BILATERAL OR UNILATERAL? THE RELATIONSHIP BETWEEN THE GOVERNMENT INVESTMENT ISSUE (GII) ISSUANCE AND MACROECONOMIC VARIABLES

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DECLARATION

We hereby declare that:

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

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

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

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DEDICATION

We would like to dedicate this dissertation to our family and friends who have given us their best support and encouragement during the preparation of this thesis.

Moreover, this thesis is also dedicated to our supervisor, Mr. William Choo Keng Soon for his advice and guidance to assist us in completing this thesis.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
ARCH	Autoregressive Conditional Heteroscedasticity
BBA	Bai' Bithaman Ajil
BLUE	Biased, Linear, Unbiased Estimator
BNM	Bank Negara Malaysia
BOT	Balance of Trade
CPI	Consumer Price Index
EMBI	Emerging Market Bond Index
EPF	Employees Provident Fund
et al.	And others
EX	Export
EXC	Exchange Rate
FGLS	Feasible Generalized Least Square
GARCH	Generalized Autoregressive Conditional Heteroscedaticity
GDP	Gross Domestic Product
GIC	Government Investment Certificates
GII	Government Investment Issuance
INF	Inflation Rate
INT	Interest Rate

IPAs	Investment Promotion Agencies
IRF	Impulse Response Function
JB	Jarque-Bera
MGS	Malaysia Government Securities
MIFC	Malaysia Islamic Finance Centre
MIFM	Malaysia Islamic Financial Marketplace
MITB	Malaysian Islamic Treasury Bills
ML	Maximum Likelihood
MTB	Malaysian Treasury Bills
MYR	Malaysia Ringgit
NCD	Negotiable Certificate of Deposit
OIC	Organization of Islamic Cooperation
OLS	Ordinary Least Squares
PMG	Pooled Mean Group
PP	Philips-Perron
PPI	Producer Price Index
REER	Real Effective Exchange Rate
SOCSO	Malaysian Cocoa Board, the Social Security Organization
SSA	Sub-Saharan African
UAE	United Arab Emirates
US	United States
VAR	Vector Autoregressive
VDC	Variance Decomposition

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PREFACE

This researcher paper is submitted in partial fulfillment of the requirement for Bachelor of Business Administration (HONS) Banking and Finance. Our supervisor of this research paper is Mr. William Choo Keng Soon. Although he final year project is made solely by the authors, yet it is based on the similar research of the others and the resources are quoted as in references. Since this is the first ever research conducted on Government Investment Issue (GII) Issuance, thus we are extracting the literature review part by using the bond and SUKUK market as the mirror references to reflect the potential conditions of GII Issuance.

In this case, we do not pre-determine the directional relationship between the GII Issuance and macroeconomic variables and instead, we attempt to examine the bi-lateral relationship between these two elements. The macroeconomic variables that had been selected here are Export (EX), Inflation (INF), Exchange Rate (EXC), Gross Domestic Product (GDP) and Interest Rate (INT). There are definitely a lot of hardships that we had passed through during the progress, but it make us feel worthwhile when we realized that we had learned something new and gain extra mile of knowledge. With no doubt, this kind of extra knowledge will help us in our future career life.

ABSTRACT

The main purpose of this study is to examine the two way relationship between the macroeconomic factors and Government Investment Issue (GII) Issuance in Malaysia. The data collected are ranging from the time frame of 2003 to 2013 in the quarterly basis, with the total observations of 44.

The macroeconomic variables that had been selected to conduct the research inclusive of Export (EX), Inflation (INF), Exchange Rate (EXC), Gross Domestic Product (GDP) and Interest Rate (INT). After the data and variables had been put into the test on econometric analysis software by using the Unit Root test, Granger Causality test, Simple OLS Regression Model and the Diagnostic Checking, it is observable that macroeconomic variables tend to be the one that significantly influence the Government Investment Issue (GII) Issuance in Malaysia, instead of the other way round.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

There are two different types of Islamic bonds in Malaysia - Government Investment Issues (GII) and Sukuk. GII is one of the debt securities issued by Malaysia government to raise fund. The main difference between GII and Sukuk is that, GII is issued by government of Malaysia while Sukuk is issued by corporates. GII is a long term government debt securities with the maturities up to 20 years and issued based on Islamic principles (Government Investment Issue (GII), n.d.).

Besides, GII is in compliance with Shari'ah requirement. It is one of sources of funding for government among other financing instruments included Malaysia Government Securities (MGS), Malaysian Treasury Bills (MTB) and Malaysian Islamic Treasury Bills (MITB). Major buyers of government securities are Investment Promotion Agencies (IPAs), Employees Provident Fund (EPF), Malaysian Cocoa Board, The Social Security Organization (SOCSO) and so on (Government Debt Securities, n.d.).

GII issuance could have significant relationship with major macroeconomic variables. Therefore, it is essential to determine the causal relationship and significance of the relationship between GII issuance and macroeconomic variables. This study emphasizes on five macroeconomic variables, which are openness of economy, exchange rate, Gross Domestic Product (GDP), inflation rate, and interest rate.

The aim of this thesis is to study the two-way relationship between GII issuance and the macroeconomic variables. In this chapter, the background of the GII, problems lead to this research, objective of this research, research questions, hypothesis and the contributions of this research will be discussed.

1.1 Research Background

1.1.1 Introduction of Sukuk

Sukuk is one of the most important financial products in the Islamic finance which known as a Shari'ah or Islamic compliant bond, whereby it carries no uncertainty (Garar), interest (Riba) and gambling (Maisir) (Alvi, n.d.) elements in it. At the same time, Sukuk is an asset-backed trust certificate that evidences the ownership. It is issue to raise the capital for long-term investment. Since Sukuk is relatively new to the financial market, and is only issued in certain countries only. This is because most of the Islamic finance infrastructures in most of countries around the globe have not been well establish yet (Introduction to Sukuk, n.d.). However, Sukuk carries the benefits of having relatively large issuance size and being able to provide liquidity to the investors due to its active trading in the secondary market (Chik, 2012).

Sukuk is issued in both Islamic and non-Islamic countries such as Egypt, Indonesia, Hong Kong, Iran, Saudi Arabia, Malaysia, Pakistan, United Arab Emirates (UAE), Brunei, United Kingdom and more. Although the issuance volume of Sukuk declines in the year of 2008 due to the global market disorder, Sukuk is still perceive to remain strong position in the long term. The outstanding amount of global Sukuk rose to approximately US$231.4 billion at the end of 2012 (Introduction to Sukuk, n.d.). Eygpt announced to open the Sukuk market in the year 2011 while Philippine and Sri Lanka also showed their intention to develop the Sukuk market. Other than that, Australia also aggressively worked on its tax law in order to facilitate Islamic finance, so that it can develop the Sukuk market smoothly. Motive to develop Sukuk market is also shown by Russia, France, South Korea, Japan, Brazil and Nigeria (Rauf, n.d.).

By looking at the Islamic capital market internationally, Malaysia is the pioneer. A remarkable issue of Sukuk occurred at the successful launching of first foreign five year Sukuk that amounted to US$600 million. Sukuk market has experienced tremendous growth in Malaysia and became the largest market among all. In Malaysia, the well-established infrastructures that consist of reporting, trading and settlement system formed a strong foundation to support the development of the Sukuk market. Securities Commission Malaysia is responsible to control and regulate the issuance of Sukuk in Malaysia by using the framework provided under the guidelines of Sukuk. The structures of Sukuk have to be confirmed and agreed by Shari'ah advisers who are certified and qualified by the Shari'ah Committee. Therefore, the Shari'ah Committee is an body that governs financial institutions conducting Islamic Banking activities in conjunction of Bank Negara Malaysia (BNM) (Introduction to Sukuk, n.d.).

Up to year of 2003, Malaysia's Sukuk issuances have been restricted to those instruments that based on the securitization of debt derived from the contracts of Bai Bithaman Ajil (BBA), Murabahah and Ijarah. Starting from 2004, issuers of Sukuk in Malaysia began to adopt participatory contracts, such as Musharakah and Mudarabah. Since then, the market experienced significant growth. Malaysia has been honored with the name of chieftain in the Sukuk market internationally, contributed by its high Sukuk issuance volume and value (Alvi, n.d.).

To summarize, the issuance of Sukuk is issued based on some Shari'ah contracts such as Murabahah, Bai' Bithaman ajil (BBA), Ijarah, Mudharabah and Musharakah. These principles allow the investors to earn Islamic-permissible profits (Introduction to Sukuk, n.d.).

1.1.2 Introduction of Government Investment Issues (GII)

Government Investment Issue (GII) is an Islamic security issued by BNM on the government behalf, with the intention to acquire funds from the local capital market to finance the development expenditures of government (Government Debt Securities, 2011).

The significant feature of GII that differentiate itself from the other government instruments is its compliance with Shari'ah requirements. In year 1983, the GII (previously known as Government Investment Certificates, GIC) issuance was firstly introduced in Malaysia under the governing law of Government Investment Act 1983, which is currently known as Government Funding Act 1983. Malaysian Parliament approves this in order to allow the

Islamic banks to preserve liquid papers to meet the liquidity requirement, based on the Shari'ah principals (Government Investment Issue-i (GII-i), n.d.). From the viewpoint of investors, GII is a non-interest bearing government securities that can be purchased at a par value, based on the principal of Bai' Bithaman Ajil, and receive the coupon earnings semiannually (Government Debt Securities, 2011).

The GII bond issuance size is ranging from RM 2 billion to RM 5 billion with the original tenure maturities of 3-, 5-, 7-, 10-, and 15- or 20-years. In year 2012, the total issuance size of GII is amounted to RM 121.5 billion, or 29.1% of the total debt of government. This amount is expected to grow continuously in the future, as government is required to issue GII on a regular basis. Furthermore, the GII is being actively bought and sold in the secondary market, with the yearly turnover amount up to RM 240 million in 2011. The average turnover of GII per day also increased drastically since 2008, from RM 120 million to RM 1.05 billion (as at 15 May 2012) with the standard trading lot of RM 10 million as similar with MGS (Government Investment Issue (GII), n.d.).

1.1.3 Similarities and Differences between the GII and MGS

GII and MGS (Malaysia Government Securities) are similar yet different. They are both similar in terms of the effective flow of cash from them, their issuance method, legal status in which both instrument represents direct obligation of government to the holders as well as their feature of transaction as the financial products. Meanwhile, the main difference between GII and MGS is their structures, whereby GII is issue under the compliance of Shari'ah principal, while MGS is not (Government Investment Issue (GII), n.d.). Other detailed similarities and differences between the GII and MGS are as followed:

(i) Issuer, Tenure and Issue size

Both of the GII and MGS are issued by central bank on behalf of government of Malaysia, with the securities tenure from 3 years to 20 years with issuance size ranging from RM 2 billion to RM 5 billion. Both GII and MGS are redeemable at par upon maturity (Government Investment Issue (GII), n.d.).

(ii) Return Payment

The return payment for GII is defined in terms of profit payment or profit rate, while the return payment term of MGS is coupon payment or coupon rate. The return payments for both instruments are made semi-annually, and the return rate is determined by the market factors according to the weighted average success rate of the issues. Besides, both of their day count is in Actual basis (Government Investment Issue (GII), n.d.).

(iii) Regulatory Treatment

Both GII and MGS are being regulated under the same regulatory treatment, in which it included the risk weightage of 0% based on the Capital Adequacy Framework in Islamic Banks and the Risk-Weighted Capital Adequacy Framework. Moreover, they are subjected to a rate gliding of 2% and classified as qualified collateral to meet the requirement of Standing Facility. Besides, they are exclusive from the Single Customer Credit Limit and are grouped as the asset with 0% risk based on the Risk-Based Capital Framework. Therefore, holding GII and MGS in the trading books is able to reduce the statutory liabilities base under the Statutory Reserve Requirement (Government Investment Issue (GII), n.d.).

(iv) Odd Coupon

Odd coupon refers to the situation where interest payment from an investment is longer or shorter than the customary six months due to the unequal division of investments' lifetimes (Odd Coupon, n.d.). In the case of odd coupon occurred, both GII and MGS have the different settlement way. For GII, the coupon payable is fixed regardless the odd coupon period. Therefore, a long coupon period will have no effect on the day counts in the semi-annual coupon payment. However, the coupon payment for the odd coupon periods of MGS will have to be adjusted. For example, a longer period of coupon payment will be compensated with a greater number of payment day counts (Government Investment Issue (GII), n.d.).

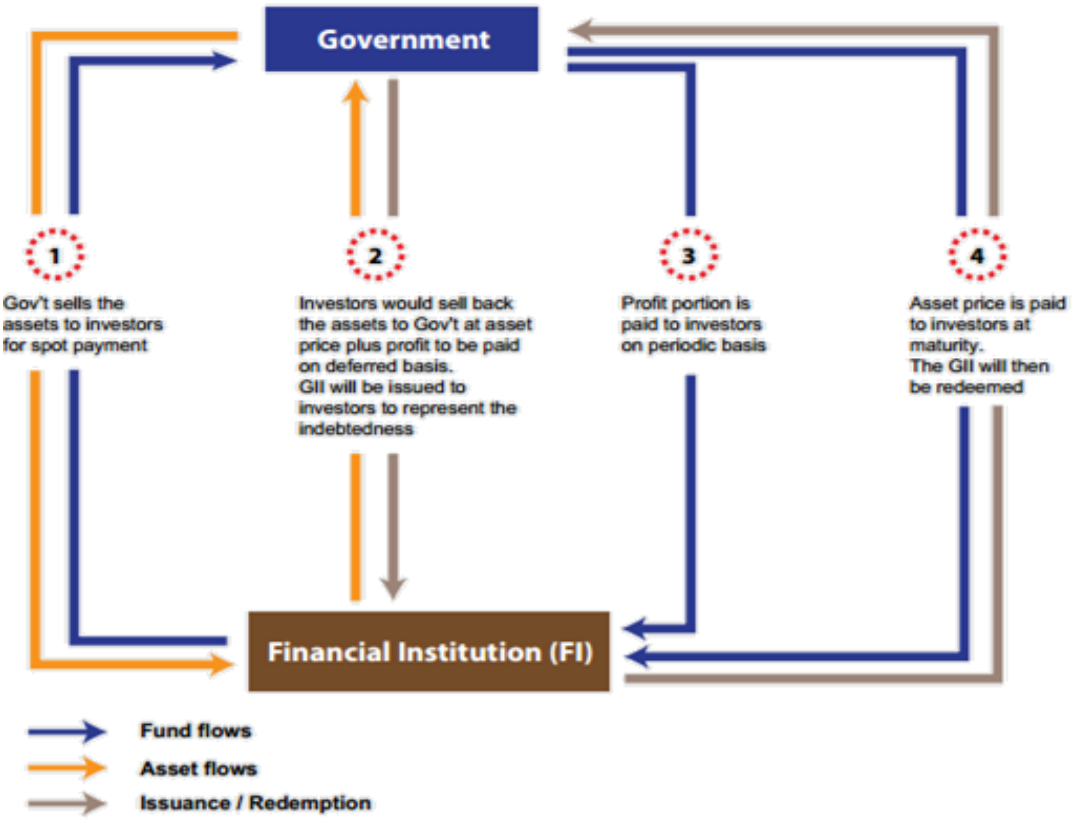
1.1.4 Issuance Structure of GII

In general, the issuance structure of GII can be categorized into two main principles of Shari'ah, the Bai Al-Inah and the Murabahah concept.

Bai Al-Inah Concept

Under the concept of Bai Al-Inah, the GII is issued and settled through four main processes between the two counterparties of Government and Financial Institution, or the investors (Government Investment Issue (GII), n.d.).

Figure 1.1: GII Structure based on Bai Al-Inah Concept



Source: Malaysia Islamic Finance Centre (MIFC)

***Step One*:** In order for government to raise their required fund, they will firstly sell their Shariah-complied assets such as equities to the investors, and receives the immediate payment from them.

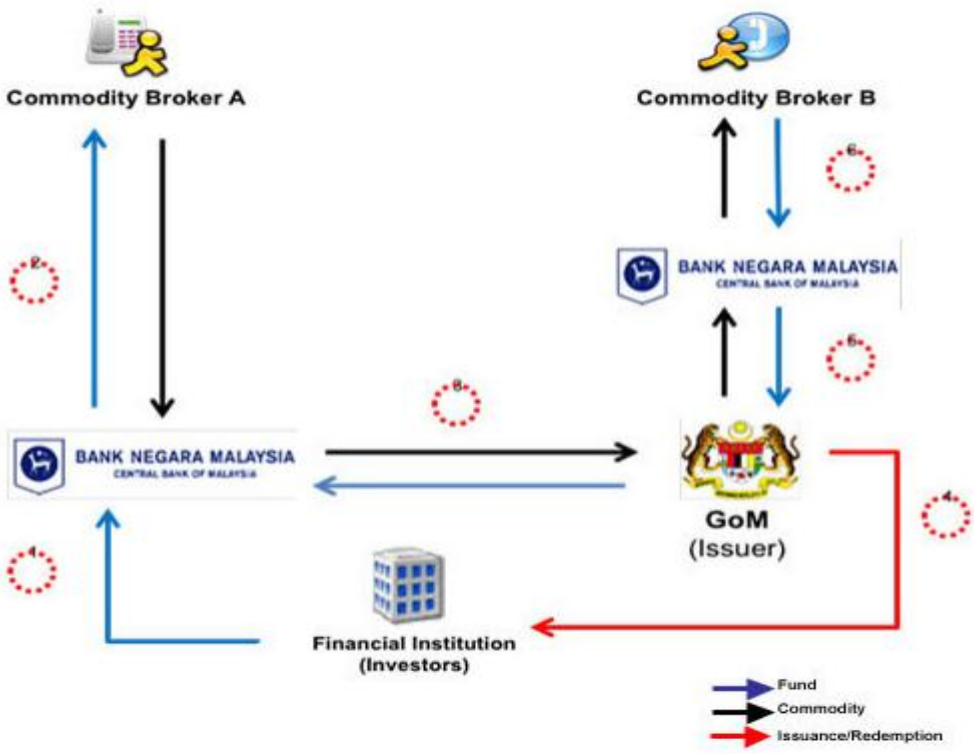
***Step Two*:** After the completion of sales, investors will then sell back the assets to the government at profit on deferred basis. The GII will then be issued by the government to represent their acknowledgement of indebtedness.

***Step Three*:** Similar with other bonds, the coupon payments will be made to the investors on periodic basis, for example semi-annual or quarterly basis which denote the coupon of Government Investment Issues.

***Step Four*:** Upon the maturity, the GII will be redeemed back by the government after clearing the payment of asset's principal amount plus the coupon profit to the investors.

Murabahah Concept

Figure 1.2: GII Structure based on Murabahah Concept



Source: Malaysia Islamic Financial Marketplace (MIFM)

Distinct from the Bai Al-Inah concept, the GII under Murabahah concept requires more parties and steps for the issuance and settlement. These parties include Commodity Broker A, Commodity Broker B, Bank Negara Malaysia (BNM), government, and also the Financial Institution (investors) (GII on Murabahah Concept, 2014).

***Step One*:** The investor requests BNM to act as their agent to purchase certain commodities on their behalf.

***Step Two*:** As the agent appointed by investors, BNM purchases the commodities such as Crude Palm Oil from Commodity Broker A.

