs and the year of signing each FTAs and the year when each of the FTAs are in effect are different. Therefore, in our study, the year of signing and the years when the FTAs have in effect have been included in order to have a precise result. We collected them from Asia Regional Integration Center (ARIC) and Ministry of International Trade and Industry (MITI) Malaysia. However, it is not a

simple task in collecting all these data one by one, thus, this provide a great contribution towards future researches in collecting these data.

Other than that, our study also provides an empirical guideline to academic researchers in Malaysia context. Also, variables which included in our gravity model bring an important implication for the assessment and evaluation of variables on Malaysia's bilateral trade.

Lastly, MITI's objective is to expand Malaysia economy through international trade and achieve the vision 2020 to be achieved by involving different trade policy and FTAs. Thus, our research paper will act as a reference for policy makers that want to attain a greater trade creation of benefits with the formation of new FTA, while minimize the possibility of trade diversion and other negative impact that bring by FTAs.

5.3 Limitation of the Study and Recommendations for Future Research

This study investigates the effect of the FTA on Malaysia's trade with its trading partner by using Gravity model and panel data analysis. Although the research has attained its research objective, but there were still some inevitable limitation. First of all, this research was reliance on both bilateral FTAs and regional FTAs, while it merely conducted the overall impart of BTA and RTA on Malaysia's trade flow. In fact, the individual impact of every FTA is hard to differentiate. In order to capture the critical effect of each FTA, future research may investigate more complex relationships between trade flow and each FTA.

Secondly, this research has identified the FTA have brought influences on Malaysia's trade flow. However, it does not show the result of FTA's influence to the specified

components of commodities and industries. Consequently, future research may consider to estimate the FTAs effect on different commodities and industries, as well as how the FTA was used. Hence, they may able to find out which commodities and industries should be more focus during the signing of FTAs.

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