THE IMPACT OF BILATERAL TRADE AND FOREIGN DIRECT INVESTMENT ON MALAYSIA'S ECONOMIC GROWTH: THE ROLE OF SINGAPORE

BY

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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 member in completing the research project.

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11MP	11th Malaysia Plan
ADF	Augmented Dicker-Fuller
AIC	Akaike Information Criterion
ARCH	Autoregressive Conditional Heteroscedasticity
ARDL	Autoregressive Distributed Lag
ASEAN	Association of Southeast Asian Nations
BG	Breusch Godfrey
BLUE	Best Linear Unbiased Estimators
BNM	Bank Negara Malaysia
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum of Squares
DF-GLS	Dicker-Fuller GLS
DIA	Direct Investment Abroad
DOS	Singapore Department of Statistics
DOSM	Department of Statistics Malaysia
E&E	Electrical and Electronic
ECM	Error Correction Term
EPU	Economic Planning Unit
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GLS	Generalized Least Square
GM-CCE	Group Mean Common Correlated Effect
GM-DOLS	Group Mean Dynamic Ordinary Least Square
GMM	Generalized Method of Moments
GST	Goods and Services Tax
IFDI	Inward Direct Investment

In	Natural logarithm
JB	Jarque-Bera
LSDV	Least Squares Dummy Variable
MAS	Monetary Authority of Singapore
MITI	Ministry of International Trade and Industry
MNCs	Multinational Corporations
MoF	Ministry of Finance Ministry
NEM	New Economic Model
OEC	Observatory of Economic Complexity
OFDI	Outward Foreign Direct Investment
OLS	Ordinary Least Square Method
PP	Phillips-Perron
RM	Ringgit Malaysia
RMSM	Revised Minimum Standard Model
RMSM-X	Revised Minimum Standard Model -Extended
RTS	Rapid Transit System
S$	Singapore Dollar
SC	Schwarz Criterion
SMEs	Small and Medium Enterprises
US	United States
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
VIF	Variance Inflation Factor
WBG	World Bank Group
WD-DOLS	Within Dimension Dynamic Ordinary Least Square
WEF	World Economic Forum
WTO	World Trade Organization

PREFACE

Nowadays, global trade and investment liberalization is a powerful tools for countries to promote economic growth. However, this may also cause a country to have a high degree of exposure towards external uncertainty. Malaysia is encouraging open economy to increase productivity output and promote innovation which can drive Malaysia's economic growth and upgrade to become a high-income country. Hence, this research is conducted to investigate the impact on Malaysia's economic growth when Malaysia has bilateral trade and investment with Singapore.

Singapore is chosen as the study target because the economy of Singapore is highly interdependent with Malaysia's economy. Moreover, Singapore, which is located near to Malaysia has the bilateral trade and investment relationships with Malaysia since the year of 1965s. Singapore is also the top trading and investment partner of Malaysia in ASEAN region.

This research will investigate the existence of relationship between Malaysia exports to Singapore, Malaysia imports from Singapore, Malaysia inward foreign direct investment by Singapore, Malaysia outward foreign direct investment in Singapore and Malaysia's economic growth. The results of this research can provide insight to the Malaysian Government policy makers and domestic firms in their strategic decision when they are having export, import, inward and outward foreign direct investment activities with Singapore.

ABSTRACT

Open economy is essential for a sustainable economic growth in a country. In recent years, Malaysia is actively promoting economic integration to improve innovation and productivity outputs to become a high-income nation. Singapore is the top ASEAN trading and investment partner of Malaysia and both countries have bilateral ties with each other since 1965s. This research study analyzes the impact of Malaysia bilateral trade and investment with Singapore on Malaysia's economic growth from 2008 to 2016. Vector error correction model (VECM) estimation reveals that Malaysia exports to Singapore and Malaysia outward foreign direct investment in Singapore have significant relationship with Malaysia's economic growth. On the other hand, Malaysia imports from Singapore and Malaysia inward foreign direct investment by Singapore have insignificant relationship with Malaysia's economic growth. The results also show that Malaysia exports to Singapore is significantly positive towards Malaysia's economic growth and Malaysia outward foreign direct investment in Singapore is significantly negative towards Malaysia's economic growth. This concludes that only Malaysia exports to Singapore can help to increase Malaysia's economic growth.

Keywords: Exports, imports, inward foreign direct investment, outward foreign direct investment, gross domestic product.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

Association of Southeast Asian Nations (ASEAN) was the third largest economy in Asia and the sixth largest economy in the world in 2016 (MITI, 2017). The improving productivity and growth across ASEAN are due to global flows in trade and services as well as investment. Foreign direct investment (FDI) relationship is formed as a result of a firm holds minimum ten percent of the ordinary shares in another firms in another countries and its purpose mainly is to complete major trade deals and seek to improve competitiveness in trade-related areas. There is also an increasing trend in intra-ASEAN trade and investment as a result of the rise of the consuming class in ASEAN member state and the huge population mobility to cities for better jobs (ASEAN, 2016). Intra-ASEAN trade means the ASEAN member countries such as Malaysia, Singapore, Philippines, Thailand, Indonesia, Vietnam, Myanmar, Cambodia, Laos and Brunei can trade and make FDI to each other at low tariff and barriers. Intra-ASEAN trade constituted 24 percent of total trade and remained as the largest market for ASEAN in 2016 (MITI, 2017).

The bilateral ties between Malaysia and Singapore was formed since 1965 after Singapore leaved the Federation of Malaysia as the economies of both countries are highly interdependent (Kok, 2013). Singapore has been the largest ASEAN trading partner of Malaysia (Hays,2015). According to observatory of economic complexity (OEC) (2016), Malaysia trades electrical and electronic (E&E) components, machinery and equipment, and chemical products with Singapore in which these three catalytic subsectors have been identified to drive the growth of manufacturing sectors under the 11th Malaysia Plan (11MP) because the

manufacturing sector contributes significantly to Malaysia's economy (Chin, 2017).

In addition, according to The Ministry of Finance Ministry (MoF), Malaysia's outward foreign direct investment (OFDI) was channelled primarily to the financial service sectors and the top investment destination was Singapore (Malaysia's overseas investments reach RM908 billion, 2017). The bilateral ties between Malaysia and Singapore are getting strengthened through joint venture development projects between Khazanah Nasional Bhd and Temasek Holdings (Private) Ltd. Khazanah is the strategic investment fund of the Malaysian government which holds and manages the commercial assets of government while Temasek is an investment company based in Singapore. The joint venture development projects include the establishment of rapid transit system (RTS), Marina One and DUO joint development in property and commercial market as well as the Iskandar Malaysia. The mutually beneficial cooperation between Malaysia and Singapore is due to the two countries' strong and longstanding bilateral relationship (Lum, 2018).

In conclusion, the development of various infrastructure projects and the bilateral trade and investment symbolises the close relations between Malaysia and Singapore. This relationship has become valuable after years of close ties and collaboration (Bilateral relations between Singapore and Malaysia at its peak: Rahman Dahlan, 2017). This research aims to examine the effect of Malaysia exports to Singapore, Malaysia imports from Singapore, Malaysia inward foreign direct investment by Singapore and Malaysia outward foreign direct investment in Singapore on the Malaysia's economic growth.

1.1 Research Background

The topic of this research is 'The impact of bilateral trade and foreign direct investment on Malaysia's economic growth: The Role of Singapore'. As mentioned, the bilateral trade and FDI between Singapore and Malaysia was formed due to the long-term bilateral ties. The bilateral relationship between Malaysia and Singapore have been described as interdependent. The following section introduces the economic condition of Malaysia and Singapore respectively.

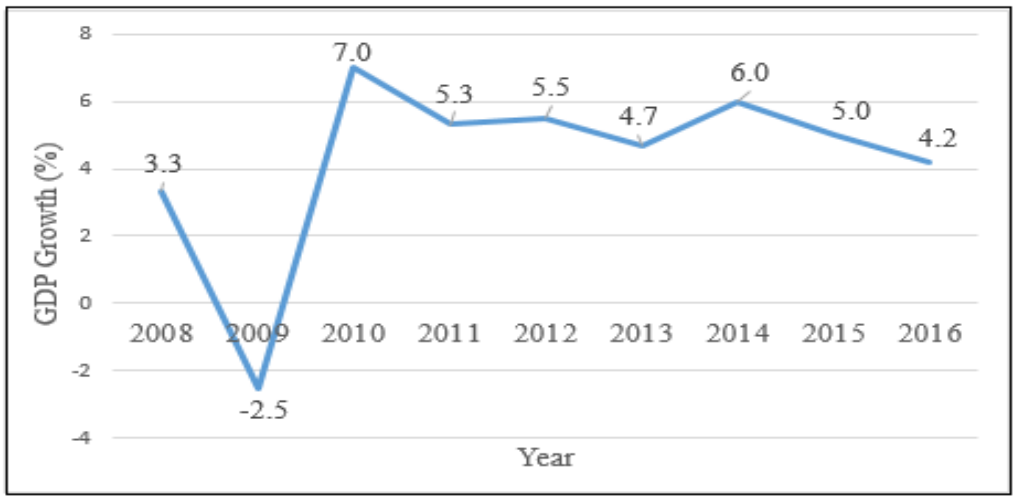
1.1.1 Malaysia

Malaysia has undergone significant transformation from a predominantly agriculture-based economy to manufacturing and modern services. This has lead Malaysia to maintain its position as high middle economy from 1992 until today (EPU, 2015). The reason for the country to stuck in a middle-income trap is because of the global crisis in the year of 2008. New Economic Model (NEM) was unveiled in 2010 in order to make changes in the economic structure by boosting the foreign direct investment and enhancing the productivity level (Malaysia enters next growth frontier: UOB, 2017).

As looking at the Figure 1.1, Malaysia's gross domestic product (GDP) was affected adversely by global financial crisis and it dropped sharply to -2.5 percent in 2009. However, the GDP growth reboot with the fastest growth of 7.0 percent in the next year. The strong recovery of GDP growth is done by robust domestic demand activity, rapid expansion in intra-regional trade and inventory restocking (MITI, 2010). Malaysia experiences healthy economic growth after 2010 because Malaysian Government is directing various economic frameworks towards

innovation, knowledge and creativity. This made the economy less vulnerable to external shocks and Malaysia is able to move forward in a sustainable way (Abidin, 2017).

Figure 1.1: Malaysia's GDP Growth



Source: Bloomberg (2018)

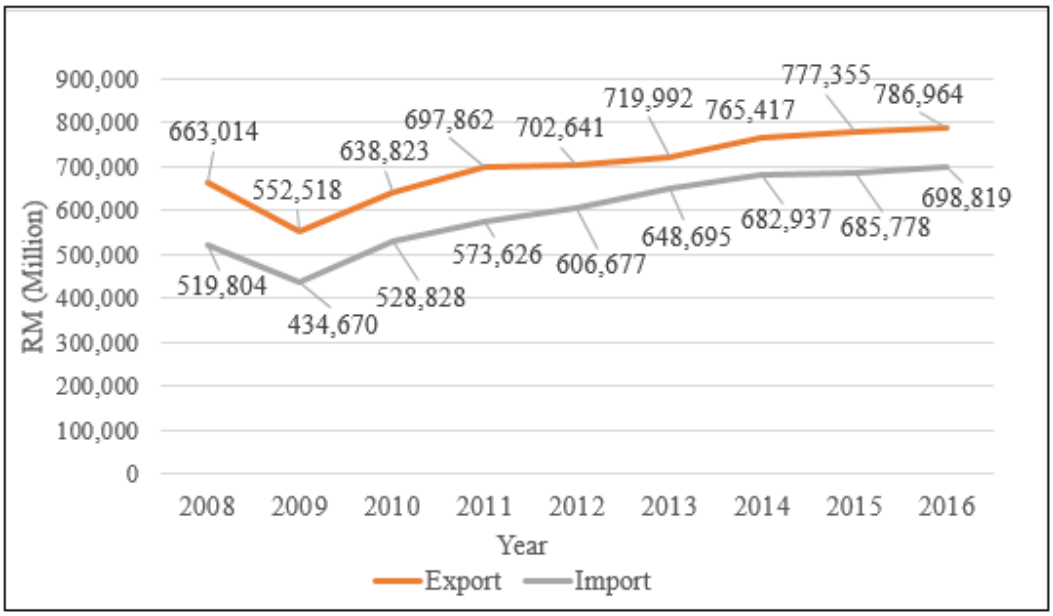
Figure 1.2 shows the trend of exports and imports of Malaysia. The top trading partners of Malaysia are China, Singapore and United States. In 2009, the export and import activities of Malaysia are also affected due to the decrease in the global and domestic demand as well as the price of oil and primary commodity (MITI, 2009). The overall trade outlook since 2010 was supported by increasing demand for commodity products and E&E and the optimistic perspective towards global growth (Murugiah, 2017).

Aside from agricultural and mining products, the exported products also include manufactured goods. The rapid growing of manufacturing sectors was the largest component of total exports in 2017. However, due to the lack of modern technology, Malaysian Government is trying to adopt greater automation, upgrade the labor skills and produce more complex and diverse products in manufacturing sectors (EPU, 2015). Malaysia export manufactured goods the most at 82.1

percent, while the mining goods and agricultural goods occupied 8.6 percent and 8.4 percent respectively.

On the other hand, intermediate goods valued at 60.5 percent of total imports, followed by capital goods (13.0 percent), and consumption goods (8.9 percent). The trading products include E&E products, chemicals products, machinery and equipment, transport equipment, petroleum products and others (MITI, 2017).