Step Three: After the purchase of commodities, BNM who act as the agent of investor will sell-off that particular commodities to government at a marked-up price for the earning of profit for deferred payment. The return from sales indicates the coupon payment of GII in which it will be made on periodic basis.

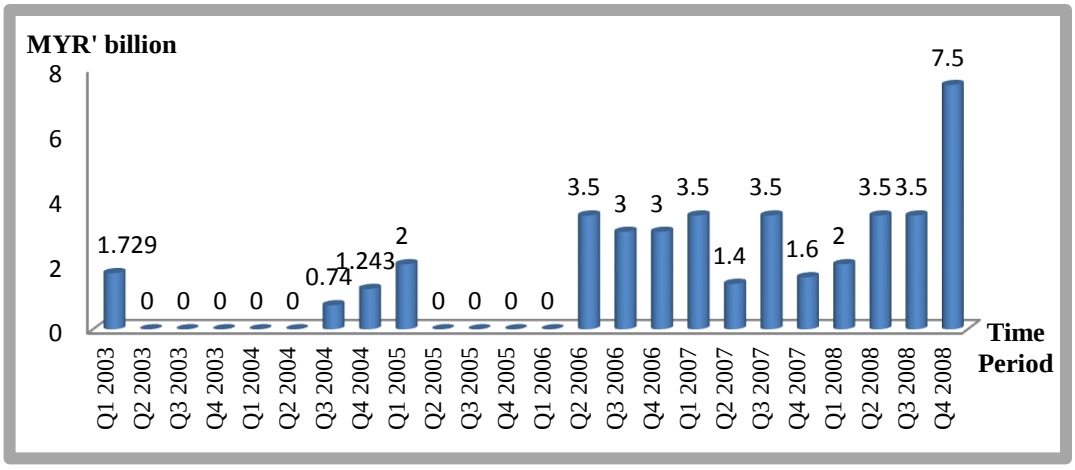
***Step Four*:** Afterwards, the GII will be issued by government to the investor to denote their indebtedness acknowledgement. The profit is also to be paid to investors on periodic basis. Upon maturity, the GII will be redeemed by government after settle the payment of principal amount and final profit to the investors.

***Step Five*:** In order for government to raise their required fund, they would ask BNM to act as their agent to sell those commodities at cost.

***Step Six*:** BNM will finally sell the commodities on behalf of government to Commodity Broker B and transfer the cash to government.

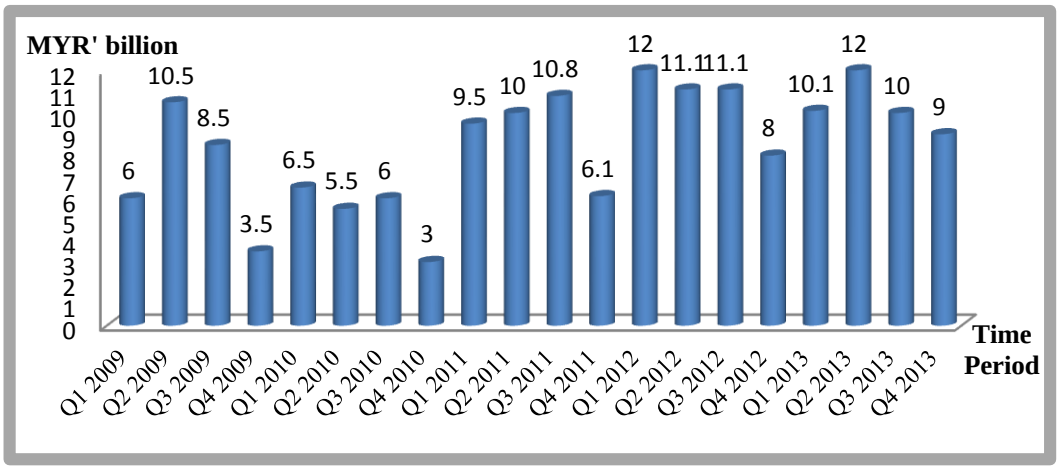
1.1.5 Recent Trends of GII in Malaysia

Graph 1.1: GII issuance trends from year 2003 to 2008



Source: Bank Negara Malaysia

Graph 1.2: GII issuance trends from year 2009 to 2012



Source: Bank Negara Malaysia

By referring to the information extracted from the website of BNM, there is an increasing trend of the size of total GII issuance in Malaysia throughout the past decade. The issuance volume of GII reached it's the maximum amount at RM12,000,000,000 in 2013. The drastic increase is one of the main motives to conduct study on this field.

1.2 Problem Statement

Islamic finance is expected to have a long term optimistic growth in the market since there are increasing numbers of countries, both Islamic and non-Islamic, started to become more active in their Islamic windows. Moreover, the major leading financial centers located in New York, Hong Kong, Singapore, and London is also on their pathway to accommodate Islamic finance (Hesse, Jobst, and Sol é, 2008).

Malaysian Government Investment Issues (GII) is one of the Islamic financial products which is showing significant growth in issuance as shown by the graph in the Section 1.1.5. GII is important to Malaysian government as it serves the similar function with Malaysian Government Securities (MGS), that is, to enable the Malaysian government to raise long term capital for development purposes. Therefore, it is essential to study the possible macroeconomic factors that will potentially affect the GII issuances, and also how GII issuance will influence those macroeconomic factors.

Bhattacharyay (2013) and Said and Grassa (2013) conclude that the openness of economy is having positive relationship with the bond or sukuk market development. In contrary, Mu, Phelps, and Stotsky (2013) and Adelegan and Radzewicz-Bak (2009) stated that the relationship between two to be negative. Motivated by the conflict among the studies, this study will study the relationship between the openness of economy and GII issuance.

Another attempt of this research is to study the relationship between GII and foreign exchange rate. This attempt is motivated by some past researches. For example, according to Ahmad and Muda (2013), Ahmad and Radzi (2011), Danila (2015), Adelegan and Radzewicz-Bak (2009) and Bhattacharyay (2013),

foreign exchange rate and its volatility could negatively affect Sukuk and other bond markets.

Ahmad and Radzi (2011), Said and Grassa (2013), and Ahmad, Daud and Kefeli (2012) have studied the relationship between GDP and Sukuk market development, while Bhattacharyay (2013) and Andritzky, Bannister, and Tamirisa (2005) have studied the relationship between GPD and bond market development. All the researchers consistently evidence a positive relationship between GDP and Sukuk or bond market. To further enrich the researches, relationship between GDP and GII issuance will be examined.

This study also aims to determine the relationship between inflation rate and GII issuance. According to Said and Grassa (2013), inflation does not significantly influence the Sukuk market development. On the other hand, Ahmad, Daud, and Kefeli (2012) claimed that inflation could significantly and negatively affect the issuance of Sukuk. In addition, Aizenman and Marion (2011), Ameer (2007), and Broeck and Guscina (2011) concluded that inflation is negatively related to stock, bond, and other debt issues. Therefore, this research is attempted to prove the relationship between inflation rate and GII issuance.

According to Bhattacharyay (2013), Adelegan and Radzewicz-Bak (2009), interest rate is having negative relationship with the issuance of bond. Moreover, Said and Grassa (2013) and Elkarim (2012) claims that the issuance of Sukuk is negatively related with the changes of interest rate. Due to the similarities between GII and Sukuk, GII is suspected to have relationship with interest rate. Thus, this research will examine the relationship between two.

Different researchers might come out with different conclusion due to the difference in models used, samples covered, data used. Therefore, to accurately

conclude the relationships between GII issuance and the macroeconomic variables, a specific research is needed rather than making conclusion based on the studies by previous researchers on Sukuk, bond or other markets.

1.3 Research Objectives

1.3.1 General Objective

To determines the relationships between macroeconomic factors and the issuance of Government Investment Issue (GII) in Malaysia.

1.3.2 Specific Objective

- To study the relationship between openness of economy (export) and the GII issuance in Malaysia.
- To study the relationship between exchange rate and the GII issuance in Malaysia.
- To study the relationship between gross domestic product (GDP) and the GII issuance in Malaysia.
- To study the relationship between inflation and the GII issuance in Malaysia.

- To study the relationship between interest rate and GII issuance in Malaysia.

1.4 Research Questions

- Does openness of economy (export) significantly influence the issuance of GII in Malaysia or vice versa?

- Does exchange rate significantly influence the issuance of GII in Malaysia or vice versa?

- Does gross domestic product (GDP) significantly influence the issuance of GII in Malaysia of vice versa?

- Does inflation significantly influence the issuance of GII in Malaysia or vice versa?

- Does interest rate significantly influence the issuance of GII in Malaysia or vice versa?

1.5 Hypothesis of the Study

1.5.1 Openness of economy (export)

H_0: There is no granger cause relationship between openness of economy and GII issuance.

H_1: There is granger cause relationship between openness of economy and GII issuance.

H_0: Openness of economy does not significantly influence the issuance of GII.

H_1: Openness of economy significantly influences the issuance of GII.

1.5.2 Exchange rate

H_0: There is no granger cause relationship between exchange rate and GII issuance.

H_1: There is granger cause relationship between exchange rate and GII issuance.

H_0: Exchange rate does not significantly influence the issuance of GII.

H_1: Exchange rate significantly influences the issuance of GII.

1.5.3 Gross Domestic Product (GDP)

H_0: There is no granger cause relationship between GDP and GII issuance

H_1: There is granger cause relationship between GDP and GII issuance.

H_0: GDP does not significantly influence the issuance of GII.

H_1: GDP significantly influences the issuance of GII.

1.5.4 Inflation (CPI)

H_0: There is no granger cause relationship between inflation rate and GII issuance.

H_1: There is granger cause relationship between inflation rate and GII issuance.

H_0: Inflation rate does not significantly influence the issuance of GII.

H_1: inflation rate significantly influences the issuance of GII.

1.5.5 Interest rate

H_0: There is no granger cause relationship between interest rate and GII issuance.

H_1: There is granger cause relationship between interest rate and GII issuance.

H_0: Interest rate does not significantly influence the issuance of GII.

H_1: Interest rate significantly influences the issuance of GII.

1.6 Significance of Study

Throughout the past 30 years, industry of Islamic finance is expanding drastically in Malaysia. With the supports of figures, Malaysia's Islamic assets have reached the total amount of USD 65.6 billion and continue to grow at an average growth rate of 18-20% yearly (Overview of Islamic Banking in Malaysia, n.d.). Numerous studies have been conducted to study the issuance of Sukuk, but there is no any research study regarding GII yet. Therefore, this study which focuses on GII is relatively new and would be beneficial to a few parties, such as the government, academicians and investors.

Government is the issuer of the GII, and with no doubt, this study can assist them in making related decisions for example whether to issue and how much the volume of GII is appropriate to be issued. For example, what variables could significantly affect the issuance of GII should be considered and prioritized by the government before the issuance of such bond. This is because these variables will

affect the issuing volume of the GII and hence potentially influence its price and the total amount of capital can be raised.

On the other hand, this study will be also advantageous to the public investors. Implication provided in this study can be useful for investors to choose a bond instrument among others to invest in, and also to give some ideas about whether to invest in corporate or government Islamic bonds. Investors might find this study beneficial when they are evaluating the risk of GII bond issued by Malaysia government in term of macroeconomic indicators studied in this study. As a result, the investors could make a wiser investment decisions in Islamic bonds.

To the academicians, this study would generate the new academic evidences about government Islamic bonds. The result of this study might be useful to be applied as academic materials related to Malaysia's GII. This is because the study suggests not only the how macroeconomic variables impact the issuance volume of GII and its respective vice versa relationship, but also proves their significance by using the reliable historical data in Malaysia. In short, this study gives Islamic finance learners a more realistic view of GII.

1.7 Chapter Layout

This research paper is done and arranged in the following sequences.

Chapter 1: Research Overview

Chapter one covers introduction and research background of the research topic will be discussed, and the problem statement of this research will also be discussed followed by the research objectives, hypothesis and the significance of the study.

Chapter 2: Literature Review

Chapter two covers the reviews on previous studies will be carried out. This part will look on previous studies done on the topics related to ours. Issues, findings, implications and methodologies of previous studies will be highlighted.

Chapter 3: Methodology

Chapter three covers the reviews on data collection methods, sources of data, sample size, and also the methods that will be used in conducting this research.

Chapter 4: Result Analysis

Chapter four reports the empirical results. Consequently, the results generated will be compared with the results obtained by the past researchers.

Chapter 5: Conclusion

Chapter five draws the conclusions of this study. Besides, the policy implications and recommendations to improve this research are also included in this section.

1.8 Conclusion

In the conclusion, the main intention of this research is to introduce the importance of the relationship between macroeconomic variables and the development of Government Investment Issue (GII). This study is especially important for the government and investors. There is no harm to conduct this study as this could benefit the government and investors. Both parties would be able get to capture the patterns and trends of GII issuance, after relationships between the macroeconomic factors and the GII issuance volume is discovered in this study. The main macroeconomic factors covered in this study are openness of economy (export), exchange rate, Gross Domestic Product (GDP), inflation and interest rate.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter looks in depth on the methodologies and findings of previous studies on the relationship between macroeconomic factors and Sukuk or other bond markets. The reason to focus on the bond markets and Sukuk markets is that GII has relatively rare previous study, so both of the markets act as a mirror to reflect the behavior of GII.

The relationships between the Openness of Economy or Export (EX), Exchange Rate (EXC), Gross Domestic Product (GDP), Inflation Rate (INF) and Interest Rate (INT) and the issuance volume of Sukuk and other related bond instruments will be discovered by reviewing related past studies. There are two main sections of this chapter, which are the empirical findings from previous academicians and the review of the related theoretical models.

2.1 Literature Review

2.1.1 Openness of Economy (Export)

Openness of economy or the trade openness in a country is another independent variable that is expected to impact the issuance of bond and Sukuk market (Said and Grassa, 2013). Said and Grassa (2013) quantified the Openness of Economy as the ratio of export. The higher the exports suggest a more "open" economy. This statement is consistent with the claim by Bellas, Papaioannou and Petrova (2012) in which the trade openness is quantified in the ratio of export to GDP in a country.

According to Bhattacharyay (2013), it is essential to figure out the factors that will affect the effectiveness of the bond market development in Asia because he believes that from the external shocks, it is possible for the well-developed local currency bond market contribute to protect the local financial sector and able to improve the process of intermediation between savings and productive investment in Asia. His research used the time series data (1998 to 2008) from major East Asian economies - Malaysia, Hong Kong, Vietnam, Indonesia, Philippines, Singapore, Republic of Korea, China, Japan, and Thailand. Based on his result, the economy openness (measured in export) has significant positive impact on the development of corporate bonds market in Asia. Therefore, he suggested that opening up an economy for international trade, especially financial products could enhance local bond market development.

Mu, Phelps, and Stotsky (2013) aimed to study the current situation of local currency bond market and determine the key determinants of bond market (government and corporate bonds) developments in sub-Saharan Africa. The data used consists of issuance on government and corporate securities in 36 countries of Africa from 1980 to 2010. At the end of their research, they claimed that the government securities market is negatively and significantly influenced by the trade openness (measured in export).

Said and Grassa (2013) studied on a broad set of determinants of Sukuk market development by using panel data from 2003-2012. The scope of this study covers ten countries with the Sukuk issuers which are Qatar, Malaysia, Saudi Arabia, Indonesia, Kuwait, UAE, Bahrain, Gambia, Pakistan, and Brunei. Besides macroeconomic factors, they also analyzed the influence of other indicators such as institutional environment, financial system, and the regional and societal factors on Sukuk markets. At the end of their result, they concluded that the trade openness has a positive and significant effect toward the Sukuk market development, meaning that higher trade openness level will lead to greater development of local Sukuk market because the markets have greater accessibility to the external funding.

Adelegan and Radzewicz-Bak (2009) focus their study on the determinants of bond market development. Their data covers 23 sub-Saharan African (SSA) countries form year 1990 to 2008. Various macroeconomic factors that are considered to have impact on the development of bond markets in SSA are examined in the study. From the result they derived, their findings are contrary to the findings of Said and Grassa (2013) in which Adelegan and Radzewicz-Bak (2009) concluded that the trade openness is negatively related to the development of bond market.

Another group of researchers - Bellas, Papaioannou, and Patrova (2010) focus on the factors of emerging market sovereign bond spread by studying

the financial market factors and the long and short run effects of macroeconomic towards the sovereign bond spreads. Their data set covers form the first quarter of 1997 to the second quarter of 2009 for a total of 14 countries. Throughout their research, they found that the trade openness has a significant positive long-term relationship with the evolving market sovereign bond spreads.

In conclusion, the relationship between openness of economy and bond markets is consistently significant based on the study above. However, there is argument that relationship is whether positive or negative. Bhattacharyay (2013), Bellas, Papaioannou, and Patrova (2010), and Said and Grassa (2013) argued that it is positive; while Mu, Phelps, and Stotsky (2013) and Adelegan and Radzewicz-Bak (2009) proved it to be negative. Bhattacharyay (2013) and Said and Grassa (2013) explained, opening up an economy could increase access to external funds, which in turn help develop the bond markets. However, the negative relationship is not explained theoretically either by Mu, Phelps, and Stotsky (2013) and Adelegan and Radzewicz-Bak (2009).

Demand theory suggests that when number of buyer increases, the demand of goods and services will increase accordingly, holding other variables constant. Similarily, as explained by Bhattacharyay (2013) and Said and Grassa (2013), when one economy is more open to the others, the foreign buyers of local bonds will increase and this leads to the increase in demand of the bonds. Consequently, it will enhance the development of local bond market.

2.1.2 Exchange Rate

The exchange rate for a particular country involves the expression of one currency price against another foreign currency. As mentioned by Ahmad and Muda (2013), this macroeconomic factor is expected to be one of the major determinants of the investor's choice on bond when its underlying exposure (exchange rate risk) is considered. In short, exchange rate is expected to have influence on bond issuances.

Bhattacharyay (2013) who investigated the factors of bond market development in Asia based on the data of 10 Asian countries from 1998 to 2008 concluded that the development of bond market and the exchange rate variability is having negative relationship. He explained the bond markets possess lower risk to foreign investors when the country has a relatively stable exchange rate, then leads to better development of the bond markets of that country as foreign investors expect the higher stability of return. Regarding the significance of the relationship between two, he stated that exchange rate volatility is expected to have a negative and significant relationship with the development of total bonds, involve the sum of corporate bond and government bond collectively, and government bond. Moreover, He also concludes that there is no consistent and significant relationship between corporate bonds and exchange rate variability. This is due to the growth of the corporate bonds market is naturally slow and he cannot expect a significant relationship.

Ahmad and Muda (2013) studied the behavior of investors when choosing the currency for Sukuk issued from the Organization of Islamic Cooperation (OIC) member countries. Their study is based on the evaluation of the behavior of Malaysia Ringgit with the data from 1980 to 2006. "Foreign exchange exposure is one type of the risks present in Sukuk structures."

Ahmad and Muda (2013) stated. They further explain, excessive fluctuations of exchange rates have negative influence on the issuance of Sukuk at international level as it possesses higher risk and reduces the foreign participations in domestic Sukuk markets. They also provided empirical evidences, showing that the total issuances of cross-border bonds are significantly higher in countries with strong currency compared to those with weak currency. Since exchange rate is important determinant of issuance of Sukuk, Ahmad and Muda (2013) suggested that the exchange rate regimes of OIC member countries should focus on its stability to enhance the development of Sukuk.

