DETERMINANTS OF STOCK MARKET VOLATILITY: EVIDENCE FROM MALAYSIA

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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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LIST OF ABBREVIATION

APT	Arbitrage Pricing Theory
ARCH	Autoregressive Conditional Heteroscedasticity
BLUE	Best Linear Unbiased Efficient
CAPM	Capital Asset Pricing Model
CLRM	Classical Linear Regression Model
CPI	Consumer Price Index
EXC	Exchange Rate
FDI	Foreign Direct Investment
FTSE	Financial Times Stock Exchange
GDP	Gross Domestic Production
INT	Interest Rate
IPO	Initial Public Offering
JB	Jarque-Bera
KLCI	Kuala Lumpur Composite Index
KLSE	Kuala Lumpur Stock Exchange
LM Test	Breusch Godfrey Langrange Multiplier Test
MUI	Market Uncertainty Index
OLS	Ordinary Least Square
OPR	Overnight Policy Rate
RESET	Ramsey's Regression Specification Error Test
SC	Security Commission
UK	United Kingdom
US	United States
VIF	Variance Inflating Factor

PREFACE

Market participant are concern with the volatility of stock market. Macroeconomic can determine the stock market fluctuation in the market. By proving the relationship between the macroeconomic variables and the stock market, market participant can interpret and understand the volatility of stock market more accurately and precisely.

Besides that, this research also includes the implication for various market participants that are actively engaging in investment activities in the Malaysia stock market.

This research is intended to establish a significant contribution to those parties who have concerns about Malaysia stock price fluctuations as well as macro financial environment of Malaysia.

ABSTRACT

This paper studied the four macroeconomic determinants of FTSE Kuala Lumpur Composite Index volatility from 1980 to 2013 which consists of annual data of 34 sample sizes. The four macroeconomic variables are inflation rate, interest rate, exchange rate, and gross domestic production (GDP). This study used Ordinary Least Square (OLS) method to compute the statistical result. Based on the result, all the variables are significant except for interest rates. According to the statistical relationships, there are some inconsistencies between the actual and expected outcome for inflation rate and interest rate.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

The main highlight of this chapter is on the backgrounds of this research, problem statements, objectives, hypothesis, as well as the significance of this study. The layouts for the following chapters are also included together with the conclusion for this chapter.

1.1 Research Background

When people talk about stocks, it usually refers to the companies that are listed on the stock exchange all around the world. In 1300s, the Venetians were the first to trade securities with governments by using slates with information for sale and meet clients which act like brokers nowadays. In 1531, Belgium started the first stock exchange- Sans stock exchange, which brokers and moneylenders would meet there to make dealing with notes and bonds which is quite odd. In fact in 1500s, there was no real stock. Then in 1600s France, Britain and the Netherlands chartered voyages to the East Indies, it is very risky as the weather is unpredictable, navigations is poor and there were pirates back in the days. So to lessen the risk, ship owners seek investors to put money for the voyage and they will give part of their revenue to the investors if the voyage was successful. Those are the starting point of investment in stock market and it evolved into electronic stock exchange that we use to make investments in domestic or foreign stock market today.

Based on Capital Markets and Services Act 2007, Kuala Lumpur Stock Exchange (KLSE) is a financial institution which categorized under stock exchange industry in Malaysia. Bursa Malaysia provides various services such as trading, depository

services, clearing and settlement. In fact, it plays an important part in Malaysia's open market for large organization and government to raise capital (Erzen, 1995). KLSE has established sophisticated system to facilitate the computerization of services and process in order to improve the market efficiency and infrastructure in the mid-1990s. On the other hand, the initial public offerings (IPO) and the equity investment have also been reviewed. As a result, some of big privatized companies such as TenagaNasionalBerhad and Telekom Malaysia Berhad were listed on KLSE and led to fast growing in the market. In addition, KLSE and Securities Commission (SC) have work together to improve the transparency of the market, disclosure, accounting and corporate governance. Unfortunately, the degree of conformation is still under the international standard. So, most of the investors are focused on short-term placements instead of long-term. In order to promote long-term investment, the issuers tend to increase the dividend payments (Shimomoto, 1999).

According Asian Institute of Chartered Bankers, the equity market is a place that provides a trading platform for those corporations that wish to raise fund through equity by issuing new stocks on Bursa Malaysia. Equity market can spread into two main sectors. The primary market operates with the objective to raise the new funds for enterprises whereas secondary market is to provideinvestment liquidity for investors to achieve investment goals.

KLCI is calculated based on 86 major Malaysian stocksusingpaasche formula and with 1977 as the base level. In 1995, KLSE has 492 listed companies (Yao &Poh, 1997). The Malaysian stock market was set in year 1986 with 70 constituents and it increased to 100 in 1995. While in 2009, the indices split into two new indices which are FTSE BM KLCI 30 (KLCI) and FTSE BM MID 70 (KLCI 70) (Azevedoet al., 2014). Malaysia's stock market was the fifth biggest share market in terms of market capitalization prior to the Asian financial crisis (Poobalan, 2001).

Walid, Chaker, Masood and Fry (2011) has stated that stock market crash (1987), Mexican currency crisis (1994), Asian currency crisis (1997) and the subprime loan crises (2007 -2008) had been experienced by emerging countries. These

crises have brought big impact to the world as it reduced the confidence of investors which reduced the volume of investments in the stock market. It then influenced corporations as they cannot get the funds that they needed for development of businesses and eventually brought negative impact to the countries' economy.

In the earlier 1990s, Malaysia uses monetary policy strategy to control inflation in Malaysia by adjusting its interest rate. Later, Bank Negara Malaysia (BNM) had implied the Overnight Policy Rate (OPR) as a new framework in April 2004 in order to raise the effectiveness of its monetary policy. It provided a signal to the market on the posture of monetary policy and acts as a target rate for Bank Negara Malaysia's daily liquidity operations (Goh and McNown, 2015). "Malaysia current monetary policy is still providing an essential support to economic growth adequately", said Tan Sri Dr ZetiAkhtar Aziz, Bank Negara Governor (The Star, 2013).

Previous studies have been very useful and provided much important information regarding the field of stock market research. Several studies also studied the relationship between macroeconomic factors and stock market return. Nevertheless, results generated by previous authors are not conclusive. Abrugi (2008) stated that large gap still exist in the identification of relationship between macroeconomic factors and return, especially emerging market. Therefore, this study intends to serve as a bridge to identify any linkage between the selected macroeconomic variables and stock equity market return in Malaysia.