Figure 1.2: Malaysia's Exports and Imports



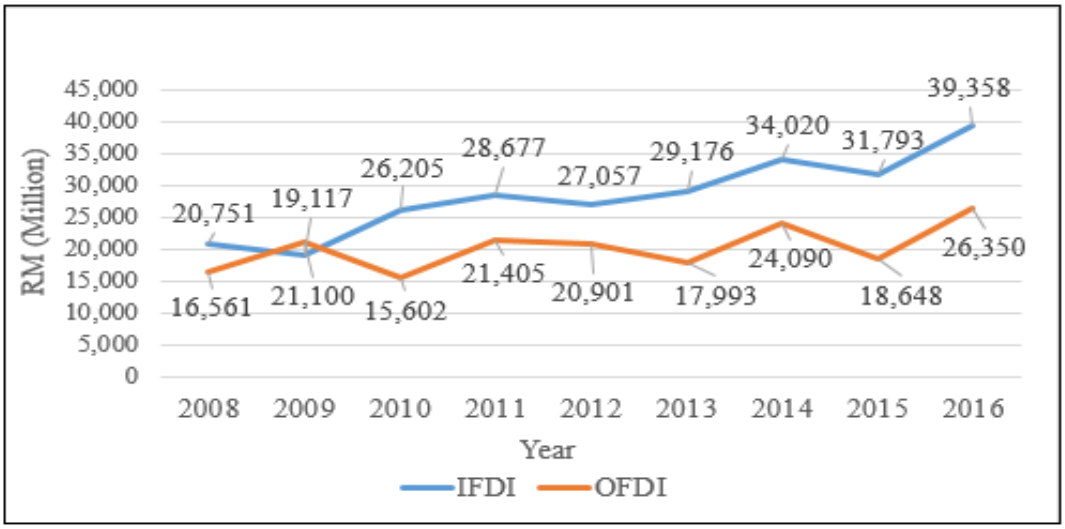
Source: Bloomberg (2018)

Figure 1.3 displays the trend of inward and outward foreign direct investment of Malaysia. In 2009, the outward foreign direct investment (OFDI) surpass the inward direct investment (IFDI) as a result of global financial crisis. After following years, the IFDI and OFDI are increasing because Malaysian Government encourages the deepening of the economic cooperation and integration among regional economies through bilateral trade and regional trade agreements (BNM, 2017), According to DOSM (2017), majority of FDI in Malaysia is in manufacturing (41.0 percent) followed by service (21.3 percent)

sectors and information & communication (7.8 percent). A larger share of FDI is sourced from Singapore (20.6 percent), Japan (12.7 percent), Hong Kong (8.9 percent) and others. While Malaysia's major concentration of direct investment abroad (DIA) is in service sector (56.9 percent), followed by mining & quarrying (25.8 percent) and manufacturing (14.1 percent). The bulk of DIA was mainly in Asian region with RM15.0 billion, Europe with RM7.8 billion and America with RM7.7 billion. Singapore was the predominant destination for Asia.

Local companies invest abroad because they are seeking for potential market and cheaper resources. The rapid expansion of DIA has been facilitated by key regulatory and policy developments. The deregulation of foreign exchange administration rule provides flexibility for domestic firms to obtain external financing and increase the competitiveness of business (BNM, 2017), On the other hand, Malaysian Government is attracting FDI in higher value-added and knowledge intensive employment activities which can create more job opportunities. The implemented strategies are ease the access to financing, improve regulation to be more business friendly, and reduce the talent gap. They also helps foreign investors to reduce the cost of doing business by providing more basic infrastructure and facilities (EPU, 2015).

Figure 1.3: Malaysia's Inward and Outward Foreign Direct Investment



Source: Bloomberg (2018)

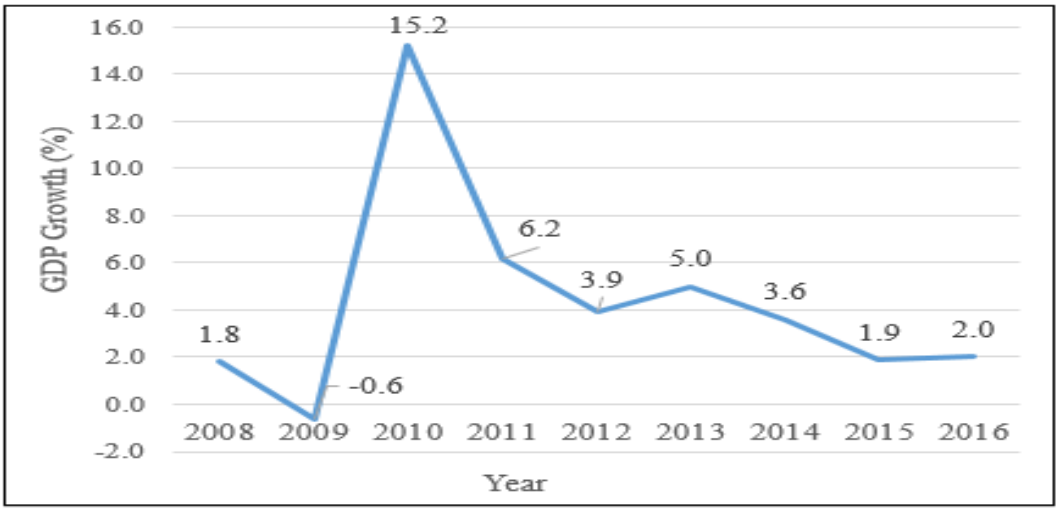
In conclusion, Malaysia is improving labor skills and innovation, adding in sophisticated technology, and building up modern infrastructure through trade liberalization and foreign direct investment to enhance its economic growth.

1.1.2 Singapore

From being an island that has no natural resources, no hinterland, and no industry, Singapore has promoted liberalization of trade and investment to increase innovation, create high-end manufacturing and modern service as well as upgrade the labours' skills in order to increase its economic growth (MAS, 2016). According to Lee (2017), Singapore was the third-most competitive economy in the world based on the World Economic Forum (WEF) rankings in 2016. In another word, Singapore has modern infrastructure, business-friendly macroeconomic environment, efficient labour market, strong appetite for entrepreneurship and high education level that drive its long-term growth and prosperity under the assessment of WEF.

Figure 1.4 shows the GDP growth of Singapore. Singapore's economy is similar to Malaysia's economy in which the GDP growth was contracted to negative sign in 2009 as a result of global downturn, but the economy recovered strongly in 2010 to grow by about 14.5 percent. The economy was boosted by the inventory expansion across both manufacturing and services sectors as well as the recovery in the financial sector (MAS, 2011). Even though the GDP growth is slowing down, it is slightly moderated because Singapore's fiscal and monetary policy are strong enough to maintain macroeconomic stability and support economic growth.

Figure 1.4: Singapore's GDP Growth



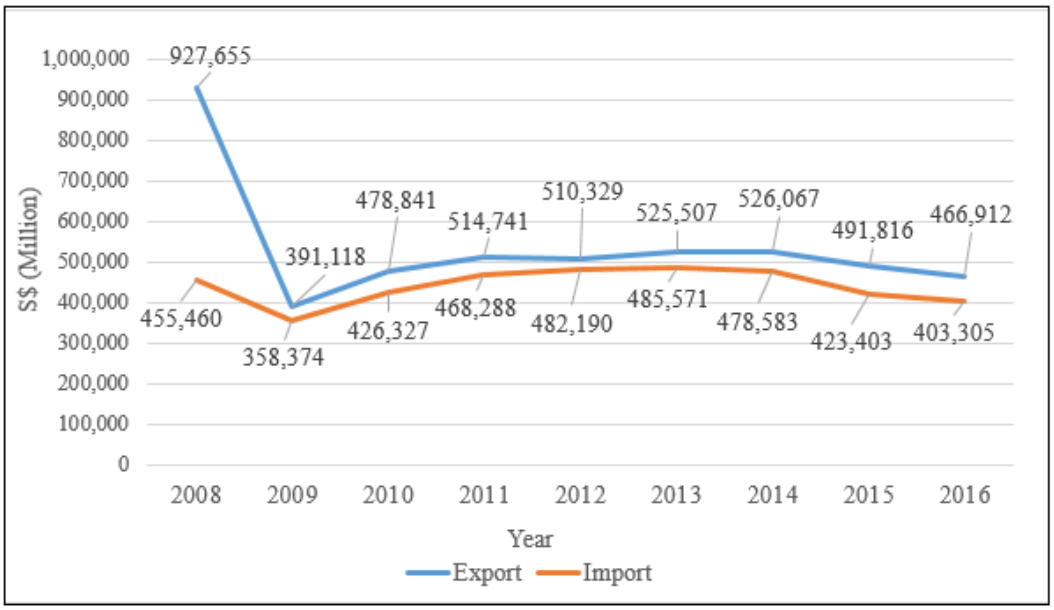
Source: Bloomberg (2018)

Trade contributes significantly to the Singapore economy. Trade is accounted for approximately 60.0 percent of Singapore's gross domestic product (GDP) and half of employment in the same period (WTO, 2016). Many countries like to trade with Singapore because it is located between the east and west trading routes that allows international traders to access easily to large potential markets such as China, India and Southeast Asia. Besides that, Singapore is the second busiest container port in the world because it connects to more than 600 ports in 120 countries (Shira, 2016). Besides that, Singapore ranked top in Asian for developing human capital because Singapore is excellent at using its high quality of education system and staff training to enhance people's know-how and skills (Chia, 2017).

The trading products of Singapore in 2016 include monolithic integrated circuits, petroleum oils, and aircraft parts, part of turbo jet, transmission apparatus, and technology of automatic data process. Singapore major trading partners are China, Malaysia and the United States (WBG, 2018). Figure 1.5 shows the exports and imports trends of Singapore from the period between 2008 and 2016. It is shown that Singapore has excellent result of exports in 2008, which is a total ofaroundS$92.0 million goods. However, in year 2009, Singapore experiences major decline in the output abroad due to financial crisis. The fluctuation on the

value of export on the year after become quite stable. On the other hand, Singapore faces insignificant fluctuations in the imports activities too, but Singapore still have a positive trade balance.

Figure 1.5: Singapore's Exports and Imports



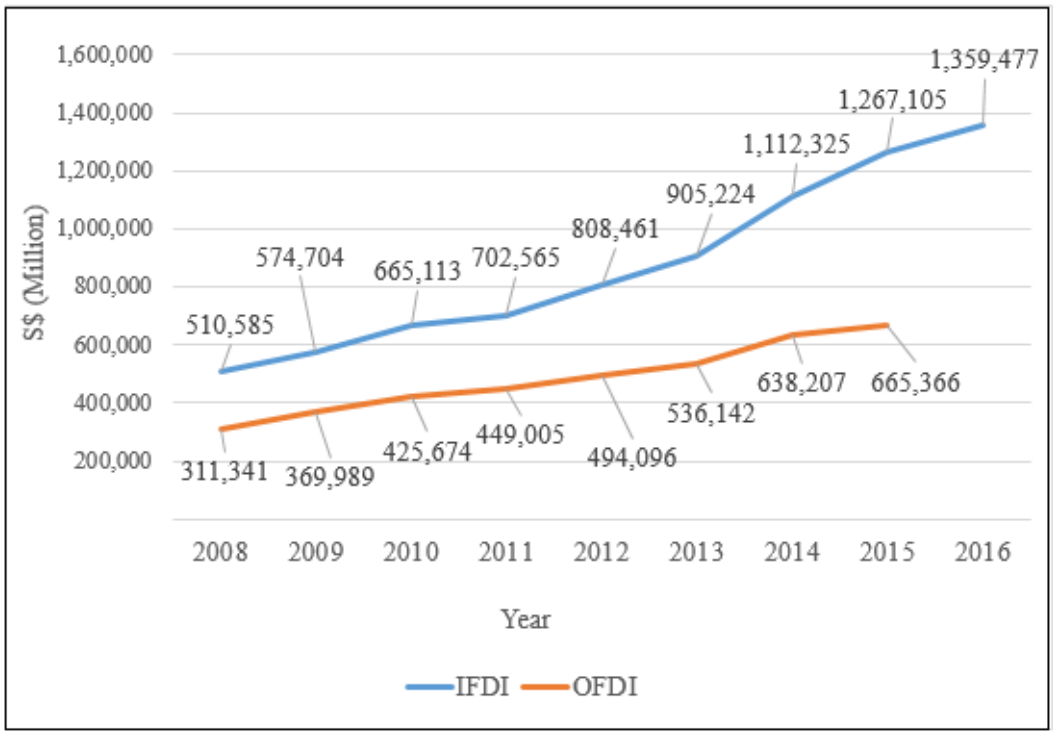
Source: Bloomberg (2018)

Openness to investment is also the key feature of Singapore's trade policy. As shown in Figure 1.6, IFDI and OFDI are increasing gradually over the years. This is because Singapore is offering investment incentives such as tax concessions and easy to borrow loan condition. Besides that, its strategic location and the easy access to big markets are strategic advantages (Santander, 2018). These two types of investment mostly was in the form of direct equity which comprise of paid-up capital and attributable reserve. On the contrary, net lending to and from foreign direct investors were accounted for smaller proportions.

In terms of region, Europe (30.9 percent) was the largest FDI source, followed by Asia (21.5 percent) and North America (21.5 percent). Singapore is the top worldwide financial hub and is the largest corporate banking centre in Asia which offers a wide range of financial services to domestic economy and Asia Pacific region. Besides that, the large proportion of foreign listings on Singapore

Exchange (SGX) allows investors to expose to Asian investment growth and corporate issuers to gain global capital (ES, 2018). Hence, it is expected that almost half of the IFDI was at financial and insurance service sector, the wholesale & retail trade was the second popular sector and manufacturing sector was another significant FDI. The activities of FDI abroad was slightly different as Singapore invest more in the manufacturing industry than the wholesale & retail trade. This is because manufacturing sector is believed to move up the value chain and wholesale & retail trade are more domestically-oriented activities (MAS, 2016). The major common investment partner countries include China, Malaysia, United States, Hong Kong, and others (DOS, 2016).

Figure 1.6: Singapore's Inward and Outward Foreign Direct Investment



Source: Bloomberg (2018)

In conclusion, liberalization to trade and FDI plays a significant role to the economic progress of Singapore. Due to the economic liberalization, Singapore has modern infrastructure, proprietary technology and innovation, skilled workforce and robust financial structure which make it to be positioned as high-income nation (Charts Bin, 2016).