Adelegan and Radzewicz-Bak (2009) conducted an empirical analysis on the factors of bond market development in 23 Sub-Saharan Africa (SSA) countries based on the data from 1990 and 2008. They suggested that the safety of investment environment is important determinant of development of private and government bonds because it determines the development stage of the country's economy. Also, they pointed out that volatility of exchange rate of the country's currency will affect the investment environment and concluded that the bond from country with less volatile currency exchange rate is perceived to less risky and more demanded by foreign investors. They stated that the volatility of exchange rates is predicted to have negative and statistically significant relationship with the bond market development.

Ahmad and Radzi (2011) examined the sensitivity of Sukuk and conventional bond issuance in Malaysia to the financial crisis in 2007 or 2008 based on the data from 1990 to 2009. They stated that exchange rate stability is the major factors of the issuance of the bond, if the exchange rate is volatile, it poses higher uncertainty or risk, thus reduce the foreign participation in the domestic bond markets. Ahmad and Radzi (2011) pointed out that the high volatility of exchange rate represent higher uncertainty, and this adds to the

risk premium and price of the derivative instrument. Therefore, when there is no efficient derivative market to hedge the risk, the foreign participation will be adversely affected when exchange rate is not stable and the study of Ahmad and Radzi (2011) also implied that the FOREX and the issuance of Sukuk in Malaysia is having significant relationship.

Danila (2015) examined the factors that affect the price of retail Sukuk in Indonesia based on the monthly data of 2009 to 2012. At the very first, he explained that the retail Sukuk is designed by the Indonesia government for the domestic investors only, therefore the Sukuk is not exposed to foreign exchange risk. However, at the end of the study, Danila's research shows that there is negative relationship between the foreign exchange rate (defined as RP/$) and the retail Sukuk price. When Dollar depreciates, Sukuk price rises. Danila (2015) suggested this negative relationship exists because the investors might compare other currencies such as dollar to retail Sukuk which is denominated in Rupiah as an alternative investment.

Based on the studies above, generally the exchange rate volatility consistently has negative relationship on the bond market as suggested by Bhattacharyay (2013), Ahmad and Muda (2013), Adelegan and Radzewicz-Bak (2009) and Ahmad and Radzi (2011). Admad and Muda (2013) and Danila (2015) suggested that bonds denominated in stronger currency are more preferred by both international and domestic investors. While most of the studies indicated that exchange rate significantly affect the bond market at the level of international issuance, Danilla (2015) suggested that exchange rate also has impact on the domestic issuance of the bonds too.

Risk aversion theory explains the behavior of investors when making investment choices. Bhattacharyay (2013), Ahmad and Muda (2013), Adelegan and Radzewicz-Bak (2009) and Ahmad and Radzi (2011)

consistently stated that investors tend to avoid high risk, and look for safer investments such as bonds exposed to relatively lower foreign exchange risk. This concept can explain the negative relationship between volatility of the exchange rate and the bond markets. Investors are not comfortable with the high fluctuations of exchange rate and thus demand for the related bonds will decrease. In short, foreign investors with risk aversion behavior are more likely to invest in bond that is denominated in stronger and stable currency.

2.1.3 Gross Domestic Product (GDP)

GDP can be expressed as the total value of a country's production or the national economic growth in a given year. GPD can be an indicator of economy size of a country. Ahmad and Radzi (2011) found out that there is strong and positive relationship between capital markets (stock and debt markets) and GDP.

Ahmad and Radzi (2011) conducted a research on the sustainability of Sukuk and also the conventional bonds in Malaysian capital market, during the period of financial crisis. The authors used three main macroeconomic factors which are GDP, foreign exchange rate and market liquidity as determinants of the issuance level of Sukuk and conventional bonds throughout the years of 1990 to 2009. The result obtained from this study proved that the relationship between the GDP and the issuance of Sukuk is strong and positive. According to Admad and Radzi (2011), conventional bonds issuers have relatively higher concerns of economic factors like GDP in bond issuance.

Another research on the determinants of Sukuk market development was carried out by Said and Grassa (2013), in which they covered the wider region of study that included countries of Bahrain, Kuwait, Brunei, Saudi

Arabia, UAE, Qatar, Pakistan, Indonesia, Gambia and Malaysia. The time period involved in this study is ranged from year 2003 to 2012. GDP was used as one of the indicators to study the development of Sukuk market throughout years, and the result shows that the economic growth (GDP per capita) has significant positive relationship with the growth of Sukuk market.

Ahmad, Daud and Kefeli (2012) completed a research on how the economic forces affect Sukuk market in Malaysia over the period of 1996 to 2011. The outcome of study indicates that there is a positive impact of GDP on the Sukuk issuance in Malaysia over a long horizon. The authors also find that Sukuk Granger-causes GDP, therefore they suggest government to create new policies to develop the Sukuk market in order to boost the economy.

Bhattacharyay (2013) conducted an analysis on the determinants of bond market developments in Asia, in which it included Malaysia, Hong Kong, Philippines, Vietnam, Indonesia, Japan, Thailand, Republic of Korea, Singapore, and China as the target regions of study. The period of study is from year 1998 to 2008, and one of the analyzed variables in this research is stage of development (measured in GDP) of the countries. The author concluded that GDP has a significant and positive relationship with the both corporate bonds and government bonds market development. He explained a more developed economy is more likely to have larger banking system, stronger financial market infrastructure, stronger legal systems, more innovative financial products and more transparent corporate governance to facilitate the development of bond markets.

A study conducted by Andritzky, Bannister, and Tamirisa (2005) aimed to examine the reaction of bond markets to macroeconomic announcements. The study covers the period of 1998 to 2004, while the country of study is United States. The study concluded that all the macroeconomic

announcement factors have significant impacts to the emerging bond market, while the GDP announcement in the market moves in the same direction with the emerging bond markets, constituting a positive relationship.

After the reviews of all the above 5 journals, it can be concluded that the relationship between the Gross Domestic Product (GDP) and bonds market are significant and consistently positive.

Income effect indicates that when an economy's income increase (as shown by increase in GDP), investable income in the economy will increase. Consequently, the demand for investment instruments such as bonds will increase. It could explain the positive relationship between GDP and bond markets as suggested by Said and Grassa (2013), Bhattacharyay (2012), and Admad and Radzi (2011).

2.1.4 Inflation

Inflation can be defined as the decrease in public's purchasing power of each unit of currency and the increase in the price level of goods and services. According to Ameer (2007), the demand for bonds depends on investors' expectations of the future inflation. He further explained that this is because inflation will reduce the real return of the fixed interest payments generated by bonds. Thus, inflation is expected to have significant impact on the bond markets.

The study by Said and Grassa (2013) covers Sukuk issuers' countries such as Malaysia, Pakistan, Kuwait, Brunei, Bahrain, Qatar, Indonesia, Saudi Arabia, Gambia and UAE. The time period of this study is from 2003 to 2012. At the very first of the study, Said and Grassa (2013) expected that the inflation will adversely affect the Sukuk market development, as inflation indicates instability of an economy, and unstable economy is negative to the development of the bond markets. However, the statistical results generated by Said and Grassa (2013) contradict the initial expectation. They found that generally, inflation does not significantly affect the development of Sukuk market.

Ameer (2007), who conducted a study to determine the influence of macroeconomic factors on the stock and bond markets in two Asian countries - South Korea and Malaysia. The period of study covers the year from 1995 to 2004. The author explained that the inflation will affect the real return of the bond. However, in Granger causality test, there is no Granger causality relationship between inflation and bond issue for both countries. Using impulse response function (IRF) to capture dynamic pattern, the authors

found that the shock in inflation can significantly and positively affect the bond issues in Malaysia. Ameer (2007) theoretically explained that shock in inflation will increase the nominal interest rate. As a result, bond issuance will increase due to the increase in tax advantage of debt financing when the nominal interest rate increases.

The study conducted by Ahmad, Daud, and Kefeli (2012) aimed to investigate the influence of macroeconomic factors on Sukuk issuance in Malaysia. The study consists the period of year 1996 to 2011 at the aggregate level. The outcome of the research proved that there is no granger cause relationship between inflation which is measured in Consumer Price Index (CPI) and Producer Price Index (PPI) and Sukuk issuance. Plus, Sukuk only react to the shocks in CPI (positively) and PPI (negatively) in the short run but not in the long run.

Broeck and Guscina (2011) conducted an analysis in Denmark and other 16 euro zone countries about the crisis-related changes in the issuance of government debt. The time period of chosen is from year 2007 to 2009. Broeck and Guscina (2011) explained that when inflation is high, government faces more difficulties in issuing debt as inflation makes the real return on debt lower. Therefore, they drew a conclusion on the effect of inflation on the debt issues, which is negative. When inflation rate increases, the volumes of debt issuances will decrease.

Aizenman and Marion (2011) studied the possibility of using inflation as a tool to inflate away public debt (including bonds) in US. The study covers the period from 1946 to 2008 (post World War 2). The authors proved that a moderate inflation will inflate away some public debt, due to the decrease in

real return to the investors. It suggested negative relationship between inflation and public debt (example: bonds). However, based on their explanation, inflation is less likely to be used as a tool to reduce debt burden, because inflation is harmful to the economy and using it as a tool will lead to unintended acceleration of inflation.

Min et al. (2003) suggested that the macroeconomic fundamentals such as inflation play a significant role in determining the long term solvency of an economies and the bond spreads. The study covers 11 emerging economies in Latin America and Asia from 1991 to 1999. Based on the study, inflation can be taken as a proxy to reflect the management quality of economies. The author explained higher inflation represent worse economic management which leads to higher bond spread (higher risk perceived). To conclude the study, inflation significantly and positively affects the bond spread, and further affects the volume bond issuance.

To conclude, generally inflation rate have negative influence on the bond markets development as suggested by Broeck and Guscina (2011), Aizenman and Marion (2011) and Said and Grassa (2013). Despite Said and Grassa (2013) failure in attempt to prove the significance of the negative relationship. On the opposite, Ameer (2007) suggested the shock in inflation rate can positively affect the bond issue, along with his explanation regarding the tax advantage of debt financing. Besides that, some of the studies such as Ameer (2007) and Ahmad, Daud, and Kefeli (2012) statistically proved that there is no Granger causality relationship between inflation and bond issuance.

Fisher effect is used by the previous studies such as Min et al. (2003), Broeck and Guscina (2011) and Aizeman and Marion (2011) to describe the negative relationship between inflation and the bond markets. Fisher effects suggest that the real interest rate (real return to investors) is derived by subtracting

expected inflation rate from nominal interest rate. Inflation will erode the real return that investors are about to get because it leads to decrease in purchasing power of the interest earned. Therefore, real return decreases when inflation increases, holding that nominal interest rate constant. As a result, demand for that bond decreases and bond issuance will drop.

2.1.5 Interest Rates

Interest rate reflects the return to the borrowers of funds, and at the same time the cost of funding to the lenders. Said and Grassa (2013) claimed that interest rate is a indicator of economic condition and it will affect the bonds or Sukuk markets. He further elaborated that interest rate represent the opportunity costs of investing in bonds among other investment alternatives.

According to Bhattacharyay (2013), he conducted an analysis on the factors on bond market development in Asia. The countries such as Japan, Singapore, Korea, Malaysia, Vietnam and others were included in this analysis. The period of study was from the year of 1998 to 2008. The authors proved that interest rate variability will negatively and significantly affect bond issuance. When the interest rate is unstable, it induces higher uncertainty and the investors have low incentive to invest in bonds market. To promote the bond market development, the authors suggested that policymakers should stabilize the interest rate.

Adelegan and Radzewicz-Bak (2009) conducted a research on the determinants of bond market development based on the 23 countries of sub-Saharan African (SSA) throughout the year 1990 to 2008. The result suggested that volatility of interest rates and interest rate will negatively and

significantly affect bond market development. The authors also recommended that policy makers should focus on policies that make volatility of interest rate low and interest rate favorable in order to develop the bond market.

Another research to examine the influences of macroeconomic factors on Sukuk market was done by Said and Grassa (2013). This study covered the countries of Pakistan, Qatar, Kuwait, Brunei, Bahrain, Indonesia, UAE, Malaysia, Saudi Arabia and Gambia over the period of 2003 to 2012. First, the authors explained that interest rate will negatively affect the issuance of bond and Sukuk, as when the expected interest rate is increase, the price of bonds or Sukuks will decrease which make the bond less valuable to investors. In addition, the authors also claimed a strong negative relationship between development of Sukuk market and interest rate volatility. Their statistical result proved that the above two relationships are negative, however insignificant.

Besides, Elkarim (2012) also carried out a research to examine the impact of interest rate on the issuance of Sukuk and conventional bonds during the period of economic crisis in Malaysia. This study focused on the period of 1990 to 2011. Based on his statistical result, he claimed that interest rate strongly and negatively affects the Sukuk issuance.

Ameer (2007) studied the influence of macroeconomics factors on the stock and bond market for two countries in Asia which are Malaysia and South Korea. Based on the Granger Causality test, bond issued Granger-cause interest rate in Malaysia. On the other hand, in South Korea, two-way relationship between interest rate and bond issuance exists. As explained by Ameer (2007), the liberation of interest rate in South Korea has switched private borrowing to public borrowing (example: bond market). These

Granger causality results (both Malaysia and South Korea) remain unchanged in long run. Using impulse response function (IRF) to capture dynamic pattern, the authors found that shock in interest rates will negatively affect the bond issue in both countries.

In general, it can be concluded that the interest rates can negatively affect the bond market as suggested by Adelegan and Radzewicz-Bak (2009), Elkarim (2012), Said and Grassa (2013). On the other hand, Bhattacharyay (2013), Adelegan and Radzewicz-Bak (2009), Said and Grassa (2013) and Ameer (2007) consistently proved that variability of interest rate will negatively affect the bond issue. In addition to these findings, according to Ameer (2007), bond issue tends to Granger cause interest rate in Malaysia and South Korea.

Risk aversion theory could explain how interest rate variability negatively affect the bond markets as proven by Bhattacharyay (2013), Adelegan and Radzewicz-Bak (2009), Said and Grassa (2013) and Ameer (2007). Investors dislike risk and are more likely to invest in bonds exposed to lower risk. Therefore, when interest rate variability is high, investors perceive higher risk and demand less of the bonds. Consequently, development of the bond market becomes sluggish.

2.2 Review of Theoretical Model

2.2.1 Ordinary Least Square (OLS) Model

Ordinary Least Square regression is a technique which applied to model with a single response variable that has been recorded on at least an interval scale (Hutcheson, 2011). It is a common method that was used to study the relationship between the issuance of bonds and various macroeconomic factors. Previous researchers that adopt OLS Model include Broeck and Guscina (2011), Min et al. (2003), Bhattacharyay (2013), Adelegan and Radzewicz-Bak (2009), Ahmad and Radzi (2011), Ahmad and Muda (2013), Andritzky, Bannister and Tamirisa (2005), Broeck and Guscina (2011), and Min et al. (2003).

Andritzky, Bannister and Tamirisa (2005) employed country-by-country Ordinary Least Squares (OLS) model that assumes a constant variance of the residual. OLS was used to test the relationship between the daily percentage changes in the bond spreads and macroeconomic factors announcement day. Andritzky, Bannister and Tamirisa (2005) used dummy variables to capture day-of-the-week effect and announcement day effect. The model is as below:

$$R_{i,t} = c_i + \alpha_i R_{i,t-1} + \sum_{w=Mon}^{Thu} \delta_{i,w} D_{i,w} + \sum_{k=GDP}^{SR(US)} \delta_{i,k} D_{i,k,t} + \varepsilon_{i,t}$$

$$E(\varepsilon_{i,t}) = 0$$

Where D_w is the day-of-the-week dummy variable and D_k are announcement day dummy variable. The regression model also includes one constant c_i and one lag variable ($R_{i,t-1}$).

Broeck and Guscina (2011) used OLS Model to examine the relationship between macroeconomic variables with the government debt issuance in 16 euro zone countries. The authors constructed their regression model with panel data, as below:

$$Y_{i,t} = Y_{i,\,t\text{-}}1 + \beta\, X_{i,t} + \nu_i + \varepsilon_{i,t}$$

Where $Y_{i,\,t}$ is the total issuance of government bonds, $X_{i,\,t}$ is the vector of independent variables, while β represents the estimated coefficients. V_i accounts for the effect of the unobserved countries' disturbance while $E_{i,t}$ is the error term.

OLS Model was used by Adelegan and Radzewicz-Bak (2009) to study how the macroeconomic variables affect bond market development. The model constructed by the authors is as below:

$$Y_{it} = \alpha_i + \beta_1 EcSize_{it} + \beta_2 Open_{it} + \beta_3 BankSize_{it} + \beta_4 IntRate_{it} + \beta_5 X_{it} + \varepsilon_{it}$$

Where Y is the bond market capitalization as a share of GDP, while EcSizeit represents economic size; Openit represents the natural openness; BankSize represents bank size; and Intrateitit represents interest rate.

2.2.2 Stylistic Model

Stylistic model is used to interpret the statistical results through the vision aids. For example, pie charts, bar charts, line graphs are stylistic models. Aizenman and Marion (2011) used graphs to illustrate the relationship between the debt maturity in United State and the inflation rate.

2.2.3 Generalized Autoregressive Conditional Heteroscedasticity (GARCH) Model

According to Gujarati & Porter (2009), the GARCH model is different from ARCH model in the sense that GARCH model is more general as compared to ARCH, and it was invented due to the $\rho(\varepsilon_{t-2}^2, \varepsilon_{t-3}^2)$, $\rho(\varepsilon_{t-3}^2, \varepsilon_{t-4}^2)$, and so forth slowly decay and the difficulties in estimations of ARCH model. The simplest form of GARCH model can be expressed as below:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \alpha_{t-1}^2 + \beta_1 \alpha_{t-1}^2$$

Where this equation shows the conditional variance of μ at the time *t* depends on its conditional variance in the previous time period and also depends on the square of error terms in the time model of ARCH. Andritzky, Bannister and Tamirisa (2005) employed Emerging Market Bond Index–Global (EMBI Global) which covers 12 countries to study how macroeconomic factors affect the level and volatility of sovereign bond markets. They used country-by-country GARCH estimation to estimate the reaction of individual country and a panel GARCH model to test the samples as a whole.

2.2.4 Feasible Generalized Least Square (FGLS) Model

FGLS estimators were used by Claessens, Klingerbiel, and Schmukler (2007) to examine the impacts of institutional and macroeconomic characteristics on the size and currency composition of the government bond markets. The main intention of using panel FGLS estimations is to detect the autocorrelation coefficients and the heteroskedasticity error structures.

Through the FGLS model, Claessens, Klingerbiel, and Schmukler (2007) analyzed the effect of Gross Domestic Product (GDP), inflation index, and the fiscal burden of government on the government bond market development in 35 countries, from the year 1993 to 2000.