1.2 Problem Statement

Policy makers and many market practitioners have been studying the origins of the equity market fluctuation for long time. The main objective of policy maker is to identify the determinants of equity market and the effects and consequences of manipulating the macroeconomics variable to the country economic while the market practitioners focus on the use of the financial instruments to speculate or

hedge the equity market. Both of the parties have the same objective which is speculating profit and manage the risk exposure in the equity market by using the fundamental analysis on the future outlook of the economic factors. Abugri (2006) stated that there are many theoretical justifications to justify the relationship between macroeconomic factors and stock return. Besides, market participants also paid attention to the news of economic outlook and changes of the country policy. Therefore, large corporation may be put at risk if they are unable to detect or predict any movement in the stock market due to changes or manipulation of macroeconomic factors. In fact, certain risk may also be reduced to a minimal level if the important factors can be taken into consideration and monitor frequently.

Many previous studies have contributed to the literature of this field (Maskay and Chapman, 2007; Cook and Halm, 1988; Tsai, 2012; Feldstien, 1978). Unfortunately, the results of the empirical analysis are still ambiguous due to many factors such as different economy cycle stages, exchange rate policy, currency control policies and etc.

Another inconsistency of findings can also be found regarding the relationship between interest rates and stock market by studies conducted by many authors. Cook and Hahn (1988) reported the public generally agreed that the central bank has the power to manipulate the market interest rate throughinfluencing the fund rate. In other words, the changes in interest rate are significantly correlatedwith the stock market situation. In addition to that, Abugri (2006) found that interest rates in several emerging countries such as Brazil, Argentina and Chile yield negative effects relative to respective equity market, but not in Mexico. However, Abrugi (2006) did not provide clear explanation as to why the interest rate variable is not significant in Mexico.

Last but not least, this study found that there are still insufficient literatures and studies carried out in the aspects of emerging countries. Abrugi (2006) emphasized the existence of large gap in identifying the macroeconomic variables affect equitymarket returns and most of them primary emphasis on the growth of markets rather than emerging markets. In the study of Schwert (1989), Wu and

Lee (2015), Beetsma and Giuliodori (2012) and by Beltratti and Monara (2005), the data used are from DataStream of other countries like USA and UK. Therefore, the result from their researches might not be consistent with the findings in this study. Yet, it is still important to carry out this study because Aitken (1996) argued that investors may fail to seize the available arbitrage opportunities if investor lack of knowledge and not understanding local policy of a specific country's characteristics and treat them all the same. Therefore, this study intends to address the problems above by conducting a research to identify any linkage between the selected macroeconomic variables and the equity market, specifically in Malaysia.

1.3 Research Objectives

1.3.1 General Objective

This study intends to examine various macroeconomic factors influencing the stock market return particularly in Malaysia. In addition to that, this study also intends to identify which factor contributes the most to stock market fluctuations. However, most importantly, this study's primary goal is to study the impact and relationship between the selected macroeconomic variables and movement in Malaysian stock market movement.

1.3.2 Specific Objectives

1) To analyze the relationship between inflation rate and Malaysian stock price movement.
2) To analyze the relationship between interest rate and Malaysian stock price movement.

3) To analyze the relationship between gross domestic production growth rate and Malaysian stock price movement.
4) To analyze the relationship between exchange rate and Malaysian stock price movement.
5) To analyze the impact of interest rate, exchange rate, gross domestic production growth rate and exchange rate on Malaysian stock price movement as a whole.

1.4 Research Questions

1) Are there any significant relationship between gross domestic production growth rate and volatility of stock market?

2) Are there any significant relationship between interest rate and volatility of stock market?

3) Are there any significant relationship between inflation rate and volatility of stock market?

4) Are there any significant relationship between exchange rate and volatility of stock market?

5) Can the stock market volatility be explained by growth domestic production growth rate, exchange rate, inflation rate and interest rate as a whole?

1.5 Hypothesis of the study

H0 = Therelationship between gross domestic production growth rate and volatility of stock price is not significant.

H1 = The relationship between gross domestic production growth rate and volatility of stock price is significant.

H0 = Therelationship between interest rate and volatility of stock price is not significant.
H1 = The relationship between interest rate and volatility of stock price is significant.

H0 = The relationship between inflation rate and volatility of stock price is not significant.
H1 = The relationship between inflation rate and volatility of stock price is significant.

H0 = The relationship between exchange rate and volatility of stock price is not significant.
H1= The relationship between exchange rate and volatility of stock price is significant.

1.6 Significance of Study

This study analyzes the relationship between independent variables (exchange rate, consumer price index, interest rate and gross domestic production) and dependent variable (stock market index), whether the relationship is positive or negative and what is the changes of dependent variable when there are changes in independent variables with the use of data from 1980 to 2013. Azevedo, Karim, Gregoriou and Rhodes (2013) stated that for the past decade, Malaysia is one of the leaders in Asian emerging market which accompanied by notable growth and many analysts used Malaysia KLCI to evaluate the economic view not only for Malaysian economy but also other economies in the Asian market. This is because Malaysia has been recognized internationally by Asia pacific region as one of the top benchmarks for equity markets.By conducting this study, it would be able to help investors to avoid stock market crashes as investors will be clear whether these

independent variables would bring positive or negative relationship to the stock market and how much changes would it bring to the stock market. This will act as an indicator for investors and to prevent stock market crashes.

This study can also provide policy makers and investor with more insight how Malaysia stock market will react to the independent variables because most of the studies conducted by other researches focus mainly on developed countries for instances United States and United Kingdom but do not focus on emerging countries like Thailand and Malaysia. For example, Walid, Chaker, Masood and Fry (2011) stated that very little research has been made on emerging market and most of the empirical investigation has focused on developed market when examining the linkage between changes of foreign exchange rate and volatility of stock market. By conducting this study, it could provide policy makers and investors with a higher level of understanding on the performance of stock market and the factors that make the stock market to be volatile in emerging markets because Malaysia is one of the best references in Asia- pacific market.

Although many studies have been conducted to examine how macroeconomic variables affect stock market, the results are not consistent. Some researchers found that the variable will have positive relationship but some researchers found that it has negative relationship with the dependent variable. Some researches even found that there is no relationship between some of themacroeconomic variables and stock market. This study would provide clearer view of Malaysia stock market by trying to investigate the relationship and changes between dependent and independent variables.

1.7 Chapter Layout

1.7.1 Chapter 1

This chapter covers a brief overview, which begin with an introduction and followed by research background.This chapter also includes problem

statement as well as the objectives and hypothesis of this study. Lastly, significance of the study is discussed following and a conclusion.