1.2 Problem Statement

Both countries have bilateral trade and FDI to each other since 1965. Singapore has used trade and investment liberalization to make its country from being nothing to having modern infrastructure and technology, skilled labour, and strong financial structure and become a high-income nation. Hence, Malaysia is also trying to upgrade itself to high-income nation via open economy. However, Malaysia's growing reliance on external market has inevitable left the economy more exposed to external shock.

During the period from 2008 to 2016, there are global financial crisis in 2008, depreciation in Malaysian ringgit against the Singapore dollar, economic slowdown in the post-crisis period as well as high competition among global players. Export-oriented manufacturing countries such as Malaysia were affected as global demand dropped. At the same time, Malaysia implemented goods and services tax (GST) which reduce domestic confidence level and lead to slowed consumer spending (Shaffer, 2015).

These external issues and government's economic reform somehow will affect Malaysian's economy. As the top trading and investment partner of Malaysia in ASEAN, Can Malaysia's economy to be enhanced through export, import and FDI with Singapore? Answering this issues is crucial because complementary relationship between two countries means there is a beneficial effect of trade and FDI on Malaysia's economic growth. Otherwise, Singapore's bilateral trade and FDI with Malaysia will harm Malaysia's economic growth. This research is conducted to investigate the impact on Malaysia's economic growth when Malaysia bilateral trade and FDI with Singapore.

1.3 Research Question

This research study incurs following inquiries:

i. Does Malaysia exports to Singapore have significant relationship with Malaysia's economic growth?
ii. Does Malaysia imports from Singapore have significant relationship with Malaysia's economic growth?
iii. Does Malaysia inward foreign direct investment by Singapore have significant relationship with Malaysia's economic growth?
iv. Does Malaysia outward foreign direct investment in Singapore have significant relationship with Malaysia's economic growth?

1.4 Research Objectives

The objectives of this research study are:

i. To investigate the existence of relationship between Malaysia exports to Singapore and Malaysia's economic growth
ii. To investigate the existence of relationship between Malaysia imports from Singapore and Malaysia's economic growth
iii. To investigate the existence of relationship between Malaysia inward foreign direct investment by Singapore and Malaysia's economic growth
iv. To investigate the existence of relationship between Malaysia outward foreign direct investment in Singapore and Malaysia's economic growth

1.5 Significance of Study

The major objective of this study is to observe the effect of Malaysia's bilateral trade and investment relation with Singapore on Malaysia's economic growth. This study mainly analyses the existence of relationship between Malaysia exports to Singapore, Malaysia imports from Singapore, Malaysia inward foreign direct investment in Singapore and Malaysia outward foreign direct investment in Singapore and Malaysia's economic growth. This research can provide insights to Malaysian government policy makers and domestic firms.

This study can provide insights for Malaysian government policy makers in making strategic decision because they are the one who plan, formulate and implement appropriate policies on industrial development, international trade and investment. They might also aware on the results that bring negative impact on Malaysia's GDP growth. They have to create alternatives to solve the problems.

Besides that, this study would be able to provide domestic firms of the ideas on the growth and health of international trade and financial transactions between Singapore and Malaysia. Domestic firms can analyse the reasons for the results obtained and make the trading and investment activities that can really promote Malaysia's whole economic growth. They can even collaborate with Singaporean firms to increase domestic productivity and Malaysia's economic growth.

In conclusion, with this research, Malaysian government policy makers and local firms can quantify the effects of Malaysia's bilateral trade and investment with Singapore on the economic growth of Malaysia as their decisions and actions will bring economic repercussions.

1.6 Chapter Layout

Chapter 1 is about an introductory to the research topic, the issues faced by research topic, the objectives to implement this research, and whom will gain insight from this study.

Chapter 2 discusses the literature review on previous relevant work, which is used to support the variables used in this study.

Chapter 3 discusses the data methodology such as conceptual framework, data collection method, data processing, data analysis and conclusion.

Chapter 4 presents about the results of data analysis and the interpretation on the results.

Chapter 5 is to discuss the major findings, and what it implies to the users, identify the weakness of this study, provide recommendation and overall conclusion for this research study.

1.7 Conclusion

This chapter provides economic background of Malaysia and Singapore respectively. It shows that Malaysia's export, import, IFDI and OFDI activities definitely will have Singapore as the partner and vice versa. Hence, the economy

of both countries are highly interdependent on each other. However, in this uncertainty global economy, the researchers wonder the impact of trading and FDI activities on the economic growth in Malaysia. Hence, the research objectives are also included in this chapter and answering this research question and problem statement can provide insight for Malaysian government policy maker and domestic firms in making strategic decision. In next chapter, it will be discussed the findings discovered by previous researchers.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter will identify the important variables that are related to this research topic based on past studies. The findings discovered by other researchers will be shown in this chapter and they are used to support the development of conceptual framework in this study.

2.1 Review of Relevant Theoretical Models

2.1.1 Neoclassical Model with Endogenous Growth

The neoclassical model with endogenous growth views that technological progress could sustain economy in the long run. The analysis of neoclassical model started by Solow and Trevor Swan in 1956. In Solow-Swan model, they proposed that the output productivity will sustain in a long period of time when there is technological progress. Besides that, countries with better technology will have higher productivity and will be richer. Resources such as production of technology can be allocated in competitive market (Solow, 1956; Swan, 1956).

Technological progress can be found in the form of technology, innovation, improved human capability and in the organization production transferring from developed countries into developing countries. According to Romer Model, due to the industrialization process, developing countries are lack of modern technology to produce more output, hence they import from those innovation intensive countries and

learn to operate the advanced machine to increase productivity as well as economic growth (Caselli & Coleman, 2001; Lucas, 1988).

Besides that, this neoclassical model provides assumption that increasing return to scale enable country to have long-run sustained growth. This can be done by opening up investment opportunities in a country (Mallick, 2002). Romer Model introduced capital externalities and the external capital must be significant according to Cobb-Douglas production functions (Romer,1986). Cobb-Douglas production functions is one of the neoclassical production function that determines the technological progress can help to improve economic growth.

Herrerias and Orts (2011) has discussed the neoclassical model with endogenous growth in his study regarding the imports and growth in China. While Vianna (2015) has adopted Solow-Swan growth model when the researcher is examining the impact of exports to China on Latin American's GDP growth. Zhang, Alon and Chen (2014) had used Cobb-Douglas production functions to investigate the impact of outward foreign direct investment of China on Sub-Saharan Africa's economic growth. In conclusion, foreign direct investment (FDI), exports, and imports are vital factor in fostering economic growth.

2.1.2 Other relevant Theoretical Model

Fenoaltea (1988a, 2011) created a financial business model to link domestic economic growth with capital flows across borders. According to the author, when Italy imports foreign technology and goods, the investment in industry and infrastructure will produce higher production capacity which in turn prompt Italy to export. Italy's balance of payment plays an important role to record the international capital flows which

determine the economic growth. The international capital flows occur through exports and imports. The study of Pistoresi and Rinaldi (2012) is consistent with this model when investigating the relationship between exports, imports and economic growth.

Last but not least, the Revised Minimum Standard Model (RMSM) also explains the determinants of economic growth. Initially created in 1973, it is most widely used by the World Bank to forecast economic growth in developing countries. This model merely concentrates on the supply side of the economy which means that the output is affected by the capacity to production. Hence, investment is considered to be the only determinant to economic growth. This model has been applied in the study of Mallick (2002). Due to its limitation, RMSM model has been evolved over time to become Revised Minimum Standard Model – Extended (RMSM-X). This extension of RMSM involves the demand for money function, the investment-output relation, the private consumption function, the import demand function and also the export demand function for commodities (Nowak, 2013). Therefore, this study uses imports, exports, and FDI to determine economic growth.

2.2 Review of the Literature

2.2.1 Economic Growth

Economic Growth is a broad concept and cannot be narrowed down. Gross domestic product (GDP) is one of the key macroeconomic indicator to measure economic growth. GDP measures goods and services manufactured within a country in a monetary value (Iqbal, Turray & Sami, 2017). GDP growth rate shows the degree of economy to which a country is expanding. Rapid economic growth can transform poor countries into rich countries (Krasniqi & Topxhiu, 2017).

Economic growth consists of quantitative growth and qualitative growth. The quantitative growth normally occurs in agricultural economy in which the output increases when the input resources increase. However, many countries including Malaysia are shifting towards industrial economy because agricultural economy can lead to diminishing marginal productivity in the long run. While in industrial economy, advanced technology and innovation are used to improve productivity and it can increase the marginal return in the long run as a result of capital investment and accumulation. Hence, countries should pursue qualitative economic growth to sustain in high development of national economy (Kim & Heshmati, 2014). This can be done by encouraging open economy in a country.

Economic integration includes export, import, inward foreign direct investment (IFDI) and outward foreign direct investment (OFDI).

2.2.2 Exports

A country exports to another country because the productive resources are more efficient in the industries outside of its country (Kristjanpoller & Olson, 2014). It is also believed that a country export the resources that has a comparative advantages to another countries in order to compete in international markets (Mishra, 2011). For instance, in Hausmann, Hwang, and Rodrik (2007), Gallagher and Porzecanski (2008) and Hsiang (2010) studies, it is important for Latin American to export to China to sustain the country's growth.

According to Maswana (2014), the more the country exports to other country, the growth rate of output will increase. This is because the expansion in exports will cause a country to become specialized in the production of export products. When a country adopt advanced technology to increase the added-value in exported product, employees gain more skills and capacities and this in turn increases the productivity level. However, the impact is lower to the economic growth of low-income developing country. Different countries would have different impact of export on economic growth due to vary trade policy (Krasniqi & Topxhiu, 2017).

Export diversification can also promote economic growth. When a country increases the variety of products and improve the quality of products, the country can gain more earning from exports in the long run because the movements in the world price of common individual goods will offset each other. Besides that, countries who produces high-productivity goods enjoy faster growth than the countries with low productivity goods (Aditya & Acharyya, 2013).

2.2.3 Imports

Imports means bring in goods and service into a country from abroad. Developing countries mostly import capital and intermediate goods into domestic production. When countries have sophisticated technology, they can increase their export activities and growth (Shahbaz & Rahman, 2012). This is because through imports, a country can learn from the accessed technical knowledge and promote technological transfer to improve the local productivity growth. Moreover, it is easier for a country to copy or absorb technology than to innovate. In the case for Africa trade with the

European Union, imports is said to provide greater stimulus for economic growth than exports because the imported country can just liberate the foreign exchange constraint without any substantial increase in productive capacity (Maswana, 2014). Besides that, when a domestic import-substituting country imports from another country, local workforces are motivated to innovate, update, diversify, and specialize the production due to the competition from the trading country (Rahman & Shahbaz, 2013).

Although import liberalization encourages technology transfer, the learning by doing process in import sector grows slower than in export sectors. This will cause the imported country to lose the competitive advantages across foreign competitors. Country who is over-relying on imports might unable to cover the cost owing to the lack of domestic production and this in turn harm the local economic growth (Makun, 2017).

In general, the effect of imports on economic growth depends on the market characteristics. Under perfect competition, when the market encourage imports and there is more investment in new technology, the industries become more productive and competitive in the long run. On the other hand, under imperfect competition, the market of import-substituting firms become shrinks as imports increase (Kim, Lim & Park, 2007). Besides that, the financial development and foreign aid can affect the impact of import on economic growth (Mohammad, 2010; Sakyi, 2011). When there is more inflow of foreign capital and export revenue, countries can import more technology and capital goods (Jawaid, 2014; Damooei & Tavakoli, 2006).

2.2.4 Inward Foreign Direct Investment (IFDI)

IFDI acts as a channel to transfer physical capital and human capital to the receiving country to increase economic growth rate. IFDI occurs in developing countries by developed countries to transfer technology in order to increase the efficiency of production factors (Alvarado, Iniguez & Ponce, 2017). Productivity effects between home country and host country are varies through IFDI due to difference in absorption capacity, knowledge and experience toward the usage of technology, and market concentration (Demir & Duan, 2017).

By setting foot in foreign country, multinational firms can train local workers and managers to access international markets easily. The spillover effects embodied in the managerial skills and the technology transfer can increase the country's economic growth. Besides that, local firms will also feel the pressure to operate better than foreign competitors (Blomström & Kokko, 1998). It can also be concluded that host country's firms are given resources and capabilities needed for internalization from foreign owners such as new products and marketing skills, employee training, technology, managerial skills, know-how and access to foreign market (Davidkov & Yordanova, 2015).

On the other hand, dependency of IFDI could produce negative impact on growth. Foreign firms in domestic country might become a monopoly in certain sectors and lead to price distortion and misallocation of resources. Ultimately, the recipient country faces stagnant growth because the economy is controlled by foreigners (Khatun & Ahamad, 2014). Other reasons that cause negative effects on economic growth of IFDI are cultural change, political issues, absorptive capability, abolition of tax revenue and others (Mucuk, 2011).

2.2.5 Outward Foreign Direct Investment (OFDI)

OFDI is characterized by the investment of private or public individual firm in foreign country to expand beyond domestic borders via green-field, alliance or acquisition (Garcia, Jin & Salomon, 2012).

OFDI involves high risk and high uncertainties because of the long time lag between the investments and the revenues generated by investors. Hence, it is important for investors to carefully examine the host country to ensure credible and friendly host country's commitment to investment policy (Jung & Rich, 2015). The attractiveness of OFDI destination should depends on the size and prospects of the economy, condition of its physical infrastructure, technological readiness, favourable trade policy and others (Barai, 2017).

When developing countries make OFDI in technological and managerial capacity, they can learn from the overseas investment and capture value for themselves and other firms from home countries (Lim & Teo, 2018). Besides that, multinational firms set up subsidiary, affiliates, plants, or offices outside of their countries to explore new market, obtain cheaper intermediate inputs, and produce final goods at lower cost. This will motivates other domestic firms to follow their path or outsource to produce cheaper products. Competition among local firms become intensive and this increase the local production as well as the overall domestic market (Desai, Foley & Hines, 2005).