2.2.5 White's Heteroscedasticity – Consistent Standard Error

The application of White's Heteroscedasticity-consistent standard error is when the error variances for i is unknown. Min et al. (2003) applies the White's Heteroscedasticity- consistent standard error to investigate how the solvency and liquidity variables and macroeconomic fundamentals influence the determination of bond spreads in emerging economics during the 1990s. Min et al. (2003) also applied the White's Heteroscedasticity- consistent standard error to study the relationship between the bond maturity and bond spreads in Latin American countries.

2.2.6 Pooled Mean Group (PMG) Model

PMG model is adopted by Bellas, Papaioannou, and Patrova (2010) in determining the effects of fundamental macroeconomic factors on the emerging market bond spreads. They claimed that PMG estimation is effective to capture the structure of data in quarterly frequency (Ferrucci, 2003). More importantly, PMG model is able to differentiate the short term parameters from the long term, at the same time allowing the parameters to be varied across segments while keeping the long term elasticity constant.

Bellas, Papaioannou, and Patrova (2010) also found that as compared to fixed-effects estimators, this model tends to generate the relatively accurate result when panel data is involved. Thus, this model is suitable for for their study on 14 countries from 1st quarter of 1997 to 2nd quarter of 2009.

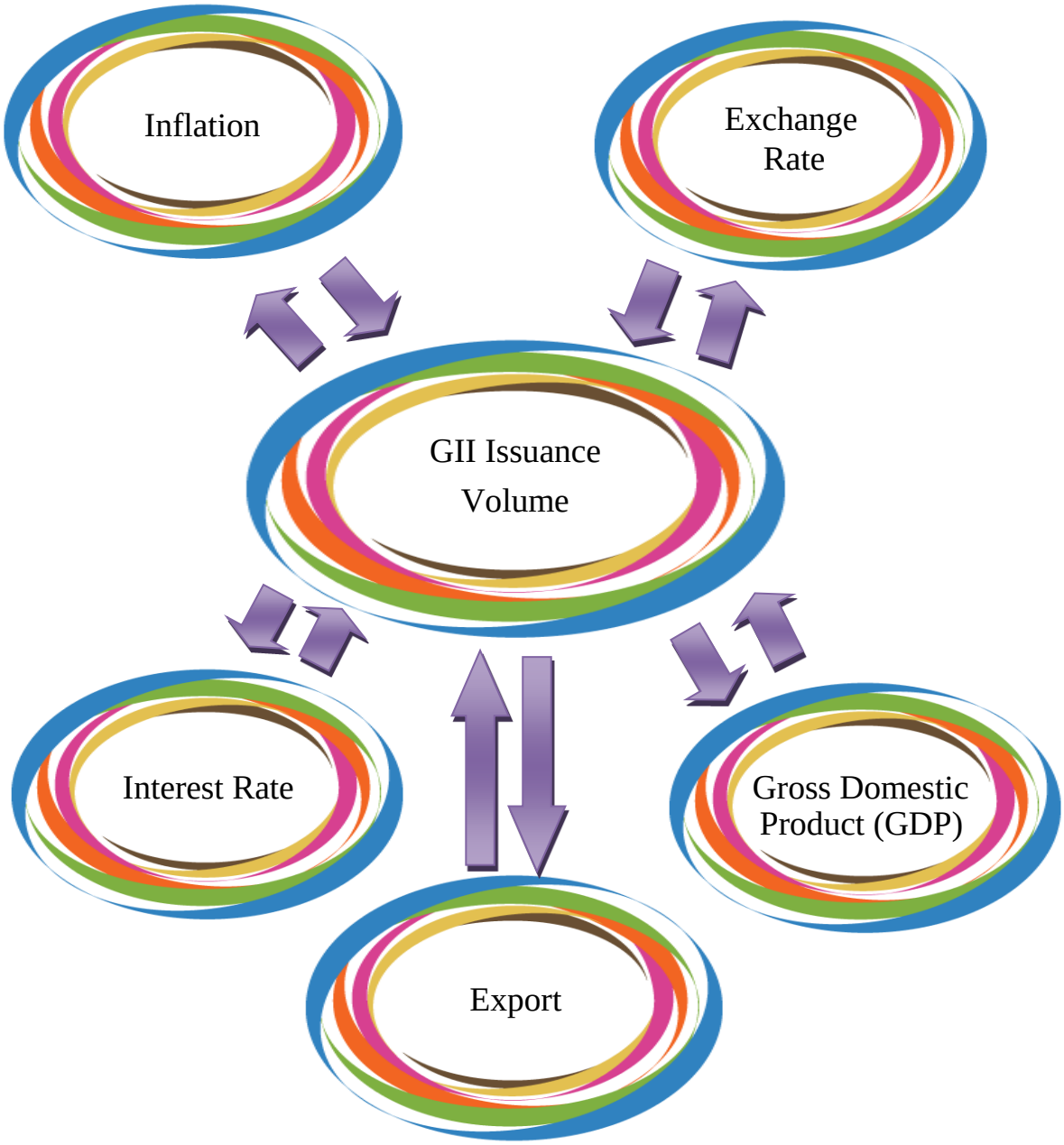
2.2.7 Vector autoregressive model (VAR)

Vector autoregressive model is a multivariate time series model which is based on linear and autoregressive assumptions. VAR is used extensively for macroeconomic analysis since it was advocated in 1980 (Luetkepohl, 2011).

Ameer (2007) who studied the relationship between macroeconomic factors and the bond and stock markets in context of Malaysia and Korea adopted vector autoregressive models (VARs) model. Also, Ameer (2007) used variance decomposition (VDC) techniques to aid the interpretation of VAR. Ahmad, Dauda and Kefelia (2012) also used VARs with VDC to investigate

various macroeconomic factors affecting Sukuk issuance in Malaysia. Another study that used VAR models was carried out by Ahmad and Muda (2013) to evaluate the currency choice behavior among selected Sukuk in OIC member countries.

2.3 Proposed Theoretical / Conceptual Framework



This research is intended to estimate the bi-lateral relationship between macroeconomic variables (Export, Exchange Rate, GDP, Inflation, and Interest Rate) and GII Issuance volume.

2.4 Hypothesis Development

2.4.1 Export

H_0: There is insignificant relationship between Export and GII.

H_1: There is significant relationship between Export and GII.

The significance of relationship between export and GII issuance volume will be determined. Rejecting null hypothesis means that the relationship between two is significant.

2.4.2 Exchange Rate

H_0: There is insignificant relationship between exchange rate and GII.

H_1: There is significant relationship between exchange rate and GII.

The significance of relationship between exchange rate and GII issuance volume will be determined. Rejecting null hypothesis means that the relationship between two is significant.

2.4.3 Gross Domestic Product (GDP)

H_0: There is insignificant relationship between GDP and GII.

H_1: There is significant relationship between GDP and GII.

The significance of relationship between GDP and GII issuance volume will be determined. Rejecting null hypothesis means that the relationship between two is significant.

2.4.4 Inflation

H_0: There is insignificant relationship between inflation and GII.

H_1: There is significant relationship between inflation and GII.

The significance of relationship between inflation and GII issuance volume will be determined. Rejecting null hypothesis means that the relationship between two is significant.

2.4.5 Interest Rate

H_0: There is insignificant relationship between interest rate and GII.

H_1: There is significant relationship between interest rate and GII.

The significance of relationship between interest rate and GII issuance volume will be determined. Rejecting null hypothesis means that the relationship between two is significant.

2.5 Conclusion

To conclude the literature review, this chapter attempts to explain the bi-lateral relationship between the macroeconomic factors (export, exchange rate, GDP, inflation and interest rate) and Sukuk or bond markets based on previous studies. Besides that, the common methodologies that have been adopted by previous researchers are discussed.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This session will explain how this research will be conducted, including the research model, model design, data collection method, and data analysis.

3.1 Research Design

The data that will be used in this research are quantitative data. The data for both independent and dependent variables are in numerical form.

3.2 Data Collection Method

The data is collected from Bank Negara Malaysia and DataStream. Basically, this research uses secondary data. Secondary data is the data that has previously been generated by others including the past records and historical data.

3.2.1 Government Investment Issue (GII)

The Government Investment Issues (GII) issuance refers to the volume of the Islamic bond the Malaysian government issued to raise fund in the Malaysia capital market. The issuance of GII data are collected from Bank Negara Malaysia covering the first quarter of year 2003 to the fourth quarter of year 2013. The data are denominated in the million(s) of Ringgit Malaysia.

3.2.2 Export (EX)

The data of exports of goods and services is collected from DataStream for the period started from the first quarter of year 2003 to the fourth quarter of 2013. The data is denominated in million(s) of Ringgit Malaysia.

3.2.3 Exchange Rate (EXC)

The exchange rate data is found from DataStream and covers the period from the first quarter of 2003 until the fourth quarter of 2013. The unit of measurement of exchange rate used is Real Effective Exchange Rate (REER) index. Base year used is year 2000. REER indicates the value of Ringgit Malaysia in relative to a basket of foreign currency primarily traded in Balance of Trade (BOT). REER is more realistic to be used because it compares the home currency to a group of foreign currencies instead of one. An increase of REER indicates appreciation of Ringgit Malaysia (Ahmad and Muda, 2013).

3.2.4 Gross Domestic Product (GDP)

The data for Gross Domestic Product is sourced from DataStream for the time period started from the first quarter of 2003 until the fourth quarter of 2013. The data will be in quarterly basis and in million(s) of Ringgit Malaysia.

3.2.5 Inflation (INF)

The inflation rate data is collected from DataStream for the years from 2003 to 2013. The data are in quarter basis and in the unit of measurement is Consumer Price Index (CPI). CPI measures change in price of a basket of consumer goods over time, thus a comprehensive measure of change of the price level in the economy.

3.2.6 Interest Rate (INT)

The source of interest rate data is from DataStream for the period from 2003 to 2013. The data collected are in quarter basis and in the unit of percentage (%). The interest rate of the Malaysia 1-year floating Negotiable Certificate of Deposit (NCD) is used as reference rate.

3.3 Data Analysis

Data analysis used in this research will be discussed. The software used to carry out the testing is E-view.

3.3.1 Unit Root Test

Unit root test is important because it tests the stationary of the data so that the problem of bias result can be avoided to ensure accurateness of the following tests. There are two common approaches of the unit root test which are Augmented Dickey Fuller (ADF) Test and also the Philips-Perron (PP) Test (Brooks, 2008).

3.3.1.1 Augmented Dickey Fuller (ADF) Test

There are two types of models that are available to conduct unit root test which including model constant with trend and model constant without trend.

Model constant with trend:

$$\Delta Y_t = \mu + \beta t + \delta Yt\text{-}1 + \Delta Y_{t-1} + \varepsilon_i$$

Model constant without trend:

$$\Delta Y_t = \mu + \delta Yt\text{-}1 + \Delta Y_{t-1} + \varepsilon_i$$

Hypothesis Statement:

H_0: All variables are not stationary and contain unit root.

H_1: All variables are stationary and do not contain unit root.

Rules of thumb

Reject H_0 if the p-value is smaller than the significant level of 0.01 which means the model is stationary; otherwise do no reject H_0 which indicates that the model is not stationary at the significance level of 0.01.

3.3.1.2 Philips-Perron (PP) Test

Besides Augmented Dickey Fuller (ADF) Test, another alternative test – Philips-Perron (PP) Test has been commonly used to examine the degree of stationary of the model. The model of PP test is modified based on the ADF Test where the PP Test is excluding the lags of dependent variable compare to the ADF Test. The model of PP Test is show as below:

$$\Delta Y_t = \alpha + \pi_{2xt-1} + \phi \left(t - \frac{T}{2} \right) + \sum_{i=1}^{m} \varphi_i \Delta Y_{t-1} + \varepsilon_{2t}$$

Hypothesis Statement:

H_0: All variables are not stationary and contain unit root.

H_1: All variables are stationary and do not contain unit root.

Rules of thumb

Reject H_0 if the p-value is lower than the significant level of 0.10 which means that the model is stationary; otherwise do no reject H_0 which indicates that the model is not stationary at the significance level of 0.01.

3.3.2 Granger Causality Test

In 1969, Granger Causality Test is invented by Clive Granger which is to find out the causality effect based on the time series data. This test is only applicable to the linear equation. Besides, Granger Causality Test was generally used to study the causal relationship between two variables in short. According to Gujarati and Porter (2009) stated that the causality test between independent and dependent variables can be relevant with the presence of lags in the time series data. The test is comes with two regression equation:

(1) $$Y_t = \sum \alpha i \, X_{t-i} + \sum \beta j \, Y_{t-j} + \mu 1t$$

(2) $$X_t = \sum \lambda i \, X_{t-i} + \sum \delta j \, Y_{t-j} + \mu 2t$$

Hypothesis Statement:

H_0: There is no granger causality relationship between two variables in the short run.

H_1: There is granger causality relationship between variables in the short run.

Rules of thumb

Reject H_0 if the p-value is smaller than the significant level of 0.01 which shows that there is granger causality relationship between variables in the short run. Otherwise do no reject H_0.

3.3.3 Ordinary Least Square (OLS) method

OLS method is contributed by Carl Friedrich Gauss, one of the mathematicians from German. This method is considered as one of the most popular and widely-used estimation practices applied by researchers, due to its simplicity and appealing statistical properties as compared to other method, such as Maximum Likelihood – ML. (Gujarati and Porter, 2009) In short, OLS estimation tries to find the line of "best fit". Or in another words, this technique attempts to fit a model to the observed data by designing a function that can be most accurately approximates the data. The intention of this fitted line is to minimize the differences (sum of square residuals) between the actual data and the estimated functional line (University of Strathclyde, n.d.).

3.3.4 Diagnostic Checking

In time series modeling, it is important to conduct various types of diagnostic tests. So, diagnostic checking is run based on the OLS time series data. Time series analysis is the use of different time period of data to investigate the certain issues. The research is done based on one observation with different time period in order to obtain the results. Due to the model must be BLUE (Biased, Linear, Unbiased Estimator) and in reality model is hardly to be BLUE, so time series data will normally face some econometric problems such as Heteroscedasticity, Autocorrelation, Model Specification and Normality problem.

3.3.4.1 Heteroscedasticity

Heteroscedasticity problem occur when the error terms' variance is dissimilar across the observations. The variances of the error terms are not constant. If there is heteroscedasticity problem, we can re-estimate the model using generalized or weighted least squares method. This will produce a new set of parameter estimates. As a result, it is more efficient than the OLS method with a correct set of covariance and t-statistics.

In order to test the heteroscedasticity problem in the model, Autoregressive Conditional Heteroscedasticity (ARCH) Test is carried out. It is only applicable to the time series data analysis and it is based on the independent variable in the auxiliary model. The estimate model and auxiliary model of ARCH Test are shown as below:

Autoregressive Conditional Heteroscedasticity (ARCH) Test

Estimated Model

$$Yi = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + u_i$$

Auxiliary Model

$$\sigma^2_{\varepsilon,t} = p_0 + p_1 \varepsilon^2_{1,t-1} + \ldots + p_p \varepsilon^2_{p,t-p} + v_t$$

Hypothesis Statement:

H_0: There is no heteroscedasticity problem in the model.
H_1: There is heteroscedasticity problem in the model.

Rules of thumb

Do no reject H_0 if the p-value is more than 0.01. Therefore, there will be no heteroscedasticity problem in the model. On the other hand, reject H_0 if the p-value is smaller than 0.01. Hence, it showed that there will be heteroscedasticity problem in the model.

3.3.4.2 Model Specification Test

It exists when a dependent variable and independent variables have problems and they are likely to give misleading conclusion. It consists of three types of model specification. The first type of model specification is omitting a relevant independent variable that is important in the determination of dependent variable. For the second type, it includes irrelevant, unnecessary or non-influential independent variables. The last type of model specification is adopting of the wrong functional form and independent variables. This is because there are different types of functional form such as linear, double-log, log-lin, lin-log, reciprocal and polynomial.

In order to test the existence of model specification error, Ramsey's RESET Test is being carried out which is Regression Specification Error Test.

Test	**Ramsey's RESET Test**
Estimate Restricted Model	$Y = \beta_0 + \beta_1 X_I + \mu$
Estimated Unrestricted Model	$Y = \beta_0 + \beta_1 X_1 \beta_2 Y^2 + \beta_3 Y^3 + \mu$
Test statistic (F-test)	$\frac{(R^2_{unrestricted} - R^2_{restricted})/(k_{unrestricted} - k_{restricted})}{(1 - R^2_{unrestricted})/(n - k_{unrestricted})}$

Rules of thumb

H_0: Model is correctly specified.

H_1: Model is not correctly specified.

Do not reject H_0 if p-value is greater than 0.01. Therefore, there will be no model specification error occurs in the model. On the other hand, reject H_0 if the p-value is smaller than 0.01. Hence, it showed that there will be model specification error exists in the model.

3.3.4.3 Autocorrelation

Autocorrelation refers to the correlation between elements of observations ordered in time. Autocorrelation is associated with the time series data or cross-sectional data. Sometimes, autocorrelation is known as lagged correlation or serial correlation. Autocorrelation can be categorized into pure and impure serial correlation. Pure serial autocorrelation is caused by the distribution of the error term of true specification of an equation. On the other hands, impure serial autocorrelation is normally caused by the external factors. It is due to the problem of specification bias such as omitted variable and wrong functional form.

To test the autocorrelation problem, Breusch-Godfrey LM Test is conducted to detect higher AR model which is AR (2). The estimated model for Breusch-Godfrey LM Test is shown as below:

Tests	**Estimate Models**
Breusch-Godfrey LM Test	$Y_t=\beta_0 + \beta_1 X_{1t} +\ldots+ \beta_k X_k t + Y_{t-1} + \varepsilon_t$
	Auxiliary Model: $E_t= \beta_0 + \beta_1 X_{1t} +\ldots+\beta_k X_{kt} + P1\varepsilon_{pt-p} + V_t$

Rules of thumb

H_0: There is no autocorrelation problem in the model.
H_1: There is autocorrelation problem in the model.

Do not reject H_0 if p-value is greater than 0.01. Therefore, there will be no autocorrelation problem in the model. On the other hand, reject H_0 if the p-value is smaller than 0.01. Hence, it showed that there will be autocorrelation problem in the model.

3.3.4.4 Normality Test

Normality test is carried out to examine whether the error term is normally distributed in the model. With the assumption of normality, the probability distribution of OLS estimators can be easily derived. This is due to the reason of any linear function of normally distributed variables will normally distributed by itself. OLS estimators are linear functions of error term. Therefore, if the error term is normally distributed, they are OLS estimators which can make the hypothesis testing very straight forward.

Jarque-Bera Test is carried out to test whether the model is normally distributed.

Test	Test statistic	Critical Value
Jarque-Bera Test	$JB= n[\frac{S^2}{6} + \frac{(K-3)^2}{24}]$ Note: S = Skewness K= Kurtosis	$X^2_{a,k}$

Rules of thumb

H_0: The error terms are normally distributed.
H_1: The error terms are not normally distributed.

Do not reject H_0 if p-value is greater than 0.01. Therefore, the error terms are normally distributed. Otherwise, H_0 if the p-value is smaller than 0.05. Hence, the error term are not normally distributed.