1.7.2 Chapter 2

This chapter describes the literature review on previous research paper which related to our topic. For instances, the dependent variables (KLCI's stock index) and few macroeconomic factors as independent variables (inflation rates, interest rates, gross domestic production growth rate, and exchange rates). The review of literature consists of sample period, significance relationship, methodologies, findings, and implications. Nevertheless, this chapter also contained the relevant theoretical models or theories regarding to each of the variables.

1.7.3 Chapter 3

Chapter 3 mainly presents the research methodology as well as the data collections. Specifically, this chapter explains the structure of research designs, including the type of econometrics model and the way for data collection.

1.7.4 Chapter 4

Chapter 4 provides the empirical findings with result analysis. In details, this chapter discussed about the decision making and conclusion for each of the test (multicollinearity, heteroscedasticity, autocorrelation, model specification bias, and error-term normality test) as well as providing the remedial for problem solving, if any.

1.7.5 Chapter 5

Last but not least, this chapter concludes every highlight in this paper by outlining the discussion, conclusion and implications of this research paper. Statistical analysis, major findings, limitation as well as suggestions for future research will be summarized in this chapter.

1.8 Conclusion

The research background and brief history of the stock market and Malaysia have been discussed following the problem statement. Besides, the objectives and significance of this study were also clearly addressed. Lastly, hypothesis of this study were clearly stated out above.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Findings regarding the linkage between the selected macroeconomic variables by previous studies will be discussed in detail in this chapter to provide a better understanding on the current status of the research in this field. The variables being discussed are stock prices, interest rates, exchange rates and inflation rate. Relevant theories are also being discussed.

2.1 Literature Review

2.1.1 Stock Index

There are numerous previous research studies about the relationship between the macroeconomics variable and stock index. In the study of Schwert (1989), he discovered that the direction of causality between volatility of return and macroeconomic variables is not consistent but significant. The extend study of Schwert (1989) was carry out by Beltratti and Monara (2005), they confirmed the relationship of the macroeconomic variable and stock index volatility. Furthermore, they used updated data to test the new empirical model. They studied the relationship between the volatility of some macroeconomic factors and S&P500 index returns volatility and found that the causality from volatility of macroeconomic to stock market is stronger. The influence of stock market volatility on macroeconomic volatility is not much. (Beltratti and Monara,2005).

While, Beetsma and Giuliodori (2012) found the macroeconomic change overtime in order to respond to equity market volatility impact. Their result show the pattern of US macroeconomic has changed due to the

volatility of market. The negative response of GDP growth to those effects has become smaller and smaller. The consumption growth which has a negative response has disappeared. The response of investment development which is negative stays the same. Furthermore, the volatility of equity market has become more important when dealing with investment in highly volatile world. (Beetsma and Gioliodori,2012).

There are a group of study support that macroeconomic variable might use as indicator to predict the volatility of future index movement. According to Wu and Lee (2015), macroeconomic variable act as indicators of stock market and may affect future consumption and investment opportunities. Hence, they play an important role in determining asset prices.

Among the macroeconomic variables, term spread and inflation have the strongest predictability of a bearish market. Hence it shows the significance and predictability of macroeconomic variable to stock index volatility.Similar research has been conduct by Rapach, Wohar and Rangvid (2004). They highlight the predictability of the relationship of macroeconomic variable and stock index volatility in the international level, they used cross-border data to run their model. They investigate the predictability of equity returns using macroeconomic variables in twelve industrialized countries. The result shows among all the macro variables, interest rate appears to be the most predictable macro variables. The finding was the same withWu and Lee (2004) which interest rate has strongest predictability among other macroeconomic variables.

The stock market of Malaysia was the fifth biggest market in Asia in terms of capitalization before the Asian financial crisis (Corradi, Distaso and Mele,2013).Their result indicates thatmacroeconomic factors can explain approximate 75% of the changes stock market variation. In addition, some of the components that are yet to be observed may affect the volatility of the stock consistent with rational asset valuation.

A study by Dopke,Pierdzioch and Hartmann(2008) shows two significances. For those investors who act in real time, they can actually use real-time macroeconomics data to forecast the volatility of the stock market. Secondly, for those researchers who ex post analyze financial and macroeconomics data, the result indicates that they can apply revised macroeconomics data to study the equilibrium relation between volatility of stock market and macroeconomics variables

The Malaysian equity market is one of developing markets with significant development in the last 20 year and KLCI is recognized as one of the outstanding references for not only Asian countries but also in Malaysia (Azevedoetc al, 2014). Rahman, Sidek and Tafri (2009) investigate the linkages between macroeconomic variables and stock market index in Malaysia and found that industrial production, money supply, exchange rate and reserves have linkage with KLCI. On the other hand, Ibrahim and Aziz (2003) examine stock price and four macroeconomic variables' co-integration and result shows that relationships exist among those variables.

2.1.2 Interest rate

Flannery and James (1984), Sweeney and Warga (1986), Choi, Elyasiani and Kopecky(1992), Elyasiani and Mansur (1998) and Reilly, Wright and Johnson (2007) examine the ex- post linkages between interest rate variation and changes in price of stock and stated that the proportionate change in equity's market value of firms is due to alteration in interest rate, supporting the notion that interest rate significantly affects stock market.There are two ways that interest rate will have impacts on stock prices which are the impact on present value of future cash flow of a firm and it will also affect the expectations of firms toward future cash flows. First, the discount rate used in equity valuation will directly be affected by the movements in interest rates. Second, changes in interest rate will have impact on firm's expectations about future cash flows by changing the cost

of financing mostly in debt oriented companies (Moya-Martinez, Ferrer-Lapena and Escribano-Scotos, 2014).

The finding of Moya- Martinez et al. (2014) also supported by Bernanke and Kuttner (2005). There are three possible linkages between alteration in interest rates and stock return.Bernanke and Kuttner (2005) stated that, the discounted cash flows and future dividend for shareholders will be lowered as a rise in interest rate will increase the interest expenses of a firm. Second, the value of future nominal cash flows to shareholders will be lesser because changes in interest rate could indicate that real interest rate is expected to rise. Third, investors move out their funds from stock to other investment instruments either because of effect of portfolio rebalancing or increase in financing cost when tight monetary policy is implemented.

Theoretically, the impact of interest rate on stock market performance is unfavourable. As stated by the flight-to-quality behaviour theory, an increase in interest rates will stimulate investors to buy fixed income deposits such as certificates of deposits, bond and Treasury bill because the risk of investments in stock market is higher but investment in fixed income securities risk is lower when there is a rise in interest rate (French, Schwert and Stambaugh, 1987).When the interest rate is higher, the interest rate for fixed income securities will also be higher and normally fixed income securities has lower risks as the monthly income which is coupon payment is known and company may get into law suits if they do not meet their obligations. Investors will invest more in fixed income securities and reduce their investment in stock market because of the risks that will face and the return that they will receive. It is clear that when interest rate is higher, stock prices is lower as demand for stock will be lowered thus the relationship between rate of interest and stock market is negative. However, whether this theory is applicable in Malaysia is still debatable as the bond market in Malaysia is not as developed as other countries.