Besides that, multinational corporations (MNCs) are motivated to exploit the opportunity granted by foreign market. By having a foreign production facilities, MNCs have their local suppliers and customers which can save the cost of serving a market from distance and understand better the local needs or tastes. This also can help to prevent potential competitors form

occupying that market. It can also be said that MNCs is the efficiency seekers due to the factor-price differentials. Rather than exploiting the existing tangible or intangible assets, the purpose of investment can be also acquire the assets and use them to complement to home production (Dunning, 1993).

However, the positive or negative impact of OFDI on domestic economic growth depends on its role in domestic market. The OFDI can reduce the economic growth when domestic firms keep on moving out from the home country. The employment opportunities for domestic populace are reduced if OFDI substitute domestic production (Rodrik, 2016). To prevent this problem, developing country government should have substantial level of foreign exchange reserves to support the various cross-border activities done by developing country's firms (Lim & Teo, 2018).

2.3 Review of Journal

The theoretical models show that exports, imports, IFDI, and OFDI are the important determinant of economic growth. These variables have been included in other researchers' framework studies and the researchers of this study has adopted some of the variables from them.

Iqbal and Sami (2017) conducted a research paper about the impact of bilateral trade between India and United States (US) on the economic growth of the respective countries in a time period of 30 years from 1985 to 2015. The researchers are adopting the variable of economic growth, export to other country, import from other country which are represented by Y, EXP, and IMP respectively in the equation below:

$$Y = \alpha + \beta 1\ (EXP) + \beta 2\ (IMP) + \beta 3\ (EX\_R) + 1$$

Rahman and Shahbaz (2013) investigated the impacts of imports and foreign capital inflows on the economic growth of Pakistan from 1990 to 2010. The researchers are adopting FDI_t proxy as foreign capital inflow from the equation:

$$\text{In } GDP_t = \alpha_0 + \alpha_{IMP} \text{ In } IMP_t + \alpha_{FDI} \text{ In } FDI_t + \varepsilon_i$$

Herzer (2008) conducted a research on the relationship between outward foreign direct investment and domestic output in 14 industrialized countries for the period between 1971 and 2005. The researcher is adopting the variable of outward foreign direct investment which is represented by $OFDI_{it}$ in his equation:

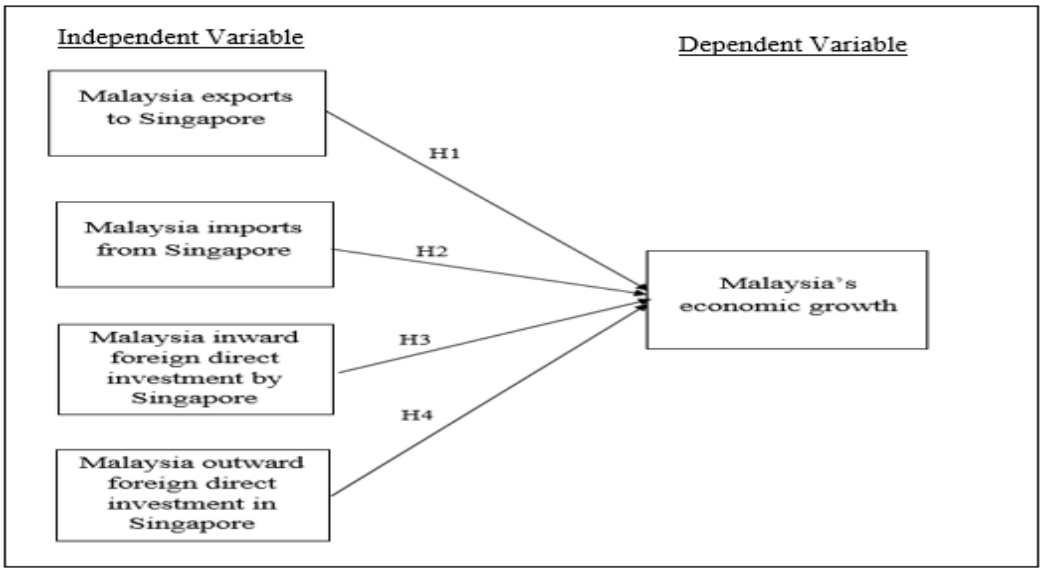
$$Y_{it} = \alpha_i + \beta\ OFDI_{it} + \varepsilon_{it}$$

2.4 Proposed Conceptual Framework

The theoretical models confirm that exports, imports, IFDI and OFDI are important determinant of economic growth.

Since this research involves Malaysia and Singapore, the theoretical models support the formation of conceptual model as below:

Figure 2.1: Conceptual Framework



2.5 Hypothesis Development

2.5.1 Relationship between Exports and Economic Growth

Iqbal, Turray and Sami (2017) conducted a research to study the impact of bilateral trade between India and United States (US) on India's economic growth from the year of 1985 to 2015. By using regression model, the results show that the ρ-valueof export is less than 0.000, which is less than 0.05 significant level. This indicates that there is a statistically significant impact of export on GDP.

Vianna (2016) conducted a research to investigate the impact of exports to China on GDP growth in seven Latin American countries which are Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. By applying annual data for the period 1994–2013 with GLS panel estimation, it shows significant effect on GDP for exports to China.

This research is to investigate the impact of exports to China on 48 countries and regions' GDP growth rate during the year of 2007 to 2015. The researcher adopted both fixed effect model and random effect model in data analysis. This is because random effect model is superior to fixed effect model suggested by the Hausman test. The coefficient of exports to China is statistically significant in both fixed effect and random effect model (Marukawa, 2017).

Krasniqi and Topxhiu (2017) have conducted a panel data research from 2005 to 2015 period to examine the impact of export on economic growth in the six countries of West Balkan, which are Albania, Kosovo, Macedonia, Montenegro, Bosnia and Herzegovina and Serbia. The study utilized the ordinary least square (OLS) method and pooled regression model to evaluate the parameters. The results indicate the statistically significant relationship between export and economic growth.

Autoregressive distributed lag (ARDL) method, johansen and juselius cointegration method and OLS are used in the study to investigate the effect of exports on the economic growth in Pakistan. The results shows that exports has significant relationship with economic growth (Jawaid, 2014).

Overall, exports has significant relationship with economic growth. This research involves Malaysia and Singapore, so the researchers develop a hypothesis which is:

H1: Malaysia exports to Singapore has significant relationship with Malaysia's economic growth

2.5.2 Relationship between Imports and Economic Growth

Iqbal et al. (2017) conducted a research to study the impact of import from US on India's economic growth as well as the impact of import from India on the economic growth of US. Using data from the year of 1985 to 2015, the regression model shows the ρ-value of import from US is 0.000, which shows significant impact on India's GDP growth. On the other hand, the ρ-value of import from India is 0.586, which is more than 0.05. This results indicate an insignificant impact of import from India on US GDP growth and the reason may be the import from India form inadequate percentage of total imports undertaken from India.

The authors investigated the impacts of import on Pakistan's economic growth from the year of 1990 to 2010. The results of the structural break autoregressive distributed lag (ARDL) bound testing approach prove that import plays a significant role to economic growth in Pakistan because new technologies are transferred via import to Pakistan (Rahman & Shahbaz, 2013).

Kristjanpoller and Olson (2014) used group mean dynamic ordinary least square (GM-DOLS) model, within dimension dynamic ordinary least square (WD-DOLS) model, and group mean common correlated effect (GM-CCE) model with leads and lags to examine the relationship between import and economic growth in Latin America. Most of the results show that import has significant relationship with economic growth.

Chaudhary, Shirazi and Chaudhary (2007) investigated the long-run and short-run impact of import on economic growth in Bangladesh via cointegration and multivariate granger causality test. The data is collected from 1973 to 2002. The results indicate that import has significant relationship with economic growth in the long run.

This researcher concerned about the relationship between import and economic growth in India because international trade plays a major role in developing countries like India. Time series data over the period 1970 to 2010 were collected and the results reveal that critical value of t-statistic is less than 0.05 significant level, so import is statistically significant to real GDP (Mishra, 2012).

Overall, imports has significant relationship with economic growth. This research involves Malaysia and Singapore, so the researchers develop a hypothesis which is:

H2: Malaysia imports from Singapore has significant relationship with Malaysia's economic growth.

2.5.3 Relationship between Inward Foreign Direct Investment (IFDI) and Economic Growth

The study done by Testas (2014) focusing on how IFDI of European Union (EU) in Tunisia will affect the Tunisia's economic growth. His study applied quantitative approach in the theory of international investment in which real gross domestic product depends on IFDI, human capital and labor input. The results from the analysis concluded that Tunisia-EU investment liberalization has led to the rapid growth rate in Tunisia because there are significant relationship between IFDI and economic growth.

Brambila-Macias and Massa (2010) conducted a research to examine the relationship between economic growth and IFDI in 15 selected sub-Saharan African countries over the period 1980 to 2008. The results of the bias-corrected least squares dummy variable (LSDV) proved that IFDI has

a significant impact on sub-Saharan Africa's growth. The author also views the global financial crisis poses important effects on sub-Saharan African's growth through capital inflow channel.

The research study of Mehic, Silajdzic andBabic-Hodovic (2014) targets several SEE countries which are Albania, Bosnia, Herzegovina, Bulgaria, Croatia, Macedonia, Romania and Serbia from 1998 to 2007. The economic growth as dependent variable was proxy as countries' initial output levels which reflecting the GDP, while IFDI was the independent variable. The regression results using OLS with panel corrected standard errors shows the IFDI has significant relationship with the economic growth.

Alvarado et al. (2017) conducted a research to understand the effect of IFDI on economic growth in 19 Latin American countries with different countries' development level. World Bank was used to classify countries based on national per capita income. The results indicate that IFDI is significant to high-income countries such as Chile and Uruguay.

Tasneem and Aziz (2017) investigated the impact of IFDI on economic growth in Pakistan by using OLS regression analysis and time series data during 1972 - 2008. The researcher adopted durbin-watson statistics to prove no autocorrelation problem of the data. The ρ-value shows the IFDI is statistically significant to economic growth. The results show that IFDI positively affects domestic output and overall growth.

Overall, IFDI has significant relationship with economic growth. This research involves Malaysia and Singapore, so the researchers develop a hypothesis which is:

H3: Malaysia inward foreign direct investment by Singapore has significant relationship with Malaysia's economic growth.

2.5.4 Relationship between Outward Foreign Direct Investment (OFDI) and Economic Growth

This study discussed the relationship between outward foreign direct investment (OFDI) and economic growth in 14 industrialized countries over the period 1971 to 2005 using panel cointegration technique. The findings reveal that OFDI has significant long-run effects on domestic output (Herzer, 2008).

Using bivariate and multivariate models, Lee (2010) studied the impact of outward foreign direct investment (OFDI) on economic growth in Japan using the data set from the year of 1977 to 2006. The researcher used ARDL approach to test for the existence of long run relationship because the estimators of the long-run coefficients are consistent in small sample size. The results show that OFDI has significant relationship with economic growth.

Chen and Zulkifi (2012) studied the relationship between Malaysia's OFDI and its economic growth from the year of 1980 to 2010. They used unit root test, johansen and juselius cointegration test, granger causality test, and vector error correction model (VECM) in their data analysis. The results show that OFDI significant relationship with the economic growth.

This paper analysed the long run relationship between OFDI and economic growth in developing countries over time span 2005 to 2014. The results obtained from OLS and generalized method of moments (GMM) show that foreign direct investment outflows has significant impact on economic growth in the long run among developing countries (Ameer & Xu, 2017).

Ciesielska and Koltuniak (2017) examined the relationship between OFDI stocks and the home country's economic growth in the Polish national economy. The researchers are using quarterly data from 2004 to 2015

which is the period after Polish accession to the European Union. The data has been deflated and all the parameter in vector error correction model (VECM) including OFDI turn out to be statistically significant with GDP.

Overall, OFDI has significant relationship with economic growth. This research involves Malaysia and Singapore, so the researchers develop a hypothesis which is:

H4: Malaysia outward foreign direct investment in Singapore has significant relationship with Malaysia's economic growth.

2.6 Conclusion

The theoretical models states that exports, imports, and FDI are important determinant of economic growth. In this research study, exports, imports, IFDI and OFDI as well as economic growth have been discussed between Malaysia and Singapore. Despite the overwhelming presumption that exports, imports, IFDI and OFDI are significant to economic growth, it has not necessarily contributed to the Malaysia's economic growth as the relationship with Singapore is probably more complex. The following chapter will discuss about the conceptual framework of this study and the methodology used to analyze the data.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter outlines the methods used in this research. The research methodologies include the conceptual framework, data collection method, data processing and data analysis.

3.1 Conceptual Framework

In the case of how Singapore affects Malaysia's economic growth via these economic development activities, casual research is taken in order to examine these hypothesis. All the variables are transformed into natural logarithm (ln) form to linearize the exponential trend (Asteriou & Hall, 2007).

The long-run model created in this study is expressed as:

$$lnGDP_t = \beta_0 + \beta_1 lnEX_t + \beta_2 lnIM_t + \beta_3 lnCR_t + \beta_4 lnDB_t + \varepsilon_t$$

Where,

GDP = Economic growth is proxied by gross domestic product growth in Malaysia

EX = Malaysia exports to Singapore

IM = Malaysia imports from Singapore

CR = Malaysia inward foreign direct investment by Singapore

DB = Malaysia outward foreign direct investment in Singapore

ε_t = Error correction term

The variables of InGDP, InEX, and InIM are adopted from the research study of Iqbal and Sami (2017), the variable of InCR is taken from Rahman and Shahbaz (2013), while the variable of InDB is adopted from Herzer (2008).

3.2 Data Collection Method

Researcher can use primary or secondary resources or both resources to collect data needed. In this research, secondary data is collected.

3.2.1 Secondary Data

The data set is a time series data which comprises of Malaysia's GDP growth, Malaysia export to Singapore (EX), Malaysia import from Singapore (IM), Malaysia inward foreign direct investment by Singapore (CR), and Malaysia outward foreign direct investment in Singapore (DB). All the data are employed in the value of Malaysian Ringgit in millions, except the GDP growth which is in percentage form. The data is on

quarterly basis from a period of 2008 to 2016, in which it consists of 36 observations. The sample data was selected due to the data availability. All variables are then converted to natural logarithms. The data was collected from Bloomberg terminal.