3.4 Conclusion

In conclusion, Augmented Dickey-Fuller (ADF) as well as Phillip-Perron (PP) Unit Root test, Granger Causality test, OLS regression time series model and diagnostic checking will be run in this research paper. That is to statistically examine the relationship between the macroeconomic factors and GII issuance volume in Malaysia from year 2003 to 2013 in a quarterly data.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Chapter 4 will focus on interpreting and analyzing of the empirical results using the methodology in Chapter three. There are several sections in this chapter which include a discussion on the model estimation and interpretation, description of the empirical models, descriptive analysis, and inferential analysis. Besides, several empirical tests such as Unit Root Test, Granger Causality Test, Ordinary Least Square (OLS) regression and diagnostic checking are being utilized. A summarization of Chapter four will be included in the conclusion as well. The analyses of the results are generated by using E-views 6 and the E-views result will be attached in this paper. The E-views result consisted of coefficient, probability, t-statistics, standard error, R-squared, adjusted R-squared and other relevant information. Therefore, this chapter is a core part of this research.

4.1 Unit Root Test

Table 4.1: Results of Unit-Root Test by using ADF test (Level form)

Variables	**Without trend**	Critical value	P-value	**With Trend**	Critical value	P-value
Inflation rate	0.009815(0)	-3.592462	0.9542	-3.545819(1)	-4.192337	0.0473
Interest rate	-1.825305(0)	-3.592462	0.3636	-2.063195(0)	-4.186481	0.5509
Exchange rate	-0.539798(0)	-3.592462	0.8731	-3.072180(0)	-4.186481	0.1258
GDP	-0.136424(5)	-3.615588	0.9380	-4.002703(4)	-4.211868	0.0168
Export	-2.219257(2)	-3.600987	0.2028	-3.466279(1)	-4.192337	0.0563

- Number in parentheses is the lag numbers. Lag lengths of the ADF unit root are based on Schwarz information criterion.
- Note: *** indicates the rejection of the null hypothesis at 1% significance levels.

Table 4.2: Results of Unit Root Test by using ADF test (1st Differentiation)

Variables	**Without trend**	Critical value	P-value	**With Trend**	Critical value	P-value
Inflation rate	-5.255348(0)	-3.596616	0.0001***	-5.194047(0)	-4.192337	0.0006***
Interest rate	-5.885666(0)	-3.596616	0.0000***	-5.813933(0)	-4.192337	0.0001***
Exchange rate	-6.399906(0)	-3.596616	0.0000***	-6.320721(0)	-4.192337	0.0000***
GDP	-4.254741(4)	-3,615588	0.0018***	-4.167565(4)	-4.219126	0.0114
Export	-5.606131(1)	-3.600987	0.0000***	-5.756117(1)	-4.198503	0.0001***

- Number in parentheses is the lag numbers. Lag lengths of the ADF unit root are based on Schwarz information criterion.
- Note: *** indicates the rejection of the null hypothesis at 1% significance levels.

Table 4.3: Results of Unit Root Test by using PP test (Level form)

Variables	**Without trend**	P-value	**With Trend**	P-value
Inflation rate	0.231648(7)	0.9716	-2.922195(3)	0.1659
Interest rate	-1.997448(2)	0.2869	-2.295597(2)	0.4272
Exchange rate	-0.307331(8)	0.9153	-3.202178(1)	0.0975
GDP	0.961328(42)	0.9954	-2.137736(11)	0.5109
Export	-2.157228(12)	0.2244	-1.937226(8)	0.6179

- Number in parentheses is the bandwidth. The PP unit root's bandwidth is based on Newey-West estimator, by using the Default (Barlett kernel).
- Critical value for Phillips-Perron statistic with intercept and without trend was -3.592462 (a = 0.01%)
- Critical value for Phillips-Perron statistic with intercept and trend was -4.186481 (a = 0.01 %)
- Note: *** indicates the rejection of the null hypothesis at 1% significance levels.

Table 4.4: Results of Unit Root Test by using PP test (1st Differentiation)

Variables	**Without trend**	P-value	**With Trend**	P-value
Inflation rate	-5.746095(10)	0.0000***	-5.555003(10)	0.0002***
Interest rate	-5.885666(0)	0.0000***	-5.813933(0)	0.0001***
Exchange rate	-6.988591(9)	0.0000***	-6.878100(9)	0.0000***
GDP	-5.576911(23)	0.0000***	-5.493362(23)	0.0003***
Export	-4.309120(17)	0.0014***	-5.626814(25)	0.0002***

- Number in parentheses is the bandwidth. The PP unit root's bandwidth is based on Newey-West estimator, by using the Default (Barlett kernel).
- Critical value for Phillips-Perron statistic with intercept and without trend was -3.596616 (p = 0.01%)
- Critical value for Phillips-Perron statistic with intercept and trend was -4.192337(p = 0.01%)
- Note: *** indicates the rejection of the null hypothesis at 1% significance levels.

Statement of Hypothesis Testing:

H_0: $\delta = 0$ (Unit Root). Variable is not stationary.
H_1: $\delta \neq 0$ (No Unit Root). Variable is stationary.

When forecast the time series of macroeconomic variables, one of the most common and significant problem is that time series are usually being trended or get affected by the continuous innovations inside the geographical area. The purpose of unit root test is to understand the possible effects of these influences and ultimately get rid of these problems, through testing the stationary of those macroeconomic series.

The decision rule of the testing is to reject H_0 given p-value is lesser than significant value of one percent. When the H_0 is rejected due to the small p-value, it indicates that the data of variable is eventually stationary and has no problem of unit root, at the same time, favorable. If the testing results do not reject H_0 in the level form, then can proceed with the first differentiation and bring on with second differentiation should the first level differentiation failed to reject H_0.

The outcomes generated by ADF and PP tests on the variables are mostly consistent, whereby majority of them achieves stationary in the 1st differentiation. The only exception is the variable of GDP, in which GDP variable could only achieve its stationary in second differentiation level with the p-level of zero percent in the ADF test. There is also none of the variables achieves their stationary at level form.

4.2 Granger Causality Test

In order to meet the research objective of understanding the directional relationship between the Government Investment Issues (GII) Issuance and the macroeconomic variables, the Granger Causality test is an essential test to be conducted, with the intention to determine whether each time series is applicable or can be used to forecast one another.

Table 4.5: Results of Granger Causality Test

Dependent Variables	Independent Variables (F-test statistic value and P-value)					
	GII	INF	INT	EXC	GDP	EX
GII		10.0157 [0.0003]***	0.18375 [0.8329]	6.28194 [0.0045]***	11.4489 [0.0001]***	2.15285 [0.1305]
INF	0.39535 [0.6763]		0.01744 [0.9824]	1.58885 [0.2178]	4.91479 [0.0128]	7.27031 [0.0022]***
INT	2.66328 [0.0831]	3.80492 [0.0314]		1.02360 [0.3692]	4.72486 [0.0149]	2.22232 [0.1226]
EXC	5.80404 [0.0064]***	1.87201 [0.1681]	6.08544 [0.0052]***		5.03488 [0.0116]	1.79160 [0.1809]
GDP	3.65462 [0.0356]	1.31601 [0.2805]	1.05645 [0.3579]	4.62017 [0.0162]		0.56953 [0.5707]
EX	3.06592 [0.0586]	4.02971 [0.0261]	1.28500 [0.2887]	2.45637 [0.0996]	2.38829 [0.1058]	

- The figures above show the F-test statistic value, while the number in parentheses […] indicates the p-value.
- Note: *** indicates the rejection of the null hypothesis at 1% significance levels.

Statement of Hypothesis Testing:

H_0:	There is no Granger Cause relationship between each independent variable and dependent variable in short run.
H_1:	There is Granger Cause relationship between each independent variable and dependent variable in short run.

The decision rule of the Granger Causality Test is to reject H_0 when the p-value is fall below 1% significant level. The outcome of H_0 rejection means that there is a causality relationship between the independent variable on the dependent variable in short run. From the statistical result shown above, it shows that majority of the macroeconomic variables are having the significant causality effect on GII Issuance, whereby most of their p-value is less than 0.01 or 1%. The contradict result shows only in the variable of Interest Rate and Export in which the result reflects that these two variables simply not granger cause GII Issuance.

This research is also attempt to analyze the bi-directional granger causality effect between variables by setting the GII Issuance as the independent variable and make the macroeconomic variables as the dependent variable. Consequently, the GII Issuance is insignificant in granger causing each of the macroeconomic variables except by Exchange Rate Index.

The highlight of the testing result would be on the Exchange Rate Index variable. Granger Causality test shows that there are two way relationships existing between the Exchange Rate Index and GII Issuance. It means that both series are affecting one another in a significant way. Surprisingly, there is no any directional relationship between Interest Rate (INT) and Export (EX) with the GII Issuance. The other two variables of Inflation and GDP are granger causing GII Issuance and having one-way relationship with GII Issuance.

4.3 Model Estimation and Interpretation

The simple regression models used in this chapter is referring to the equation models formed in Chapter three. In the regression models, the dependent variable, Y represents the Government Investment Issuance (GII). Whereas, the independent variables in these regression models are Export (EX), Interest Rate (INT), Inflation Rate (INF), Gross Domestic Product (GDP) and Exchange Rate (EXC) respectively. In this section, the simple regression models were constructed based on the E-view results.

4.3.1 Export (EX)

Table 4.6: Result of the OLS equation for Model 1

Variable	Coefficient	Standard Error	T-statistic	Probability (p-value)
Intercept	-11280.32	2710.780	-4.161281	0.0002
EX	0.108137	0.017977	6.015361	0.0000

Based on the result from Table 4.6, the equation model is as follow:

$$Y_i = -11{,}280.32 + 0.108137EX_i$$

Y_i = Government Investment Issuance (GII) RM at i^{th} term

EX_i = Exports of Goods and Services in quarterly RM at i^{th} term

In the above regressions model, β_0 is -11,280.32 which means that the Government Investment Issuance (GII) will be equal to -RM 11,280.32 when Export of Goods and Services (EX) is zero. Next, β_1 is 0.108137 which means that for every additional RM 1 increase in the Export of Goods and Services (EX), on average, the amount of Government Investment Issuance (GII) will increase by RM 0.108137.

4.3.2 Exchange Rate (EXC)

Table 4.7: Result of the OLS equation for Model 2

Variable	Coefficient	Standard Error	T-statistic	Probability (p-value)
Intercept	-27806.91	3258.854	-8.532728	0.0000
EXC	281.6004	27.99879	10.05759	0.0000

Based on the result from Table 4.7, the equation model is as follow:

$$Y_i = -27{,}806.91 + 281.6004EXC_i$$

Y_i = Government Investment Issuance (GII) RM at i^{th} term

EXC_i = Exchange Rate Index in quarterly (2003=100) at i^{th} term

In the above regressions model, β_0 is -27,806.91 which means that the Government Investment Issuance (GII) will be equal to -RM 27,806.91 when Exchange Rate Index (EXC) is zero. Next, β_1 is 281.6004 which mean that for every additional one unit increase in the Exchange Rate Index (EXC), on average, the amount of Government Investment Issuance (GII) will be increased by RM 281.6004.

4.3.3 Gross Domestic Product (GDP)

Table 4.8: Result of the OLS equation for Model 3

Variable	Coefficient	Standard Error	T-statistic	Probability (p-value)
Intercept	-8224.691	1376.023	-5.977148	0.0000
GDP	0.073505	0.007523	9.771007	0.0000

Based on the result from Table 4.8, the equation model is as follow:

$$\boldsymbol{Y_i = -8{,}224.691 + 0.073505GDP_i}$$

Y_i = Government Investment Issuance (GII) RM at i^{th} term

GDP_i = Gross Domestic Product in quarterly RM at i^{th} term

In the above regressions model, β_0 is -8,224.691 which means that the Government Investment Issuance (GII) will be equal to -RM 8,224.691 when Gross Domestic Product (GDP) is zero. Next, β_1 is 0.073505 which means that for every additional RM 1 increased in the Gross Domestic Product (GDP), on average, the amount of Government Investment Issuance (GII) will be increased by RM 0.073505.

4.3.4 Inflation Rate (INF)

Table 4.9: Result of the OLS equation for Model 4

Variable	Coefficient	Standard Error	T-statistic	Probability (p-value)
Intercept	-39660.89	3606.686	-10.99649	0.0000
INF	464.6391	37.57611	12.36528	0.0000

Based on the result from Table 4.9, the equation model is as follow:

$$Y_i = -39{,}660.89 + 464.6391\text{INF}_i$$

Y_i = Government Investment Issuance (GII) RM at i^{th} term

INF_i = Inflation Rate, CPI in quarterly (2003=100) at i^{th} term

In the above regression model, β_0 is -39,660.89 which means that the Government Investment Issuance (GII) will be equal to -RM 39,660.89 when Inflation (INF) is zero. Next, β_1 is 464.6391 which means that for every additional one unit increase in the Consumer Price Index compared to the base year of 2003 (2003=100), on average, the Government Investment Issuance (GII) will increase by RM 464.6391.

4.3.5 Interest Rate (INT)

Table 4.10: Result of the OLS equation for Model 5

Variable	Coefficient	Standard Error	T-statistic	Probability (p-value)
Intercept	19006.26	3799.852	5.001841	0.0000
INT	-5071.884	1342.345	-3.778375	0.0000

Based on the result from Table 4.10, the equation model is as follow:

$$Y_i = 19{,}006.26 - 5071.884\text{INT}_i$$

Y_i = Government Investment Issuance (GII) RM at i^{th} term

INT_i = Interest Rate in quarterly % at i^{th} term

In the above regression model, β_0 is 19,006.26 which mean that the Government Investment Issuance (GII) will be equal to RM 19,006.26 when Interest Rate (INT) is zero. Next, β_1 is -5071.884 which means that for every additional one percentage point increase in Interest Rate (INT), on average, the Government Investment Issuance (GII) will decreased by RM 5071.884.

4.4 Hypothesis Testing

In this part, hypothesis testing will be carried out to check the relationship between dependent variable and independent variables. The significance of the individual independent variables was tested by using T-test.

4.4.1 Export

The hypothesis testing was carried out based on the result in Table 4.6.

Statement of Hypothesis Testing:

H_0: There is insignificant relationship between export and GII issuance.

H_1: There is significant relationship between export and GII issuance.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability of the t-test statistic is lower than the significant value of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of t-Test = 0.0000

Decision:

Reject H_0 since the probability value of the t-test statistic of 0.0000 is less than the significant level of 0.01

Conclusion:

There is sufficient evidence to conclude that there is significant relationship between Export and the GII Issuance at significance level of 0.01.

4.4.2 Exchange Rate

The hypothesis testing was carried out based on the result in Table 4.7.

Statement of Hypothesis Testing:

H_0: There is insignificant relationship between exchange rate and GII issuance.

H_1: There is significant relationship between exchange rate and GII issuance.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the t-test statistic is lesser than the significant value of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of t-Test = 0.0000

Decision:

Reject H_0 since the probability value of the t-test statistic of 0.0000 is less than the significant level of 0.01.

Conclusion:

There is sufficient evidence to conclude that there is significant relationship between Exchange Rate and the GII issuance at significant level of 0.01.

4.4.3 Gross Domestic Product (GDP)

The hypothesis testing was carried out based on the result in Table 4.8.

Statement of Hypothesis Testing:

H_0: There is insignificant relationship between GDP and GII issuance.

H_1: There is significant relationship between GDP and GII issuance.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the t-test statistic is lesser that the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of t-Test = 0.0000

Decision:

Reject H_0 since the probability value of the t-test statistic of 0.0000 is lesser than the significant level of 0.01.

Conclusion:

There is sufficient evidence to conclude that there is significant relationship between GDP and the GII issuance at significant level of 0.01.

4.4.4 Inflation Rate

The hypothesis testing was carried out based on the result in Table 4.9.

Statement of Hypothesis Testing:

H_0: There is insignificant relationship between inflation rate and GII issuance.

H_1: There is significant relationship between inflation rate and GII issuance.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the t-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of t-test = 0.0000

Decision:

Reject H_0 since the probability value of the t-test statistic of 0.0000 is lesser than the significant level of 0.01.

Conclusion:

There is sufficient evidence to conclude that there is significant relationship between inflation rate and the GII issuance at significance level of 0.01.

4.4.5 Interest Rate

The hypothesis testing was carried out based on the result in Table 4.10.

Statement of Hypothesis Testing:

H_0: There is insignificant relationship between interest rate and GII issuance.

H_1: There is significant relationship between interest rate and GII issuance.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the t-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of T-test = 0.0005

Decision:

Reject H_0 since the probability value of the t-test statistic of 0.0005 is lesser than the significant level of 0.01.

Conclusion:

There is sufficient evidence to conclude that there is significant relationship between Interest Rate and the GII Issuance at significance level of 0.01.

4.5 Diagnostic Checking

4.5.1 Autocorrelation

The problem of autocorrelation exists when there is relationship between the error terms in the model and this will cause the estimate parameters to be biased, inefficient, and inconsistent, thus, Breusch-Godfrey Serial Correlation LM Test had been used to perform in this research.

4.5.1.1 Export

Table 4.11: Lag Length determination for Model 1

Lag Length	AIC	SIC	P-value
1	**46.13901**	**46.26660**	**0.0001**
2	46.17532	46.33752	0.0001
3	46.20975	46.41250	0.0009
4	46.24404	46.48733	0.0021
5	46.28553	46.56938	0.0047

Based on the lowest AIC and SIC, the best lagged length for residual is one, hence the ARCH test with lagged length of one is conducted.

Table 4.12: Breusch-Godfrey Serial Correlation LM Test for EX model

F-statistic	23.28058	Prob. F (1,41)	0.0000
Obs*R-squared	15.93554	Prob. Chi-Square (1)	0.0001

Based on the result showed in Table 4.12, diagnostic checking for autocorrelation was carried out.

Statement of Hypothesis Testing:

H_0: There is no autocorrelation problem.

H_1: There is autocorrelation problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-Test = 0.0001

Decision:

Reject H_0 since the probability value of the F-test statistic of 0.0001 is lesser than the significant level of 0.01.

Conclusion:

There is sufficient evidence to conclude that there is autocorrelation problem exist at significant level of 0.01.

4.5.1.2 Exchange Rate

Table 4.13: Lag Length determination for Model 2

Lag Length	AIC	SIC	P-value
1	**45.82030**	**45.94195**	**0.0100**
2	45.86572	46.02792	0.0362
3	45.86971	46.07246	0.0429
4	45.91486	46.15816	0.0856
5	45.87962	46.16347	0.0525

Based on the lowest AIC and SIC, the best lag length for residual is one, hence the ARCH test with lagged length of one is conducted.

Table 4.14: Breusch-Godfrey Serial Correlation LM Test for EXC model

F-statistic	7.284692	Prob. F (1,41)	0.0101
Obs*R-squared	6.638262	Prob. Chi-Square (1)	0.0100

Based on the result showed in Table 4.14, diagnostic checking for autocorrelation was carried out.

Statement of Hypothesis Testing:

H_0: There is no autocorrelation problem.

H_1: There is autocorrelation problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.0100

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.0100 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is autocorrelation problem exist at significant level of 0.01.

4.5.1.3 Gross Domestic Product (GDP)

Table 4.15: Lag Length determination for Model 3

Lag Length	AIC	SIC	P-value
1	**45.93583**	**46.05748**	**0.0535**
2	45.98126	46.14346	0.1550
3	46.00432	46.20707	0.2018
4	46.03655	46.27985	0.2735
5	45.99961	46.28336	0.1448

Based on the lowest AIC and SIC, the best lagged length for residual is one, hence the ARCH test with lagged length of one is conducted.

