THE RELATIONSHIP OF GOVERNMENT EXPENDITURE, POPULATION, EXCHANGE RATE, TRADE OPENNESS AND ECONOMIC GROWTH IN MALAYSIA

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DECLARATION

I hereby declared that:

1) This MKMA25106 Research Project is the end result of my 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 supporting of any application for any other degree or qualification of this or any other university.

3) The word count of this research report is __18991__ words

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DEDICATION

The research project is dedicated to those who had fully supported me throughout my study life. I am glad and would like to devote this research project to my parents who had given their full support with encouragement throughout the years. My siblings and friends are dedicated as well for their continuous help and support without reciprocate.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
C	Constant
ECM	Error Correction Mechanism
ECT	Error Correction Term
ER	Exchange Rate
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product per capita
GE	Government Expenditure
GNI	Gross National Income
IMF	International Monetary Fund
LER	Logged Exchange Rate
LGDPPC	Logged Gross Domestic Product per capita
LGE	Logged Government Expenditure
LM	Lagrange Multiplier
LPOP	Logged Population
LTO	Logged Trade Openness
MIDA	Malaysia Investment Development Authority
NEM	New Economic Model
OECD	Organization for Economic Co-operation Development
OLS	Ordinary Least Square
POP	Population

PP	Phillips-Perron
RM	Ringgit Malaysia
TO	Trade Openness
UEMOA	Union of et Monetaire Africaine
UOW	University of Washington
USD	United State Dollar
VAR	Vector Autoregression
VECM	Vector Error Correction Model
WB	World Bank
WDI	World Development Indicator

ABSTRACT

This paper examines the short term and long term relationship between government expenditure, population exchange rate, trade openness and gross domestic product per capita (GDPPC) growth in Malaysia. This research examines the relationship between government expenditure, population exchange rate, trade openness and economic growth in Malaysia from year 1970 to year 2012 which consists of 43 observations. This paper utilizes several analysis tools such as Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Unit Root Test, Johansen Test of Cointegration, Granger Causality, Vector Error Correction and Model (VECM) to evaluate the relationships. ADF Unit Root Test issued to determine whether the data is stationary. Johansen Test of Cointegration is utilized to indicate the number of cointegrating equations which exists among the variables. VECM Model will be used to examine the long run and short run relationships between the variables after the formation of cointegrating equations exists. Lastly, Granger Causality Test used to clarify the effects on the growth of GDPPC in the future following government expenditure, population, exchange rate and trade openness granger of current year. The appropriate interpretation for the above models will be provided and empirical issues will also be addressed.

CHAPTER 1

RESEARCH OVERVIEW

1.0 Introduction

The dynamic and significant changes of global economies structure where the globalization, liberalization, government policies of the worldwide nations will have impacts on the global economies including Malaysia. The substantial global economies changes result doubt on the relationship between government expenditure and economic development and the significance of population, exchange rate and trade openness. This research thereby will investigate the impacts of government expenditure, population exchange rate and trade openness on economic growth in Malaysia. This chapter will discuss background of the research, problem statements, research objectives, research questions, summary of hypotheses, significance of study, chapter layout as well as the conclusion.

1.1 Research Background

Since 1957, Malaysia has made a great leap which transforms the country economy from primary commodities to an energetic and dynamic nation of industrializing. On the other hand, cost effective workforce, Malaysia economical and political stability, pragmatic and prudent investor friendly business policies,

and developed infrastructure had made Malaysia becomes an enticing place for foreign investors. Today, Malaysia had been chosen as one of the world's top nations for service-based operations and offshore manufacturing. Besides, many existing foreign corporation have continued to choose Malaysia as an investment location through their several diversifications and expansions over the years especially in projects of high technology. (Malaysia Investment Development Authority, 2013)

According to World Bank (2013), Malaysia is an upper-middle income nation with gross national income (GNI) per capita of USD 8,770 in year 2011. On top of that, Malaysia is a highly open economy and one of the top exporters of electronic accessories and components, natural gas, palm oil, and electrical appliances. Besides, Malaysia has also grown from being a raw materials producer such as rubber and tin in the 1970s to a diversified economy which has an average growth of 7.3% from 1985 to 1995.

Malaysia growth rates were continued to be solid from year 2000 to 2008 with an average of 5.5% per year after Asian financial crisis. Growth was accompanied by a dynamic poverty reduction from 12.3% to 2.3% from year 1984 to 2009. Nevertheless, income equality and pockets of poverty remain high compared to the developed countries. (WB, 2013)

After that, New Economic Model (NEM) had been commenced by Malaysia to become a nation of high income in year 2020 while ensuring that economic growth is also inclusive and sustainable. NEM predicts that private sector is the main sector to drive the economic growth which leads Malaysian economy into higher value-added activities in both services and industry sectors. Malaysia will need better knowledge base, better skills, more competition, smarter cities, a leaner public sector, and greater efforts to make sure environmentally sustainability in order to achieve these objectives. (WB, 2013)

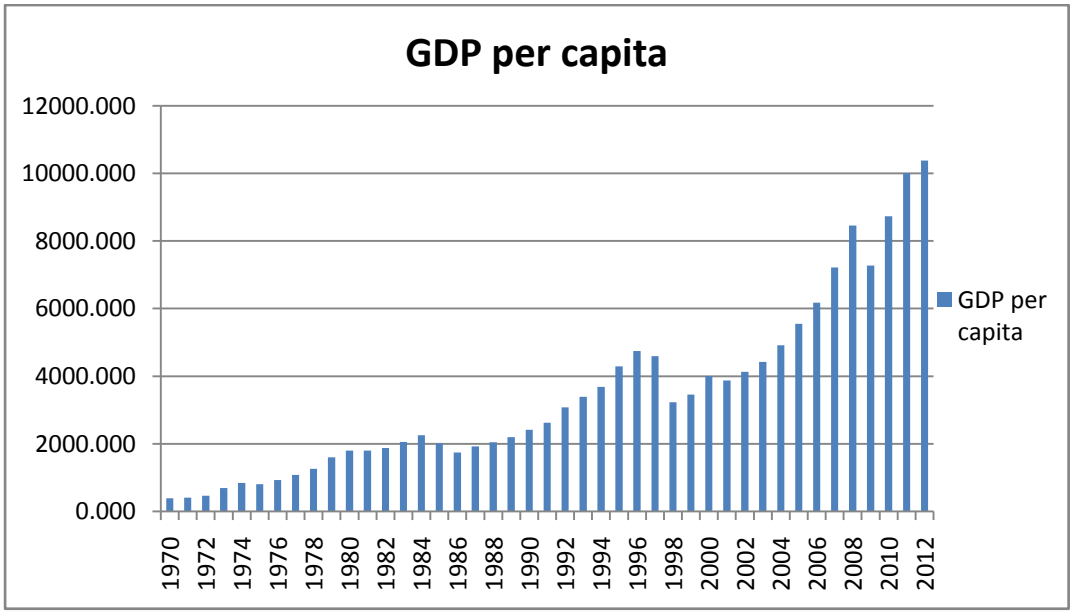
Besides, Malaysia as an open economy had achieved its economic development goals which highly depend on foreign trade. Foreign trade has become one of the

important elements of Malaysia gross domestic product (GDP) in the past thirty years which demonstrating international trade has been playing a significant role in Malaysian economic growth. (Yusoff, 2005)

Malaysia economy is projected to maintain on a sustainable growth from year 2013 to 2017. Growth in 2013 is estimated to slow slightly which is 4.5%. A return to trend for gross fixed investment will partially reflected by the slowdown which surged in the first half of 2012 as Malaysia government had launched a number of large infrastructure projects. (Malaysia Economic Report, 2012)

The major objectives of this research are to investigate the short run and long run relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. Besides, relationship of causality between these variables is part of this research.

Figure 1.1 Malaysia GDP Per Capita



Note: Adapted from World Bank (2013)

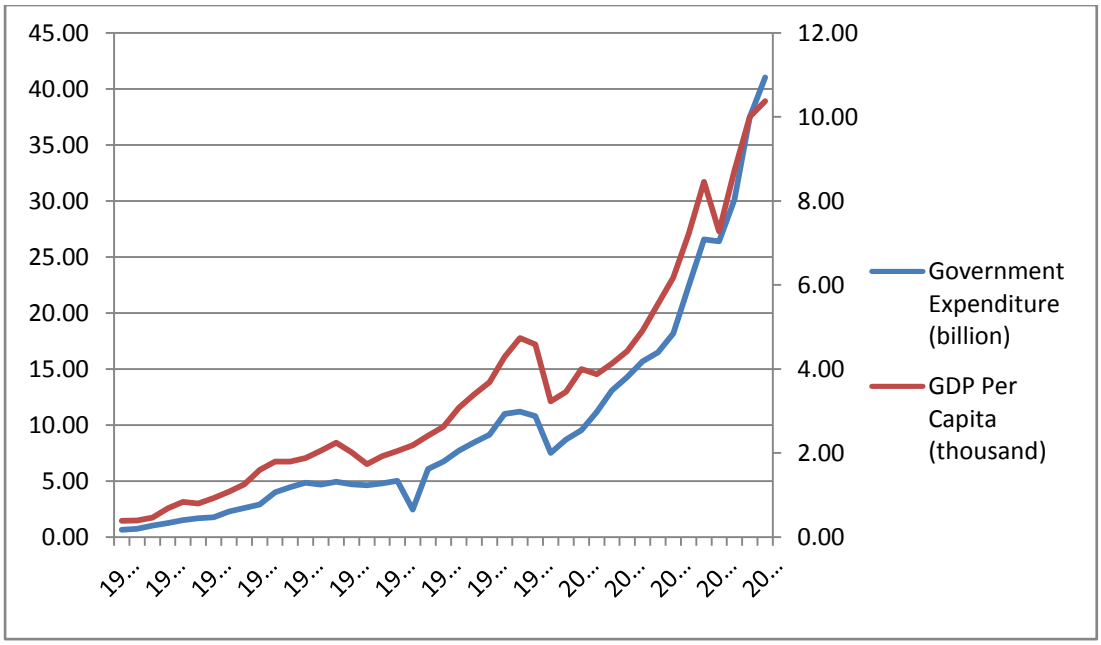
The GDP per capita is defined as sum of gross value added by all resident producers in the economy plus any taxes from products and less any subsidies which are not incorporated in the products value. GDP per capita is calculated

without deductions of fictional assets depreciation and natural resources depletion. (WB, 2013)

Figure 1.1 shows the GDP per capita of Malaysia from year 1970 to 2012. The graph shows that GDP per capita has a significant upward sloping from left to right which indicate that Malaysia GDP per capita is rapidly growing during the period of time. Historically, Malaysia GDP per capita has increased from USD 392.04 in year 1970 to USD 10380.53 in year 2012. Although there are some significant reduction in growth during the period such as 1997 to 1998 and 2009 to 2010, this phenomenon may due to the impacts from Asian financial crisis and also global financial crisis in year 2007 and 2008.

1.1.1 Government Expenditure and Economic Growth

Figure 1.2: Malaysia Government Expenditure and Economic Growth



Note: Adapted from World Bank (2013)

Figure 1.2 shows the government expenditure and GDP per capita of Malaysia from year 1970 to 2012. The left axis represents government expenditure in term of billion while the right axis represents GDP per

capita in thousand. The graph indicates that government expenditure and GDP per capita is rapidly growing during the period of time with an upward sloping curve, illustrating a positive impact on economic growth resulted from government expenditure.

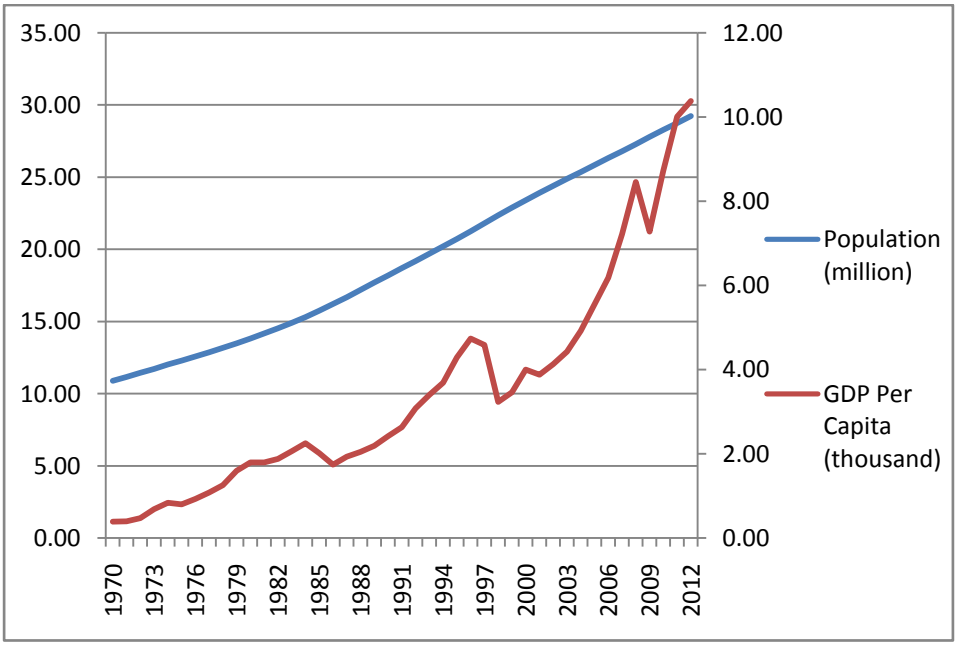
According to Arshad and Mustapha (1987), governments have played significant role in affecting aggregate economic activities level in most of the economies. There are two policy options which called monetary and fiscal policies. The former is associated to the interest rate, money demand, as well as the control and management of money supply, while the latter is related to expenditure and revenue of public. Although fiscal and monetary policies are autonomous in theory but they are cooperated with each other in influencing the overall economic performance.

In Malaysia context, government expenditure has been an important policy mechanism in the management and operations of the economy. The trend and pattern in the government expenditure have greatly influenced Malaysia economic growth greatly. Historically, Malaysia public expenditure had rapidly grown over the years. Thus, it is certainly to agree that government plays an important role in determining the decision of country resource allocation. (Arshad and Mustapha, 1987)

However, some researchers such as Awan, Azid and Sher (2011) and Pham (2009) found out that government expenditure is not necessary to have positive impact towards economic growth. Awan et al. (2011) concluded that unproductive government expenditure causes strong negative impact on economic growth while Pham (2009) identified that expenditure on social and general development also show significant negative relationship with economic growth.