3.3 Data Processing

The data processing in this research study consists of five steps. First and foremost, researchers have identified the independent and dependent variables based on the past research studies. They have looked through many similar journals and determined the independent variable that is suitable for the research.

After deciding the variables, the researchers use Bloomberg terminal to collect the data needed. The period of the data is determined based on its availability. All the data found from the Bloomberg terminal are downloaded and saved into Microsoft Excel.

Next, researchers combine, arrange and transform the data before run the analysis. Instead of analysing the data in millions of Malaysian Ringgit, the variable data is transformed into natural logarithms (ln) form. The logarithmic transformation can help to strengthen the trend out so that it can be better fitted by linear model (Nau, 2017).

The forth step in the data processing is to run the data analysis using E-views 8. This software helps to run the stability and residual diagnostic, unit root test, johansen and juselius cointegration test, vector error correction model (VECM),

VECM granger causality, impulse response function and variance decomposition in order to find out whether the multiple regression model have faced any problem.

Lastly, the results are extracted from E-views 8 for interpretation.

3.4 Data Analysis

E-views 8 is used to analyse the data collected in this study. E-views is an analysis software that is used mainly for time-series data. There are a lot of test conducted by the E-views analysis in this study.

3.4.1 Ordinary Least Square Method

This study conducts multiple regression model using ordinary least square (OLS) method. It is used to explain the relationship between dependent variable and independent variable. It describes the changes in dependent variable that is associated with a unit changes in independent variable. Besides that, it can indicate how well the data fits the linear model by determining its residual or deviations (Hutcheson, 2011). In this study, OLS method is used to estimate the association between Malaysia exports to Singapore, Malaysia imports from Singapore, Malaysia inward foreign direct investment by Singapore and Malaysia outward foreign direct investment in Singapore to economic growth in Malaysia. The coefficient of each variable in the regression model describes how many percent

changes in the Malaysia's economic growth by a unit changes in export, import, inward and outward foreign direct investment respectively.

3.4.2 Unit Root Test

In general, unit root test is used to check the stationarity of the time series data for all the variables. When the data is stationary or does not have unit root, its mean, variance, and covariance are constant across different periods (Gujarati & Porter, 2009). On the other hand, when the variables have unit root, spurious regression problem will occur (Granger & Newbold, 1974). It means that the estimated results become inaccurate where the independent non-stationarity variables are not casually related to each other since the R-square is high (Talla, 2013). In order to ensure the validity of the results, the stationarity of data series should be investigated using several unit root test (Granger & Newbold, 1974). In this study, Dicker-Fuller GLS unit root test, Augmented Dicker-Fuller, and Phillips-Perron test are applied to test the stationarity of data series.

3.4.2.1 Dicker-Fuller GLS unit root test (DF-GLS)

Dicker-Fuller GLS unit root test is a modified Dicker-Fuller test statistics that using a generalized least square (GLS) rationale. It performs well in small sample size and power (Elliott, Rothenberg & Stocks, 1996). T-statistic is used to determine the stationarity of each variable. Dicker and Fuller (1979) proposed three alternative regression equations for testing the presence of unit root.

The first equation has both no constant and no trend:

$$\Delta y_{t-1} = \gamma y_{t-1} + u_t$$

The second equation contains a constant in the random walk process but no trend:

$$\Delta y_{t-1} = \alpha_0 + \gamma y_{t-1} + u_t$$

The third equation contains both a constant and a trend / non-stochastic time trend:

$$\Delta y_{t-1} = \alpha_0 + \alpha_1 t + \gamma y_{t-1} + u_t$$

In each case, the hypothesis are:

H_0: The variables have unit root /are not stationary

H_1: The variables do not have unit root /are stationary

According to the rule of thumb, when the t-statistic value is smaller in absolute term than the critical value, the null hypothesis is rejected, it can be concluded that the variables do not have unit root and are stationary and vice versa (Asteriou & Hall, 2007).

3.4.2.2 Augmented Dicker-Fuller (ADF)

In case the u_t is correlated in the equation of DF-GLS test, ADF is conducted by 'augmenting' the equations by including the lagged values of the dependent variable ΔY_t to eliminate autocorrelation.

Using the third equation of DF-GLS test, the ADF test estimates the following regression:

$$\Delta y_{t-1} = \alpha_0 + \alpha_2 t + \sum_{i=1}^{m} \alpha_i \, \Delta y_{t-1} + u_t$$

The lag length is either determined by akaike information criterion (AIC) or schwarz criterion (SC). T-statistic and ρ-value are used to determine whether the null hypothesis is rejected.

The hypothesis are as followed:

H_0: The variables have unit root /are not stationary

H_1: The variables do not have unit root /are stationary

According to the rule of thumb, when the t-statistic value in absolute term and ρ-value is smaller than the critical value, the null hypothesis is rejected, it can be concluded that the variables do not have unit root and are stationary and vice versa (Asteriou & Hall, 2007).

3.4.2.3 Phillips-Perron (PP) test

Phillips-Perron (PP) test is a non-parametric method of controlling higher-order serial correlation in data series (Asmy, Rohilina, Hassama & Fouad, 2009). It corrects the serial correlation in the error term by adjusting the t-statistics of the coefficient y rather than adding the lag length (Gujarati & Porter, 2009). Heteroskedasticity and autocorrelation are used as consistent covariance matrix estimator (Newey & West, 1987). Adjusted t-statistic and ρ-value are used to test whether the null hypothesis is rejected or not.

According to Phillips and Perron (1988), the hypothesis is as follow:

H_0: The variables contain unit root test/are not stationary

H_1: The variables do not contain unit root test/are stationary

According to the rule of thumb, when the negative adjusted t-statistic value and ρ-value is smaller than the critical value, the null hypothesis is rejected, it can be concluded that the variables do not have unit root and are stationary and vice versa (Asteriou & Hall, 2007).

3.4.3 Johansen and Juselius Cointegration Test

Once the variables achieve order of integration, it may proceed to the second step to evaluate the cointegration properties of the variables. The variables are said to have achieved order of integration when all the variables become stationary at first differences. The cointegration test is to identify whether there is long run relationship between variables (Bhunia & Ganguly, 2015). Johansen test given by Johansen (1988) and Johansen and Juselius (1990) is chosen to analyse the existence of long-run relationship because the model consists of two or more than two variables (Alexander, 1999). The number of cointegrating vectors is based on the trace and maximal eigenvalue statistics.

The trace test cointegration rank 'r' is as follow:

$$\lambda_{trace} = -T \sum_{j=r+1}^{n} In(1 - \lambda_j)$$

Maximum number of cointegrating vectors against r+1 is presented in following way:

$$\lambda_{max}\ (r,r+1) = -Tln(1-\lambda_j)$$

The null hypothesis of trace statistics and maximal eigenvalue statistics are the same which is there is no cointegrating vector (r = 0), but the alternate hypothesis is different. In trace statistics, the alternate hypothesis states that there is one or more cointegrating vectors (r > 0). While in maximal eigenvalue statistics, the alternate hypothesis states that there is one cointegrating vector (r = 1).When the results show that variables are cointegrated in the long run, it should proceed to vector error correction model (VECM) (Ibrahim & Yusoff, 2001). Before run the johansen test, an optimal lag length should be selected based on different type of information criteria because it is sensitive towards the lag length (Johansen, 1988).

3.4.4 Vector Error Correction Model (VECM)

If the results of both trace and maximal eigenvalue statistics indicate that there is at least one cointegrating vector exists, the variables are said to be cointegrated in the long run. VECM is then applied to show how many percent changes of the dependent variable when a unit change of each independent variable. Besides that, VECM can test the long-run and short-run causality among the variables (Sahoo & Sethi, 2017). The causality may occur from error correction term (ECM) (Granger, 1988).

The inclusion of significant and negative coefficient of error correction term in VECM helps to correct any short-run fluctuations towards long-run equilibrium relationship among variables (Sahoo & Sethi, 2017).

3.4.5 VECM Granger Causality Test

Granger causality test is used to determine whether one variable will cause another or vice versa. It can also be said that the variables have either unidirectional or bidirectional causality relationship (Engle & Granger, 1987). The causal linkages are examined by using VECM.

The hypothesis is as followed:

H_0: Y does not Granger cause on X

H_1: Y Granger cause on X

According to the decision rule, the null hypothesis will be rejected if the ρ-value is less than 5.0 percent significant level and vice versa.

3.4.6 Impulse Response Function

Impulse response function is to identify the one-period response of dependent variable towards unit change in shock which stems from each independent variable.

According to Greene (2003), in the autoregressive form of the model, we can identify each innovation, v_{mt} with a particular variable in γ_t, say γ_{m_t}. Updating by one period indicates the effect of one-time shock, v_{mt} on $\gamma_{m,t+1}$. For example,

In the current period,

$$\gamma_{m_t} - \bar{y}_m = dv_{mt} = \emptyset_{mm}(0)dv_t$$

One period later,

$$\gamma_{m,t+1} - \bar{y}_m = (\Gamma)_{mm}dv_{mt} = \emptyset_{mm}(1)dv_t$$

Two period later,

$$\gamma_{m,t+2} - \bar{y}_m = (\Gamma^2)_{mm}dv_{mt} = \emptyset_{mm}(2)dv_t$$

Given that,

dv_{mt} = Effect of one-time shock to the system

Γ^n = Multipliers in the system

$\emptyset_{mm}$(i) = Impulse response characteristics of variable γ_m to innovation in v_m

A practical way to visually represent the response of independent variable to the various shock is to plot the impulse response function (Enders, 2004).

3.4.7 Variance Decomposition

Variance decomposition is the alternate of impulse response function which explains the movement of dependent variable caused by the innovations in a table form. Shan (2005) and Shahbaz, Islam and Aamir (2012) also suggest to implement this innovative accounting approach because Granger Causality test is unable to determine the strength of

causality effect over various time horizons. Overall, variance decomposition method under vector autoregressive (VAR) system shows the response of the dependent variable to shocks stemming from itself and independent variables in the short run (Enders, 2004).

3.4.8 Stability Diagnostics

In this study, cumulative sum (CUSUM) test and cumulative sum of squares (CUSUMSQ) test are used to test the structural stability of the model based on recursive residuals. They are proposed by Brown, Durbin and Evans (1975) which are appropriate for time-series data, especially when one is uncertain about when a structural break might have taken place.

3.4.8.1 Cumulative Sum (CUSUM) Test

The CUSUM test is based on the cumulated sum of recursive residuals:

$$W_t = \sum_{r=k+1}^{r=t} \frac{w_r}{\hat{0}}$$

Where ω is the recursive residual. The test is performed by plotting W_t against t with the 5.0 percent critical line. The 5.0 percent significant lines are connecting the points:

$$[k, \pm -0.948\ (T-k)^{1/2}] \text{ and } [T, \pm 3 \times 0.948(T-K)^{1/2}]$$

The test finds parameter instability if W_t moves outside the boundaries.

3.4.8.2 Cumulative Sum of Squares (CUSUMSQ) Test

The CUSUMSQ is based on cumulative sum of squared residuals:

$$S_t = \frac{\sum_{k+1}^{t} w_j^2}{\sum_{k+1}^{T} w_j^2}$$

With $t = k+1,\ldots,T$

The expected value of S_t is $E(S_t) = \frac{t-k}{T-k}$, which goes to zero at $t = k$. The test is performed by plotting S_t against t using a 5.0 percent critical line which is parallel. If theS_t moves outside the parallel line, the parameter or variance is unstable.

3.4.9 Residual Diagnostics

The research method used in this study is OLS estimator. There are certain assumptions underlying this OLS method that should be fulfilled in order to be a best linear unbiased estimators (BLUE). When the variables in the study do not meet the assumptions of BLUE, the data analysis become inaccurate and inefficient.

The seven classical assumptions are:

(a) The regression model is linear
(b) There is a zero population mean in the error term
(c) All explanatory variables has uncorrelated relationship with the error term
(d) There is uncorrelated in the error term
(e) There is no heteroscedasticity in the error term
(f) There is no perfect multicollinearity among the explanatory variables
(g) There is a normally distribution in the error term

To fulfil these econometric assumptions, this study has conducted the normality test, autocorrelation test, heteroscedasticity test and multicollinearity test respectively.

3.4.9.1 Normality Test

Normality test is used to find out whether the error term in the model is normally distributed. Normality test is significant to small and finite sample size because according to Central Limit Theorem, the error term may still be normal distributed when the sample size is small and finite (Gujarati & Porter, 2009). Hence, we need to test the normality assumption in the small sample size data.

The hypothesis testing of normality test is defined as:

H_0 = The error term is normally distributed

H_1 = The error term is not normally distributed

Jarque-Bera (JB) test is used to test for the error term normality. The JB test computes the skewness and kurtosis measures of error term and its test statistics is as follow:

$$JB = n\left(\frac{S^2}{6} + \frac{(K-3)^2}{24}\right)$$

Where,

n = sample size

S = skewness coefficient

K = kurtosis coefficient

If the computed ρ-value of JB statistic is less than 5 percent critical value, which also mean that the value of JB statistic is very different from 0, we reject the null hypothesis. It can be concluded that the error term is not normally distributed and vice versa.

3.4.9.2 Autocorrelation Test

Autocorrelation means the error term for any observation is associated with the error term for any other observation. For instance, we are looking at the effect of labor and capital on output in quarterly time series data. If there is labor strike affecting output in one quarter, the strike is believed not to be carried over to the next quarter, and hence, the output is not expected to be declined in the next quarter due to the disruption. In this case, the error term is considered as not correlated (Gujarati & Porter, 2009).

The hypothesis statement of autocorrelation test is defined as:

H_0 = There is no autocorrelation problem between error terms

H_1 = There is autocorrelation problem between error terms

In this research, we used Breusch Godfrey (BG) test or known as LM test in E-views 8 to detect the autocorrelation problem in the model. If the probability of chi-square is less than 5.0 percent critical value, the null hypothesis is rejected. As a conclusion, the error terms have autocorrelation problem.