Moya-Martinez et al. (2014) found that the Spanish firms can benefit from interest rate falls. This is because reduction in long term interest rate will lead to reduction of borrowing cost for companies thus the profits of a company will increase and equity stock price will increase because demand of the company's stock will increase as investors mainly focus on profit of a company. This result implies that the relationship between rate of interest and index of stock market is negative. Korkeamaki (2011) also found that interest rate is a significant factor and it has negative influence on stock returns.

By investigating fifteen countries, Mahmudul and Gazi (2009) found that only six countries have negative and significant relationship with share price variation, which are Malaysia, Japan, Bangladesh, Columbia, Italy and South Africa. On the other hand, Abugri (2006) found that interest rate negatively affect the stock market return in Brazil, Argentina and Chile because the cost of capital increases as interest rate increase.

According to Alam and Uddin (2009), the consequences of interest rate on stock market indicate a crucial implication for monitoring policy, risk management and financial securities valuation. They used the sample from 1988 to 2003 and the data of interest and stock index of 15 developed countries and found that the linkages between rate of interest and price of share in all countries are negative and significant. All these findings show that relationship between index of stock and rate of interest is negative and it significantly affects stock index.

2.1.3 Exchange rate

Based on Phylaktis and Ravazzolo (2005) studies, result shows that is it essential to apply exchange rate policies because foreign exchange market and stock market are closely correlated. The authors also provided various results but only few are significant to our research area, which was the

author has suggested that the stock market of U.S and the real exchange rates are positively related, and the stock market of U.S is clarified as a crucial variable because it acts as a channel for the linkage between foreign exchange market and the local markets (Phylaktis and Ravazzolo, 2005).

Aggrawal (1981) reveals the relationships of exchange rates towards stock prices of U.S are found to be positively correlated by using floating rate basis, which means that an increase in the value of U.S dollar would lead to a hoist in stock prices, vice versa. The author also emphasize that the U.S stock market prices are more correlated with the value of the U.S Dollar, instead of prediction by U.S capital market.

Aggrawal (1981) also mentioned that the changes within the exchange rate not only directly influence the multinational and export oriented firms share price, yet it may also indirectly affect the domestic firms. For a multinational firm, the change of exchange rates will immediately influences the value of its foreign operations and continuously affects the profitability of the firm. Domestic firms are also influenced by the change of exchange rates, since they still may import their input and export their output.

Last but not least, Richards, Simpson and Evans (2009) study the relationship between prices of stock and rate of exchange in Australia and result shows the linkages are positive. This is proved when the value of stock market increased by approximately sixty-seven percent while the Australian currency value appreciated by almost thirty-three percent.

On the other hand, based on Tsai (2012) research, the author had collected a data from six Asian countries to study the linkages between index of stock and exchange rate. The result shows a fascinating pattern of this relationship, which is negatively correlated, when the currency are awfully either high or low.In other country,Rjoub (2012)has examined the linkages between Turkish exchange rates and stock prices based on a floating rate

basis. The result shows the impact on Turkish stock market is negative, which indicates that a decline value of Turkish lira is expected to arouse domestic economic activity. However, the depreciation of Turkish lira may help the economy, but it will not overcome the trade problem.

By investigating the linkages between the Islamic stock market and the macroeconomic variables, Ibrahim and Aziz (2003) have concluded that foreign exchange rate and Islamic stock market is negatively correlated. These findings also found to be the same as the stock market data from Kuala Lumpur Composite Index (KLCI), which is long-term equal relationship with a set of almost similar macroeconomic variables.

2.1.4 Inflation rate

This study uses consumer price index in Malaysia as a measurement for inflation rate. Based on previous studies, most authors concluded that inflation rate deemed to have a significant negative impact and relationship on the country's growth as well as the stock market (Yang and Doong, 2004; Apergis, 2003; Abugri, 2008; Emara, 2012). For example, Yang and Doong (2004) claim that a higher domestic inflation rate may lead to depreciation of home country's currency. Therefore, encourages foreign investors to withdraw or reduce their portfolio investment and leading to falls in stock markets. In other words, high inflation rate reduces investors return and therefore influencing investor behaviour. Thus, high inflation rate negatively affect the stock market by creating high uncertainty. This finding is further supported by Abrugi (2006) who stated that the effects of inflation are accompanied by high money supply. He claims that high money supply will lead to high inflation which is followed by higher uncertainty in the market and low returns for investors in the stock markets. Apergis (2003) did not clearly state that higher inflation leads to negative impact on the stock market. However, he did clearly mentioned that a

country's output will be negatively affected by higher inflation due to inefficiencies in resources.

In addition to that, other researchers such as Okun (1978) and Friedman (1968) have contributed to the literature of the cost of inflation. However, none of them uses stock price to measure the impact of disinflation. Fortunately, Henry (2002) studied the cost-and-benefit analysis of a country's attempt in stabilizing inflation by simply analyzing the stock market responses after a disinflationary announcement being made. He found that the coefficient for "high inflation" is significant at 1 percent. In other words, the stock markets in countries with high inflation rate experienced an increase in real dollar term after government announced that stabilizing high inflation measures to be taken. On the contrary, coefficient for "Moderate inflation" and "low inflation" are insignificant, meaning there is no significant responses from the stock markets in countries with relatively low inflation rate when government announced to stabilize inflation.

As opposed to the findings above, some authors argued that stock markets may be a good hedge against inflation in countries other than U.S. According to Fisher effect hypothesis, stock market returns typically includes real rate of return and expected rate of inflation, and these two rates are independent from each other (Firth, 1979). This means that there should be a positive linkage between return of stock market and inflation if investors in the stock market were to be compensated for the dropping purchasing power. Gultekin (1983) results showed strong positive linkage between return of stock market and expected rates of inflation. This backs the Fisher Effect hypothesis mentioned earlier. Besides, he also found that nominal stock market returns has a one-to-one responses with expected inflation.

Similar findings by Firth (1979) also supported the Fisher Effect hypothesis, claiming that the stock market return responded positively to the expected inflation rate in U.K. Both, Firth (1979) and Gultekin (1983)

also found that the inflationary coefficient were greater than unity. In order words, investors in the stock market were overly compensated for the expected inflation rate.