1.1.2 Population and Economic Growth

Figure 1.3: Malaysia Population and Economic Growth



Note: Adapted from World Bank (2013)

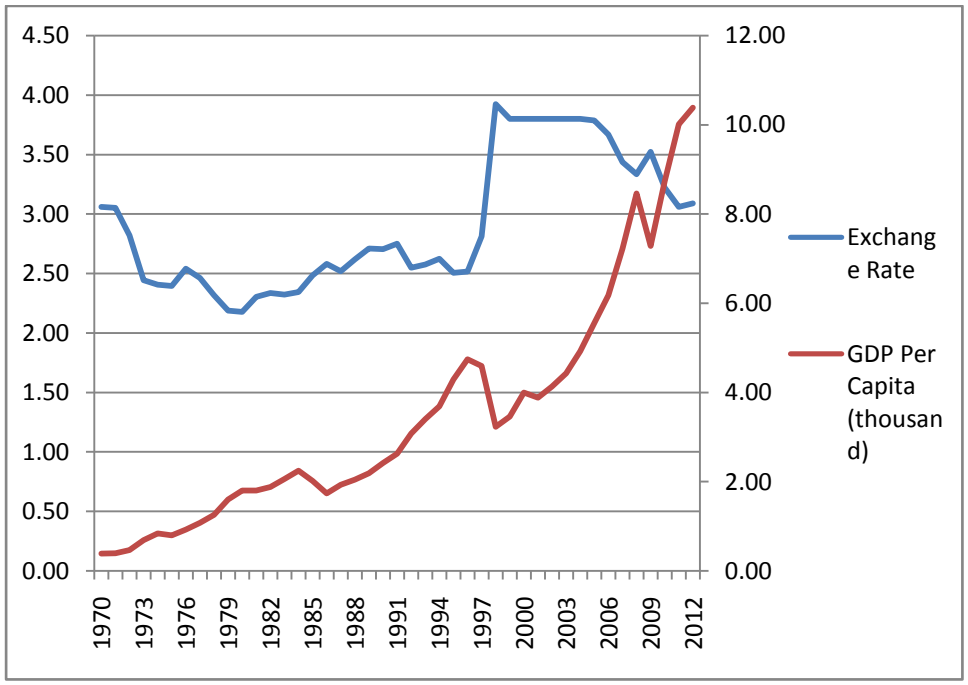
Figure 1.3 shows the relationship between population and GDP per capita from year 1970 to 2012. The left axis represents population in million while the right axis represents GDP per capita in thousand. According to figure 1.3, population should have a positive relationship with economic growth since both variables have upward sloping from left to right. The population had continuously increased from approximately 11 million in year 1970 to 29 million in 2012. Meanwhile, GDP per capita also rose from USD 392 in 1970 to USD 10380 in year 2012.

However, population is another arguing issue that the negative and positive effects on economic development are still intricate on most economists. According to Pham and Tran (2011), Malthus (1826) stated that population can reduce the GDP per capita due to population increase in rate of geometrical while production in rate of arithmetic. Thus, the growth rate cannot be kept at the same pace. However, Solow (1956)

stated that an increase in the population can decline the per worker capital. As a consequence, higher population growth can bring the detriment to productivity and economic growth.

1.1.3 Exchange Rate and Economic Growth

Figure 1.4: Malaysia Exchange Rate and Economic Growth



Note: Adapted from World Bank. (2013)

US currency had been used to compare with RM as the exchange rate indicator in this research with its strongest economic power in the past 40 years. Besides, US currency has also been widely used as an international exchange rate to compare with the home currency since USD is relatively static compared to other currencies.

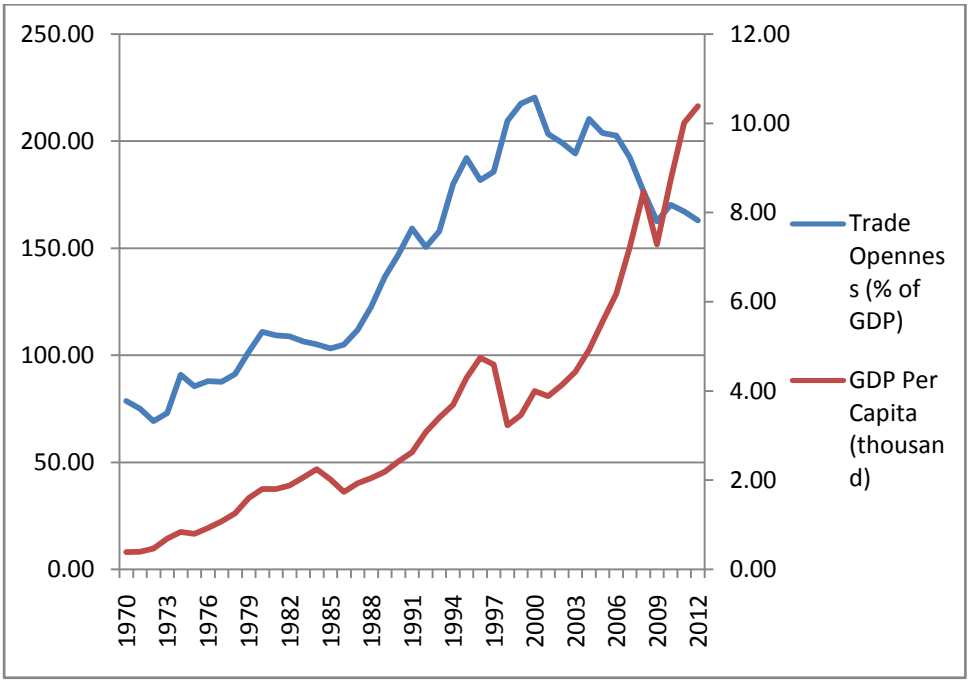
Figure 1.4 illustrates the movement of exchange rate and GDP per capita over 43 years, starting from year 1970 to 2012. The left axis represents the exchange rate which RM over USD while right axis represents GDP per capita in thousand. Based on the graph, it is unclear in identifying the association between economic development and exchange rate. Initially,

Malaysia exchange rate was 3.06. However, the exchange rate was facing a drop continuously to 2.18 in year 1980. Nevertheless, the exchange rate showed a rebound to 2.75 in year 1991. After that, a minor drop was occurred with falls of exchange rate to 2.52 in year 1996. Next, the exchange rate increased to 3.92 in two years. Then, a fixed exchange rate is applied to Malaysia at 3.80 for 6 years consecutively until year 2004. Lastly, the exchange rate declined for the next 8 years to 3.06 at the year 2012. However, GDP per capita shows a significant upwards trend which is not consistent with the exchange rate movement. Thus, the relationship behind the variables is unclear until an analysis is done to prove it.

Exchange rate is one of the important issues because it might create plenty of negative effects the exchange rate is misaligned. One of them is that misalignment in real exchange rate will deteriorate the balance of external, hence reducing net exports by undermining an economy external competitiveness through the exports price rising while reducing imports price. Besides, misalignment of real exchange rate will lead to resources misallocation which results in unfavorable effect on domestic investment as well as output. Last but not least, real exchange rate misalignment will also distort the financial markets by inducing speculative attacks against national currencies. (Yol, 2009) Thus, examining the relationship between economic development and exchange rate would be very significant for government to better monitoring and managing the exchange rate.

1.1.4 Trade Openness and Economic Growth

Figure 1.5: Malaysia Trade Openness and Economic Growth



Note: Adapted from World Bank. (2013)

Figure 1.5 shows the relationship between economic development and trade openness in Malaysia from year 1970 to 2012. The left axis represent the trade openness which is calculated by percentage of GDP while the right axis represents GDP per capita in thousand. The graph shows significant positive relationship between GDP per capita and trade openness until year 2000 since both variables move in the same direction. However, trade openness started to move in opposite direction with GDP per capita from year 2000 onwards, indicating the possibility of occurrence of negative impacts on economic growth. Therefore, there is a need to investigate the relationship between these variables.

The trade openness of the Malaysian economy in terms of total trade to GDP ratio has increased over time. The average value of trade openness over year 1970 to1979 was 88.6%. Trade openness continued to increase

to an average ratio of 113.1% over year 1980 to 1989 period and 178.2% over year 1990 to 1999 period respectively. Trade openness achieves 220.4% in year 2000. Liberalization and globalization of world economy are expected to increase Malaysia trade openness. (Abdullah, Mohd Mustafa and Habibullah, 2009) However, trade openness encounters a reduction from 220.4% in year 2000 to 163% in year 2012.

Abdullah, Mohd Mustafa and Habibullah (2009) stated that the association between economic development and the country openness has been a widely debated topic among the economists, theoretically and empirically. Based on the comparative advantage theory, a country will export goods and services that have comparative advantage and import goods and services that have no comparative advantage. This will improve the efficiency and stimulate the economic growth. Hence, trade openness through export and import is estimated in supporting economic growth.

In a nutshell, four variables which are government expenditure, population, exchange rate and trade openness will be investigated to identify their relationship with economic growth in this study.

1.2 Problem Statements

Economic Growth (GDP) is theoretically influenced by consumption, investment, government spending, export and import. However, some previous researchers argued that there are other variables which may influence the economic growth. They are variables such as population, exchange rate, and also trade openness. The purposes of this research are to analyze and evaluate the role of government expenditure, population, exchange rate and trade openness. Besides, this research also ascertains their value in economic growth.

In fact, government expenditure is one of the components of GDP in Keynesian Theory. An increase in government expenditure should affect GDP positively. As evidence, Sajikumar (2006) found that an increasing in government expenditure will lead to increase in economic growth. Besides, Sajikumar (2006) also found that economic growth is granger cause government spending in India in a way of unidirectional. However, Malaysia had encountered fiscal deficit in the past decades which government spent excessively than it takes in, but yet economic growth was still lagged behind other countries' economies. Hence, an investigation should run to study Malaysia's short and long run relationship between government expenditure and economic development. Besides, the direction of the causality should also be justified.

On the other hand, population generally should have positive impacts on economic growth. Higher population shall have higher consumption power as well as the power of productivity which should positively affect an economy. However, several researchers argued that higher population will cause negative impacts on economic growth due to capital dilution, living standard, resource shallow and age structure respectively. Nevertheless, Malaysia population had rapidly increased for the past 4o years since 1970 but the economic growth in Malaysia was lagged behind other economies such as Korea, Thailand and Singapore. Without a clear relationship, fiscal policies implementation is hardly to be effective. Therefore, there is a need to clarify the short run, long run relationship and also the direction of causality between economic growth and population in Malaysia.

Other than that, theoretically, exchange rate should have negative relationship with economic growth. It is because currency depreciation will foster a country export which will lead to an increase in GDP. Meanwhile, currency depreciation will also discourage a country import which foreign goods and services are relatively expensive. However, Malaysia had encountered currency depreciation for the past 4 decades, but yet it is suspicious that economic growth of Malaysia is lagged behind other economies. Consequently, the need arises to indicate the short run and long run relationship between exchange rate and economic growth in Malaysia as well as the direction of the causality.

Besides, trade openness basically should have positive impacts on economic growth. It is because trade openness is defined as export and import over GDP ratio. An export oriented country will have greater trade openness ratio which should greatly foster the economic growth Therefore, an increase in trade openness shall enhance an economies development. However, Malaysia as an export oriented country, but yet the economic growth is lagged behind other economies. Hence, the short run and long run relationship between trade openness and economic growth in Malaysia shall be evaluated. In addition, the direction of causality should also be clarified.

Lastly, causal relationship between variables sometimes is implied by the long run relationship between the variables. An independent variable is granger caused by dependent variable occasionally and vice versa. Theoretically, government expenditure, population, exchange rate, trade openness should have foster economic growth. However, several previous studies found that these variables might granger cause each other. Therefore, the direction of causality between the variables shall be clarified in order to describe the actual relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia

1.3 Research Objectives

This research is to examine the relationship among government expenditure, population, exchange rate, trade openness and economic growth in Malaysia in short and long run. This research will involve several analyses such as Augmented Dickey-Fuller and Phillip-Perron Unit Root Test, Johansen Cointegration Test, and Vector Error Correction Model.

This study will also investigate the causality between government expenditure, population, exchange rate, trade openness and economic growth by using Granger Causality Test.

1.4 Research Questions

- Is government expenditure positively influence economic growth in Malaysia in long run?
- Is population positively influence economic growth in Malaysia in long run?
- Is exchange rate negatively influence economic growth in Malaysia in long run?
- Is trade openness positively influence economic growth in Malaysia in long run?
- Is government expenditure positively influence economic growth in Malaysia in short run?
- Is population positively influence economic growth in Malaysia in short run?
- Is exchange rate negatively influence economic growth in Malaysia in short run?
- Is trade openness positively influence economic growth in Malaysia in short run?
- How is the causality among economic growth and government expenditure in Malaysia?
- How is the causality among economic growth and population in Malaysia?
- How is the causality among economic growth and exchange rate in Malaysia?
- How is the causality among economic growth and trade openness in Malaysia?

1.5 Summary of Hypotheses

H_1: Government expenditure positively influences economic growth in Malaysia in long run.

H_2: Population positively influences economic growth in Malaysia in long run.

H_3: Exchange rate negatively influences economic growth in Malaysia in long run.

H_4: Trade openness positively influences economic growth in Malaysia in long run.

H_5: Government expenditure positively influences economic growth in Malaysia in short run.

H_6: Population positively influences economic growth in Malaysia in short run.

H_7: Exchange rate negatively influences economic growth in Malaysia in short run.

H_8: Trade openness positively influences economic growth in Malaysia in short run.

H_9: Causality exists among government expenditure and economic growth in Malaysia.

H_{10}: Causality exists among population and economic growth in Malaysia.

H_{11}: Causality exists among exchange rate and economic growth in Malaysia.

H_{12}: Causality exists among trade openness and economic growth in Malaysia.

1.6 Significance of Study

In this research, reader may have better understanding about the GDP and economic growth. Besides, this research will give a clearer picture to the readers for better understanding about the determinants that influence economic growth. In addition, this research will also expect to give a theoretical explanation about the relationship between government expenditure, population, exchange rate, trade openness, and economic growth as well as the causality.

This research on the other ways gives Malaysia government as the reference to the policy decision making. This research may help the Malaysia government to improve the policy decision making by using the feedback as reference. Besides, this research will help the government to make better and more effective decisions in the future by having more accurate and precise prediction.

This research also expected to give a better understanding to future researchers about the effects of government expenditure, population, exchange rate, and trade openness in influencing Malaysia's economic growth. Hence, this research would assist future researchers in conducting further investigation on economic growth to better explain the countries' economies.

1.7 Chapter Layout

This chapter mainly introduces the concept of economic growth, problem statement, objective, research question and also the significance of study. The next chapter which is chapter two will present the literature review, conceptual framework, and hypothesis. Chapter three will present the data and methodology. Chapter four will report the overall finding of this research by using E-view 6. The last chapter which is chapter five will briefly explain the important details of this study. The conclusion, recommendation, policy implication and the limitation of the study will be discussed.

1.8 Conclusion

Due to the globalization, a country's economic growth will not only influenced by consumption, investment, government expenditure, export and import but other variables such as population, exchange rate, and trade openness. These variables are expected to play significant roles in affecting Malaysia economic growth. Therefore, this study will be conducted by using government expenditure, population, exchange rate, and trade openness as the independent variables to estimate the economic growth.

The following chapter will present the literature review by using pervious researchers' journals. Besides, review of relevant theoretical model, conceptual framework and hypothesis development will be included in next chapter.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This section attempts to evaluate empirical studies for determinants of economic growth in Malaysia. Literature review provides a comprehensive point of view encountered by potential shortfall and arguments from the previous researchers. Most of the previous researchers had done related empirical researches, conceptual framework had been created to examine relevant issues including government expenditure, population, exchange rate and trade openness upon the economic growth in Malaysia. This chapter consists of three parts which are review of the literature, conceptual framework, and conclusion.

2.1 Review of the Literature

The study is to empirically test the determinants which influence the economic growth of Malaysia in short run and long run. In this research, government expenditure, trade openness, population, and exchange rate are hypothesized to test the economic growth of Malaysia from year 1970 to 2012. Besides, each of the independent variables will be investigated solely with the economic growth to reveal the causality between independent variables and dependent variable.