3.4.9.3 Heteroscedasticity

H_0 = The error term is homoscedasticity

H_1 = The error term is heteroscedasticity

When the error term is heteroscedasticity, the variance of the error term is not constant. The reasons why the variance of the error term may be variable can be due to the presence of outlier, the error-learning model and others (Gujarati & Porter, 2009). To handle this problem, this research has carried out autoregressive conditional heteroscedasticity (ARCH) test using E-views 8 to detect the heteroscedasticity. ARCH test is used to model the stationary explanatory variables which is in first difference form as they also exhibit volatility. According to the rule of thumb, if the probability of chi-square value is less than 5.0 percent critical value, the null hypothesis is rejected. It is concluded that the error term is heteroscedasticity.

3.4.9.4 Multicollinearity Test

Multicollinearity means the existence of linear relationship between two or more explanatory variables in the equation. If multicollinearity occurs, it is difficult to determine which explanatory variables are influencing the dependent variable. The multicollinearity problem may be due to several factors, such as the model has more explanatory variables than the number of observations, the model is being specified, the model shares a common trend and others.

There are many methods to measure the level of multicollinearity between the explanatory variables. In this study, variance inflation factor (VIF) is used as an indicator of multicollinearity. VIF is defined as:

$$\text{VIF} = \frac{1}{(1-R^2)}$$

Where R^2 is the R-squared in the equation model of that explanatory variable on the remaining independent variables. VIF shows how much of the variance of a coefficient estimate of an explanatory variable has been inflated by the presence of multicollinearity. As R^2 approach 1, the VIF approaches infinity, this means that variance of an estimator is increasing. In another word, when the VIF is increasing, the explanatory variables are becoming more collinear (Gujarati & Porter, 2009).

According to IHS Global Incorporation (2017), Eviews 8 presents two forms of VIF, which are centered VIF and uncentered VIF. Centered VIF is the ratio of the coefficient estimate from the original equation divided by the variance from a coefficient estimate from an equation with only that explanatory variable and a constant. While uncentered VIF does not include the constant variable. The centered VIF is numerically identical to $\frac{1}{(1-R^2)}$.

As a rule of thumb, if the VIF of a variable is more than 10 or when R^2 is more than 0.90, the variable is said to be highly collinear to each other(Gujarati & Porter, 2009).

3.5 Conclusion

The long run equation model for this research study is written in conceptual framework section for easy explanation in Chapter 4 later. The data used is secondary data which is collected from Bloomberg terminal and it covers the period from 2008 to 2016. All the data collected will be transformed into natural logarithm (In) form and then run the test using E-views 8.Several tests will be conducted and the results are interpreted in Chapter 4.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter will discuss the findings of empirical results based on the research methodologies discussed in Chapter 3. From this chapter, the researchers are able to determine long run relationship between exports, imports, inward and outward foreign direct investment and economic growth. The export mean Malaysia exports to Singapore, import mean Malaysia imports from Singapore, inward foreign direct investment mean the Malaysia inward foreign direct investment by Singapore, outward foreign direct investment mean Malaysia outward foreign direct investment in Singapore.

4.1 Descriptive Statistics

Table 4.1 shows the summary of statistics variable of this study. The dependent variable that is economic growth which is denoted by gross domestic product (GDP) has the mean value of 1.0462 percent and the median value of 1.0500 percent. Its maximum value is 1.1030 percent and its minimum value is 0.9420 percent. The standard deviation of the GDP is 0.0300 percent. Skewness of the data is -1.7319 which is less than zero, so GDP is a left skewness. Value of kurtosis is 7.0899 which is more than 3 shows that the distribution of GDP has heavier tails and it is called a leptokurtic distribution.

The first independent variable which is Malaysia exports to Singapore (EX) has the mean value of RM8291.2 million and the median value of RM7944.0 million. Maximum value of the data is RM10941.8 million and the minimum value is RM5927.5 million which show the range of the data. The standard deviation of EX is RM1220.5 million and its skewness value is 0.0923 which shows that data is positively moderately skewed. The data of EX is a mesokurtic distribution because the kurtosis is less than 3, which is 2.3812.

Besides that, the mean value and the median value of Malaysia imports from Singapore, which is denoted by IM are RM6047.0 million and RM6331.6 million respectively. The maximum value of the data is RM7666.5 million and the minimum value is RM3090.6 million. The standard deviation of IM is RM1189.6 million and its left skewness value is -0.8193. The kurtosis value of IM is 3.0681 which means the data is a leptokurtic distribution.

Other than that, the mean and median value of Malaysia inward foreign direct investment by Singapore which is denoted by CR are RM4213.4 million and RM4044.0 million respectively. The range of CR has the maximum value of RM7562.0 million and the minimum value of RM1903.0 million. The standard deviation is RM1266.5 million. Its skewness of 0.8356 shows that CR is positively moderately skewed. Its kurtosis value is also more than 3, which is 3.4655, signalling that this data has more outlier.

The last independent variable which is Malaysia outward foreign direct investment in Singapore (DB) has the mean value of RM2933.6 million and the median value of RM2843.0 million. The range of DB shows the maximum value of RM4427.0 million and the minimum value of RM1390.0 million. The standard deviation is RM621.0 million and its skewness is 0.1675, which shows that DB is a right skewness. The kurtosis value is 2.9815, which is approximately 3, signalling that DB is normally distributed.

Table 4.1: Descriptive Statistics

	GDP (%)	EX (RM in million)	IM (RM in million)	CR (RM in million)	DB (RM in million)
Mean	1.0462	8291.2	6047.0	4213.4	2933.6
Median	1.0500	7944.0	6331.6	4044.0	2843.0
Maximum	1.1030	10941.8	7666.5	7562.0	4427.0
Minimum	0.9420	5927.5	3090.6	1903.0	1390.0
Std. Dev.	0.0301	1220.5	1189.6	1266.5	621.0
Skewness	-1.7319	0.0923	-0.8193	0.8356	0.1675
Kurtosis	7.0900	2.3089	3.0681	3.4655	2.9815

4.2 Unit Root Test

Table 4.2 reports the results of augmented dickey fuller (ADF), phillips-perron (PP), and dicker-fuller GLS unit root test in each logged variable at level and first difference.

The variable lnGDP has unit root or is not stationary at level according to ADF and PP test because the ρ-value is more than 0.05 significant level. Hence, the null hypothesis is not rejected. At first difference, although PP test shows that lnGDP is not stationary at constant with trend, both ADF and dicker-fuller GLS confirm that lnGDP is stationary and does not have unit root because the ρ-value is less than 0.05 significant level.

ADF, PP, and dicker-fuller GLS test show that the variable lnEX has unit root at level when the variable is constant without trend, while ADF and dicker-fuller

GLS test conclude that lnEX does not have unit root at level when the variable is constant with trend. When lnEX is converted into first difference, only dicker-fuller GLS shows that lnEX is not stationary when the variable is constant without trend, but other tests reject the null hypothesis because the ρ-value is less than 0.05 significant level. Therefore, lnEX is stationary or does not have unit root at first difference.

All three tests reveal that the variable lnIM is not stationary or has unit root at level because the ρ-value is more than 0.05 significant level. While at first difference, ADF shows that lnIM has unit root when the variable is constant without trend. However, PP test shows that the null hypothesis of unit root test for lnIM is rejected. dicker-fuller GLS also provides similar results with PP test. There is enough evidence to state that lnIM is stationary and does not have unit root at first difference.

Both the variable lnCR and lnDB have similar results which is taken by all these three tests. They are stationary and do not have unit root at level as well as at first difference because their null hypothesis is rejected at 0.05 significant level.

In conclusion, all the variables are stationary and do not have unit root at first differences because the null hypothesis is rejected at 0.05 significant level. Since all the variables are cointegrated at their first order, I(1) which has fulfilled the criteria , the researchers proceed to johansen and juselius cointegration test to examine the long run relationship between the variables.

Table 4.2: Unit Root Test

	Augmented Dickey Fuller (ADF)		Phillips Perron (PP)		Dicker-Fuller GLS	
	Level					
Variable	Constant Without Trend	Constant With Trend	Constant Without Trend	Constant With Trend	Constant Without Trend	Constant With Trend
InGDP	-2.3815	-2.5178	-2.7821	-2.8735	-4.1984**	-2.3700
InEX	0.7807	-5.6514***	-1.6420	-3.1867	-0.8165	-3.4815**
InIM	-1.9495	-0.7739	-1.9102	-2.6119	-1.3731	-2.6488
InCR	-3.8308***	-6.0312***	-3.7945***	-12.4989***	-3.8349**	-5.9677**
InDB	-5.6933***	-4.7612***	-5.7340***	-6.8672***	-5.6923**	-6.9957**
	First Difference					
InGDP	-8.4967***	-9.2970***	-3.1836**	-3.0759 (2)	-3.5850**	-3.6285**
InEX	-5.7890***	-5.6779***	-6.8297***	-7.9510***	-1.0030 (2)	-5.4042**
InIM	-1.4218 (2)	-5.8088***	-6.0363***	-5.9234***	-3.0222**	-7.0243**
InCR	-6.3600***	-6.1351***	-18.3278***	-18.0664***	-8.9502**	-8.9688**
InDB	-7.8530***	-4.2074**	-21.5733***	-21.0895***	-7.9478**	-7.2768**

*Note: *** and ** denote the rejection of null hypothesis at 1.0 percent and 5.0 percent significance level. The figure in parenthesis (...) represents optimum lag length. Augmented Dickey Fuller (ADF) and Dicker-Fuller GLS select lag length based on Akaike Info Criterion (AIC), while the Phillips-Perron is based on the Newey-West bandwidth criterion.*

4.3 Johansen and Juselius Cointegration Test

Before the researchers proceed to johansen & juselius cointegration test, they should select the optimum lag length. In this research, the lag number is selected based on akaike's information criterion (AIC) and schwarz criterion (SC). As per Table 4.3, the lag number of 3 is selected due to the minimum result of AIC and SC.

Table 4.3: Optimum Lag Order Selection

Model	Lag Order	AIC	SC
1	p = 1, q = 1	-8.3249	-6.5292
2	p = 1, q = 2	-9.5833	-6.6357
3	p = 1, q = 3	-11.3448	-7.2224

In order to determine the number of cointegrating vector (r) among the time-series variables, trace test and maximum eigenvalue test are used in this study. Table 4.4 reveals the results of both trace test and maximum eigenvalue test. Both trace test and maximum eigenvalue test reject the null hypothesis (H_0: r = 0) at 0.05 level. This means that the dependent and independent variables have one or more cointegrating vector. Based on the results, trace statistics are rejected at $r \leq 3$ at 0.05 significant level. It indicates no more than four cointegrating vectors at the 0.05 significant level. While maximum eigenvalue test is rejected at H_0: $r = 2$ at 0.05 significant level, which means that the variables are cointegrated at r = 3. In conclusion, this study has 3 cointegrating vectors among the variables with the lag length of 3. In another word, there is a long-run relationship between independent and dependent variables.

Table 4.4: Results of Cointegration Test

H_0	Trace Statistics	0.05 Critical Value	Max-Eigen Statistics	0.05 Critical Value
None	163.7124	69.8189**	67.1123	33.8769**
At most 1	96.6001	47.8561**	55.7852	27.5843**
At most 2	40.8149	29.7971**	25.0697	21.1316**
At most 3	15.7452	15.4947**	14.1518	14.2646
At most 4	1.5934	3.8415	1.5934	3.8415

*Note: ** denotes the rejection of null hypothesis at 0.05 significant level.*

4.4 Vector Error Correction Model (VECM)

$$\ln GDP = 0.1288 + 0.0938\ \ln EX - 0.0052\ \ln IM - 0.0246\ \ln CR - 0.0853\ \ln DB - 0.6238\varepsilon$$
$$(2.4647)^{**} \quad (-0.3479) \quad (-1.1338) \quad (-3.2990)^{**} \quad (-4.1244)^{**}$$

***Note**: ** denotes significant at 5.0 percent significance level. The figure in the parenthesis (...) represent as t-value.*

The long-run equation of InGDP above shows the empirical results of this research study.

The theoretical hypothesis is as below:

H1: Malaysia exports to Singapore has significant relationship with Malaysia's economic growth

The *t-value* of InEx is significant at 5.0 percent significant level, so the empirical results support the theoretical hypothesis in which Malaysia exports to Singapore (InEX) has significant relationship with Malaysia's economic growth (InGDP). This is because Malaysia is an export-oriented country in which highly dependent on export activities to compete in international market. This finding is consistent with existing literature such as Iqbal et al. (2017), Vianna (2016) and Marukawa (2017).

The results also show positive relationship between Malaysia exports to Singapore and Malaysia's economic growth. When Malaysia has 1.0 percent increase in export production to Singapore, it will stimulate economic growth by 0.0938 percent. This is because Singapore has low resources and its strategic location connecting east and west shipping line enable Malaysia to fulfil large external demand. According to Maswana (2014), expansion in exports will lead to the specialization in higher value-added exported products and in turn increase the economic growth.

H2: Malaysia import from Singapore has significant relationship with Malaysia's economic growth

The *t-value* of InIM does not significant at 5.0 percent significant level. Hence, the empirical result is Malaysia imports from Singapore (InIM) does not have significant relationship with Malaysia's economic growth. This does not support the theoretical hypothesis but the empirical result of not significant relationship is corroborated with Marukawa (2017) and Iqbal et al. (2017).

Malaysia imports from Singapore does not affect Malaysia's economic growth probably due to the economic slowdown and depreciation in Malaysia Ringgit during the period of 2008 and 2016. These external environment might cause slowdown in the domestic consumption and therefore there is negative relationship between Malaysia import from Singapore and Malaysia's economic growth. The results show that when Malaysia has 1.0 percent increase import from Singapore, the GDP decreases 0.0052 percent.

H3: Malaysia inward foreign direct investment by Singapore has significant relationship with Malaysia's economic growth.