Table 4.16: Breusch-Godfrey Serial Correlation LM Test for GDP model

F-statistic	3.794760	Prob. F (1,41)	0.0583
Obs*R-squared	3.727432	Prob. Chi-Square (1)	0.0535

Based on the result showed in Table 4.16, diagnostic checking for autocorrelation was carried out.

Statement of Hypothesis Testing:

H_0: There is no autocorrelation problem.

H_1: There is autocorrelation problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.0535

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.0535 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is autocorrelation problem exist at significant level of 0.01.

4.5.1.4 Inflation Rate

Table 4.17: Lag Length determination for Model 4
Ramsey RESET

Lag Length	AIC	SIC	P-value
1	**45.64905**	**45.77069**	**0.2858**
2	45.69421	45.85641	0.5621
3	45.7190	45.92175	0.5666
4	45.75200	45.99530	0.6361
5	45.76587	46.04971	0.5731

Based on the lowest AIC and SIC, the best lagged length for residual is one, hence the ARCH test with lagged length of one is conducted.

Table 4.18: Breusch-Godfrey Serial Correlation LM Test for INF model

F-statistic	1.090053	Prob. F (1,41)	0.3026
Obs*R-squared	1.139517	Prob. Chi-Square (1)	0.2858

Based on the result showed in Table 4.18, diagnostic checking for autocorrelation was carried out.

Statement of Hypothesis Testing:

H_0: There is no autocorrelation problem.

H_1: There is autocorrelation problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is less than the significant level of 0.10. Otherwise do no reject H_0.

Probability Value:

P-value of F-Test = 0.2858

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.2858 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is autocorrelation problem exist at significant level of 0.01.

4.5.1.5 Interest Rate

Table 4.19: Lag Length determination for Model 5

Lag Length	AIC	SIC	P-value
1	**46.03673**	**46.15838**	**0.0000**
2	46.04281	46.20501	0.0000
3	46.07086	46.27361	0.0000
4	46.07659	46.31989	0.0000
5	46.11391	46.39776	0.0000

Based on the lowest AIC and SIC, the best lagged length for residual is one, hence the ARCH test with lagged length of one is conducted.

Table 4.20: Breusch-Godfrey Serial Correlation LM Test for INT model

F-statistic	57.92300	Prob. F (1,41)	0.0000
Obs*R-squared	25.76359	Prob. Chi-Square (1)	0.0000

Based on the result showed in Table 4.20, diagnostic checking for autocorrelation was carried out.

Statement of Hypothesis Testing:

H_0: There is no autocorrelation problem.

H_1: There is autocorrelation problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.0000

Decision:

Reject H_0 since the probability value of the F-test statistic of 0.0000 is lesser than the significant level of 0.01.

Conclusion:

There is sufficient evidence to conclude that there is autocorrelation problem exist at significant level of 0.01.

According to Gujarati and Porter (2009), the main consequence of Autocorrelation is the inefficiency of OLS that indicates the OLS estimation will no longer be BLUE. However, as long as the Homoskedasticity can be proven in the model, then the model will still remain unbiased, consistent and efficient. Under these conditions, the existence of Autocorrelation is not a big matter as the Homoskedasticity had proven the BLUE properties of model estimation and the subsequent t-test and intervals will still be accurate.

Since the Heteroskedasticity test for Export (EX) model as referring to Table 4.22, and Heteroskedasticity test for Interest Rate (INT) model as referring to Table 4.30 shows that there is no problem of Heteroskedasticity in these both particular model, thus, it is not necessary for us to statistically overcome the problem of Autocorrelation in these two models, as the model already showing BLUE in estimation nature.

4.5.2 Heteroscedasticity

When the variances of error terms are not constant, the problem of the heteroscedasticity will exist. ARCH test had been carried out in this research to test whether the heteroscedasticity problem exist in the model.

4.5.2.1 Export

Table 4.21: Lag Length determination for Model 1

Lag Length	AIC	SIC	P-value
1	**90.38261**	**90.46452**	**0.0292**
2	90.43735	90.56147	0.0903
3	90.49285	90.66002	0.1809
4	90.55842	90.76953	0.3332
5	90.62603	90.88196	0.5007

Based on the lowest AIC and SIC, the best lagged length for residual is 1, hence the ARCH test with lagged length of 1 is conducted.

Table 4.22: Heteroskedasticity Test: ARCH for EX model

F-statistic	5.095212	Prob. F (1,41)	0.0294
Obs*R-squared	4.753077	Prob. Chi-Square (1)	0.0292

Based on the result showed in Table 4.22, diagnostic checking for heteroscedasticity was carried out.

Statement of Hypothesis Testing:

H_0: There is no heteroscedasticity problem.

H_1: There is heteroscedasticity problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.0292

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.0292 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is heteroscedasticity problem exist at significant level of 0.01.

4.5.2.2 Exchange Rate

Table 4.23: Lag Length determination for Model 2

Lag Length	AIC	SIC	P-value
1	**89.92809**	**90.01001**	**0.0415**
2	89.97940	90.10352	0.1016
3	90.05003	90.21720	0.2258
4	90.12452	90.33503	0.3847
5	90.12140	90.37733	0.2490

Based on the lowest AIC and SIC, the best lagged length for residual is one, hence the ARCH test with lagged length of one is conducted.

Table 4.24: Heteroskedasticity Test: ARCH for EXC model

F-statistic	4.384251	Prob. F (1,41)	0.0425
Obs*R-squared	4.153925	Prob. Chi-Square (1)	0.0415

Based on the result showed in Table 4.24, diagnostic checking for heteroscedasticity was carried out.

Statement of Hypothesis Testing:

H_0: There is no heteroscedasticity problem.

H_1: There is heteroscedasticity problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.0415

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.0415 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is heteroscedasticity problem exist at significant level of 0.01.

4.5.2.3 Gross Domestic Product (GDP)

Table 4.25: Lag Length determination for Model 3

Lag Length	AIC	SIC	P-value
1	**89.61106**	**89.69298**	**0.1667**
2	89.66948	89.79360	0.3563
3	89.73524	89.90242	0.5851
4	89.80288	90.01399	0.7703
5	89.85532	90.11126	0.7998

Based on the lowest AIC and SIC, the best lagged length for residual is 1, hence the ARCH test with lagged length of 1 is conducted.

Table 4.26: Heteroskedasticity Test: ARCH for GDP model

F-statistic	1.908007	Prob. F (1,41)	0.1747
Obs*R-squared	1.912098	Prob. Chi-Square (1)	0.1667

Based on the result showed in Table 4.26, diagnostic checking for heteroscedasticity was carried out.

Statement of Hypothesis Testing:

H_0: There is no heteroscedasticity problem.

H_1: There is heteroscedasticity problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.1667

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.1667 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is heteroscedasticity problem exist at significant level of 0.01.

4.5.2.4 Inflation

Table 4.27: Lag Length determination for Model 4

Lag Length	AIC	SIC	P-value
1	**88.86691**	**88.94883**	**0.7432**
2	88.92187	89.04599	0.7991
3	88.96671	89.13389	0.7442
4	89.02918	89.24029	0.8533
5	89.06232	89.31826	0.7605

Based on the lowest AIC and SIC, the best lagged length for residual is 1, hence ARCH test with lagged length of 1 is conducted.

Table 4.28: Heteroskedasticity Test: ARCH for INF model

F-statistic	0.102594	Prob. F (1,41)	0.7504
Obs*R-squared	0.107330	Prob. Chi-Square (1)	0.7432

Based on the result showed in Table 4.28, diagnostic checking for heteroscedasticity was carried out.

Statement of Hypothesis Testing:

H_0: There is no heteroscedasticity problem.

H_1: There is heteroscedasticity problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value of F-test = 0.7432

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.7432 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is heteroscedasticity problem exist at significant level of 0.01.

4.5.2.5 Interest Rate

Table 4.29: Lag Length determination for Model 5

Lag Length	AIC	SIC	P-value
1	**90.65533**	**90.73724**	**0.0383**
2	90.72032	90.84444	0.1051
3	90.96292	90.85662	0.2184
4	90.79505	91.00616	0.1319
5	90.87676	91.13269	0.2251

Based on the lowest AIC and SIC, it shows that the best lagged length for residual is one, hence ARCH test with lagged length of one is conducted.

Table 4.30: Heteroskedasticity Test: ARCH for INT model

F-statistic	4.544318	Prob. F (1,41)	0.0391
Obs*R-squared	4.290451	Prob. Chi-Square (1)	0.0383

Based on the result showed in Table 4.30, diagnostic checking for heteroscedasticity was carried out.

Statement of Hypothesis Testing:

H_0: There is no heteroscedasticity problem.

H_1: There is heteroscedasticity problem.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Ba

P-value of F-Test = 0.0383

Decision:

Do not reject H0 since the probability value of the F-test statistic of 0.0383 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that there is heteroscedasticity problem exist at significant level of 0.01.

4.5.3 Model Specification

Ramsey Reset test had been carried out in this research to test the model specification.

4.5.3.1 Export

Table 4.31: Ramsey RESET Test for EX model

F-statistic	3.4402055	Prob. F (1,41)	0.0708
Log likelihood ratio	3.547022	Prob. Chi-Square (1)	0.0597

Based on the result showed in Table 4.31, diagnostic checking for model specification was carried out.

Statement of Hypothesis Testing:

H_0: The model is correctly specified.

H_1: The model is not correctly specified.

Significance Level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

Prob. F(1,41) = 0.0708

Decision:

Do not reject H_0 since the probability value of the F-test statistic 0.0708 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the model is not correctly specified at significant level of 0.01.

4.5.3.2 Exchange Rate

Table 4.32: Ramsey RESET Test for EXC model

F-statistic	0.724570	Prob. F (1,41)	0.3996
Log likelihood ratio	0.770796	Prob. Chi-Square (1)	0.3800

Based on the result showed in Table 4.32, diagnostic checking for model specification was carried out.

Statement of Hypothesis Testing:

H_0: The model is correctly specified.

H_1: The model is not correctly specified.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is lesser than the significance level of 0.01. Otherwise do not reject H_0.

Probability Value:

Prob. F(1,41) = 0.3996

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.3996 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the model is not correctly specified at significant level of 0.01.

4.5.3.3 Gross Domestic Product (GDP)

Table 4.33: Ramsey RESET Test for GDP model

F-statistic	0.443762	Prob. F (1,41)	0.5090
Log likelihood ratio	0.473674	Prob. Chi-Square (1)	0.4913

Based on the result showed in Table 4.33, diagnostic checking for model specification was carried out.

Statement of Hypothesis Testing:

H_0: The model is correctly specified.

H_1: The model is not correctly specified.

Significance Level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is less than the significance level of 0.01. Otherwise do not reject H_0.

Probability Value:

Prob. F(1,41) = 0.5090

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.5090 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the model is not correctly specified at significant level of 0.01.

4.5.3.4 Inflation Rate

Table 4.34: Ramsey RESET Test for INF model

F-statistic	2.583586	Prob. F (1,41)	0.1157
Log likelihood ratio	2.688776	Prob. Chi-Square (1)	0.1011

Based on the result showed in table 4.34, diagnostic checking for model specification was carried out.

Statement of Hypothesis Testing:

H_0: The model is correctly specified.

H_1: The model is not correctly specified.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject $_{H0}$ if the probability value of the F-test statistic is less than the significance level of 0.01. Otherwise do not reject H_0.

Probability Value:

Prob. F(1,41) = 0.1157

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.1157 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the model is not correctly specified at significant level of 0.01.

4.5.3.5 Interest Rate

Table 4.35: Ramsey RESET Test for INT model

F-statistic	2.726452	Prob. F (1,41)	0.1063
Log likelihood ratio	2.832771	Prob. Chi-Square (1)	0.0924

Based on the result showed in Table 4.35, diagnostic checking for model specification was carried out.

Statement of Hypothesis Testing:

H_0: The model is correctly specified.

H_1: The model is not correctly specified.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the F-test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

Prob. F(1,41) = 0.1063

Decision:

Do not reject H_0 since the probability value of the F-test statistic of 0.1063 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the model is not correctly specified at significant level of 0.01.

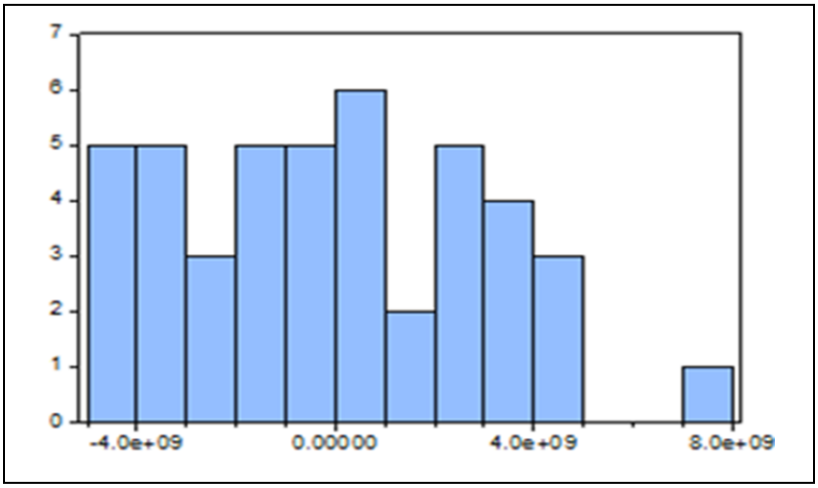
4.5.4 Normality Test

Jarque-Bera test had been carried out in this research to test the normality of the error terms in the model.

4.5.4.1 Export

Based on the result showed in Table 4.36, diagnostic checking for normality was carried out as the following page showed.

Table 4.36: Result of Jacque-Bera Test for EX model



Jacque-Bera	1.341470	Probability	0.511333

Statement of Hypothesis Testing:

H_0: Error terms are normally distributed.

H_1: Error terms are not normally distributed.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the Jarque-Bera test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value = 0.5113

Decision:

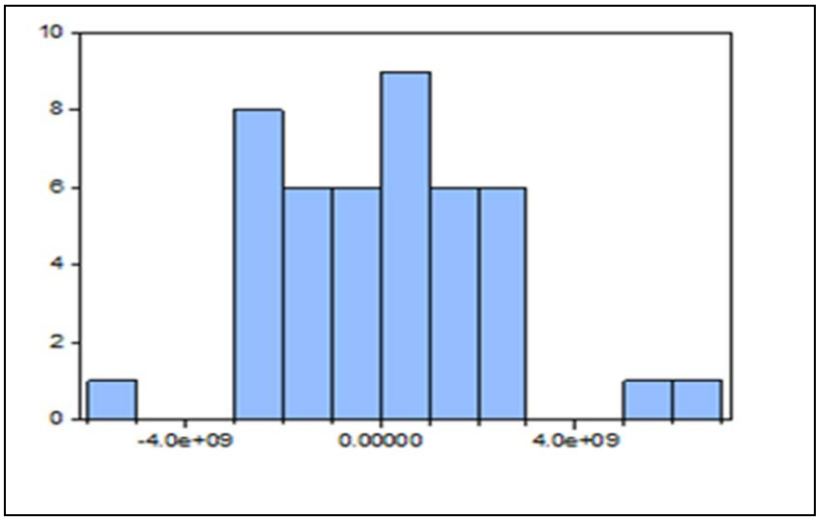
Do not reject H0 since the probability value of the Jarque-Bera test statistic of 0.5113 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the error terms are not normally distributed at significant level of 0.01.

4.5.4.2 Exchange Rate

Table 4.37: Result of Jacque-Bera Test for EXC model



Jacque-Bera	3.033985	Probability	0.219371

Based on the result showed in Table 4.37, diagnostic checking for normality was carried out as the following page showed.

Statement of Hypothesis Testing:

H_0: Error terms are normally distributed.

H_1: Error terms are not normally distributed.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the Jarque-Bera test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value = 0.2194

Decision:

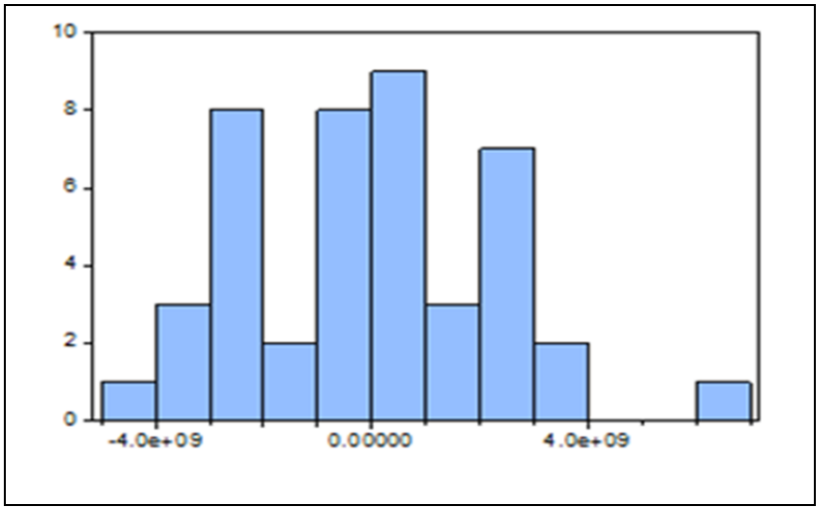
Do not reject H_0 since the probability value of the Jarque-Bera test statistic of 0.2194 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the error terms are not normally distributed at significant level of 0.01.

4.5.4.3 Gross Domestic Product (GDP)

Table 4.38: Result of Jacque-Bera Test for GDP model



Jacque-Bera	0.498769	Probability	0.779280

Based on the result showed in Table 4.38, diagnostic checking for normality was carried out as the following page showed.

Statement of Hypothesis Testing:

H_0: Error terms are normally distributed.

H_1: Error terms are not normally distributed.

Significant level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the Jarque-Bera test statistic is lesser than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value = 0.7793

Decision:

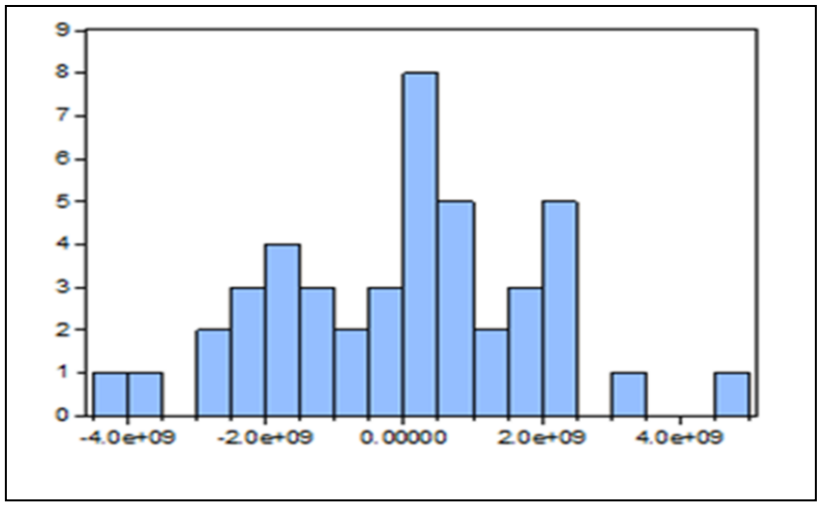
Do not reject H_0 since the probability value of the Jarque-Bera test statistic of 0.7793 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the error terms are not normally distributed at significant level of 0.01.