2.1.1 Economic Growth

Economic development is described as a long-term expansion of the economy productive potential. Sustained economic development shall have impacts on higher real living standards and reducing unemployment rate. Short term development is measured by the percentage change in real GDP annually.

Palmer (2012) defined economic growth refers to an increase in the productive capacity of an economy as a result of which the economy is capable of producing additional quantities of goods and services. Normally the living standard is measured by the quantity of goods and services available thus economic development is synonymous with enhance in the general living standard. Palmer (2012) also mentioned that GDP is a measure of the goods and services value which produced in the economy irrespective to the owners of the factors of production used to produce these goods and services. Thus, it will be realized that economic growth and growth in GDP are synonymous.

World Bank (2013) had defined GDP as value added amount by the entire producers. Values added are equal to the value of gross output after deducting the value of product in processing used in production, before accounting for predetermined capital expenditure in the production. GDP at prices of purchaser id defined as gross value added amount by the entire resident producers in economy and any taxes of the products and any subsidies deduction which are excluded in products' values. GDP calculation is exclusive of fabricated assets depreciation and natural resources depletion.

Meanwhile, the measurement of GDP development is calculated by the increase in goods and services values which are produced by an economy. Economic growth normally calculated is in real terms to eliminate the

impact from changes on the products prices. There are three different approaches to determine GDP which generating the same result. These three techniques are the income technique, the expenditure technique, and the product technique. (Tradingeconomics, 2012)

An economy reap GDP per capita is frequently utilized to indicate individuals average living standard in a nation. Therefore, economic development is used to indicate an improvement in the average living standard. (Tradingeconomics, 2012) Meanwhile, GDP per capita is GDP over population of midyear. Furthermore, per capita GDP growth is defined as the annual GDP per capita growth rate based on constant local currency in percentage while cumulative are constantly based on USD in year 2005 (World Bank, 2013)

2.1.2 Government Expenditure

Preliminary economics textbooks had identified the goods and services range which the government has purchased. Increasing in any kind of government expenditure will increase aggregate demand in short run. However, government expenditure advancement will increase the borrowing cost which will harm the several private investments and moderating aggregate demand growth. This will lead to the decline in investment expenditure which consequently diminished the private capital shares. The decline in share of private capital will reduce the long run productivity so does the output capacity. (Goldsmith, 2008) According to Awan, Azid, and Sher (2011), association among government expenditures and economic development is debatable key issue for examination.

According to Tang (2009), Keynesian view has theorized that the government expenditure on public is an exogenous cause which can be utilized as a policy variable to manipulate the short run growth. According to Keynesian point of view, aggregate demand curve will be shifted by the expansionary fiscal policy from left to right in short run. Thus, existing

equilibrium of market will move to new equilibrium which will result in a higher level of real GDP.

However, the literature of the relationship between the economic development and government expenditure had produced ambiguous results. Sajikumar (2006) and Chimobi (2005) found a positive relationship between economic development and government expenditure while Evans (1997) found that government expenditure influence economic growth negatively. However, Hansson and Henrekson (1994) found a mixed result which the relationship between economic development and government expenditure is ambiguous.

According to Sajikumar (2006), a positive relationship between economic development and government expenditure had been generated. The finding shows that economic development is stimulated by an increase in government expenditure. Besides, Sajikumar (2006) also found that causality between economic development and government expenditure is unidirectional which economic growth is granger cause the government expenditure. The area of research is located at India and the methodologies. Sajikumar (2006) used are Test of integration and co-integration, and Error Correction Mechanism.

Crawford (1994) supported Sajikumar (2006) that the increase in economic growth might due to the aggressive government's effort in supporting investment oriented activities. The researcher predicted that local and state policymakers might miss a chance to attain higher long term growth rates in income and employment due to excessive attention has been drawn to the short term consumption-oriented expenditure effects. Crawford (1994) also suggested that investment-oriented expenditures demand is expected to increase as growth in the school age population and renewal of the aging infrastructure to become more acute is needed.

Dao (2012) had developed a per capita GDP growth model based on traditional approach of introducing government expenditure as input in the aggregate production function while considering the effects of both human and physical capital. Dao (2012) also found that continuous increase the per capita expenditure for health care and education relative to income are expected to assist the developing countries to grow faster.

Besides, Tarawalie (2010) also found that government expenditure expansion through the effect of multiplier will stimulate economic development. Sevitenyi (2012) also found that economic growth in Nigeria is promoted by government expenditure.

However, Evans (1997) argued that economic growth is negatively affected by government expenditure. Evans (1997) found that if the growth is endogenous, the growth rate should be negatively related to comprehensive government consumption. Strong evidence shows that everlasting and appreciably increase in output by government will everlastingly diminish GDP per capita growth rate if growth is endogenous. However, the growth is exogenous if its level is lower. Besides, Evans (1997) also concluded that the growth rate is not affected permanently by government expenditure.

Besides, Butkiewicz and Yanikkaya (2011) are supported with the statement that government expenditure is negatively affect economic growth. Butkiewicz and Yanikkaya (2011) found that minor negative association between government expenditure and economic development exists in developed countries while negative growth effect are more consistent and have greater degree for developing countries. The authors stated that high levels of interest payments are the result of past government dissaving and social security and welfare programs which reduce the incentive to save. As consequences, it leads to reduce economic development.

In addition, Awan, Azid and Sher (2011) added that public investment and productive government expenditure are significant in influencing economic development. However, unproductive government expenditure will have significant negative growth impact. Awan, Azid and Sher (2011) also foresaw that the increase in economic growth might due to increase in public investment as well as private investment.

Pham (2009) also discovered a mixed result that government expenditure will have a negative impact on the social and general development on GDP while government expenditure on economic expenditure will have a significant positive impact on GDP. The research indicates that expenditure on social and general development will affect GDP negatively while expenditure on economic development will affect GDP positively.

Hansson and Henrekson (1994) also show a mixed result in determining the relationship between economic development and government expenditure. Majority of OECD countries have a result that government expenditure is negatively affecting economic growth. However, Hansson and Henrekson (1994) found that education expenditure is influencing economic growth positively. They also recommended that theoretical reasoning is not sufficient to decide the government expenditure should be estimated to have negative or positive impact on development.

Besides, Commenatore, Panico and Pinta (2009) also studied that economic growth can be influenced by different types of government expenditure in Post-Keynesian theory by applying Classical-Harrodian and Kaleckian analysis. Kaleckian analysis shows that the unproductive expenditure is always beneficial to the economic development while Classical-Harrodian analysis found to be detrimental to the economic development.

Interestingly, Sinha (1998) found that the GDP growth does not stimulate government expenditure. This result is reasonable only if non-economic

factors are more important in explaining the growth of government expenditure rather than economic factors. Besides, Sinha (1998) also found the evidence that economic development is not influenced by government expenditure.

However, Wong (2010) found that the causal relationship is unidirectional which running from agriculture and rural development expenditure to economic growth. Besides, Wong (2010) also reveals that the causal relationship is only from economic development to transportation as well as defense and security type of government expenditure which is unidirectional. Sevitenyi (2012) also found that the causal relationship between total government expenditure and economic development is unidirectional which total government expenditure is granger cause economic development which supported the Keynesian theory.

As a conclusion, the ambiguous result in the previous studies depends on the type of country, statistical method, potential biases induced by simultaneity, omitted variables and also unobserved specific effects. Since Malaysia government had increased government expenditure continuously for the past 43 years which is from 1970 to 2012. The amount of government expenditure had increased from roughly 650 million in year 1970 to 41 billion in year 2012. The increase in government expenditure shall create significant positive impacts on economic development in Malaysia.

H_1: Government expenditure positively influences economic growth in Malaysia in long run.
H_5: Government expenditure positively influences economic growth in Malaysia in short run.
H_9: Causality exists among government expenditure and economic growth in Malaysia.

2.1.3 Population

Becker, Glaeser and Murphy (1999) mentioned that population began to grow rapidly with an eightfold rate increase in total world population within three centuries. According to Bucci and Torre (2009), there is no mutual view between demographers and economists on the association between economic growth and population change which means that the association between economic growth and population is still unclear and ambiguous. Besides, Crenshaw, Ameen and Christenson (1997) mentioned that economic stagnation is always happens if there is rapid population growth in less developed countries. In fact, scarce capital will be forced to spend on non-productive categories of population if the population is rapidly grown. This will lead to undercapitalization of the economy. As consequences, problems such as unemployment, low wages, and feeble market demand will occurred.

The relationship between economic growth and population is found to be ambiguous since the results gained from the previous researchers are different from each other. Kelley and Schmidt (1995) and Madsen, Ang, and Banerjee (2010) found that population is negatively influence economic development. However, some researchers such as Becker et al. (1999), Bucci and Torre (2008) and Crenshaw et al. (1997) found a similar result which the results are mixed.

Kelley and Schmidt (1995) found that population has negative impacts towards economic development. The result shows that the strong and robust negative relationship had emerged in 1980s. However, it does not seem to have outstanding impact on per capita output growth (1960-1970). Pham and Tran (2011) also found that population growth had significant negative relationship towards economic development in Asian developing countries. Reasons behind the negative effects can be capital dilution, resource shallow, age structure and living standard.

Madsen, Ang, and Banerjee (2010) also found that population is negatively influences economic development. Madsen et al. (2010) found that population growth was important economic development indicator in Britain for the last four hundred years. Population growth was categorized as an important determinant until mid of nineteenth century. The increase in population size had caused a negative impact on economic development in spite of the surge within innovative activities during the First Industrial Revolution. However, a decrease in population causes positive impacts on per capita growth after the Second Industrial Revolution started. It is because of the raise in international technology spillovers and domestic research intensity. Besides, Yol (2009) also found that population have negative impacts on economic growth in long run.

In addition, Banerjee (2012) found that higher population growth will slow down the economic growth while innovative activity influences productivity growth positively. Thus, the productivity growth becomes a competition between technological innovation and population growth. Banerjee (2012) also found that sustained technological progress can maintain economic growth by surpassing the population growth.

However, Becker et al. (1999) argued that the relationship between populations and economic growth is ambiguous. The result shows that there is negative as well as positive relationship between productivity and population which the productivity will ultimately influence GDP. The decline of productivity due to population might because of the traditional declining returns from more intensive use of natural resources and land. Nevertheless, increase in populations might promote knowledge expansions and greater specialization. The real relationship between economic development and population growth is basically depending on diminishing returns to natural resources or knowledge expansion and inducements to human capital.

Bucci and Torre (2008) found similar result which the long run relationship between economic development and population is indistinct. The result depends on whether human capital and physical are substitutes or complementary for each other in the skill formation process. In other words, population might influence economic development either indirectly or directly.

Crenshaw, Ameen, Christenson (1997) also found that economic development will sluggish if there is an increase in the child population while economic growth will be promoted by adult population. Kosai, Saito and Yashiro (1998) added that increasing labour scarcity would arise more efficient in resources utilization, and ultimately encouraging economic growth.

Besides, there are some researchers examine the causality between economic development and population. Thornton (2001) found that the long run relationship between economic growth and population does not exist except Peru. Thus, the economic development neither granger cause population nor vice versa.

Wong and Furuoka (2005) found different results that presented by different countries. Study shows that the causal relationship between population and economic development is bidirectional which population granger cause economic growth for Korea, Thailand, Japan. However, there is unidirectional granger causality from population to economic growth but not vice versa for cases in China, Singapore and Philippine case. Nonetheless, there is also unidirectional causality from economic growth to population but not vice versa in Malaysia and Hong Kong case. For Indonesia and Taiwan, the causal relationship between population and economic development is independent. Therefore, Wong and Furuoka (2005) concluded that population may perhaps be favorable or else disadvantageous to economic growth as well as economic development will influence towards population.

In conclusion, most of the researchers can find a negative relationship between economic growth and population. However, mixed result in the previous studies might also depend on the type of country, statistical method, and also the unobserved specific effects.

H_2: Population positively influences economic growth in Malaysia in long run.
H_6: Population positively influences economic growth in Malaysia in short run.
H_{10}: Causality exists among population and economic growth in Malaysia.

2.1.4 Exchange Rate

At the theoretical level, the traditional view of the neutrality of money suggests that the exchange rate regime should be insignificant for long term growth performance (Vita & Kyaw, 2011). Nevertheless, Milton Friedman (1953 as cited in Vita & Kyaw, 2011) argues that flexible regimes are better suited to protect the economy against economic uncertainties. Specifically, flexible regime of exchange rate might promote economic growth which better absorb and adjust to real domestic and foreign uncertainties.

The literature of the association between exchange rate and economic development shows miscellaneous results. Koçat (2008), Suliman (1996), Vita and Kyaw (2011), and Lee, Baimukhamedova, and Akhmetova (2010) found that exchange rate does not influence economic growth. However, Abida (2010), Sarkar and Amor (2009), Rapetti (2011), and Rodrik (2008) found similar result which exchange rate has negative relationship towards economic development. In short, depreciation of currency will stimulate economic growth.

Koçat (2008) found that the relationship between real incomes, real exchange rate and real export of goods and services in Turkey does not

exist in long run. The research is based on Johansen Methodology by applying ADF and PP unit Root Test. Suliman (1996) supported that cointegration results empirically support the unresponsiveness of real variables to change in the exchange rate and there is no common trends exists between output growth and exchange rate changes.

According to Vita and Kyaw (2011), exchange rate regime selection does not significantly influence the economic development. Thus, Vita and Kyaw (2011) concluded that developing countries will not have any impacts in long run economic growth while selecting exchange rate policy. Lee, Baimukhamedova, and Akhmetova (2010) found that there is insignificant relationship between economic growth and exchange rate in Kazakhstan. The research is applying weighted least squares regression which is weighted by dollar exchange rate.

However, Abida (2010) argued that the exchange rate shall have negative relationship between economic growths. Abida (2010) found that RER depreciation stimulates long run economic growth while RER appreciation will have harmful impacts on long run economic growth. The finding illustrated that RER misalignment reduction by pursue appropriate and major exchange rate reform are expected to record gains in economic growth. Yol (2009) also supported Abida (2010) that real exchange rate misalignment has positive relationship with economic growth.

Sarkar and Amor (2009) found a similar result which undervaluation effect on economic growth is positively significant. RER fluctuation in short run had significantly influenced economic growth. Rapetti (2011) found that competitive real exchange rates have a propensity to be associated with higher economic growth. Rapetti (2011) found that persistent real exchange rate overvaluation will cause external and financial crisis with immediate and long lasting negative impacts on economic development in countries of Latin America. Besides, the authors also found that

maintaining stable and competitive real exchange rate had successfully accelerated economic growth.

Rodrik (2008) also found that undervaluation of the currency had stimulated economic growth in their research. The result suggests that tradable excessively suffer from the market failures or government which keep unfortunate nations from congregating toward countries with higher revenues. In other words, undervaluation is significantly related to more rapid economic development.

Ba and Shen (2010) added that China export industries which seize great ratio in foreign trades are actually low in per capita capital possession and greatly rely on cheap labor. These industries therefore are vulnerable to US real exchange rate and economic growth. In addition, export industries that have a high per capita capital possession seize a low ratio in foreign trade of China which is invulnerable to the US real exchange rate and economic development.