The *t-value* of InCR does not significant at 5.0 percent level. Hence, the empirical results also do not support the theoretical hypothesis. This means that Malaysia inward foreign direct investment by Singapore (InCR) has no significant relationship with Malaysia's economic growth. The results of not significant relationship between Malaysia inward foreign direct investment by Singapore and Malaysia's economic growth is the same as noted by Adams and Klobodu (2017), Abbes, Mostefa, Seghir and Zakarya (2015) and Alvarado et al. (2017). A reason for this unsubstantial impact of foreign direct investment by Singapore on Malaysia's economic growth is because the contribution of foreign direct investment to Malaysia's GDP growth is insignificant (Foreign Direct Investment, percent of GDP – country rankings, 2018).

Besides that, a 1.0 per cent increase in foreign direct investment by Singapore will decrease the Malaysia's GDP by 0.0246 percent. The negative relationship between lnCR and InGDP might be due to presence of growth-limiting effects of foreign direct investment such as the shortage of skilled workforce in Malaysia. According to Saieed (2017), Singaporean firms who relocate their business in Malaysia find it difficult to have employee with right skills and knowledge due to mismatch of wages. There is no talent workforce available to fully absorb the benefits gained from inward direct investment. Therefore, Malaysia's economy experiences negative growth when the inward foreign direct investment by Singapore increases.

H4: Malaysia outward foreign direct investment in Singapore has significant relationship with economic growth

The *t-value* of InDB is significant at 5.0 percent significant level. The empirical results support the theoretical hypothesis which is Malaysia outward foreign direct investment in Singapore (InDB) has significant relationship with Malaysia's economic growth. The significant results is consistent with existing literature such as Herzer (2008), Lee (2010) and Ameer and Xu (2017). The significant impact of InDB on InGDP might because of the economic liberalization as well as the globalization of production pattern. Malaysia can outward foreign direct investment to seek for cheaper or limited resources and exploit opportunity granted by foreign market to complement domestic production.

However, outward foreign direct investment in Singapore has negative relationship with Malaysia's economic growth. When Malaysia makes outward foreign direct investment in Singapore, the GDP decreases by 0.0853 percent. According to DOS (2016), Malaysia major invest in financial and insurance service sector of Singapore. The negative impact of outward foreign direct investment in Singapore towards Malaysia's economic growth might because the

investment in financial and insurance service sector do not allow Malaysia to bring back any proprietary technology or human capital that can enhance its GDP growth.

The coefficient of error correction term, $\mathcal{E}$ is -0.6238, which is negative and significant implies that the error term can be adjusted towards the long-run equilibrium at a rate of 62.4 percent over each quarter.

4.5 VECM Granger Causality Test

The VECM granger causality test shows the direction of causality among the variables in this model. The results regarding the VECM granger causality test are reported in Table 4.5. The coefficient of ECT_{t-1} in ΔlnGDP equation is negative and significant which is -0.62379, indicates there is long-run Granger Causality between variables.

The results depict that Malaysia exports to Singapore (InEX) and Malaysia outward foreign direct investment in Singapore (InDB) have strong unidirectional causality to Malaysia's economic growth (InGDP) because the null hypothesis of InEX and InDB do not granger cause on InGDP are rejected at 0.01 significant level. Hence, it can be concluded that Malaysia exports to Singapore and Malaysia outward foreign direct investment in Singapore will granger cause on Malaysia's economic growth in the long run.

The unidirectional causality where exports and outward foreign direct investment to economic growth are also supported by Maswana (2014) and Lee (2010) respectively. On the other hand, Malaysia inward foreign direct investment by Singapore (InCR) and Malaysia imports from Singapore (InIM) have no causal relationship with Malaysia's economic growth (InGDP). The absence of significant casual flows between imports, inward foreign direct investment and economic growth are also found by Din (2004) and Rahman (2009) respectively.

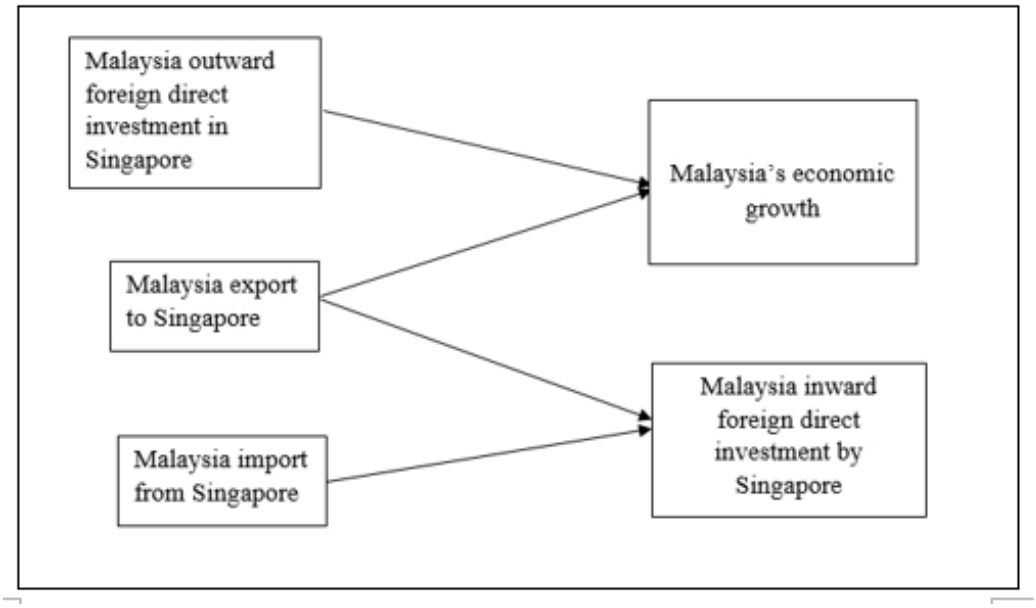
Besides that, the granger causality results show that there is a unidirectional causality running from InEX and InIM to InCR. In another word, when Malaysia exports to and imports from Singapore for quite some time, Singaporean firms eventually will make foreign direct investment in Malaysia. The reasons could be due to the high cost of doing business in Singapore and the limited land space for firms to expand its capacity. The unidirectional causality run from exports and imports to inward foreign direct investment are also proved by Ekanayake, Richard and Veeramacheneni (2003) and Ahmed, Cheng and Messinis (2011) respectively.

Table 4.5: Granger Causality Result based on VECM

	Independent Variables					
Dependent	**χ^2 -statistics of lagged 1st differenced term [p-value]**					**ECT_{t-1} coefficient**
Variable	**ΔLGDP**	**ΔLEX**	**ΔLIM**	**ΔLCR**	**ΔLDB**	**(t-ratio)**
ΔLGDP	-	29.5999 [0.0000]***	1.7154 [0.6335]	0.1333 [0.9876]	14.8762 [0.0019]***	-0.6238 (-4.1244)**
ΔLEX	0.1787 [0.9809]	-	2.2672 [0.5188]	4.7783 [0.1888]	0.6237 [0.8910]	
ΔLIM	3.1256 [0.3727]	2.9932 [0.3927]	-	7.4948 [0.0577]	5.5246 [0.1372]	
ΔLCR	3.3937 [0.3348]	9.0554 [0.0286]**	15.3420 [0.0015]***	-	4.5892 [0.2045]	
ΔLDB	1.0473 [0.7898]	0.5021 [0.9184]	4.1964 [0.2410]	5.9371 [0.1147]	-	

***Note**: *** and ** denotes significant at 1.0 percent and 5.0 percent significance level, respectively. The figure in the parenthesis (...) denote as t-statistic and the figure in the squared brackets [...] represent as p-value.*

Figure 4.1: Granger Causality Diagram



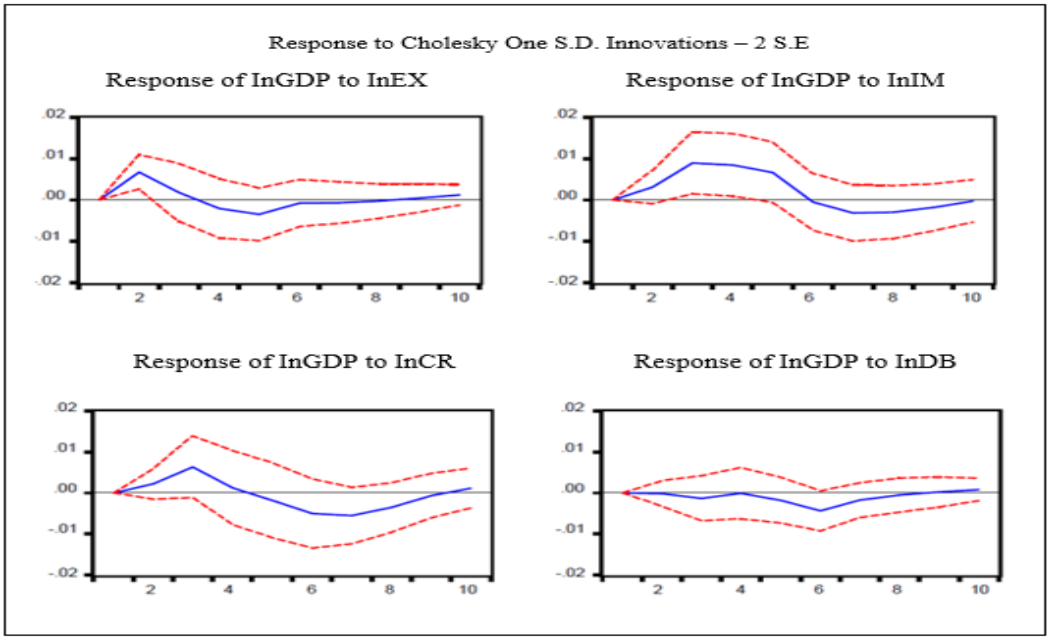
4.6 Impulse Response Function

Figure 4.1 indicates ten quarter response of dependent variable towards the shocks stemming from other independent variables under vector autoregressive (VAR) system. The results show that one standard deviation innovative shock in exports will increase economic growth within one year, and it increases significantly over the third quarter as the lower confidence interval (the two standard deviation band denoted by dotted line) crosses the zero line. Economic growth also reacts positively and significantly to structural innovations in imports in the sixth quarter. Albeit one standard deviation innovative shock in inward foreign direct investment will increase economic growth in a year, but it is insignificant. Imports seem to have the greatest impact on economic growth in the short run because the positive and significant impact of imports on economic growth has the longest period of time.

The response of economic growth to a shock in the outward foreign direct investment is negative and not significant in the short run as the lower two standard deviation are below the zero line for the entire time horizon. It is logic as

Malaysian government is spending money out of the country and the investment has not yet generated income for the economic growth in a short period of time.

Figure 4.2: Results of Impulse Response Function



4.7 Variance Decomposition

Economic growth in Malaysia is very sensitive to its own shock and other variables. According to Table 4.6, 100.0 percent of the variation of economic growth is explained by itself in the first quarter and that this slowly drop to about 42.0 percent in tenth period. This implies that economic growth is the endogenous variables. Exports, imports, inward foreign direct investment and outward foreign direct investment explain economic growth by 8.9 percent, 29.5 percent, 15.7 percent and 3.8 percent respectively in the tenth period. This shows that imports is the most important determinant of economic growth in Malaysia in the short run. While economic growth is not very responsive to exports and the response of economic growth towards the outward foreign direct investment is the least.

Table 4.6: Results of Variance Decomposition

Variance Decomposition of InGDP:					
Period	**InGDP**	**InEX**	**InIM**	**InCR**	**InDB**
1	100.0000	0.0000	0.0000	0.0000	0.0000
2	81.2483	14.2663	3.0339	1.4382	0.0133
3	62.6371	9.8207	18.1133	9.0421	0.3868
4	54.8769	9.1431	27.6860	7.9613	0.3328
5	49.5277	10.1712	31.7776	7.6981	0.8255
6	46.1871	9.5800	29.6748	10.9486	3.6095
7	43.5032	9.0315	29.1693	14.4753	3.8208
8	42.4196	8.7486	29.4015	15.6932	3.7371
9	42.2009	8.7248	29.6865	15.6675	3.7203
10	42.1028	8.8525	29.5308	15.7352	3.7786

4.8 Stability Diagnostic

Figure 4.3 and Figure 4.4 represent the results of cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) test on the recursive residuals. The results reveal that the statistics of CUSUM and CUSUMSQ test are within the critical bound of 0.05 significant level. Hence, it can be concluded that the residuals are structural stable in the equation of InGDP.