4.5.4.4 Inflation

Table 4.39: Result of Jacque-Bera Test for INF model



Jacque-Bera	0.209832	Probability	0.900400

Based on the result showed in Table 4.39, diagnostic checking for normality was carried out as the following page showed.

Statement of Hypothesis Testing:

H_0: Error terms are normally distributed.

H_1: Error terms are not normally distributed.

Significance Level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the Jarque-Bera test statistic is less than the significant level of 0.10. Otherwise do not reject H_0.

Probability Value:

P-value = 0.9004

Decision:

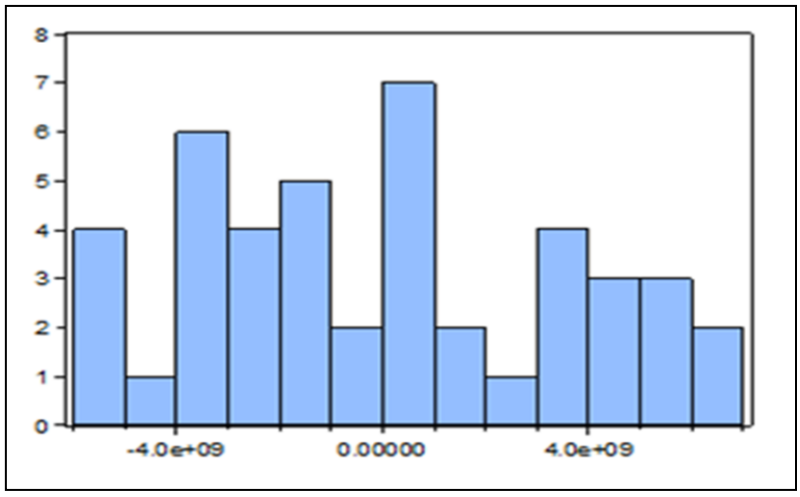
Do not reject H_0 since the probability value of the Jarque-Bera test statistic of 0.9004 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the error terms are not normally distributed at significant level of 0.01.

4.5.4.5 Interest Rate

Table 4.40: Result of Jacque-Bera Test for INT model



Jacque-Bera	2.518938	Probability	0.283805

Based on the result showed in Table 4.40, diagnostic checking for normality was carried out as the following page showed.

Statement of Hypothesis Testing:

H_0: Error terms are normally distributed.

H_1: Error terms are not normally distributed.

Significance level:

$\alpha = 0.01$

Decision Rule:

Reject H_0 if the probability value of the Jarque-Bera test statistic is less than the significant level of 0.01. Otherwise do not reject H_0.

Probability Value:

P-value = 0.2838

Decision:

Do not reject H_0 since the probability value of the Jarque-Bera test statistic of 0.2838 is greater than the significant level of 0.01.

Conclusion:

There is no sufficient evidence to conclude that the error terms are not normally distributed at significant level of 0.01.

4.6 Conclusion

In chapter 4, all the data and observations obtained from databases are being input into the E-view 6 software to conduct variety kind of testing. These testing included Unit Root test, Granger Causality test, OLS regression time series model and also diagnostic checking.

For the unit root test, result shows all the variable data shows non-stationary in their own level form, but somehow the consistent result shown when the data is being tested on their first differential form, whereby majority of the variable data become stationary. The only exception is the variable of GDP. The ADF results tell us that the data of GDP unable to meet its stationary requirement in the first differential form. Instead, it only becomes stationary when going through the second differential form.

As of the result generated by granger causality test, it is observable that there are three macroeconomic variables of inflation, exchange rate and GDP are showing the granger causality effect to GII issuance in the short run, at the significant level of 0.01 or 1%. On the other hand, when examining the granger causality properties of GII issuance on each macroeconomic factor, it shows that GII issuance could only granger cause exchange rate in the short run economy. It is mentionable that exchange rate is the only macroeconomic variable that having the bi-lateral relationship with GII issuance in Malaysia.

As of the OLS regression model generated, it shows that all the five macroeconomic variables are contributing the significant relationship with GII Issuance volume at the significant level of a = 0.01. Other than the Interest Rate, it is suggestible that all the macroeconomic variables are positively affect the GII Issuance volume. The results generated by E-view software are mostly favorable

for us, since all of the independent variables are statistically proven significant in influencing the variable of GII Issuance volume.

Last but not least, from the diagnostic checking, it shows that majority of the econometric problem is not existing in our series, whereby the result is near to unbiased result in the data analysis. However, the problem of Autocorrelation is triggered by the variables of Interest Rate and Exports.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

The summary of previous statistical analyzes will be discussed in this section. Also, the major findings comparison between literature review and testing conducted in chapter four, implications or significance of study will together be covered in this last chapter. Finally, the main limitations and the recommendations to enrich this research paper in the future will be discussed.

5.1 Summary Of Statistical Analyzes

The core objective of this research paper is to determine the directional relationship between the GII issuance and five macroeconomic variables in Malaysia. The mentioned macroeconomic variables here are inclusive of Inflation, Interest Rate, Exchange Rate, GDP and Export in Malaysia. The time series data involved covers the time period throughout year 2003 to 2013 in quarterly basis. In order to conduct analyzes accurately, the obtained data are input into E-view software to generate the interpretable result.

5.1.1 Stationary Test

Before any of the analysis is performed, it is essential for us to test whether each of our data is stationary in nature or not. In order to do this, Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) test are applied.

Table 5.1 Results of Stationary Test

Variables	Stationary	
	ADF Unit Root Test	**PP Unit Root Test**
Inflation		
Level form	X	X
1st differential form	√	√
Interest Rate		
Level form	X	X
1st differential form	√	√
Exchange Rate		
Level form	X	X
1st differential form	√	√
GDP		
Level form	X	X
1st differential form	X	√
Export		
Level form	X	X
1st differential form	√	√

- ✘ indicates that variable is yet to achieved its stationary form at the particular form of level.
- ✔ indicates that variable had achieved its stationary form at the particular form of level.

All the variable data shows non-stationary in their own level form, but somehow the consistent results are shown when the data is being tested on their first differential form, whereby majority of the variable data had achieved its stationary form. The only exception is the variable of GDP. The ADF results tell us that the data of GDP unable to meet its stationary at the first differential form. Instead, it only becomes stationary when going through the second differential form.

5.1.2 Granger Causality Test

With the purpose of meet the research objective in determining the directional relationship between macroeconomic variables and GII issuance, granger causality test is applied to see whether one variable is useful in forecasting another.

Table 5.2: Results of Granger Causality Test

Dependent Variable	Independent Variable					
	GII	INF	INT	EXC	GDP	EX
GII		1%	-	1%	1%	-
INF	-		-	-	-	1%
INT	-	-		-	-	-
EXC	1%	-	1%		-	-
GDP	-	-	-	-		-
EX	-	-	-	-	-	

As of the result generated by E-view software, three macroeconomic variables of inflation, exchange rate and GDP are showing the granger causality effect to GII issuance in the short run, at the significant level of 0.01 or 1%. On the other hand, when examine the granger causality properties of GII issuance on each macroeconomic factor, it shows that GII issuance could only granger cause exchange rate in short run. Therefore, exchange rate is the only macroeconomic variable that having the bi-lateral relationship with GII issuance in Malaysia.

There is also certain less-related granger causality effect found between the macroeconomic factors with each other. The interest rate granger causing exchange rate in short-run, and the exports also granger cause inflation in short-run at the significant level of 1%.

5.1.3 OLS Model Estimation

Subsequently, the macroeconomic time series data is set as the independent variable and conduct the Simple Linear Regression Model with the dependent variable setting of GII Issuance volume. In order to see whether each variable is significant enough to influence the GII Issuance, the significant level for the decision rule is fixed at 0.01 or 1%. The directional relationship of each variable will also be concluded here.

Table 5.3 Results of OLS Model Estimations

Independent Variables	P-value (Significance at a = 1%)	Relationship
Inflation	0.0000 (Significant)	Positive
Interest Rate	0.0005 (Significant)	Negative
Exchange Rate Index	0.0000 (Significant)	Positive
GDP	0.0000 (Significant)	Positive
Export	0.0000 (Significant)	Positive

As of the E-view result, it shows that all the five macroeconomic variables have significant relationship with GII Issuance volume at the significant level of a = 0.01. Other than the Interest Rate, all the macroeconomic variables positively affect the GII Issuance volume. The results generated by E-view software are mostly favorable for us, since all of the independent variables selected are statistically proven in significance in influencing the variable of GII Issuance volume.

5.1.4 Diagnostic Checking

In order to ensure our models do not violate certain unwanted econometric conditions, diagnostic checking is conducted to check and view the outcome in a more interpretable way. This kind of methodology can notify us whether if a model offended the conditions of Autocorrelation, Heteroscedasticity, Model Specification bias and Normality of regressing.

Table 5.4 Result of Diagnostic Checking

Variables	Autocorrelation	Heteroscedasticity	Model Specification Bias	Normality Test
Inflation	✔	✔	✔	✔
Interest Rate	✘	✔	✔	✔
Exchange Rate Index	✔	✔	✔	✔
GDP	✔	✔	✔	✔
Exports	✘	✔	✔	✔

- The decision rule is to reject the H_0 when p-value falls below significant level of 0.01 or 1%.
- ✘ indicates that variable violates the particular econometric problem (Reject H_0).
- ✔ indicates that variable does not violate particular econometric problem (Do not reject H_0).

From the table of result itself, it shows that majority of the econometric problem is not exists in our series and the result is near to unbiased result in our data analysis. However, the problem of Autocorrelation is triggered by the variables of Interest Rate and Exports.

5.2 Discussion on Major Findings

According to the result obtained by E-view empirical testing from chapter four, there are three macroeconomic variables able to statistically granger cause GII Issuance in short-run, which are inflation, exchange rate and GDP. On the other hand, when the testing is conducted on how can GII Issuance granger causes the macroeconomic variables, the results showed the only significant variable is exchange rate, which means GII Issuance tends to granger cause exchange rate in short run.

By making the findings comparison, there is a contradict result with Ameer (2007) who stated that the inflation and bond issuance is having no granger cause relationship in both Malaysia and South Korea at the significant level of 0.01 or 1%. Ahmad, Daud and Kefeli (2012) who conduct studies in Malaysia also claim that there is no granger cause relationship between inflation and Sukuk issuance. However, our researches indicate that inflation is granger causing the GII issuance in the short-run.

From the context of interest rate, the research conducted by Ameer (2007) concludes that bond issuance is granger causing the interest rate in Malaysia. This contradicts our result that indicates no any causality relationship between interest rate and GII issuance.

As suggested by Ahmad and Radzi (2011), there is evidence showing the existence of correlation between market growth of stock or debt market and GDP. Even though the correlation has been discovered between the growth of capital market and economic development, somehow the causal relationship between these variables in long-run is still remains unclear. The causal relationship between these two variables can be different in multiple geographical areas,

depending on each of their different circumstances. The result showed by our testing showed that GDP can potentially granger cause GII issuance, but GII issuance is not granger causing the GDP. The conducted testing shows inconsistency with analysis conducted by Ahmad, Daud and Kefeli (2012) who find that SUKUK granger causing the GDP in long run.

This discussion will be followed by the testing on simple OLS regression model how the macroeconomic variables can influence the GII Issuance.

Based on the e-view output result, the inflation significantly affects the GII Issuance volume in the positive direction. At the same time, there is a previous researcher – Ameer (2007) who conduct the analysis on bonds and stocks market in the two Asian countries of Malaysia and South Korea having the consistent analysis result with us. This indicates when inflation increases, GII Issuance volume will also increase. This is suspected that this kind of relationship exists due to the high inflation indicates the bad economic, at the same time it will hit investors' confidence in making the risk taking decision. This could be linked to risk averse behavior of investors which suggests reluctance to assumer high risk. Thus, public tend to switch to a safer investment alternatives such as GII. However, there are some studies conducted by Broeck and Guscina (2011), Aizenman and Marion (2011) and Said and Grassa (2013) contradict our result, stating that inflation and GII issuance is having negative relationship. This also means the result contradicts to the Fisher effect that suggests the negative relationship betwen inflation and bond markets as explained in previous section.

A testing also conducted to study the relationship between Interest Rate and GII Issuance volume in chapter four, and the result statistically proved that the relationship between these two variables is negative and significant. Surprisingly, the result shows consistency with the studies conducted by Adelegan and Radzewicz-Bak (2009), Elkarim (2012), Said and Grassa (2013). This could be

related to the price risk, since when the market interest rate increase, the demand of GII that comes with the fixed payment of interest in general, is expected to decrease due to the expected future lower price of GII (Danila, 2015).

The simple regression model also conducted on the relationship on how exchange rate can affect the GII Issuance. Based on the model result, it shows that the exchange rate is significantly and positively influences the GII Issuance in Malaysia. This result shown is tally with the research conducted by Ahmad and Muda (2013), and Danila (2015). When the domestic currency appreciates, demand for domestic bonds by foreign investors increases, which drive up the bond issuance (Ahmad and Muda, 2013). However if the bonds were restricted to domestic buyers only, Danila (2015) explained that domestic investors tends to view foreign currency and domestic bond as substitute investments. When domestic currency appreciates, domestic investors tend to invest in bond denominated in domestic currency rather than in foreign currency. Therefore, as the exchange rate increase (domestic currency appreciate), GII Issuance tends to increase. This is consistent with the risk aversion behavior of investors that tend to seek asset with stronger currency to invest in, due to its higher stability and lower risk.

The E-view test is conducted to test on how can GDP affects the GII Issuance in Malaysia; the testing shows that the positive and significant relationship exists within them. This particular result is in line with all five researches conducted by Ahmad and Radzi (2011), Said and Grassa (2013), Ahmad, Daud and Kefeli (2012), Bhattacharyay (2013) and Andritzky, Bannister, and Tamirisa (2005) as discussed in chapter two, in which the researches made by them are majorly on the bond and Sukuk market in multiple geographical areas and all the outcome shows that GDP has significant positive influence on GII Issuance. As mentioned by Ahmad and Radzi (2011), Sukuk issuer is more concern about the

macroeconomic factors such as GDP than conventional bond issuer when making bond issuance decision. Meanwhile, Bhattacharyay (2013) explained that GDP is indicator of size of economy and stage of development which are positively related to bond market development. Similar to previous studies, income effect can be used to explain the positive relationship, stating that when rise in income can lead to development of bond markets.

The last simple regression model testing would be made on the relationship between export and GII Issuance. The result from this testing indicates that the export is expected to positively and significantly affect the GII Issuance. Not forget to mention, this outcome is in line with the conclusions made by Bhattacharyay (2013), Bellas, Papaioannou, and Patrova (2010), and Said and Grassa (2013). This kind of positive relationship could be potentially caused by the reason of economy openness is significant with the participation of foreign investors in cross-border investment. Therefore, the greater is the extent of export, it can potentially enhance the local bond market development since it allows a gateway for foreign investors to get into a certain market, as suggested by Bhattacharyay (2013) and Said and Grassa (2013). To theoretically explained, demand theory is suitable to be used. When export increase, suggesting a more open economy, number of buyers of the bonds increase and leads to development of the bond market.

5.3 Implication of the Study

This paper had studied about the relationship between the Malaysia Government Investment Issuance (GII) and five macroeconomic factors which are the openness of the trade which is measure by the export (EX), interest rate (INT), inflation rate (INF), Gross Domestic Product (GDP), and also exchange rate (EXC). The outcome of this research will contribute useful information to several parties such as government Malaysia, public investors, and also academicians.

Based on the result of this research project, the examined macroeconomic factors, export, exchange rate, Gross Domestic Product, inflation rate, and interest rate, are all having significant relationship with the GII issuance. Four of the macroeconomic factors, export, exchange rate, GDP, and inflation rate, are positively affecting the issuance of the GII. However, the interest rate will negatively affect the GII issuance.

Government of Malaysia, as the issuer of the Government Investment Issued (GII), can take this research paper as reference in the decision making stage when they want to issue new batch of GII. Deciding what is the volume of GII to be issued is a critical part. If the issuance of the GII is in high volume, when the demand on it is lower than its supply, this will cause the value of GII to drop or the GII are forced to be sold at a lower price to attract investor.

For example, since the interest rate is having negative relationship with GII issuance, when the market interest rate increase, investors will be more prefer to keep their money as deposit instead of investing in the securities such as GII. If the expected demand of GII is low, it is better for the Malaysia government to issue less GII to prevent it to be devalued. Besides, government can take action when the exchange rate is increase. For example, when the exchange rate

increase, the value of the MYR will increase and investor will increase their demand on domestic bond including GII, which will drive the issuance of GII up. In short, understanding the relationship between GII issuance and the macroeconomic factors will able to helps government to issue GII at the more appropriate volume and price.

Beside government party, this research's output will also benefit public investor where it can act as a guideline when the investors are deciding what and how much to invest. Investors need to have an idea about what is the different between conventional bond and Islamic bond, and the different between sukuk and GII so that they are able to involve in the investment plan that meet their needs. By knowing the relationship between the macroeconomic factors and the GII issuance, this will help investor when they are deciding whether to invest or not to. Take the market interest rate as an example, if the market interest rate is increase, investors are prefer to save their money as deposit rather than invest in the securities as deposit provide them safer return.

Besides, this research paper will also assist investor in the risk evaluation. Investor of GII will face only minor or no default risk since the GII is issues by the government Malaysia. See again the exchange rate, investors can make their investment decision according to the exchange rate. When the exchange rate of Malaysia increase, this will cause Ringgit Malaysia to appreciate and investors will have more confidence to invest in Malaysia's securities compare to the foreign countries. Other than these, investors are able to develop better strategy in their investments and they are able to determine the desired investment portfolio.

Based on the Graph 1.1 and Graph 1.2 which show the issuance of GII from year 2003 to 2013 in quarterly basis, it can be see that the volume of GII issued is increasing year by year. The highest volume of GII issued is RM12 billion which

is on the first quarter of year 2012 and the second quarter of year 2013. Compare to the first quarter of year 2003, where the GII issued by government Malaysia is only RM1.729 billion.

Last but not least, as the issuance of GII is in the increasing trend and there are no research related to the GII had been done, so this research paper will help those future researchers and academicians who are interested to study the GII related topics. This research project can act as new academic evidence that is related to the government Islamic bond because this research examines the relationship between the GII issuance and the selected macroeconomic factors and also proven the significance of every selected macroeconomic factor to the GII issuance.

5.4 Limitation of the Study

Along the study to determine the relationship between macroeconomic factors and the issuance of Government Investment Issue (GII) in Malaysia, several limitations were found.

Foremost, the lack of technical knowledge on Generalized Autoregressive Conditional Heteroscedaticity (GARCH) model caused this test unable to be run although it is very useful in detecting the fluctuations of the variables. Therefore, regression model that used in this research paper is restricted to OLS Linear Regression Model (LRN). This model underlies some weaknesses, for example the inability in capturing the non-linear pattern between dependent and independent variables. Instead, it assumes that the influence of independent variable on the dependent variable is in a linear form and having the same degree or magnitude of effects on each other. In reality, the assumption of linear relationship is difficult to be convincing.