In this study, inflation is expected to affect the stock market return negatively taking into account the rising price level of goods and the depreciating Ringgit Malaysia currency. The expected sign for consumer price index estimates (CPI) in Chapter 3 is negative, supporting researchers such as Abrugi (2006), Henry (2002) and Yang and Doong (2004). Therefore, predicting that Malaysia's stock market is not a good hedge against inflation for investors.

2.1.5 Gross domestic production growth rate

Based on previous studies, most researchers agree that GDP positively affects the stock market and it is an important variable that affects the stock market (Gan et al., 2006). Their findings showed GDP is positively related to the expected stock return because stock index captures the effect of GDP growth. Similar findings by Maysami and Koh(2000) whom argued that any movement in production level should affect the stock market due to the impact of changes in expected dividends. Moreover, Ang and McKibbin (2005) claimed that economic growth may stimulate demand for more financial services and hence the financial system will grow in response to economic expansion reflected in the stock market performance.

On the other hand, other authors argued that the relationship between GDP and stock market is bi-directional instead of unilateral (Lewis, 1955;Arestis andDemetriades, 1997). Lewis (1955) stated that economic growth facilitates the creation and development of financial markets in which further promotes economic growth, thus proving a two way relationship between financial development and economic growth. The

argument is that the relationship between GDP and stock market are both demand-following and supply-following. Demand-following means that demand for financial service increases when there is economic growth hence stipulate stock market performance, which is supported by Ang and McKibbin (2005), Asgharian et al. (2015). Supply-following means that the creation of financial market induces economic growth. This is supported by Arestis and Demetriades (1997) whom explained that a holistic and complete financial market can stimulate the GDP growth of the country, specifically it increase equity market capitalism which will result a positive impact to the stock index.

Liang and Teng (2006) found that the creation and development of financial does not stipulate economic growth in the long-run and should be the other way round, supporting findings of Robinson (1952) whom claimed that finance does not exert a causal impact on growth and insisted that financial development is an outcome of economic growth.

In addition to the literature on relationship between stock market and economy condition, Asgharian, Christiansen and Hou (2015) studied the effects of macroeconomic uncertainty on stock market and bond market volatility. Results showed that the stock market tends to move in an opposite direction from the macroeconomic uncertainty index while the bond market tends to move in the same direction with the macroeconomic uncertainty index. This finding can be explained using the flight-to-quality behaviour theory. Besides, this indicates a negative relationship between economy uncertainty and stock market performance whereas the bond market is positively related to the uncertainty of the economy. In addition to his study, they claimed that GDP growth rate and macroeconomic uncertainty index has only low correlation. Hence, GDP growth rate does not reflect information regarding market uncertainty. Furthermore, they found that the stock market respond to GDP growth rate positively. In fact, the volatility of stock market increases as GDP growth rate increases. Therefore, this finding supports the notion that GDP growth rate affects the stock market volatility in a positive direction.

Lastly, Ngare, Nyamongo and Misati (2014) found thateconomic growth does not affect stock market return.Nevertheless, majority studies support the notion that GDP growth rate affects the stock market volatility in a positive direction as Fama (1981) claimed that there is significant prove that stock returns are positively and significantly related to production index which reflects the real economic.

2.2 Review of Relevant Theories

2.2.1 Stock Price

2.2.1.1 Arbitrage pricing theory

Stephen Ross established Arbitrage pricing theory in 1976, it is an asset pricing model which stated that asset return can be predicted by usingthe linear combination of return on an asset or portfolio and many independent macroeconomic variables for example inflation rate and industrial production. The APT is a good alternative of CAPM model because it agrees faultlessly with the intuition of CAPM model (Roll & Ross, 1980). Unlike the CAPM model, APT takes multi and single period cases into consideration and it does not require the market portfolio mean variance to be efficient. APT uses risky assets return and risk premium of the macroeconomic factors whereas CAPM model require expected market return.There are three assumptions in APT: arbitrage opportunities are not allowed in the market, a factor structure can model an assets returns and risk can be eliminated by diversifying the portfolio (Kelsey and Yalcin, 2007).

2.2.2 Interest Rate

2.2.2.1Dividend-Discount Valuation Model

Dividend- discount valuation modelis used to predict the dividends of stock and discount the dividend back to present value. This will allow investors to value a stock and compare the value price with the market price. The most common used model is Gordon Growth Model which established by Myron J. Gordon in 1956.Foerster and Sapp (2011) found that the simple Gordon Growth Model performs better than other more sophisticated valuation model. When the growth rate in dividends remain the same in perpetuity, it is suitable to use Gordon Growth Model to determine the value of preferred stock.

$$P = \frac{D1}{(K-G)}$$

Where:

P= Value of stock

D1= Dividend per share one year from now

K= Required rate of return for investors

G= Growth rate in dividends

To value a stock, especially common stock, which does not have constant growth rate, we could use multistage growth model,

$$P=\frac{D1}{(1+k)^1}+\frac{D2}{(1+k)^2}+\cdots+\frac{Dn}{(1+k)^n}$$

Where:

P= Value of stock

D1= dividend growth rate, year 1

D2= Dividend growth rate, year 2

D_n= Dividend growth rate thereafter

K= Required rate of return

n= no. of year

Intrinsic value of a stock can be determined by using dividend discount valuation model. The stock is undervalued when underlying value is lesser than market value while the stock is overvalued when underlying value is greater than market value. The interest rate will have impact on stock price as when interest rate increases, the stock price will be decreased.
Dividend discount valuation is important when computing stock market index. It is used to determine a company's present value of the share price, which is essential to compute the market capitalization and determine the current stock market index. The stock market index can be computed by weighted average market capitalization.

Step 1: Compute the market capitalization by taking the outstanding shares of each company and multiply the current price of the company that composed in the index.

Step 2: After getting all the market capitalization, sum it up to get the total market capitalization and use it to compute the index weight or market weight. The market weight of each company can be computed by dividing the market capitalization of a company by the total market capitalization.

Current price of the stock market is important when determining stock market index of a country. When there arechanges in prices of share of the company composed in the index, the index of stock market will react to the changes of the underlying stock price. When the stock price of a company increases, the stock market index will also increases, vice versa.

2.2.3 Exchange Rate

2.2.3.1 The classical economic theory (traditional approach and portfolio approach)

Recently, the linkage among stock index and exchange rates has drawn many attentions of researcher and policy makers. Based on Rjoub (2012)

studies, the author has showed some theoretical economic model which relevant to the linkage between exchange rates and index of stock in literature, which is the classical economic theory. Literally, it classified into two approaches, such as traditional approach and portfolio approach.