Figure 4.3: Plot of Cumulative Sum (CUSUM) of Recursive Residuals

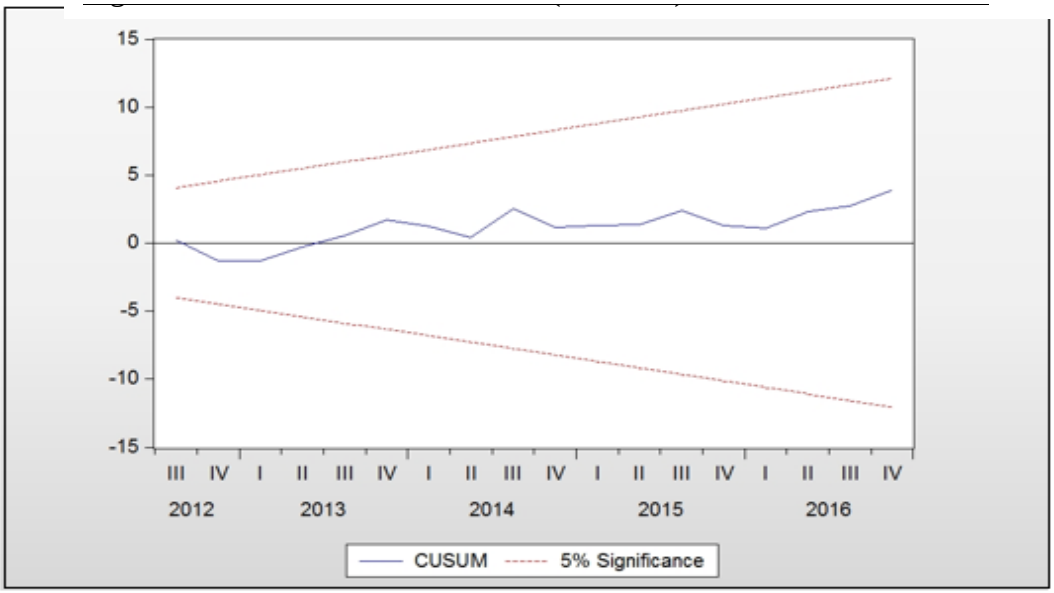
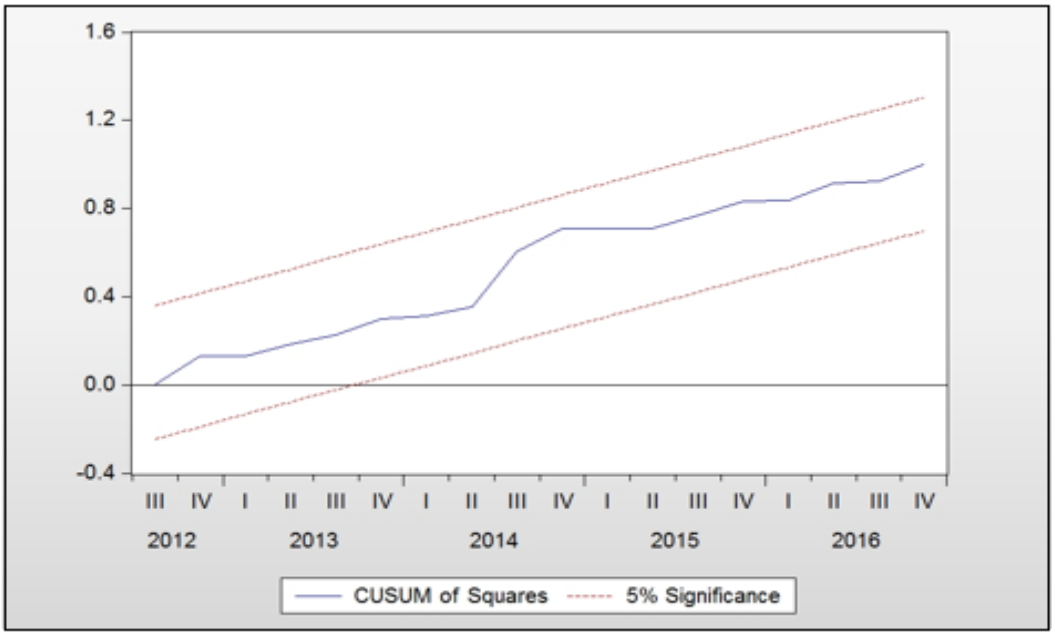


Figure 4.4: Plot of Cumulative Sum of Squares (CUSUMSQ) of Recursive Residuals



4.9 Residual Diagnostic

Regarding the normality test, the ρ-value of jarque-beta (JB) statistic is 0.4651, which is more than the 5.0 percent significant level. The result concludes that the null hypothesis is not rejected as well as it indicates the error term is normally distributed.

The probability of chi-squared shown in breusch-godfrey serial correlation LM Test is 0.5361. Since the ρ-value is more than 5 percent significant level, the null hypothesis is not rejected. This implies that the error terms do not have autocorrelation problem.

In the autoregressive conditional heteroscedasticity (ARCH) test, the probability of chi-squared is 0.2158. This means that the error term is homoscedasticity as the ρ-value is more than 0.05 significant level.

According to the rule of thumb, if the variance inflation factor (VIF) of variables is more than 10, the variables are said to be highly collinear to each other. Since the VIF of all variables are less than 10, it can be concluded that there is no multicollinearity among the explanatory variables.

Since the error term is uncorrelated, homoscedasticity, normally distributed and the variables are not collinear to each other as a result of various tests, we assume that the regression model is linear, the error term has zero population mean, and all explanatory variables are uncorrelated with the error term. Therefore, we have fulfilled all the assumptions. The ordinary least square (OLS) method is considered to be the best linear unbiased estimator (BLUE) and our results are proved to be accurate.

Table 4.7: Results on the Residual Diagnostic

Residual Diagnostic	Probability
Normality Test	0.4651
Breusch-Godfrey Serial Correlation LM Test	0.5361
Heterosckedasticity Test: ARCH	0.2158

Table 4.8: Results of Variance Inflation Factor (VIF)

Variable	Uncentered VIF	Centered VIF
ECT	4.1305	4.1305
D(lnGDP(-1))	7.3339	7.3331
D(lnGDP(-2))	5.4491	5.4427
D(lnGDP(-3))	2.2690	2.2642
D(lnCR(-1))	3.6287	3.6282
D(lnCR(-2))	2.9854	2.9797
D(lnCR(-3))	2.7994	2.7900
D(lnDB(-3))	1.5147	1.5120
D(lnEX(-2))	4.5311	4.5304
D(lnEX(-3))	6.1463	6.1243
D(lnIM(-1))	2.2642	2.2486
D(lnIM(-2))	2.4090	2.4047
D(lnIM(-3))	5.0705	5.0693
C	1.0794	NA

4.10 Conclusion

In a nutshell, this study uses times series econometrics test to analyse the dynamics of the data. First and foremost, unit root test is applied to figure out whether all the variables are stationary or non-stationary. Based on the results of augmented dickey fuller (ADF), phillips-perron (PP), and dicker-fuller GLS unit root test, all the logged variables are stationary at first difference. Since all variables are integrated of first order I(1), we proceed to johansen & juselius cointegration test. Using AIC and SC lag order criteria selection, we found that lag length of 3 is the best for undergoing this cointegration test.

The trace statistics and maximal eigenvalue statistics reveal that the empirical model has 3 cointegrating vector and a long run relationship exists among the variables. Therefore, we proceed with VECM approach. The VECM results show that only Malaysia exports to Singapore (InEX) and Malaysia outward foreign direct investment in Singapore (InDB) are significant to Malaysia's economic growth (InGDP). On the other hand, Malaysia import from Singapore (InIM), Malaysia inward foreign direct investment by Singapore (InCR) have no significant relationship with Malaysia's economic growth.

Granger causality is being used to determine the causality direction of the model in the long run. From the results, it clearly shows that InEX and InDB will granger cause on InGDP in the long run. Surprisingly, InEX and InIM will granger cause on InCR in the long run. While the results of both impulse response and variance decomposition confirm that InIM plays a significant role to the economic growth in the short run.

Last but not least, stability and residual diagnostic are performed. The results of CUSUM and CUSUMSQ test prove that this empirical model is stable with no structural break in the residuals. The results of this regression model is accurate because it has fulfilled all the assumptions of a BLUE as the error term is uncorrelated, homoscedasticity, normally distributed, the variables are not collinear to each other, the regression model is linear, the error term has zero population mean, and all explanatory variables are uncorrelated with the error term.

In conclusion, this chapter presents all the empirical results and findings in the form of figure and table. The detailed explanations are written in each part of the test. The findings and implications of the whole study, limitations, and suggestions will be discussed in the chapter 5.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATION

5.0 Introduction

This chapter provides discussion of major findings found from the previous chapter. Based on the discussion, users can get some implications from the overall research. Nonetheless, this research has some limitations and the recommendations are provided.

5.1 Discussion of Major Findings

According to vector error correction model (VECM) outcome, Malaysia exports to and outward foreign direct investment in Singapore have significant relationship with Malaysia's economic growth. While Malaysia imports from Singapore and inward foreign direct investment by Singapore do not affect Malaysia's economic growth. The overall summary is shown in Table 5.1.

Malaysia exports to Singapore will affect Malaysia's economic growth because Malaysia is highly dependent on exports as its engine of growth. When Malaysia exports more to the Singapore, Malaysia's economic growth is increased because the expansion in exports enable Malaysia specialized in the production and achieve economies of scale. With the advanced technology and low cost of production, the output productivity increase and thus promote economic growth.

Malaysia outward foreign direct investment will also affect Malaysia's economic growth due to the economic liberalization and the globalization of production pattern. This is because the low entry barriers allows Malaysia to move outside of its boundary to seek for cheaper resources, obtain inputs that are unavailable in the home country, as well as bring in foreign technical skills to improve domestic production. However, Malaysia mostly outward foreign direct investment in Singapore's service sectors. This does not allow Malaysia to bring back any proprietary technology or talent that capture value for Malaysia, therefore, Malaysia outward foreign direct investment in Singapore has negative relationship with Malaysia's economic growth.

On the other hand, Malaysia imports from Singapore has no relationship with Malaysia economic growth. The reasons might due to the economy slowdown as well as depreciation in Malaysian Ringgit. These external environment might lead to the decrease in domestic consumption. Hence, the expansion in the Malaysia imports from Singapore will have negative impact on the economic growth of Malaysia.

Last but not least, the contribution of foreign direct investment towards Malaysia's gross domestic product (GDP) growth is still insignificant. Hence, the results show that Malaysia inward foreign direct investment by Singapore has no significant relationship with Malaysia. However, the foreign direct investment by Singapore lead to the decrease in GDP. The reasons could be the insufficient talented workforce which hinder the growth effect of foreign direct investment. This is because the low-skilled labour has low innovation and low output productivity which can have adverse impact on the economic growth. This reason has been supported by Saieed (2017) noted that Singaporean firms who have invested in Iskandar find difficult to have Malaysians with right skills and knowledge due to the mismatch of wages.

Table 5.1: Discussion of Major Findings

Independent Variable	Dependent Variable	Actual Result
H1: Malaysia exports to Singapore	Malaysia's economic growth	Positive relationship and significant at 5.0 percent level
H2: Malaysia imports from Singapore		Not significant
H3: Malaysia inward foreign direct investment by Singapore		Not significant
H4: Malaysia outward foreign direct investment in Singapore		Negative relationship and Significant at 5.0 percent level

5.2 Implication of the Study

The results shown in the research can provide insight to the Malaysian government policy makers and domestic firms in making strategic decision.

The results show that imports will increase economic growth in the short run and export enhances the economic growth in the long run. Hence, domestic small and medium enterprises (SMEs) can focus on importing proprietary technology and human talent to produce quality products for future export purpose in order to stay

competitive against international competitors. The transfer of skills and knowledge from foreigners to local can occur through imports.

Besides that, Malaysia government policy maker can implement various campaign and provide incentives to encourage local firms to make more export to Singapore. This is because Singapore is a good exporting destination due to the large demand of Singaporean and exposure to other foreign markets. When there is expansion in exporting, Malaysia can specialized in production and achieve economies of scale to increase output productivity.

The results also states that outward foreign direct investment is significant to the economic growth in the long run. Hence, aside from financial sector, Malaysians government policy makers and domestic SMEs can make foreign direct investment in other sectors that allow Malaysia to bring in proprietary technology and human capital from Singapore in order to enhance Malaysia's economic growth.

Furthermore, the results show the negative impact of foreign direct investment by Singapore on Malaysia's economic growth. There are some reasons that prohibit the growth effect of inward foreign direct investment by Singapore. One of the reasons is the shortage of skilled labour when Singaporean firms have physical presence in Malaysia, Hence, Malaysia government policy makers can address this issue promptly.

The granger causality results show that the trading partnership between Malaysia and Singapore will attract Singapore to make investment in Malaysia. It is actually a good practice as the establishment of foreign firms in Malaysia can create more job opportunities and local workers can learn overseas knowledge by just staying in Malaysia. Besides that, from the perspective of domestic firms, they are

motivated to innovate to compete with foreign rivals. Hence, Malaysian government policy makers can apply this scenario on its other trading partner.

5.3 Limitation of the Study

In this research, there are some limitations. The first limitation is that there are limited existing literature review discussing about the impact of export, import, inward and outward foreign direct investment on economic growth between two countries. Hence, the outcome might not be the same as the existing literature because most of the study's target is referring to individual country. The study of individual country and two country bilateral relationship might pose different results.

Besides that, there is a lack of moderating or intermediating variables in this research. Explanatory variables such as exports, imports, inward foreign direct investment and outward foreign direct investment are used in this research to determine the Malaysia's economic growth. There might be other controlling variables causing the changes in the results.

Last but not least, another limitation is that the data coverage for the research study. This research only cover quarterly data from period 2008 to 2016 due to the data available. Even though it has 36 observations which has fulfilled the assumption of Central Limit Theorem, there is a constraint in selecting the appropriate lag length due to the inadequate lag order.

5.4 Recommendation for Future Research

For future research study purpose, researchers can study the impact of exports, imports, inward foreign direct investment, outward foreign direct investment on the economic growth of Malaysia and Singapore respectively. The researchers can compare the results and study the role of macroeconomics in each country because different countries have different result.

In addition, the future research should include moderating or intermediating variables to examine the impact of independent variables on economic growth. This is because the trading and investment activities might be influenced by other variables and indirectly affect Malaysia's economic growth. Financial institutions, market size, geographical distance, and capacity to absorb technology can be included as controlling variable in order to make the study more interesting.

Last but not least, researchers should use longer period to analyse data in order to obtain adequate lag order. By that time, they can choose the most appropriate lag length and obtain more accurate results. Researchers could also try other data categories such as panel data or cross-sectional data for more different possible results.

5.5 Conclusion

This study discussed the existence of relationship between Malaysia exports to Singapore, Malaysia imports from Singapore, Malaysia inward foreign direct

investment by Singapore, Malaysia outward foreign direct investment in Singapore and Malaysia's economic growth.

The results show that only Malaysia exports to Singapore has significant and positive relationship with Malaysia's economic growth. Hence, it can be concluded that Malaysia economic growth is enhanced by exporting to Singapore. In another word, Singapore and Malaysia has complementary relationship on exporting activities only.

Besides that, Malaysia outward foreign direct investment in Singapore is significant to Malaysia's economic growth, however, there is a negative relationship. The majority investment in Singapore's service sectors seems like did not provide any backward linkage. Therefore, Malaysian government policy makers and local firms can focus on investing in value-added manufacturing sectors.

Both imports and inward foreign direct investment are showed to be not significant and negative to Malaysia's economic growth. This can be said that Malaysia import from Singapore and Malaysia inward foreign direct investment by Singapore do not help to increase Malaysia's economic growth.

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