Last but not least, Tarawalie (2010) discovered that the REER is correlated positively with economic growth in Sierra Leone. Tarawalie (2010) also stated that the REER depreciation will enhance economic growth in Sierra Loene.

In a nutshell, the ambiguous result in the previous studies might also due to the type of country, statistical method, and also the unobserved specific effects. However, there are some researchers who had revealed the causality between real exchange rate and economic growth. Previous researcher such as Minescu (2012) suggested that real exchange rate does not influence economic growth but the economic growth influence real exchange rate in some degree to certain extent through channels of total industry and manufacturing industry.

H_3: Exchange rate negatively influences economic growth in Malaysia in long run.

H_7: Exchange rate negatively influences economic growth in Malaysia in short run.

H_{11}: Causality exists among exchange rate and economic growth in Malaysia.

2.1.5 Trade Openness

Due to ambiguous result by previous researchers, trade openness had become a well debated factor in the current economic development literature. Besides, trade openness also recognized as a significant factor in determining the economic development. Emergence of globalization and passage of time had caused all the developing nations to realize that there is a must to liberalize the economies in term of trade openness although the nations are initially following the restricted trade policies. Therefore, trade openness plays significant role for the nation's industrialization improvement. Furthermore, a nation development will change the trade structure on the basis of comparative advantage and endowments (Hultman, 1967 as cited in Ellahi, Mehmood, Ahmad, and Khattak, 2011). Besides, the trade openness level also shows a nation comparative advantage degree in undertaking investment (Adhikary, 2011).

The literature of trade openness and economic growth done by previous researcher also shown mixed result. Most of the researchers such as Ellahi et al. (2011), Marelli and Signorelli (2011), Soukhakian (2007), Paudel and Perera (2009), Wong (2005), Agbetsiafa (2010), Hassan (2005) and Dritsaki and Dritsaki (2013) found that trade openness positively influences economic development. However, Adhikary (2011) found that trade openness has negative impacts on economic growth.

According to Ellahi et al. (2011), import and export influence positively to economic growth of Pakistan. Based on the result, Ellahi et al. (2011)

suggested that developing nations must implement and focus on liberalization and trade openness to strengthen the nations' economies and therefore improve Pakistan population living standard.

Besides, Marelli and Signorelli (2011) also found that there is a positive relationship between GDP per capita and trade openness which is significant in all specifications. Furthermore, Soukhakian (2007) also found that there is a long run relationship between economic growth, financial development, and trade openness. Paudel and Perera (2009) added that economic growth is positively influenced by trade openness in Sri Lanka in long run.

Moreover, Wong (2005) also found similar results which openness to international trade has a significant relationship with economic growth. Therefore, Wong (2005) suggests international trade openness is important for economic development. Last but not least, Agbetsiafa (2010) also found that international trade openness will promote economic development of Union Economique et Monetaire Ouest-Africaine (UEMOA).

Besides, Dritsaki and Dritsaki (2013) found that Bulgaria's financial development and trade openness reinforce each other and the result shows evidence that the strength of the economic performance of Bulgaria is positively influenced by trade openness degree. Besides, Asghar, Awan, and Rehman, (2011) also found that there is positive relationship between trade openness and economic development in Pakistan from year 1974 to 2009.

However, Adhikary (2011) found that economic development is negatively influenced by trade openness. According to Adhikary (2011), the degree of trade openness unleashed diminishing negative impact on Bangladesh's economic development. The result might due to the country specific

effects which cause Adhikary (2011) to generate a different result compared to other researchers.

Besides, some researchers also investigated the causality between economic growth and trade openness but the findings are ambiguous. Most of the researchers found different result of causality against each other. According to Ellahi et al. (2011), trade openness positively affects the economic growth but there is no evidence to justify that economic growth positively affects trade openness. Besides, Wong (2005) also agreed with Ellahi et al. (2011) that there is strong evidence showing that there is unidirectional causal relationship from trade openness to international trade to economic development but not the vice versa.

Choong, Yusof and Liew (2005) found a similar result which export has a significant stable positive long run relationship with the economic growth in Malaysia. However, Yusoff (2005) argued that export is not granger cause the economic developement in Malaysia. Yusoff (2005) also found that Japanese income unidirectional caused Malaysia export but there is no evidence to indicate that Malaysia export caused domestic income.

However, Soukhakian (2007) and Madsen (2009) found that Granger Causality Tests suggested the economic growth lead to more efficient import and export for Japan which meant that economic growth granger cause the trade openness but not vice versa.

On the other hand, Agbetsiafa (2010) found bidirectional result which openness to international trade promotes economic growth while growth also associated increase in trade openness. Ekanayake, Vogel, and Veeramacheneni (2003) also found a similar result that the causal relationship between economic growth and export is bidirectional. Other than that, Asghar et al. (2011) also found that the causal relationship between economic growth and trade openness is bidirectional in Pakistan.

Interestingly, Jalles (2011) found different result in different regions. Jalles (2011) found that the broad unilateral liberalization is enhancing economic growth and the results are not affected by neighboring countries trade policies. Meanwhile, South East Asian countries which are non-discriminatory liberalization have a negative relationship on economic growth but the result is not robust to the Trade to GDP ratio which is the alternative of openness specification.

As the conclusion, the ambiguous result in the previous studies might also due to the type of country, statistical method, potential biases induced by simultaneity, omitted variables and also the unobserved specific effects.

H_4: Trade openness positively influences economic growth in Malaysia in long run.
H_8: Trade openness positively influences economic growth in Malaysia in short run.
H_{12}: Causality exists among trade openness and economic growth in Malaysia.

2.1.6 Unit Root Test

There are several stationary tests and the most frequently used tests are the ADF test and PP test.

Initially, ADF test was firstly introduced by Dickey and Fuller (1979) to resolve the stationary problem on the estimators' distribution for autoregressive time series. After that, Dickey and Fuller (1981) used the likelihood ratio to identify the unit root problem for an autoregressive time series.

Arshanapalli and Nelson (2008) had briefly described the unit root problem. According to Arshanapalli and Nelson (2008), the time series is

stationary only if the series fluctuates with a constant variation about a mean which is constant over the time. It is because a stationary time series should have a propensity to return and regularly cross the mean. A stationary time series is more likely to return rather than away from mean when it is far from the mean. A stationary time series shall exhibits no trend and show a tendency to revert.

Sj ̈o (2008) explained that unit root test is an analysis tool which its motive is to investigate the properties of the prior to the construction of an econometric model. Sj ̈o (2008) also described that unit root tests are primarily descriptive tools to classify series stationary and non-stationary which also can be understood as whether the variables have the unit root problem.

It is significant to determine the individual series' characteristic prior to the test of cointegration. Plenty of researches have revealed that majority of macroeconomics time series are not stationary. (Taha and Loganathan, 2008 as cited in Loganathan, Muhamad, and Mohamad Akhir, 2011) Non-stationary time series cause a setback for researchers or academicians which Durbin Watson statistics, the normal properties t-statistics and other results such as R-square are biased. (Loganathan, Muhamad, and Mohamad Akhir, 2011)

The difference between ADF and PP test is mainly on the treatment on the serial correlation in the test regressions. The unit root tests are conceptually uncomplicated but there are some difficulties such as unit root tests generally have non-normal and nonstandard asymptotic distributions. The distributions do not have convenient closed form expressions and they are standard Brownian motion functions. Besides, the distributions are influenced by the deterministic terms inclusion such as dummy variables, constant, time trend. Therefore, the test regression with different deterministic terms shall be utilized with different sets of critical values. (UOW, n.d.)

Appropriate specification of the null and alternative hypotheses is crucial to differentiate the data trend properties when testing the stationary. The appropriate null and alternative hypotheses should show reflection if data observation does not show a decreasing and increasing trend. The data trend properties under the alternative hypothesis will decide the test regression type. Besides, the asymptotic distributions of the unit root statistics will also influenced by different type of deterministic terms in the test regression. (UOW, n.d.)

For example, the constant formulation is suitable for financial time series or non-trending economic data such as exchange rate and interest rate. Following is the constant test regression:

$$yt = c + \varphi yt-1 + \varepsilon t$$

While the time trend and constant formulations are suitable for trending time series such as macroeconomic aggregate like GDP or asset prices. Following is the test regression for constant and time trend:

$$yt = c + \delta t + \varphi yt-1 + \varepsilon t$$

2.1.7 Johansen Test of Co integration

According to Masood, Aktan and Chaudhary (2009), cointegration analysis was introduced about twenty years ago and nowadays cointegration methods had become popular tools which frequently applied in economic work. However, these methods are often difficult to validate on theoretical or economical grounds due to the strict unit root assumption.

For example, variables such as real exchange rates, interest rates, unemployment rates, and inflation rate are highly constant and regularly modeled as unit root processes. Nevertheless, there is a reason to believe that these time series have an exact unit root, rather than a root that close

to unity. Since unit root tests are very limited to differentiate between a close alternative and a unit root, the pure unit root assumption is normally based on convenience rather than on strong empirical or theoretical facts. (Hjalmarsson and Österholm, 2007)

Integrated and near integrated time series have implications for interference and estimation which are same in many aspects. For example, when variables are either nearly integrated or integrated, spurious regressions will become a problem. Hence, it is significant to examine the cointegration relationship for near integrated time series. (Hjalmarsson and Österholm, 2007)

Therefore, it is feasible to set up a model that leads to stationary relations among the non-stationary variables once the variables have been classified as integrated of order I(0), I(1), or I(2). The essential criterion for stationary among the non-stationary variables is defined as cointegration. Johansen Test of Cointegration is an essential solution to investigate whether the modeling empirically meaningful relationships.

Georgantopoulos (2013) explained that cointegration analysis is important because there is misspecification on VAR model in the 1st difference if cointegration relationship exists between two or more non-stationary variables. Residuals from dynamic VECM vectors shall be included in model when there is a cointegration relationship existed.

Johansen had developed two cointegration test statistics which are the maximum eigenvalue test and trace test. Trace test examines the null hypothesis that r= 0 which means that there is no cointegration while a general alternative hypothesis of r>0 (there is cointegration relationship existed). The maximum eigenvalue test examines the null hypothesis that r is the amount of cointegrating relationship against the specific alternative hypothesis that r+1 is the cointegrating relationship. (Masood et al., 2009)

Generally, Hjalmarsson and Österholm (2007) stated that the maximum eigenvalue test performance is better than the trace test. However, both tests have significantly huge deviations from the nominal size which troubles related to Johansen's cointegration test procedures shall be absented. (Hjalmarsson and Österholm, 2007)

2.1.8 Granger Causality Test

Usman and Sarpong (2009) explained that Granger causality test is a test for statistical hypothesis to verify whether a time series is significant in estimating another. Typically, a "mere" correlation is normally reflected by regressions, but Granger argued that there is a set of tests interpretation to reveal the causal relationship. Granger (1969) described causality as one time series Y is granger cause another time series X if the past history information of Y is helpful to estimate the X future state and beyond past history information of X itself. Granger causality test had become a clear time series statistical tool to examine causal relationship which had been applied in plenty of econometric researches. The relationship between two time series can be unidirectional, bidirectional or independence which means no granger causality in any direction. Granger causality test is only applicable to stationary variables. Thus, non-stationary variables must apply to temporally differenced data rather than the original data. (Usman and Sarpong, 2009)

Liu and Bahadori (2012) also mentioned that granger causality test is one of the earliest methodologies which developed to quantify and reveal the causality from time series observations. It is based on the generally accepted observation that the cause occurs prior to its effect. Formally, an independent variable is granger cause a dependent variable when is the past value can help to forecast the dependent variable's future value beyond the effect of the past value of the dependent variable itself. According to Liu and Bahadori (2012), granger causality test has gained wonderful success across many domains because of its simplicity,

robustness and extendibility. However, the success has also been accompanied with criticism from different perspectives. Besides, Liu and Bahadori (2012) also mentioned two principles in granger causality test, first, the cause happens prior to the effect, and second, the cause makes unique changes in the effect.

2.1.9 Vector Error Correction Model

Alogoskoufis and Smith (1991) stated that ECM have proved a popular organizing principle in applied econometrics, regardless of consensus lack as to precisely represent their defining characteristic, and the rather limited role that has been given to economic theory by their proponents.

Endrész (2011) had applied VECM on an investigation of business fixed investment and credit market frictions for Hungary. The author explained that VECM is used to discover an equilibrium relationship between integrated variables, cointegration and error correction model. VECM also provides an efficient estimator to describe short run dynamics. Endrész (2011) further explained that the short run relationship is captured by the lags of differenced variables and an equilibrium correcting term.

Ogege and Shiro (2012) had investigated the fiscal and monetary policy growth model by using VECM incorporating a two period lagged residual to scrutinize the relationship in long run. According to Ogege and Shiro (2012), VECM is applied to capture short run parameter deviations from the long run dynamics. Asghar et al. (2011) also stated that VECM is suggested for cointegrated system to capture the long run and short run dynamics. As a result, Asghar et al. (2011) had applied VECM to explore the linkages among economic growth, trade openness, income inequality, education and health in Pakistan.

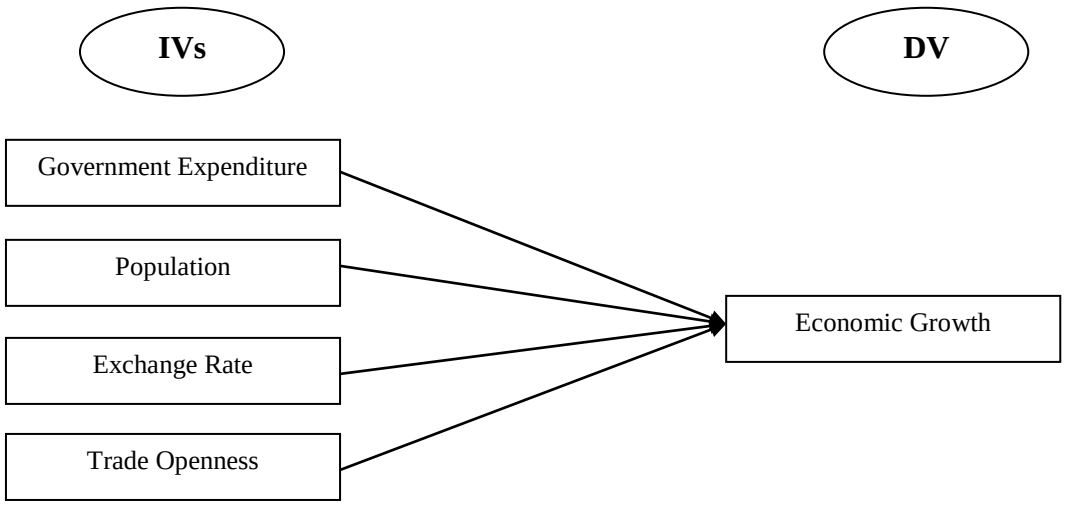
On the other hand, previous researchers such as de Mello and Pisu (2009), Darrat, Chong, Shelor, and Dicken (1999), Brailsford, Penm, and Terrell

(2006), Agarwal, Penm, and Terrell (2003), Suresh and Sreejesh (2010), and Asari, Baharuddin, Jusoh, Mohamad, Shamsudin and Jusoff (2011) had applied VECM model in their research to examine the short and long run dynamics relationship.