Likewise, there are lack of past studies on the relationship between macroeconomic factors and the issuance of Government Investment Issue (GII) in Malaysia. Only a few similar studies had been done on this topic, making this topic lack of researcher insight. So, there are difficulties in finding supporting journals or articles as reference. The insufficient information on previous researches becomes a difficulty and obstacle in the study. Therefore, only the studies related to similar securities such as Sukuk can be referred as a mirror to study the behavior of GII.

Besides that, occasionally to access to journals or previous studies related to this topic is also difficult. Some of the journals are restricted for specific users only and some of them are with charges. Due to the limited budget, it is unaffordable for us to purchase the journals. However, most of the journals related that is

accessible are being accessed by us. And it marks an imperfection when some of the journals are not used, despite of their possible usefulness on this study.

In addition, this research has insufficient sample size. The data collected from the data stream is available from the first quarter of year 2003 to fourth quarter of 2013. The sample size for the research consists of 44 observations. Even if the quarterly data had been used in this study, but increasing the sample size can contribute to better evaluation.

In this research, the independent variables selected are limited to macroeconomic factors only. Therefore, this study only views the GII behavior from macroeconomic perspective only. Other political, social and technological factors are not considered in this study, and these factors might have significant impact on the GII issuance too.

5.5 Recommendations for Future Research

First, due to the time and resources constraint, this project is unable to cover all macroeconomic factors into this study. Therefore, future research should be conducted based on other macroeconomic variables such as level of national employment, balance of payment, import and others to enhance this study. To highlight, one of the essential factors is the level of national debt, whereby as the national debt level is high due to the accumulated budget deficits, it might suggest higher risk of government bond in relative to other countries. Since this research focus only on macroeconomic variables, thus it is suggestible that future research can be focused on other factors (for example political, social and technological factors) that possibly to have relationship with GII. For example, percentage of Muslim might significantly affect issuance of GII, since Muslim is the major investors in Islamic market. Other than that, according to Said and Grassa (2013), government adopting Shari'ah law legal origin is more likely to develop the Islamic finance industry. This is because Shari'ah law is the main source of Islamic finance. Also, regulation governing the Islamic market is also important, as it can directly affect the confidence of the investors. Thus, regulatory quality indicates efficiency and reliability of the market and it is believed to have impact on the GII market. Also, the corruption perceptions index indicates the integrity and reputation of the government; it should have certain impact on the securities issued by the government including GII.

Furthermore, future research can be suggested to increase the sample size in our estimation. The large sample size in data can contributes to the lower variance in the variable. Also, the lower variance of variable will make the regression become more efficient. This will help to minimize the autocorrelation and heteroscedasticity problem. Therefore, the result will become BLUE (best, linear, unbiased and estimated) and also increase the reliability.

In order to overcome the limitation of OLS regression model as discussed, it is suggestible that the future researches can be done by using the other kind of estimations such as GARCH Model. GARCH Model is also being recommended as it could assist researchers in estimating the volatility of the influences, and determine the momentum of movement between the observations and results.

The last but significant recommendation here would be the application of Multiple OLS Regression Model on the related research. In this particular research paper, the Granger Causality Test had been conducted as the pioneer test that is relating with the GII. Based on the data analysis outcome, it successfully proves that macroeconomic variable is the one that tends to influence GII Issuance instead of the other way round. With this statistical evidence, future researchers can proceed with the testing of how macroeconomic variables can affect the GII Issuance in an aggregate extent by using the Multiple OLS Regression Model. This kind of model application is important, since the macroeconomic factors, for instances Interest Rate and GDP are closely related and tends to influence each other in real life. Therefore, it makes a strong standpoint of future researchers should conduct the testing in an integrated basis.

5.6 Conclusion

In a nutshell, this thesis is to examine the relationship between the macroeconomic factors of inflation, interest rate, exchange rate, GDP and exports on GII issuance volume in Malaysia throughout the period from year 2003 to 2013 in quarterly basis.

This particular chapter also summarized the major finding of researches and also the implications or significance of studies for certain parties. Besides, the limitations of studies in this research paper and some critical recommendations against these problems and future studies are also being discussed in this chapter.

Lastly, this research analysis can contribute to the Malaysia government so that they can clarify how is the directional relationship between the macroeconomic variables and the GII issuance volume. This can definitely assist them in making the decision whether the finance their expenditure through GII or other debt instruments in order to minimize the cost of funding.

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Appendices

Appendix 1.1 Result of the OLS equation for Model 1

Dependent Variable: Y
Method: Least Squares
Date: 02/10/15 Time: 14:12
Sample: 2003Q1 2013Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11280.32	2710.780	-4.161281	0.0002
EX	0.108137	0.017977	6.015361	0.0000

R-squared	0.462810	Mean dependent var	4793.455
Adjusted R-squared	0.450019	S.D. dependent var	4080.256
S.E. of regression	3025.946	Akaike info criterion	18.91222
Sum squared resid	3.85E+08	Schwarz criterion	18.99332
Log likelihood	-414.0689	Hannan-Quinn criter.	18.94230
F-statistic	36.18457	Durbin-Watson stat	0.774627
Prob(F-statistic)	0.000000		

Appendix 1.2 Result of the OLS equation for Model 2

Dependent Variable: Y
Method: Least Squares
Date: 02/11/15 Time: 16:15
Sample: 2003Q1 2013Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-27806.91	3258.854	-8.532728	0.0000
EXC	281.6004	27.99879	10.05759	0.0000

R-squared	0.706612	Mean dependent var	4793.455
Adjusted R-squared	0.699627	S.D. dependent var	4080.256
S.E. of regression	2236.239	Akaike info criterion	18.30737
Sum squared resid	2.10E+08	Schwarz criterion	18.38847
Log likelihood	-400.7621	Hannan-Quinn criter.	18.33744
F-statistic	101.1552	Durbin-Watson stat	1.217045
Prob(F-statistic)	0.000000		

Appendix 1.3 Result of the OLS equation for Model 3

Dependent Variable: Y
Method: Least Squares
Date: 02/11/15 Time: 16:17
Sample: 2003Q1 2013Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8224.691	1376.023	-5.977148	0.0000
GDP	0.073505	0.007523	9.771007	0.0000

R-squared	0.694485	Mean dependent var	4793.455
Adjusted R-squared	0.687210	S.D. dependent var	4080.256
S.E. of regression	2281.989	Akaike info criterion	18.34787
Sum squared resid	2.19E+08	Schwarz criterion	18.42897
Log likelihood	-401.6532	Hannan-Quinn criter.	18.37795
F-statistic	95.47258	Durbin-Watson stat	1.371703
Prob(F-statistic)	0.000000		

Appendix 1.4 Result of the OLS equation for Model 4

Dependent Variable: Y
Method: Least Squares
Date: 02/11/15 Time: 16:18
Sample: 2003Q1 2013Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-39660.89	3606.686	-10.99649	0.0000
INF	464.6391	37.57611	12.36528	0.0000

R-squared	0.784505	Mean dependent var	4793.455
Adjusted R-squared	0.779374	S.D. dependent var	4080.256
S.E. of regression	1916.530	Akaike info criterion	17.99881
Sum squared resid	1.54E+08	Schwarz criterion	18.07991
Log likelihood	-393.9738	Hannan-Quinn criter.	18.02888
F-statistic	152.9001	Durbin-Watson stat	1.621675
Prob(F-statistic)	0.000000		

Appendix 1.5 Result of the OLS equation for Model 5

Dependent Variable: Y
Method: Least Squares
Date: 02/11/15 Time: 16:20
Sample: 2003Q1 2013Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19006.26	3799.852	5.001841	0.0000
INT	-5071.884	1342.345	-3.778375	0.0005

R-squared	0.253680	Mean dependent var	4793.455
Adjusted R-squared	0.235910	S.D. dependent var	4080.256
S.E. of regression	3566.642	Akaike info criterion	19.24103
Sum squared resid	5.34E+08	Schwarz criterion	19.32213
Log likelihood	-421.3026	Hannan-Quinn criter.	19.27110
F-statistic	14.27612	Durbin-Watson stat	0.465585
Prob(F-statistic)	0.000492		

Appendix 1.6 Result of the Breusch-Godfrey LM Test for Model 1

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	23.28058	Prob. F(1,41)	0.0000
Obs*R-squared	15.93554	Prob. Chi-Square(1)	0.0001

Appendix 1.7 Result of the Breusch-Godfrey LM Test for Model 2

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	7.284692	Prob. F(1,41)	0.0101
Obs*R-squared	6.638262	Prob. Chi-Square(1)	**0.0100**

Appendix 1.8 Result of the Breusch-Godfrey LM Test for Model 3

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.794760	Prob. F(1,41)	0.0583
Obs*R-squared	3.727432	Prob. Chi-Square(1)	**0.0535**

Appendix 1.9 Result of the Breusch-Godfrey LM Test for Model 4

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.090053	Prob. F(1,41)	0.3026
Obs*R-squared	1.139517	Prob. Chi-Square(1)	0.2858

Appendix 1.10 Result of the Breusch-Godfrey LM Test for Model 5

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	57.92300	Prob. F(1,41)	0.0000
Obs*R-squared	25.76359	Prob. Chi-Square(1)	0.0000

Appendix 1.11 Result of the ARCH Test for Model 1

Heteroskedasticity Test: ARCH

F-statistic	5.095212	Prob. F(1,41)	0.0294
Obs*R-squared	4.753077	Prob. Chi-Square(1)	**0.0292**

Appendix 1.12 Result of the ARCH Test for Model 2

Heteroskedasticity Test: ARCH

F-statistic	4.384251	Prob. F(1,41)	0.0425
Obs*R-squared	4.153925	Prob. Chi-Square(1)	**0.0415**

Appendix 1.13 Result of the ARCH Test for Model 3

Heteroskedasticity Test: ARCH

F-statistic	1.908007	Prob. F(1,41)	0.1747
Obs*R-squared	1.912098	Prob. Chi-Square(1)	**0.1667**

Appendix 1.14 Result of the ARCH Test for Model 4

Heteroskedasticity Test: ARCH

F-statistic	0.102594	Prob. F(1,41)	0.7504
Obs*R-squared	0.107330	Prob. Chi-Square(1)	**0.7432**

Appendix 1.15 Result of the ARCH Test for Model 5

Heteroskedasticity Test: ARCH

F-statistic	4.544318	Prob. F(1,41)	0.0391
Obs*R-squared	4.290451	Prob. Chi-Square(1)	0.0383

Appendix 1.16 Result of the Ramsey Reset Test for Model 1

Ramsey RESET Test:

F-statistic	3.442055	Prob. F(1,41)	**0.0708**
Log likelihood ratio	3.547022	Prob. Chi-Square(1)	0.0597

Appendix 1.17 Result of the Ramsey Reset Test for Model 2

Ramsey RESET Test:

F-statistic	0.724570	Prob. F(1,41)	**0.3996**
Log likelihood ratio	0.770796	Prob. Chi-Square(1)	0.3800

Appendix 1.18 Result of the Ramsey Reset Test for Model 3

Ramsey RESET Test:

F-statistic	0.443762	Prob. F(1,41)	**0.5090**
Log likelihood ratio	0.473674	Prob. Chi-Square(1)	0.4913

Appendix 1.19 Result of the Ramsey Reset Test for Model 4

Ramsey RESET Test:

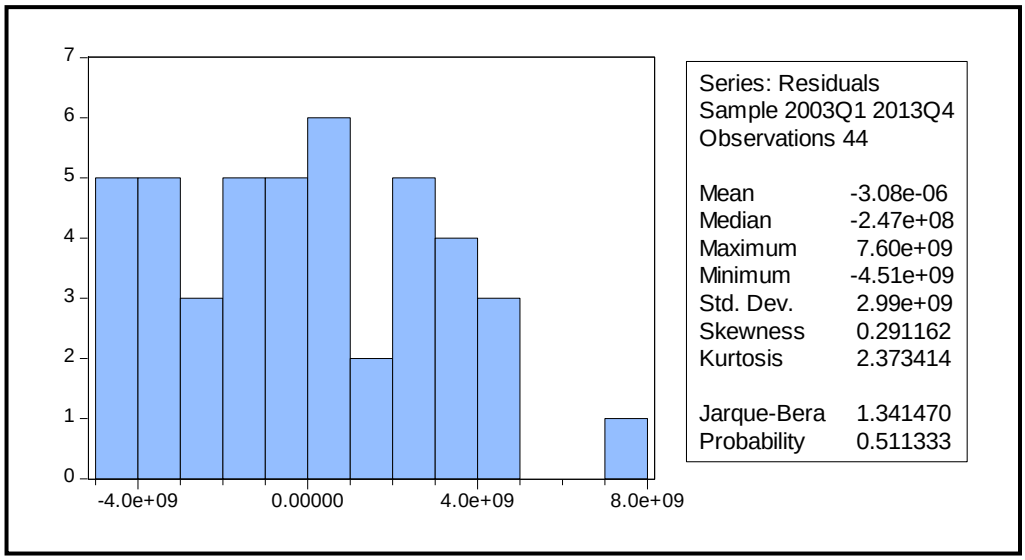
F-statistic	2.583586	Prob. F(1,41)	0.1157
Log likelihood ratio	2.688776	Prob. Chi-Square(1)	0.1011

Appendix 1.20 Result of the Ramsey Reset Test for Model 5

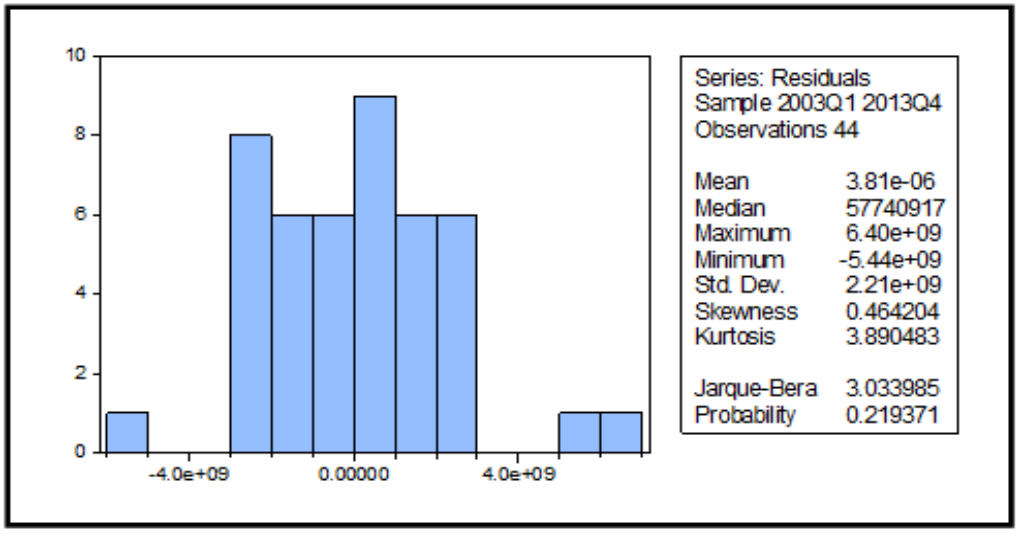
Ramsey RESET Test:

F-statistic	2.726452	Prob. F(1,41)	0.1063
Log likelihood ratio	2.832771	Prob. Chi-Square(1)	0.0924

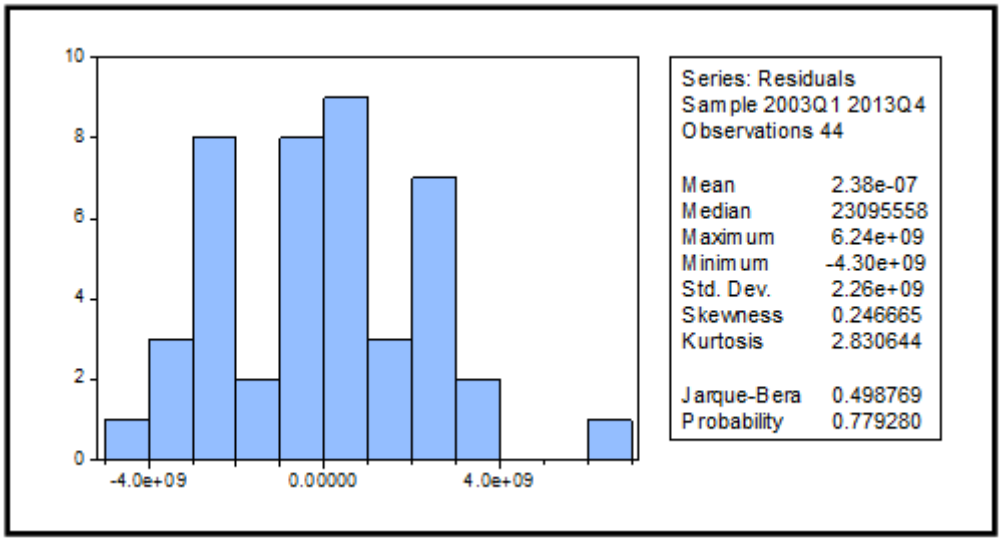
Appendix 1.21 Result of the Jarque-Bera Test for Model 1



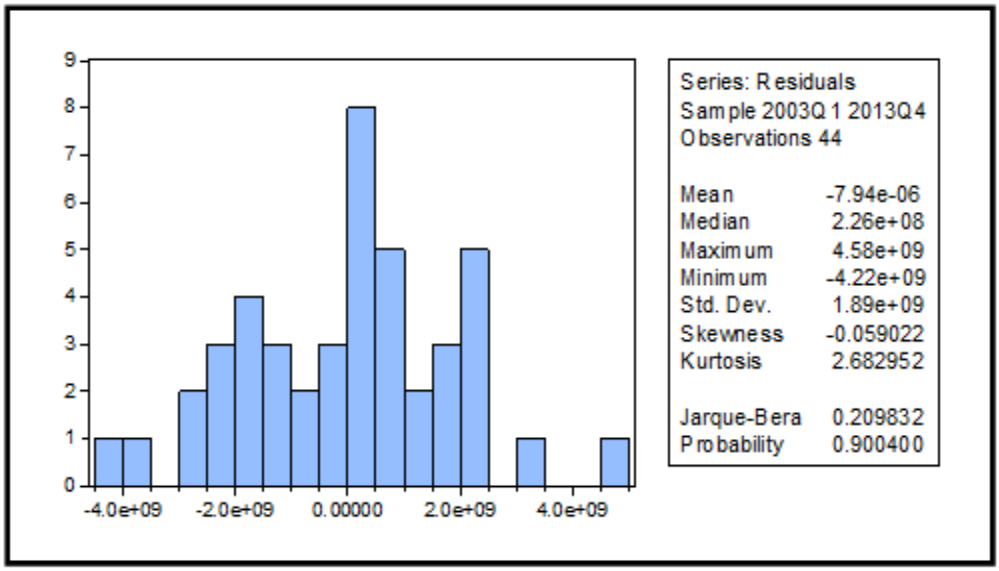
Appendix 1.22 Result of the Jarque-Bera Test for Model 2



Appendix 1.23 Result of the Jarque-Bera Test for Model 3



Appendix 1.24 Result of the Jarque-Bera Test for Model 4



Appendix 1.25 Result of the Jarque-Bera Test for Model 5