According to Dornbusch and Fischer (1980), the traditional approach is mainly focus on how the flow of current account will have an effect on the trade balance position and subsequently react to real income and country's output, which eventually affect the cash flow of companies as well as the stock prices. For examples, a decline of domestic currency value will affects the local firm become more competitive, leading to a rise in export as well as higher stock prices.

Whereas, the portfolio oriented approach view exchange rate as equity like demand and supply of assets such as stocks and bonds. In detail, portfolio approach stated that exchange rates are usually indicated by the market mechanism; show that exchange rate and stock prices are negatively correlated.

Yau and Nieh (2006) explained that traditional approach is more feasible compared to portfolio approach in long-run, like in the Taiwanese financial market. Conversely, portfolio approach is more supported for short-term like in the Japanese stock market.

2.2.3.2Good market theory

Basically, the good market theory explained that the fluctuation of exchange rate will typically influences the stock market volatility due to consequences on international competitiveness. According to Staf and Farthi (2013), the changes of exchange rate will affect the profitability of an exporter as the differences in relative to price of goods and services which eventually will be reflected in stock prices. Moreover, an income or expenses of a particular company with any international transaction, such

as import and export will be also affected by the fluctuation of exchange rates, and subsequently be reflected in the changes on particular company's stock prices.

Within this relevant international trade theory, Aggarwal (1981) investigated the linkage among the U.S stock prices and exchange rate by using a sample period of four years with monthly compounded, range from 1974 to 1978 and eventually found that trade-weighted exchange rate (in dollar) and stock prices is positively correlated, which is, a change in exchange rate also can contribute a profit or loss to the balance of payment of a particular country, which involved a transaction of multinational companies as well as affects their stock prices.

2.2.4 Inflation Rate

2.2.4.1 Fisher Effect Hypothesis

The Fisher Effect Hypothesis is a theory developed by an economist Irving Fisher. This theory states that stock market returns typically includes real rate of return and expected rate of inflation, and these two rates are independent from each other (Firth, 1979). This finding is further supported by Woodward (1992), claiming that the real rates are affected by other factors and are independent and unaffected by the inflation rate. In fact, the nominal rate is expected to have a one-for-one movement with the inflation rate. In other words, investors in stock market should be compensated by the increasing inflation through the increase in nominal rate of return.

Several studies proved that investors are well compensated in the stock market as the nominal return move together with the inflation rate (Firth, 1979 andGultekin, 1983). In fact, Gultekin (1983) claimed that investors are more than well compensated because the movement nominal return

exceeds the expected inflation. As opposed to these findings, Abrugi (2006), Henry (2002), Carmichael (1985) & Yang and Doong (2004) argued that the Fisher Effect Theory does not hold.

2.2.5 Gross domestic production growth rate

2.2.5.1 The Flight-to-Quality behaviour Theory

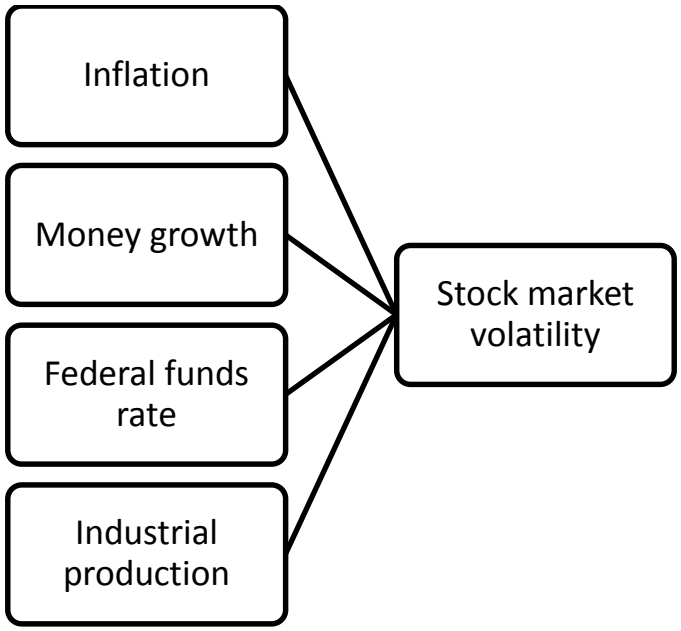
According to this theory, investors in the stock market react negatively towards a dropping GDP performance. For example, the transfer of investment from high-risk investment such as stocks to low-risk investment such as bonds. Arestis and Demetriades (1997) have proven this theory in their research by analyzing the effects of economy uncertainty towards the stock market. By using Market Uncertainty Index (MUI) as a proxy of the stability of economy, they found that bond market acts as a substitute of stock market for investors when the MUI is high. In other words, this theory states that money flows from high-risk investment to high-quality investment as market uncertainty increases. This theory serves as a foundation for this study to analyze how GDP growth rate affect the stock market return in Malaysia. This theory may not be applicable in Malaysia because the bond market in Malaysia is not well developed yet. However, Malaysia is experiencing a huge growth in the sukuk Islamic bond market and is rated as the largest issuer (Kit, n.d.).

2.2.6 Relevant Theoretical Framework

Schwert (1989) investigated the stock market volatility which involved macroeconomic variables volatility such as inflation, money growth, federal fund rate and industrial production. The author also found that the direction of causality between volatility of return and macroeconomic variables is not consistent but significant, proving that there is linkage

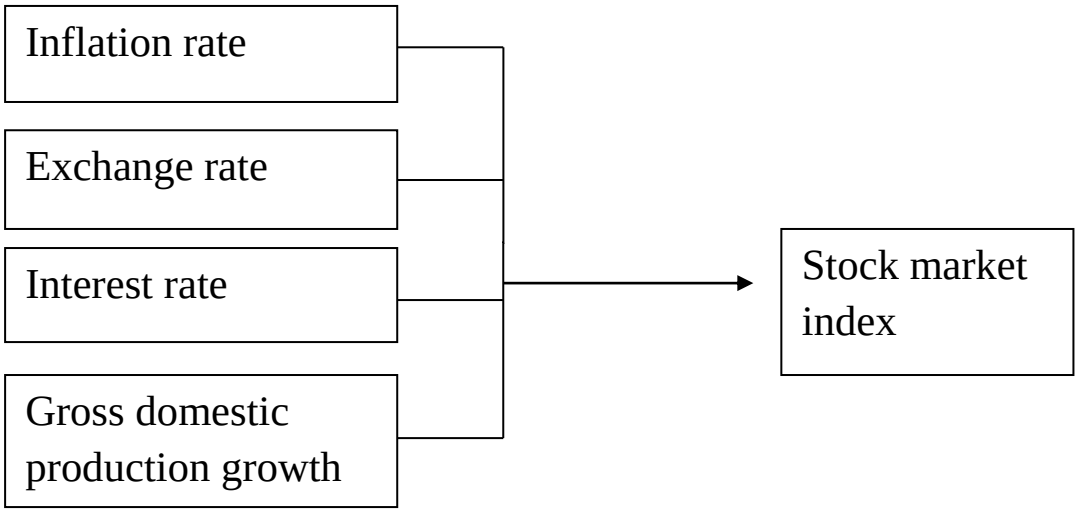
between macroeconomic variables and stock market volatility. The theoretical framework implemented by Schwert (1989) is shown as below:

Figure 2.1 Theoretical Framework By Schwert (1989)



2.3 Proposed Theoretical Framework

Figure 2.2Proposed Theoretical Framework



The proposed theoretical framework for this research is shown above and adapted partially from Schwert (1989), excluding money growth, including exchange rate.