2.2 Conceptual Framework

Research Framework:

Figure 2.1: Proposed Conceptual framework



Note: Developed for research purpose

2.3 Conclusion

In conclusion, the purposed economic growth model is used to examine the relationship between four variables (government expenditure, trade openness, population, and exchange rate) and economic growth of Malaysia in this research. These independent variables are estimated to influence economic growth of Malaysia. Besides, the time series also used to identify the causal relationship with the economic growth of Malaysia. In the nutshell, this study will choose to use ADF and PP unit root test, Johansen cointegration test, VECM and OLS regression to investigate the short run and long run relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia which terminates several the potential biases. In the meantime, this studies also implement Granger Causality Test to evaluate the direction of the causal relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia.

CHAPTER 3

DATA AND METHODOLOGY

3.0 Introduction

Empirical studies discussed in the previous chapter facilitate the research design in this chapter. This chapter describes the data and methodology used to investigate the relationship between government expenditure, population, exchange rate, trade openness and economic growth. The data and methodology attempts to examine the effect of the independent variables determinants upon economic growth that based on the hypotheses constructed from the above chapter. Therefore, this chapter includes data collection, research design, preliminary analysis, model estimation and conclusion.

3.1 Data Collection

The collected secondary databases used for this research design comprises of selected economic growth indicators which registered under World Development Indicator (WB, 2013). The key determinants of economic indicators used in this research are government expenditure, population, exchange rate, and trade openness which will be collected from World Development Indicator (WB, 2013).

There are numbers of previous researches certified significant relationship between government expenditure, population, exchange rate, trade openness and economic growth. (Evan, 1997; Crenshaw et al, 1997; Ellahi, 2011; and Sarkar & Amor, 2009). Thus, the secondary data will be collected from World Development Indicator to examine the relationships between independent variables and dependent variable, this research constructed an equation.

Secondary data is the data which is not gathered for the immediate study at hand but for some other purposes. The benefits of utilizing secondary data in this study are the cost and time economies offering. Useful secondary data information can be obtained through the internet with the relevant journals articles which are consistent with the research study or database such as World Development Indicator from World Bank, Department of Statistic Malaysia, and International Monetary Fund (IMF). Besides, secondary data can assists to identify problem, better define problem, develop an approach to the problem and formulate an appropriate research design such as by identifying the key variable.

This research is carried out by using the secondary data to identify and explain the hypotheses and research question developed from the above chapter. The relevant journal articles are selected and read in order to interpret and construct the conceptual framework which referred to the number of previous studies. The journal articles were sourced from online journal database, such as Ebscohost, Science Direct, J-Store, and Pro-quest digital library. Other than that, some journal articles, working papers and other valuable information are collected from internet. Besides, the time series data for this research purpose are collected through World Development Indicator (WB, 2013). The relevant time series data are extracted from World Development Indicator (WB, 2013) from year 1970 to 2012 respectively.

3.2 Research Design

The theoretical framework used in this research is economic growth model. The model used to estimate the long run relationship between government expenditure, population, exchange rate, trade openness and economic growth is represented as below:

GDPPC = f(government expenditure, population, exchange rate, trade openness)

$$GDPPC_t = \beta_0 + \beta_1 GE_t + \beta_2 POP_t + \beta_3 ER_t + \beta_4 TO_t + \varepsilon_t$$

β_0 is constant term, $\beta_1 GE_t$ is government expenditure of Malaysia at time *t*, $\beta_2 POP_t$ is population of Malaysia at time *t*, $\beta_3 ER_t$ is exchange rate of Malaysia at time *t*, and $\beta_4 TO_t$ is trade openness of Malaysia at time *t*, (while t = 1….T). The ε_t is the error term at time *t*.

The model utilized to examine the short run relationship between government expenditure, population, exchange rate, trade openness and economic growth is represented as follows:

$$GDPPC_t = \beta_0 + \beta_1 GE_{t-1} + \beta_2 POP_{t-1} + \beta_3 ER_{t-1} + \beta_4 TO_{t-1} + \varepsilon_{t-1}$$

β_0 is constant term, $\beta_1 GE_{t-1}$ is lagged government expenditure of Malaysia at time *t-1*, $\beta_2 POP_{t-1}$ is lagged population of Malaysia at time *t-1*, $\beta_3 ER_{t-1}$ is lagged exchange rate of Malaysia at time *t-1*, and $\beta_4 TO_{t-1}$ is lagged trade openness of Malaysia at time *t-1*, (while t = 1….T). The ε_{t-1} is the error term at time *t-1*.

The following are information describing the characteristics of the variables:

GDP per capita (GDPPC) – GDP per capita is GDP which divided by midyear population. GDP is total amount of the gross value added amount by the entire resident producers in the economy plus all taxes of the products and any subsidies deduction which are excluded in the products value. GDP calculation is exclusive of fabricated assets depreciation and natural resources depletion. GDP per capita is prepared in current USD. (WB, 2013)

Government Expenditure (GE) – Government expenditure in this research is measured by general government final consumption expenditure. The expenditure consists of government current expenditures employee compensations and goods and services purchases. Other expenditures such as security and defense spending are included while expenditures on military are excluded in the calculation. The data are in current U.S. dollars. (WB, 2013)

Population (POP) – Population in this research is measured as the total population in Malaysia, which all residents are counted except the refugees, who are measured as population of their originated nation. The population values are forecasted in the midyear. (WB, 2013)

Exchange Rate (ER) – The exchange rate for this research is measured by the official exchange rate which refers to exchange rate determined by exchange market and national authorities. The calculation is based on annual average of the year. The exchange rate is based on local currency units relative to the U.S. dollar. (WB, 2013)

Trade Openness (TO) – Trade openness for this research is calculated by total trade over GDP ratio. In other words, openness of trade is the total amount of imports and exports of products divided by GDP. (WB, 2013)

This research utilized government expenditure, population, exchange rate, trade openness and real GDP per capita as the data to investigate the long run and short run relationship as well as the causal relationship. In this research, economic development is proxied by real GDP per capita (GDPPC) as dependent variable.

Meanwhile, the population is determined by population (POP), exchange rate is ER, and trade openness is determined by total trade over GDP ratio (TO).

3.3 Preliminary Analysis

3.3.1 Descriptive Analysis

Descriptive analysis had been run in this research to generate the descriptive statistic such as mean, mode, median, maximum, minimum, skewness and kurtosis, total observations, Jarque-Bera statistic and p-value for all the variables which included in the descriptive statistic. The skewness of curve is to identify whether the curve skewed to left or right based on the figure given. Besides, Jarque-Bera statistics and p-value used to identify the normality of the variables. If the variables has p-value greater than the 0.05 significance level, the null hypothesis shall not be rejected and concluded that the time series is normally distributed.

3.3.2 Unit Root Test

ADF Unit Root test (Dickey & Fuller, 1981) is a test for a unit root in a time series model in econometrics and statistics. It is an augmented version of the Dickey-Fuller test for a greater and more complex set of time series models. ADF unit root test had been widely used by researchers to examine the stationary of the time series and determine the integration order of non-stationary time series. The deterministic terms such as constant or constant and trend should be considered to the analysis. In this research, constant and time trend will be selected to investigate the stationary:

$$yt = c + \delta t + \varphi yt-1 + \varepsilon t$$

Meanwhile, Phillips-Perron test is a test that corrected for any heteroskedasticity and serial correlation of the occurred in the regression by modifying the test statistics. (Vogelsang and Wagner, 2011) However, the ADF and PP test are approximately equaled although they may be different substantially in the limited samples due to methods of correction for serial correlation in the test regression differing from each other.

Initially, both tests should examine the time series at the level. Both tests should not reject null hypothesis at 0.05 level of significance if the p-value is higher than 0.05 and to be concluded that the time series is not stationary. After that, both tests should test on the 1st difference level. Both tests should reject null hypothesis if the p-value is below significant level of 0.05 and time series is concluded to be stationary.

3.4 Model Estimation

3.4.1 Johansen Cointegration Test

Johansen Cointegration test was widely used by previous researchers for the past twenty years. The objectives of this test is to identify the cointegration association between the non-stationary times series. Johansen cointegration test had developed two statistics which are trace test and maximum eigenvalue test. The hypotheses shall be rejected when the p-value is below significant level of 0.05. The hypothesis shall not be rejected when the p-value is above significant level of 0.05 which also means that there is cointegration equation existed in the model. Further hypothesis can be ignored as the existence of the cointegration relation had been found.

3.4.2 Vector Error Correction Model (VECM)

One of the main purposes of this research is to investigate the long run and short run relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. The investigation of long run and short run dynamics is highly rely on VECM which is the most frequently used statistic tool used by previous researchers.

The cointegrating equation generated by the VECM is the long term equilibrium relationship which the coefficient represent the percentage of variables in influencing 1% changes in dependent variables. Meanwhile, the t-statistics represent the significant level of the variables, if the t-statistics is greater than 4, the variables are significant at level of 0.01, if the t-statistics is in between 2 to 4, the variables is significant at level of 0.05, if the t-statistics is less than 2, the variables is only significant at level of 0.1.

On the other hand, VECM also provides an efficient estimator to describe short run dynamics. Previous researcher Endrész (2011) further explained that the short run relationship is captured by the lags of differenced variables and an equilibrium correcting term. Therefore, the lagged independent variables will be used to investigate the short run relationship with the dependent variable. The short run dynamics command will be put into OLS regression to generate the p-value.

3.4.3 Ordinary Least Square Regression (OLS Regression)

This study utilized the Ordinary Least Square (OLS) regression that normally used by most researchers as their statistical method. The choice of this method is based on the following consideration.

However, the main purpose of OLS regression in this research is only used to generate the p-value for short run dynamics in the VECM model. It is because VECM model only provides t-statistics but not p-value. The command as below:

$$D(LGDPPC) = [ECT] + \beta_1 D(LGDPPC(-1)) + \beta_2 D(LGE(-1)) + \beta_3 D(LPOP(-1)) + \beta_4 D(LER(-1)) + \beta_5 D(LTO(-1)) + C$$

3.4.4 Granger Causality Test

Granger Causality Test is a better solution in determining the causal relationships between the time series whether past history information of independent variable causal related to the future state of dependent variable beyond the past history information of the dependent variable. The causal relationship can be unidirectional, bidirectional and independent which described as no causal relationship between the time series.

The null hypothesis shall be rejected if p-value is below 0.05 level of significance and is concluded that independent variable is granger cause the dependent variable or vice versa.

3.5 Diagnostic Checking

There are some economic indicators being employed to measure the economic growth which the independent variables such as government expenditure, population, exchange rate, and trade openness are contained in this research.

To ensure the robustness of the model, some diagnostic checking will be run to identify the model's problems such as autocorrelation, and heteroskedasticity as

well as normality. There are several tests such as Lagrange multiplier (LM) test, ARCH test, and Jarque-Bera test that will be conducted in this research.

3.5.1 Lagrange Multiplier (LM) Test

The first diagnostic checking is autocorrelation. It can be defined as an error occurring at period *t* may be correlated with one at period *s*. Autocorrelation happens because the regression residuals for individual observations is related to residuals for the other observations. In other words, Autocorrelation problem occurs when a significant event in one state affects economic conditions in neighboring states as well. To check the autocorrelation problem, Lagrange multiplier (LM) test will be applied. Given the H_0: no autocorrelation. H_1: an autocorrelation. If Chi-square > 0.01, do not reject H_0. If we rejected H_0, Newey-West Test will be conducted to treat the problem.

3.5.2 ARCH Test

The second diagnostic checking is heteroscedasticity. Heteroscedasticity is the error term that does not have a constant variance or there may have a larger variance when values of some independent variables or dependent variables are large or small. ARCH test will be selected to check the heteroscedasticity problem. H_0: no heteroscedasticity. H_1: heteroscedasticity. If p-value of F stats > 0.01, we do not reject H_0. If H_0 is rejected, White Test will be conducted to treat the heteroscedasticity.

3.5.3 F-Test

Having done with the diagnostic checking, F-test will be computed to examine whether any of the explanatory variables influence the dependent variables. Besides, F-stat is used to explain the fitness of the model in explaining the dependent variable. H_0: $\beta_1 = \beta_2 = \beta_3 = 0$. H1: $\beta_1 \neq 0$, $\beta_2 \neq 0$, and

$\beta_3 \neq 0$. If p-value < 0.01, we reject H_0 and conclude that there is at least one of the explanatory variables is important.

3.5.4 T-Test

Lastly, T-test will be conducted to examine which explanatory variable is significant. This test will be used in VECM to investigate the significance of the relationship between the variables in both long run and short run. H0: $\beta_i = 0, (i=1,2,3)$ H1: $\beta_i \neq 0$. If p-value < 0.01, we do not reject H_0 and conclude that the variables are individually significant in affecting GDPPC.

3.6 Conclusion

The research specific measurements and statistical tests have been established in this chapter. The mechanism of methodology discussed above, the specified equation and model have been justified empirically and theoretically to present a visible view in the economic growth study. The statistical results have been generated and the justifications of hypotheses constructed from the above chapter will be deliberated in the following chapter.

CHAPTER 4

DATA ANALYSIS

4.0 Introduction

This chapter presents the data analyses by utilizing the data which extracted from World Development Indicator (WDI). The data consists of 43 observations from year 1970 to 2012. The data had been analyzed by using E-views 6, a tool that provides greater feasibility in data analysis and visualization.

There are several tests had been used to analyze the data such as ADF Unit Root Test, Johansen Cointegration Test, Vector Error Correction Model (VECM), Ordinary Least Square (OLS) Regression, and Granger Causality Test. Besides, several diagnostic checking such as serial correlation and heteroskedasticity had also been run in order to ensure the robustness of OLS regression.

ADF Unit Root Test is used to identify the unit root problem of the variables while Johansen Coinegration Test is used to identify the number of cointegration equation which exists in the model that helps in selecting Vector Autoregression (VAR) or VECM. If there is at least one cointegration equation exists in the model, VECM will be utilized to analyze the result, otherwise VAR will be chosen. Besides, Granger Causality Test is used to identify the whether there is a bi-directional relationships between the variables.

After discovering the cointegration equations, VECM will be used to investigate the relationships between the variables in the model in long run and short run. Next, OLS Regression will be used to investigate the p-value of the variables in short run dynamic. In order to ensure the robustness of the regression, serial correlation test and heteroskedasticity test will be examined.

Lastly, R^2 and F-stat will also be examined to determine the strength and reliability of the model.

4.1 Descriptive Analysis

Table 4.1 Descriptive Analysis

Sample: 1970 - 2012					
	LGDPPC	**LGE**	**LPOP**	**LER**	**LTO**
Mean	0.9491	1.8835	2.9098	1.0498	0.3084
Median	0.9700	1.9100	2.9300	1.0000	0.4100
Maximum	2.3400	3.7100	3.3800	1.3700	0.7900
Minimum	-0.9400	0.0100	2.3900	0.7800	-0.3700
Std. Dev.	0.8353	0.9716	0.3077	0.1886	0.3564
Skewness	-0.4559	-0.0821	-0.1144	0.4327	-0.3053
Kurtosis	2.7470	2.2678	1.6968	1.7708	1.7118
Jarque-Bera	1.6045	1.0089	3.1365	4.0487	3.6411
Probability	0.4483	0.6038	0.2084	0.1321	0.1619
Sum	40.8100	80.9900	125.1200	45.1400	13.260
Sum Sq. Dev.	29.3031	39.6484	3.9775	1.4943	5.3336
Observations	43	43	43	43	43

Table 4.1 demonstrates descriptive analysis finding on five logged variables had been utilized in this research. All the logged variables have 43 observations which are from year 1970 to 2012. This also explains that there is no data missing for the five variables.

For the information, LGDPPC represents logged gross domestic product per Capita, LGE represents logged government expenditure, LPOP represents logged population, LER represents logged exchange rate and LTO represents logged trade openness.

Firstly, the mean for LGDPPC is 0.9491 with the maximum of 2.34 and minimum of -0.94 and the standard deviation is 0.8353. The skewness of LGDPPC is -0.4559 which demonstrates that the curve is skewed to left. The Jarque-Bera statistic is 1.6045 with the p-value of 0.4483 which means the null hypothesis shall not be rejected and concludes that LGDPPC is normally distributed.

Secondly, LGE's mean is 1.8835 with the maximum of 3.71 and minimum of 0.01 and the standard deviation is 0.9716. The skewness of LGE is -0.0821 which means that the curve is slightly skewed to left. The Jarque-Bera statistic is 1.0089 and the p-value is 0.6038. Thus, null hypothesis cannot be rejected and concludes that LGE is normally distributed.

Thirdly, LPOP has means of 2.9098 and standard deviation of 0.3077. LPOP has maximum of 3.38 and minimum of 2.39. The skewness of LPOP is -0.1144 which also means that the curve is also skewed to left as LGDPPC and LGE. The Jarque-Bera statistic is 3.1365 with p-value of 0.2084. Null hypothesis cannot be rejected and concludes that LPOP is normally distributed.

Next, the mean of LER is 1.0498 while standard deviation is 0.1886. The maximum of LER hit 1.37 while the minimum is 0.78. The skewness of LER is 0.4327 which means that the curve is skewed to right. The Jarque-Bera statistic is 4.0487 with the p-value of 0.1321. This means that the null hypothesis cannot be rejected and concludes LER is normally distributed.

The last variable is LTO which has a mean of 0.3084 and standard deviation of 0.3564. LTO has a maximum of 0.79 and a minimum of -0.37. The skewness of LTO is -0.3053 which means that the curve is skewed to left as LGDPPC, LGE and LPOP. The Jarque-Bera statistic is 3.6411 with the p-value 0.1619. As the consequence, null hypothesis cannot be rejected and concludes that LTO is normally distributed.

In conclusion, all the five variables have 43 observations without data missing and they are normally distributed as all the Jarque-Bera p-values are above 0.05 level of significance. The analysis shows that LGDPPC, LGE, LPOP and LTO are skewed to left while only LER is skewed to right. On the other hand, LER also has smallest standard deviation compared to other variables while LGE has the largest standard deviation. This means that LER has smaller volatility compared to other variables while LGE is the variable that has the greatest volatility.

4.2 ADF and PP Unit Root Test

Table 4.2 Result of ADF and PP Test

	ADF Unit Root Test	
Variables	**None (p-value)**	**1st Difference (p-value)**
LGDPPC	0.1883	**0.0003*** **
LGE	0.5615	**0.0003*** **
LPOP	1.0000	**0.0000*** **
LER	0.3994	**0.0013** **
LTO	0.9867	**0.0003*** **

	Phillips-Perron Test	
Variables	**None (p-value)**	**1st Difference (p-value)**
LGDPPC	0.1985	**0.0003*** **
LGE	0.4460	**0.0003*** **
LPOP	0.9996	**0.0000*** **
LER	0.3494	**0.0016** **
LTO	0.9857	**0.0004*** **

Note: *** significant at 0.01 level

** significant at 0.05 level

Table 4.2 represents the result of ADF and PP test which identify whether the variables are stationary. Thus, both ADF and PP test will be run twice which are at none difference level and 1st difference level to identify the existence of unit root problem. Since the data is trending time series data, the selection of trend and intercept function will be added into the equation. .

According to table 4.2, LGDPPC is not significanrt at 0.05 level with the p-value 0.1883 and 0.1985 in none difference level in ADF and PP test respectively. Thus, the null hypothesis cannot be rejected and concludes that there is a unit root problem. However, LGDPPC is significant at 0.01 level with p-value 0.0003 in 1st difference test in both ADF and PP test. Therefore, the null hypothesis is rejected

and concludes that there is no unit root problem or the LGDPPC data is stationary when the data is 1st difference.

Secondly, LGE is not significant at none difference level with p-value 0.5615 and 0.4460 in ADF and PP test respectively which above the 0.05 level of significance. As a consequence, the null hypothesis cannot be rejected and concludes that unit root problem exists. Nevertheless, LGE is significant in 1st difference level with p-value 0.0003 in both ADF and PP test which are lower than 0.01 level of significance. Consequently, null hypothesis is rejected and concludes that the LGE data is stationary at the 1st level difference.

Thirdly, LPOP is also not significant at level 0.05 in none difference level with the p-value of 1.0000 and 0.9996 in ADF and PP test respectively. Consequently, the null hypothesis cannot be rejected and concludes that the data is non-stationary in none difference level. Conversely, LPOP is also significant at level of 0.01 in the 1st difference level with p-value of 0.0000 in both tests. Hence, the null hypothesis is rejected and concludes that LPOP is stationary at 1st difference level.

Next, LER is also not significant at none difference level with p-value 0.3994 and 0.3494 in ADF and PP test respectively that p-values are insignificant at 0.05 level. Thus, the hypothesis cannot be rejected and concludes that LER is non-stationary at none difference level. However, LER is also significant at 1st difference level with p-value 0.0013 and 0.0016 in ADF and PP test respectively which p-value is significant at 0.05 levels. In a consequence, the null hypothesis is rejected and concludes that the LER data is stationary at 1st difference level.

Lastly, LTO is not significant at level 0.05 in none difference level with the p-values of 0.9867 and 0.9857 in ADF and PP test respectively. As a result, null hypothesis cannot be rejected. Therefore, concluding that the LTO data is non-stationary at none difference level. Conversely, LTO is also significant at level of 0.01 in 1st difference level with p-values of 0.0003 and 0.0004 in ADF and PP test respectively. Therefore, null hypothesis shall be rejected and concludes that LTO data is stationary at 1st difference level.

As a conclusion, all the variables are not significant at 0.05 level in none difference level in ADF unit root test. However, LGDPPC, LGE, LPOP and LTO are significant at 0.01 level in 1st difference level while LER is significant at 0.05 level in 1st difference level. This concludes that all the time series free from unit root problem at 1st difference level. Therefore, the data must be differentiated in order to perform the following analyses such as VECM and OLS regression.

4.3 Johansen Cointegration Test

Table 4.3 Result of Johansen Conintegration Test

Sample (adjusted): 1972 2012
Included observations: 41 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDPPC LGE LPOP LER LTO
Lags interval (in first differences): 1 to 1

Hypothesized No. of Cointegrating Equation	**Trace Test (p-value)**	**Maximum Eigenvalue Test (p-value)**
0	0.0000**	0.0001**
1	0.0109**	0.0043**
2	**0.4873**	**0.6772**

Note: ** Significant at 0.05 level

Table 4.3 demonstrates the Johansen Test of Cointegration finding which indicates hypothesized number of cointegrating equation which is absolutely important in selecting the model between vector autoregression or vector error correction model.

According to table 4.3, both tests show same results in all the three hypotheses. Firstly, both tests have p-values 0.0000 and 0.0001 which are lower than

significant level of 0.05. Thus, the null hypothesis which hypothesized that there is no cointegrating equation is rejected.

Next, both tests also rejected the second null hypothesis that there is one cointegration equation with p-values 0.0109 and 0.0043 which are lower than significant level of 0.05. Therefore, the third hypothesis should be tested.

Lastly, both tests have p-values 0.4873 and 0.6772 which are higher than the significant level of 0.05. Hence, the null hypothesis cannot be rejected and concludes that two cointegrating equations exist in the model.

4.4 Vector Error Correction Model (VECM)

Table 4.4 Result of Long Run Relationship from VECM Model

Variables	Coefficient	t-statistics
D(LGE)	-0.6386	**-3.4131****
D(LPOP)	0.0255	**2.9462****
D(LER)	0.0685	0.6271
D(LTO)	0.2089	**1.9159***
R-Square	0.4588	
Adjusted R-Squared	0.3633	
Prob (F-statistics)	0.0012	

Note: ** Significant at 0.05 level

* Significant at 0.1 level

Table 4.4 is utilized to examine the relationships between government expenditure, population, exchange rate, trade openness and economic development in long run and short run. The first column from the table is the short run relationships between LGE, LPOP, LER, LTO and GDPPC while the cointegrating equation 1 represents the long run relationships.

As discussed before, the long run relationship is exactly the cointegrating equation 1 which is formulated as below:

$$D(LGDPPC) = -0.639D(LGE) + 0.026D(LPOP) + 0.069D(LER) + 0.2089D(LTO)$$

$$[-3.413]^{**} \qquad [2.946]^{**} \qquad [1.916]^{*}$$

The equation above shows that there are three independent variables which are significant in explaining economic growth in long term relationship. They are government expenditure, population and trade openness. However, the exchange rate shown is not significant in explaining economic growth.

According to table 4.4, LGE has t-stat of -3.4131 which is significant at 0.05 level in long run dynamic. Thus, the null hypothesis is rejected and concludes that LGE has significant negative long run relationships towards LGDPPC.

Besides, LPOP also has t-stat of 2.9462 which is also significant at 0.05 level in long run. Thus, the null hypothesis is rejected and concludes that LPOP has significant positive long run relationships with LGDPPC.

On the other hand, since LTO t-stat is only 1.9159 which is only significant at 0.1 level in long run. Therefore, LTO is concluded to have significant positive long run relationships with LGDPPC at confidence level of 10%.

As a result, 1% of GE will lead to a decrease of 0.68% in GDPPC in long run. However, 1% of POP will lead to an increase of 0.02% in GDPPC in long run. In addition, 1% of TO will lead to 0.20% increase in GDPPC in the long run.

Table 4.5 Result of Short Run Relationship from VECM Model

Dependent Variable: D(LGDPPC)

Method: Least Squares

Sample (adjusted): 1972 2012

Included observations: 41 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
ECT	-0.044767	0.175740	-0.254733	0.8005
D(LGDPPC(-1))	-0.546029	0.237502	-2.299051	**0.0278****
D(LGE(-1))	-0.451671	0.189874	-2.378794	**0.0231****
D(LPOP(-1))	-2.412413	3.408668	-0.707729	0.4839
D(LER(-1))	-2.109904	0.569298	-3.706150	**0.0007*****
D(LTO(-1))	1.098243	0.314101	3.496463	**0.0013*****
C	0.194544	0.082611	2.354942	**0.0244*****
R-squared	0.458803	F-statistic		4.803956
Adjusted R-squared	0.363298	Prob (F-statistic)		0.001202
Durbin-Watson stat	2.111458			

Note: *** Significant at 0.01 level

** Significant at 0.05 level

Before analyzing the short run result, R^2 should be examined to test the strength of the model. According to table 4.5, R^2 of the model is only 0.4588 or 45.88% which means that the independent variables only explained 45.88% of variation in the dependent variable while remaining 54.12% of the variation is unexplainable. Therefore, there might be some missing variables which should be included in the model.

On the other hand, the model F-statistic is 4.8039 and the p-value is 0.0012 which describe that the model is significantly reliable. Besides, the p-value also shows that there is enough evidence to reject null hypothesis and conclude that there is at least one independent variable is important in explaining D(LGDPPC).

Moreover, the model Durbin-Watson stat is 2.1114 which is higher than 2.00. Since Durbin-Watson stat is higher than 2, therefore do not reject null hypothesis and conclude that autocorrelation does not exists.

Table 4.6 Serial Correlation LM Test and Heteroskedasticity ARCH Test

Diagnostic Checking	
Tests:	p-value
Breusch-Godfrey Serial Correlation LM Test	**0.7989**
Heteroskedasticity ARCH Test	**0.7326**

The first diagnostic checking is to check the serial correlation, thus Breusch-Godfrey Serial Correlation LM Test is applied. According to table 4.6, the Chi-Square's p-value is 0.7989 which is higher than significant level of 0.05. Consequently, null hypothesis cannot be rejected and concludes that there is no autocorrelation problem.

The next diagnostic checking is Heteroskedasticity problem. Heteroskedasticity ARCH Test is used to check the problem. As table 4.6 shown, the p-value of F-statistic is 0.7326 which is above significant level of 0.05. Thus, null hypothesis cannot be rejected and conclude that there is no heteroskedasticity problem.

Following is the econometric model which determined the short term relationship between D(LGDPPC(-1)), D(LGE(-1)), D(LPOP(-1)), D(LER(-1)), D(LTO(-1)) and D(LGDPPC):

$$D(LGDPPC) = [-0.045(\ LGDPPC(-1) - 0.307LGE(-1) - 1.708LPOP(-1) + 1.171LER(-1) - 0.127LTO(-1) + 3.402)] - 0.546D(LGDPPC(-1)) - 0.452D(LGE(-1))$$

$$\underset{[-2.299**]}{} \quad \underset{[-2.379**]}{}$$

$$- 2.4124D(LPOP(-1)) - 2.109D(LER(-1)) + 1.098D(LTO(-1)) + 0.195$$

$$\underset{[-3.706***]}{} \quad \underset{[3.496***]}{}$$

According to table 4.5, there are 4 independent variables which are significant at 0.05 level in short run. D(LGDPPC(-1)), D(LGE(-1)) and D(LER(-1)) have significant negative relationships towards D(LGDPPC) while D(LTO(-1)) have significant positive relationship towards D(GDPPC) in short run. However, D(LPOP(-1)) shows no significant relationship with D(LGDPPC).

First, D(LGDPPC(-1)) has t-stat of -2.2990 and p-value of 0.0278 which is below significant level of 0.05. Thus, the null hypothesis is rejected and concludes that D(LGDPPC(-1)) has significant negative relationship with D(LGDPPC) in short run. Besides, the t-stat of D(LGE(-1)) is -2.3788 and p-value is 0.0231 which is below significant level of 0.05. Hence, there is enough evidence to reject null hypothesis and concludes that D(LGE(-1)) has significant negative relationship with D(LGDPPC) in short run. Above and beyond, D(LER(-1)) also has t-stat of -3.7062 and p-value of 0.0007 which is below significance level of 0.01. Therefore, null hypothesis is rejected and concludes that D(LER(-1)) has significant negative relationship with D(LGDPPC) in short run.

However, D(LTO(-1)) has a positive t-stat of 3.4965 and p-value is 0.0013 that p-value is also below 0.01 significance level. As the consequence, the null hypothesis is rejected and concludes that D(LTO(-1)) has significant positive relationship with D(LGDPPC) in short run. Nevertheless, D(LPOP(-1)) has t-stat of -0.7077 and p-value is 0.4839 that D(LPOP(-1)) is significant at 0.05 level. Consequently, null hypothesis is rejected and concludes that there is no significant negative relationship with D(LGDPPC) in short run.

The above equation presents how the independent variables with one lag tend to affect economic growth in Malaysia. A 1% in GDPPC of previous year will lead to a decrease of 0.54% in actual GDPPC in the short run. Besides, a 1% in GE of previous year will cause a decrease of 0.45 in actual GDPPC in short run. On the other hand, 1% of ER of previous year will also cause a decrease of 2.10 in actual GDPPC in short run. However, 1% of TO(-1) will cause an increase of 1.09 in presenting GDPPC in short run.