CHAPTER 3: METHODOLOGY

3.0 Introduction

The main objective of chapter 3 is to exhibit the methodology of this study in a structured and well-organized manner. Necessary data are collected through the data collection method discussed in this section following the data processing procedures and econometric model and methods applied. This chapter mainly consists of the following part: 1) research design, 2) data collection method, 3) data processing procedures, 4) econometric models and econometric methods.

3.1 Research Design

This research purely uses quantitative data. This research includes one dependent variable and four macroeconomics variables as independent variables. There are four independent variables which are interest rates, exchange rate, inflation rate and gross domestic production. A total of 34 observations used in this research which is from 1980 to 2013. EViews 6 software has been applied as the method to determine the relationship between the stock price and the four macroeconomic variables.

3.2 Data Collection Method

This study focuses on secondary data. This research employed time series data which extracted from the same database which is Datastream database.

3.2.1 Secondary Data

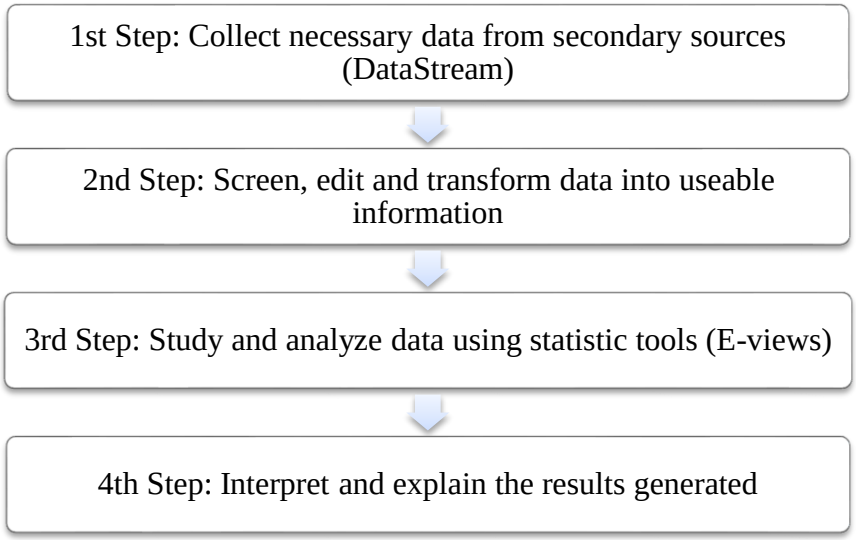
This study uses time series data which consist of 34 observations from 1980 to 2013. The dependent variable is FTSE Bursa Malaysia Index. The four independent variables are interest rate, exchange rate, consumer price index (CPI) and gross domestic production (GDP) growth rate.

Table 3.1 Data Sources

Variable	**Proxy**	**Unit measurement**	**Description**	**Sources**
Stock market index	KLCI	Index	Stock market index in Malaysia	Datastream
Interest rate	INT	Percentage (%)	Government securities, Treasury bill rate (3 months)	Datasttream
Exchange rate	EXC	Index	Exchange rate of Malaysia Ringgit (Base rate 2010=100)	Datastream
Consumer price index	CPI	Index	Consumer price index are used as indicator of inflation rate in Malaysia (Base rate 2010=100)	Datastream
Gross domestic production growth rate	GDP	Percentage (%)	Malaysia GDP annual growth rate	Datastream

3.3 Data Processing Procedures

Figure 3.1 Illustration of Data Processing



In this study, data processing comprises four steps. Firstly, relevant data will be collected from secondary sources (DataStream). Next, the collected data will be filtered and rearranged. Then, the data are edited and transformed into useable form by using statistical tool (E-views). The transformed data are then being studied and analyzed using statistic tool. Finally, the results generated are ready for interpretation.

3.4 Econometric Regression Model

Econometric Function

KLCI= f (Interest rate, Inflation rate, GDP growth, Exchange rate)

Expected sign for the selected independent variables

Interest rate: negative

Inflation rate: negative

Gross domestic production growth rate: positive

Exchange rate: positive

Econometric Model

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3 + \hat{\beta}_4 X_4$$

$$\hat{Y} = -2727.48 + 23.74633\, X_1 + 28.97065\, X_2 + 20.93754 X_3 + 10.70877 X_4$$

Dependent variable, $\hat{Y}$: Stock price

Independent variable, X_1: Interest rate

X_2: Inflation rate

X_3: Gross domestic production growth rate

X_4: Exchange rate

3.5 Econometric Method and Data Analysis

3.5.1 Introduction to Eviews 6

Eviews 6 is a convenient and user friendly tool targeted for econometric analysis, forecasting and statistics purposes. Without Eview-6, it might be perplex for researcher to carry out analysis based on their objectives respective. Able to employ a wide range of statistical and graphical techniques, allow analyzing datasets whose size is limited by available computer memory and complexity issue avoided are the advantages provided by Eview 6. This study intends to use less complicated tools and functions offered by Eviews 6. This study uses Eviews 6 to run a number of tests including Ordinary Least Square method, Multicollinearity correlation table, Heteroscedasticity (ARCH) test, Autocorrelation (White) test, Ramsey-RESET test, Jarque-Bera normality test (JB test), t-statistics hypothesis test (T-test) and F-statistics overall fitness test (F-test). This study uses all statistical functions available from Eviews 6 software that is accessed through the library service in University Tunku Abdul Rahman.

3.5.2 P-value

P-value is used when performing a hypothesis testing in an analysis or statistics. Hypothesis tests are basically used to test whether the claim about a population is valid. Hence, P-value helps to determine the significance of the results. There are two hypothesis for the claim, which called the null hypothesis and alternative hypothesis. Null hypothesis is the claim that is on trial, whereas the alternative hypothesis is the one that believe to conclude the null hypothesis to be untrue. How to interpret?