4.5 Granger Causality Test

Table 4.7: Granger Causality Test

Pairwise Granger Causality Tests

Sample: 1970 – 2012

Lags: 2

	Null Hypothesis:		Prob.
1	LGE does not	→ LGDPPC	**0.0479****
	LGDPPC does not	→ LGE	0.3860
2	LPOP does not	→ LGDPPC	**0.0210****
	LGDPPC does not	→ LPOP	0.1676
3	LER does not	→ LGDPPC	**0.0060*****
	LGDPPC does not	→ LER	**0.0036*****
4	LTO does not	→ LGDPPC	0.2858
	LGDPPC does not	→ LTO	0.9962

Notes: *** Significant at 0.01 level

** Significant at 0.05 level

Table 4.7 represents Granger Causality Test findings which shows the unidirectional or bidirectional causal relationship between the time series.

According to table 4.7, the F-statistic for the first group hypothesis is 3.3097 and the p-value is 0.0479. Since p-value is 0.0479 and it is below the 0.05 level of significance, null hypothesis is rejected and concludes that LGE is granger cause LGDPPC. However, null hypothesis cannot be rejected which LGDPPC does not granger cause LGE due to F-statistic is only 0.97765 and p-value is 0.3860 which is higher than 0.05 significant level. Thus, LGE is granger cause LGDPPC but the vice versa.

Next, the F-statistic for second group hypothesis is 4.3102 and p-value is 0.0210 that p-value is below the 0.05 level of significance. Thus, null hypothesis is rejected and concludes that LPOP is granger cause LGDPPC. However, null hypothesis cannot be rejected which LGDPPC does not granger cause LPOP since the F-statistic is only 1.8779 and the p-value is 0.1676 which higher than significance level of 0.05. As a result, there is also a LPOP is granger cause LGDPPC but not vice versa.

After that, the third group hypothesis's F-statistic is 5.9168 and the p-value is 0.0060 that p-value is below the 0.01 level of significance. As a consequence, null hypothesis is rejected and concludes that LER is granger cause LGDPPC. Besides, the second hypothesis in the third group also shows F-statistic of 6.6016 and p-value of 0.0036. This determines that p-value is below the 0.01 level of significance. Hence, null hypothesis is also rejected and concludes that LGDPPC is granger cause LER. In a nutshell, bidirectional causality exists between LER and LGDPPC.

Lastly, the fourth group hypotheses show insignificant F-statistics of 1.2969 and 0.0038 and p-value of 0.2858 and 0.9962 which are absolutely higher than the significance level of 0.05. As a result, both null hypotheses are rejected and conclude that LTO does not granger cause LGDPPC as well as LGDPPC does not granger cause LTO. Thus, there is no causal relationship between LTO and LGDPPC.

As a conclusion, Pairwise Granger Causality Test has identified two unidirectional causal relationships and one bidirectional causal relationship in the model.

4.6 Conclusion

This chapter consists of four tests being conducted in this research. They are descriptive analysis, ADF Unit Root Test, Johansen Cointegration Test, VECM Model, and Granger Causality Test. Besides, some residual tests such as Breusch-Godfrey Serial Correlation LM Test and Heteroskedasticity ARCH Test have also been utilized to do the diagnostic checking to ensure the model is free from serial correlation and heteroskedasticity problem. ADF Unit Root Test is used to investigate the stationary of the data series and identify unit root problem. Result shows that all the data series is not stationary in the initial state but the data is stationary at first difference level. The second test is Johansen Cointegration Test which is used to identify the number of cointegrating equations exists in the model. As the result, there are two cointegrating equation in the model. The next test is VECM model which is used to investigate the long term and short term relationship between the independent variables and dependent variable. The findings demonstrate that there are three independent variables having significant long term relationship with economic growth and four independent variables having significant short term relationship with economic growth. Lastly, Granger Causality test is used to examine the causal relationship between the variables. The findings prove that there are two unidirectional causal relationships and one bidirectional causal relationship between the variables exists in the model.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.0 Introduction

The function of chapter five is to review the thesis research and policy recommendations for future research. This chapter consists of six sections. The first part of this chapter will summarize the objectives of the research and the methodology utilized to complete the analysis. Secondly, the major findings will be briefly described and discussed. The third part of this chapter will discuss the policy implications of the research. Next, the limitations of this research will be discussed. Lastly, the fifth section of this chapter is to propose future research recommendation followed by conclusion.

5.1 Summary of Statistical Analyses

There are three objectives in this research. The first objective is to investigate the long run relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. Second objective is to investigate the short run relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. The third

objective is to investigate the causal relationships between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia.

E-view 6 had been used to achieve all objectives. Descriptive analysis is utilized to run the investigation on the data in order to identify whether there is any observation is missing in the variables. Besides, descriptive analysis also shows other indicators such as mean, median, maximum, minimum, skewness, Jarque-Bera statistic and its p-value. Skewness is used to identify whether the curve skewed to left or right while Jarque-Bera statistic and p-value are used to examine whether the data are normally distributed.

Prior to analyzing the long run and short run relationship between government expenditure, population, exchange rate, trade openness and gross domestic product per capita. There are two preliminary analyses have to be performed which are unit root test and cointegration test. In this research, two unit root tests are performed which are ADF and PP test. ADF and PP test are used in investigating the stationarity of the time series. After that, Johansen Cointegration Test is utilized in identifying the existence of cointegrating equation in the model. The existence of the cointegrating equation is very significant in selecting VAR or VECM to continue the analysis. It is because the existences of the cointegrating equations represent the meaning that long run relationship between the time series is existed.

VECM had been used to achieve the first two objectives which are to look into the short and long run dynamics between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia while OLS Regression is used to generate p-value of independent variables for the short term relationship with economic growth. Besides, the OLS regression is free from heteroskedasticity and serial correlation problem since command is generated from VECM. As evidence, Breusch-Godfrey Serial Correlation LM Test and Heteroskedasticity ARCH test will be run to prove that the problems are not existed.

Lastly, Granger Causality Test had been utilized to achieve the third objective in this research which is to examine the causal relationship between government expenditure, population, exchange rate, trade openness and economic growth. This test will identify that the causal relationship either unidirectional or bidirectional between the combination of time series. The major objective of this test is to investigate whether current government expenditure, population, exchange rate, and trade openness will have significant effects on future economic growth or vice versa.

5.2 Discussion of Major Findings

The major part of this thesis consists of an empirical research in which numerous variables are empirically tested. The sample is used to incorporate one country (Malaysia) from year 1970 and 2012 which has a total of 43 observations. This research consists of three major objectives which the first two objectives are to examine long and short run relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia while the third objectives is to look into the causal relationship between the variables.

Government expenditure was found to have significant negative relationship with gross domestic product per capita in long run. This phenomenon explained that government expenditure has a significant long run negative impact on economic growth in Malaysia. This result is same as Butkiewicz and Yanikkaya (2011) which they also found that total government expenditure will reduce the economic growth in developing countries. Previous researchers such as Hansson and Henrekson (1994), Evans (1997), Awan et al. (2011) and Pham (2009) also found similiar result that government expenditure had caused significant negative impacts on economic growth. In Hansson and Henrekson (1994) research, they found that majority of the OECD countries have significant negative impacts on economic growth. Besides, Evans (1997) also found that permanently increase in government expenditure will lead to economies decline. On the other hand, Awan

et al. (2011) discovered that unproductive government expenditure has strong adverse impact on economic development. Pham (2009) also found that government expenditure on social and general development will have adverse impact on economic development.

However, population was revealed to have a significant positive relationship with gross domestic product per capita in long run. The findings demonstrate that population has a significant long run positive impacts on the economic growth in Malaysia. This result meets hypothesis ($H_{2)}$ and consistent with some previous studies. According to previous researchers such as Becker et al. (1999), Bucci and Torre (2008) and Crenshaw et al. (1997), population has a positive impact on economic growth. Becker et al. (1999) found that population will have positive impact on economic growth if there are inducements to human capital and expansion of knowledge. It is because larger populations encourage greater specialization and increase investment in knowledge. Furthermore, Crenshaw et al. (1997) found that population has positive relationship with economic growth if there is an increase in adult population in a country. It is because adult population will foster economic development.

In addition, trade openness was also found to have significant positive relationship with gross domestic product per capita in long run as hypothesized (H_4). The result explained that trade openness has significant long term adverse impacts on Malaysia's economic development. This result found to be consistent with some previous researchers such as Ellahi et al. (2011), Paudel and Perera (2009), Choong (2005) and Wong (2005) which trade openness or export and import will significant positively impact economic growth of the countries. Ellahi et al. (2011) found that import and export affect positively on economic growth. Paudel and Perera (2009) and Wong (2005) found that trade openness has significant positive effects on Sri Lanka's economic development and Malaysia. Besides, Choong (2005) also support that export has a stable positive long run relationship with economic development.

Overall, government expenditure has a long run negative relationship with economic growth in Malaysia while population and trade openness have a long run positive relationship with economic growth in Malaysia. Unfortunately, there is not enough evidence to prove that exchange rate has significant long run impact on the economic growth in Malaysia.

Next, as hypothesized (H_5), government expenditure was found to have a significant short run negative relationship with gross domestic product per capita in Malaysia. This result proves that government expenditure has a significant short run negative impact on economic growth in Malaysia. Butkiewicz and Yanikkaya (2011) found the same result that total government expenditure will reduce the economic growth in developing countries. Besides, previous researchers such as Hansson and Henrekson (1994), Evans (1997), Awan et al. (2011) and Pham (2009) also found similar result which government expenditure had caused significant negative impact on economic growth. In Hansson and Henrekson (1994) study, they found that most of the OECD countries have negative impacts on economic growth. On the other hand, Evans (1997) also found that enduringly increase in government spending create adverse effects on economic development. Moreover, Awan et al. (2011) found that unproductive government expenditure has adverse relationship with economic development in their research. Pham (2009) also found that government expenditure on social and general development will also have negative relationship with economic growth.

In addition, exchange rate was discovered to have significant short run negative relationship with gross domestic product per capita in Malaysia as hypothesized (H_7). This result explained that exchange rate has significant short run adverse impacts on economic growth in Malaysia. The result is matched with several previous researchers such as Abida (2010), Sarkar and Amor (2009), Repetti (2011) and Rodrik et al (2008). Abida (2010) and Sarkar and Amor (2009) found that real exchange rate has significant adverse relationship with economic growth which undervaluation of currency will stimulate economic growth. Rapetti (2011) found that real exchange rate overvaluation had caused a long lasting negative impact on economic development. The research also found that aiming at

maintaining stable and competitive real exchange rate will accelerate economic growth of the country. Rodrik et al (2008) also found that undervaluation of the currency will stimulate economic growth.

However, trade openness was also found to have significant short run positive relationship with gross domestic product per capita in Malaysia as hypothesized (H_8). This result illustrated that trade openness has significant short term positive impacts on economic growth in Malaysia. This research finding is similar with other previous researchers finding such as Ellahi et al. (2011), Paudel and Perera (2009) and Dritsaki and Dritsaki (2013) which trade openness will positively impact economic growth of the countries. Ellahi et al. (2011) found that export and import affect positively to economic growth while Paudel and Perera (2009) found that trade openness has positive impacts on economic growth in Sri Lanka. On the other hand, Drtisaki and Dritsaki (2013) found that greater openness degree will stimulate economic growth in Bulgaria in their research.

In short, there are three variables found to have significant short run relationship in affecting economic performance in Malaysia. Government expenditure and exchange rate found to have negative short run relationship with economic performance in Malaysia while trade openness was found to have positive short run relationship with economic growth in Malaysia.

Meanwhile, this research also found that there are two uni-directional causal relationships and one bi-directional causal relationship among the variables. Firstly, this research found that government expenditure is granger cause the economic growth but not vice versa which consistent with previous researchers such as Chimobi (2010) and Sevitenyi (2012). Both researchers also found that there is a unidirectional causality running from government expenditure to economic growth in their research in Nigeria.

On the other hand, this study found that population is granger cause the economic growth but not vice versa. This result is similar with other previous researchers such as Wong and Furuoka (2005). Wong and Furuoka (2005) found that

population is granger cause economic growth but not the vice versa in China, Singapore and Philippine. Thus, the result suggests that this year population will affect the future economic performance in Malaysia.

Lastly, this research found that the relationship between exchange rate and economic growth in Malaysia is bidirectional. This research is consistent with previous researcher, Aliyu (2009). According to Aliyu (2009), there is bidirectional causality from real exchange rate to economic growth and vice versa. Other researchers such as only found unidirectional relationship. For example, Tarawalie (2010) and Tang (2011) found that real effective exchange rate is granger cause economic growth in Sierra Leone and Malaysia respectively. However, Minescu (2012) found that economic growth through total industry channel and manufacturing industry influence the dynamics of real exchange rate to some extent.

5.3 Implication of the study

The finding of this research indicates that government expenditure has significant negative relationship with economic growth in Malaysia in both short run and long run. Perhaps, Malaysia's government had focus on government expenditure on unproductive activities and expenditure on social and general development which lead to negative impact on economic growth as stated by Awan et al. (2011) amd Pham (2009). Awan et al (2011) and Pham (2009) suggested the implication with their findings that government may focus on productive government expenditure or economic expenditure in order to have positive impact on economic growth. Besides, government should also reduce the expenditure on unproductive activities and social and general development. For example, Malaysia government can implement 1 Malaysia projects for the lower income group will helps to stimulate the consumption on goods and services, and thus creating excessive demands. Excessive demands will then lead to increase in supply. Increase in supplies requires greater labour forces in order to produce

goods and services. In short, increase in government expenditure will solve certain degree of unemployment problem and increase in GDP therefore stimulates the economic growth.

On the other hand, this research found that population has significant positive relationship with economic growth in Malaysia in short run. This result may due to increase in adult population as stated by Crenshaw (1997). Thus, the finding indicated that there is an increasing in adult population which had fostered economic growth in Malaysia. The implication is that Malaysia Government should encourage youth and adult to further their studies and explore more in skills and knowledge specialization. According to Becker et al. (1999), larger populations will encourage greater specialization in skill and increase investment in knowledge. It is because the greater the inducements to human capital and expansion of knowledge will helps in stimulating economic growth. Since, Malaysia population is increasing for the past 43 years, therefore there is a need for government to focus on the youth development which can create more specialists and professionals that able to can further stimulate Malaysia economic growth in long run. Besides, Malaysia government should encourage youngsters to start up their own business which help to reduce the unemployment rate in Malaysia so does stimulating Malaysia economies at the same time.

In addition, increase in population also tends to increase consumption which leads to an increase in GDP. The prescription for Malaysia government is to reduce the taxes in order to stimulate the economic growth. It is because tax reductions will increase the household disposable income which leads to an increase in the consumption on goods and services. Therefore, supply will increase to fulfill the excessive demand. As mentioned before, increase in supply leads to increase in labour force which will also reduce unemployment rate and raiseproductivity. Therefore, higher population will enhance the consumption and stimulate economic growth.

Besides, this study also found that exchange rate has a negative short run relationship with economic growth in Malaysia. Sarkar and Amor (2009) found

that undervaluation of real exchange rate will react positively and statistically significant to the economic growth. Rapetti (2011) also supported that competitive real exchange rates tend to stimulate higher economic growth. The implication for this study is that Malaysia government should continue to monitor and maintain the real exchange rate at the competitive level to ensure the positive and high economic growth could be sustained. It is because currency appreciation will harm the export level which foreign countries will not import goods and services from Malaysia. Moreover, currency appreciation will also encourage import from foreign countries which foreign goods and services become relatively cheaper compared to local goods and services. As a consequence, decrease in export and increase in import will slowdown the economic growth. Therefore, Malaysia government should ensure the competitive exchange rate is sustainable to continuously enhance Malaysia economic growth.

Lastly, trade openness had found to have positive relationship with economic growth in Malaysia in both long run and short run dynamics. Previous researchers such as Ellahi et al. (2011), Paudel and Perera (2009), Soukhakian (2007), Choong et al. (2005) and Dritsaki and Dritsaki (2013) found similar result that trade openness has significant positive relationship with economic growth. As an implication to this research, Malaysia government should further enhance the degree of the trade openness to further stimulate high and sustainable economic growth. According to economic growth theory, increase in export increases GDP whereas increase in import reduces GDP. Therefore, Malaysia government should focus more on increasing exports rather than imports. In order to promote exports, Malaysia should allow free import of raw material to ensure the higher production for exports. Besides, Malaysia government should also implement liberal export policy which provides equal export and import opportunity to the all the sectors. In addition, Government can also simplify the export procedure to ease all the sectors especially the small and medium enterprises. Last but not least, Malaysia government should also give support and provide exporters for exhibiting their goods and services in various international exhibitions. Meanwhile, there are several training programmes that can be provided by government such as managerial training, technical training and consultancy services.

5.4 Limitation of the Study

In this research, there are some limitations which are inevitable. First of all, this research concentrated on particular country which is Malaysia only among other South East Asia region. Thus, the result might vary due to different country specific effects. In other words, same variables such as government expenditure, population, exchange rate and trade openness may have different kind of impacts on economic growth in other developing countries in South East Asia Region.

On the other hand, this research only consists of 43 observations which are derived from an annual data set in period of year 1970 to 2012. These relatively small observations limit the generalization of the outcomes. Another problem goes to quarterly data which is not able to be collected due to the limited timeframe given throughout this study. There is also inaccessibility of certain resources from well-known online databases such as World Bank Indicator and International Monetary Fund. This is the bottleneck of this study since annual data may not able to explain the changes of the variables within a year which can be very volatile.

According to major finding, government expenditure was found to have significant negative short term relationship with economic growth. However, the result also found that there is a significant positive long term relationship between government expenditure and economic growth in Malaysia. Although the result may be similar with the previous researchers, but it may accurately and precisely explain the relationship in Malaysia since government expenditure of the countries may vary among each other.

Moreover, according to Jalles (2011), result of trade openness towards economic growth may not be robust due to no alternative specification of openness which the trade to GDP ratio can be inferred.

In addition, this research only used RM currency over USD as the exchange rate indicator to evaluate the economic growth. It is due to the difficulty in collecting

other countries exchange rate over RM from 1970 to 2012. Although USD is the main foreign currency which used to trade internationally, it might not be precise in explaining economic growth in Malaysia. It is because there are other economies using different currencies to trade with Malaysia.

Lastly, this research had foregone other variables such as monetary policies and other fiscal policies such as taxation. These variables might be significant in affecting economic development in Malaysia. However, considering excessive independent variables in investigating economic growth might create unwanted bias which will lead to inaccurate results. This research will only examine the relationship of government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. Therefore, monetary policies variables and taxation which is also part of the fiscal policies will be examined in future research.

5.5 Recommendations of Future Research

This research was conducted to explore relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. Future research should consider the limitations of this thesis when replicating the empirical analysis. Besides, there are several recommendations for future research to be mentioned.

First and foremost, future researchers can widen their scope of research to the entire South East region which will better explain the relationship between government expenditure, population, exchange rate, trade openness and economic growth in the developing countries. This may enhance the accuracy and robustness of the result in explaining the economic model of South East region.

On the other hand, future researchers should also increase the observation of the research which it is the bottleneck of this research. Future researchers can use

semi-annually or quarterly data which can greatly increase the number of the observations. This is because annual data cannot explain the volatility of the variables within a year which may affect the findings. Thus, this may help the future researchers to generate more accurate and precise results which are more reliable to explain the relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia.

Besides, future researchers can also further investigate the government expenditure to figure out the factors that may affect government in setting the government fiscal policies. For example, types of the government expenditures that affect the economic growth in Malaysia such as productive expenditure, unproductive expenditure, economic expenditure, expenditure on social and general development and others. This will give clearer picture to government in order to assist in implementing proper fiscal policies to the country.

In addition, future researchers are recommended to use different kinds of exchange rate ratios to evaluate the relationship between exchange rate and economic growth. This should be more accurate and precise to explain the economic growth in Malaysia since Malaysia have trade or capital flow with many other countries such as Thailand, Singapore, Japan, Korea and so on.

Last but not least, future studies can also include other variables such as taxation which is also a part of the fiscal policies which might be significant in influencing economic development in Malaysia. Besides, monetary policies rather than fiscal policies are expected to have significant relationship with economic growth which money supply shall have greater impact on exchange rate fluctuation. This fluctuation will therefore influence the exports and imports which will ultimately affect a country GDP. Consequently, taxation and monetary policies will be examined in the future research.

5.6 Conclusion

This study was conducted to reexamine the relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia. The result shows that government expenditure has long run negative relationship with economic growth in Malaysia while population and trade openness has a significant positive relationship with economic growth in Malaysia.

On the other hand, Government expenditure and exchange rate found to have negative short run relationship with economic growth in Malaysia while trade openness was found to have positive short run relationship with economic growth in Malaysia.

Besides, this study also found two unidirectional causal relationships and one bidirectional causal relationship among the variables. Government expenditure and population were found to have unidirectional causal relationship with economic growth which government expenditure granger cause the economic growth but not vice versa. However, exchange rate was found to have bidirectional causal relationship with economic growth in Malaysia which there is significant causality from exchange rate to economic growth and vice versa.

This study had achieved several objectives and shall benefits the future researchers to further deepen their investigation in the relationship between government expenditure, population, exchange rate, trade openness and economic growth in Malaysia context. Besides, this research had also estimated to have a better understanding on the relationship between the variables in Malaysia and helps Malaysia government in managing Malaysia economy and implementing effective and efficient fiscal policies to improve economic growth.

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APPENDICES

Appendix A

Managed Malaysia's Data for Figures Presentation

Year	GDP Per Capita (thousand)	Government Expenditure (billion)	Population (million)	Exchange Rate	Trade Openness (% of GDP)
1970	0.39	0.65	10.91	3.06	78.72
1971	0.40	0.74	11.18	3.05	75.04
1972	0.47	1.01	11.46	2.82	69.26
1973	0.69	1.25	11.74	2.44	73
1974	0.84	1.52	12.03	2.41	90.98
1975	0.80	1.69	12.31	2.39	85.56
1976	0.93	1.76	12.60	2.54	87.98
1977	1.08	2.27	12.89	2.46	87.58
1978	1.26	2.59	13.19	2.32	91.2
1979	1.60	2.92	13.50	2.19	101.66
1980	1.80	3.99	13.83	2.18	110.96
1981	1.80	4.46	14.18	2.3	109.26
1982	1.88	4.84	14.54	2.34	108.9
1983	2.06	4.68	14.93	2.32	106.51
1984	2.25	4.94	15.33	2.34	105.09
1985	2.02	4.70	15.76	2.48	103.17
1986	1.74	4.63	16.22	2.58	104.95
1987	1.93	4.79	16.70	2.52	111.92
1988	2.05	5.02	17.20	2.62	122.62
1989	2.19	2.46	17.71	2.71	136.69
1990	2.42	6.07	18.21	2.7	146.96
1991	2.63	6.73	18.71	2.75	159.31
1992	3.08	7.70	19.21	2.55	150.61
1993	3.40	8.45	19.70	2.57	157.94
1994	3.69	9.14	20.21	2.62	179.91
1995	4.29	10.99	20.73	2.5	192.11
1996	4.74	11.20	21.26	2.52	181.77
1997	4.59	10.79	21.81	2.81	185.67
1998	3.23	7.50	22.36	3.92	209.49
1999	3.46	8.70	22.90	3.8	217.57

2000	4.00	9.53	23.42	3.8	220.41
2001	3.88	11.17	23.93	3.8	203.36
2002	4.13	13.07	24.41	3.8	199.36
2003	4.43	14.29	24.89	3.8	194.2
2004	4.92	15.69	25.37	3.8	210.37
2005	5.55	16.47	25.84	3.79	203.85
2006	6.18	18.17	26.33	3.67	202.58
2007	7.22	22.39	26.81	3.44	192.47
2008	8.46	26.57	27.30	3.34	176.67
2009	7.28	26.39	27.79	3.52	162.56
2010	8.73	30.10	28.28	3.22	170.33
2011	10.01	37.50	28.76	3.06	167.22
2012	10.38	41.03	29.24	3.09	163.01

Source: World Bank. (2013). World Development Indicators 2013. Washington, DC: World Bank. doi: 10.1596/978-0-8213-9824-1. License: Creative Commons Attribution CC BY 3.0

1. Data shown above is used to draw Figure 1.1, 1.2, 1.3, 1.4 and 1.5. The purpose is used to illustrate the relationship between the time series.
2. Besides, the data will further being utilized to run the analysis in this research.

Appendix B

Raw Result of Johansen Cointegration Test

Date: 10/09/13 Time: 10:27
Sample (adjusted): 1972 2012
Included observations: 41 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDPPC LGE LPOP LER LTO
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.723000	106.9750	69.81889	0.0000
At most 1 *	0.576881	54.34183	47.85613	0.0109
At most 2	0.229686	19.07768	29.79707	0.4873
At most 3	0.117903	8.378418	15.49471	0.4258
At most 4	0.075866	3.234822	3.841466	0.0721

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.723000	52.63320	33.87687	0.0001
At most 1 *	0.576881	35.26415	27.58434	0.0043
At most 2	0.229686	10.69926	21.13162	0.6772
At most 3	0.117903	5.143596	14.26460	0.7236
At most 4	0.075866	3.234822	3.841466	0.0721

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1. Appendix B demonstrated the significant part of Johansen Cointegration Test which indicated the conintegration equations.
2. To summon this table, choose all the non-stationary variables in this research, open as a group, click “view”, click “Cointegration Test”, Tick no.3 which intercept (no trend) in CE and test VAR, lag remain 1, then press ok.

Appendix C

Raw Result of VECM

Vector Error Correction Estimates
Sample (adjusted): 1972 2012
Included observations: 41 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Error Correction:	D(LGDPPC)	D(LGE)	D(LPOP)	D(LER)	D(LTO)
CointEq1	-0.044767	0.638636	-0.025450	-0.068514	-0.208930
	(0.17574)	(0.18711)	(0.00864)	(0.10926)	(0.10905)
	[-0.25473]	[3.41310]	[-2.94616]	[-0.62708]	[-1.91593]
D(LGDPPC(-1))	-0.546029	-0.550477	-0.003321	0.365362	0.104211
	(0.23750)	(0.25287)	(0.01167)	(0.14766)	(0.14737)
	[-2.29905]	[-2.17690]	[-0.28443]	[2.47439]	[0.70712]
D(LGE(-1))	-0.451671	-0.383792	0.001552	0.262282	-0.066668
	(0.18987)	(0.20216)	(0.00933)	(0.11805)	(0.11782)
	[-2.37879]	[-1.89844]	[0.16633]	[2.22185]	[-0.56585]
D(LPOP(-1))	-2.412413	2.942743	-0.358543	0.491651	-2.848139
	(3.40867)	(3.62927)	(0.16755)	(2.11921)	(2.11513)
	[-0.70773]	[0.81084]	[-2.13988]	[0.23200]	[-1.34655]
D(LER(-1))	-2.109904	-2.080100	0.014315	1.147989	0.151569
	(0.56930)	(0.60614)	(0.02798)	(0.35394)	(0.35326)
	[-3.70615]	[-3.43171]	[0.51155]	[3.24347]	[0.42906]
D(LTO(-1))	1.098243	1.169977	0.010551	-0.326764	0.160851
	(0.31410)	(0.33443)	(0.01544)	(0.19528)	(0.19490)
	[3.49646]	[3.49844]	[0.68338]	[-1.67331]	[0.82528]
C	0.194544	0.065510	0.032090	-0.054690	0.080417
	(0.08261)	(0.08796)	(0.00406)	(0.05136)	(0.05126)
	[2.35494]	[0.74479]	[7.90244]	[-1.06483]	[1.56875]
R-squared	0.458803	0.358467	0.304500	0.283076	0.200690
Adj. R-squared	0.363298	0.245255	0.181765	0.156561	0.059635
Sum sq. resids	0.388946	0.440918	0.000940	0.150337	0.149760
S.E. equation	0.106956	0.113878	0.005257	0.066496	0.066368
F-statistic	4.803956	3.166344	2.480954	2.237477	1.422778
Log likelihood	37.31019	34.73914	160.8341	56.79669	56.87559
Akaike AIC	-1.478546	-1.353129	-7.504104	-2.429107	-2.432956
Schwarz SC	-1.185985	-1.060568	-7.211543	-2.136546	-2.140395
Mean dependent	0.079268	0.083171	0.023659	0.000244	0.019024
S.D. dependent	0.134041	0.131081	0.005812	0.072405	0.068440

1. VECM is continues after Johansen test. to run VECM, click “proc”, select “make Auto Regression”, tick “Vector Error Correction”, lag interval remain 1, then click ok.

Appendix D

Raw Result for Granger Causality Test

Pairwise Granger Causality Tests
Date: 10/09/13 Time: 10:26
Sample: 1970 2012
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LGE does not Granger Cause LGDPPC	41	3.30970	0.0479
LGDPPC does not Granger Cause LGE		0.97765	0.3860
LPOP does not Granger Cause LGDPPC	41	4.31017	0.0210
LGDPPC does not Granger Cause LPOP		1.87791	0.1676
LER does not Granger Cause LGDPPC	41	5.91681	0.0060
LGDPPC does not Granger Cause LER		6.60156	0.0036
LTO does not Granger Cause LGDPPC	41	1.29690	0.2858
LGDPPC does not Granger Cause LTO		0.00378	0.9962
LPOP does not Granger Cause LGE	41	1.83497	0.1742
LGE does not Granger Cause LPOP		1.02240	0.3699
LER does not Granger Cause LGE	41	0.95450	0.3945
LGE does not Granger Cause LER		3.63886	0.0364
LTO does not Granger Cause LGE	41	0.91190	0.4108
LGE does not Granger Cause LTO		0.34514	0.7104
LER does not Granger Cause LPOP	41	2.85135	0.0709
LPOP does not Granger Cause LER		3.95006	0.0281
LTO does not Granger Cause LPOP	41	0.83476	0.4422
LPOP does not Granger Cause LTO		0.38967	0.6801
LTO does not Granger Cause LER	41	5.93586	0.0059
LER does not Granger Cause LTO		0.31212	0.7339

1. To summon granger causality test, select the variables, click “View”, click on “Granger Causality”, choose a lag within Akaike Criterion, normally, 1-2 for annually data is acceptable, after that, click ok.