- When the p-value is not more the α (significance level assume = 0.05), it points to strong evidence against the null hypothesis, thus, reject null hypothesis.
- When the p-value is more than the α (significance level assume = 0.05), it points to weak evidence against the null hypothesis, thus, do not reject null hypothesis.

Therefore, p-value allows the readers to draw their own conclusion.

3.5.3 T-statistic hypothesis test

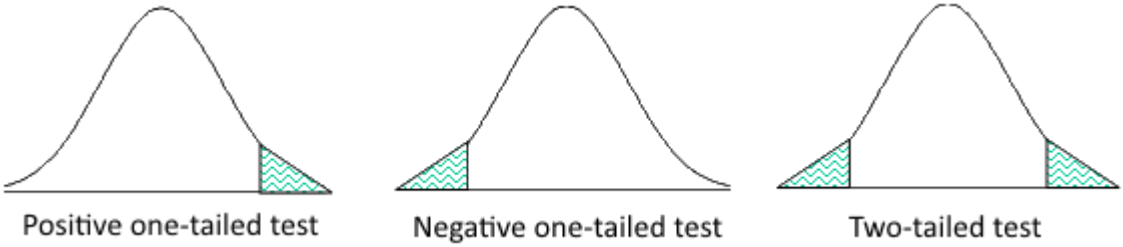
T-test helps researcher to compare whether two groups have dissimilar average values. In layman's term, whether male and female have different average score during an exam. The differences between these two groups happened due to the random probability in the selection of sample. It is considered to be more accurate and actual if the variances between the mean is bigger, as well as the sample size, and low standard deviation.

The main output of t-test is the t-test's statistical significance, which determines whether the variation between the sample averages is close to the real variation between the populations.

Figure 3.2 Normal Distribution Curve

$$NullHypothesis: H_0: \mu = \mu_0$$

$$AlternateHypothesis: H_1: \mu > \mu_0$$



- Reject the null hypothesis if F-statistic value is larger than the critical value at a specific α (significance level assume = 0.05).
- Reject the null hypothesis if F-statistic value is lower than the critical value at a specific α (significance level assume = 0.05).
- For two-tailed test, reject the null hypothesis if t-statistic value is larger than the upper critical value, or less than lower critical value at a specific significance level (assume = 0.05). Otherwise, do not reject null hypothesis.

F-test

F-test is different from T-test, where it is a statistical test which used to indicate whether the normal distribution is having the similar variances or standard deviation between two populations. In other word, the result will tell whether the model is significance. It is an essential part for Analysis of Variance (ANOVA). However, the procedure is still the same as T-test when carrying out the F-test, which required indicating the level of significance and resolving the critical value by finding out the degrees of freedom (d.f) of numerator and denominator.

$$If F_{calculated} > F_{critical}, Nullhypothesisisrejected.$$

$$If F_{calculated} < F_{critical}, Nullhypothesiscannotberejected.$$

- Reject the null hypothesis if the F-statistic value is larger than critical value at a specific significance level (assume = 0.05).

- Reject the null hypothesis if the F-statistic value is lower than critical value at a specific significance level (assume = 0.05).

3.5.4 Multicollinearity

Multicollinearitymeans that the situation of independent variables is greatly correlated with each other. Besides that, R-Squared can be use for detection of multicollinearity between the paired independent variables (Gujarati & Porter, 2009).

Frisch (1934) definedMulticollinearity as a linear relationship among the independent variables in a particular regression model. In a deeper direct explanation, multicollinearity refers to more than one relationship among the variables whereascollinearity refers to a single relationship. However, multicollinearity refers to both casesin most practices.

According to Montgomery and Elizabeth (1975),there are few factor in the model will causes multicollinearity happen:

1) The method of collection of data is not fit with the model.
2) Limitation on the population being sample or constraint in the model.
3) Model specification bias.
4) An over-explained model.
5) The independent variable exhibit same trend of pattern overtime.

There are a few ways to detect Multicollinearity in a model. First, a high R-square or high F statistic and few significantT-statistics will encourage us to reject the null hypothesis,indicating that the independent variables are correlated. Second,VIF=$1/(1-R^2)$ can compute the condition number. However, this may not always be useful as the standard errors of the estimates depend on the ratios of elements of the characteristic vectors to the roots. High sample correlation coefficients are sufficient but not necessary for multicollinearity(Gujarati & Porter, 2009).

There are some effects of Multicollinearity in the model. Firstly, the large standard errors mean will be large. This may due to small observed test statistics. Secondly, there will be a tendency for large standard errors of the estimates. Thirdly, the OLS regression model is still BLUE and consistent even when multicollinearity exist (Gujarati & Porter, 2009).

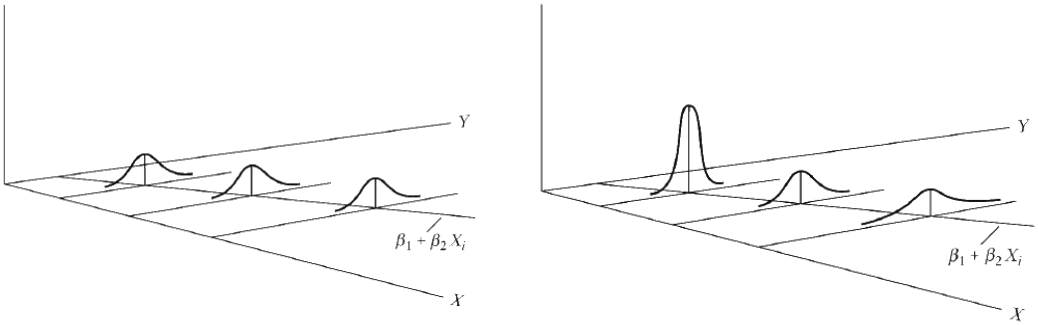
3.5.5 Heteroscedasticity

In econometrics, Autoregressive Conditional Heteroscedasticity (ARCH), which introduced by Engle (1982), is one of the tests that observed whether a time series model is suffering from heteroscedasticity problem (Nelson, 1991).To make it simple, one out of nine assumption of Classical Linear Regression Model stated that the error term should be homoscedasticity, or equal variances of the error term. Thus, heteroscedasticity violates the assumption of (CLRM) classical linear regression model, where the model does not have an equal variance of the disturbance:

Figure 3.3 Variance of Error Term

$$E(e_i^2) = \sigma_i^2$$

HOMOSCEDASTICITY **HETEROSCEDASTICITY**



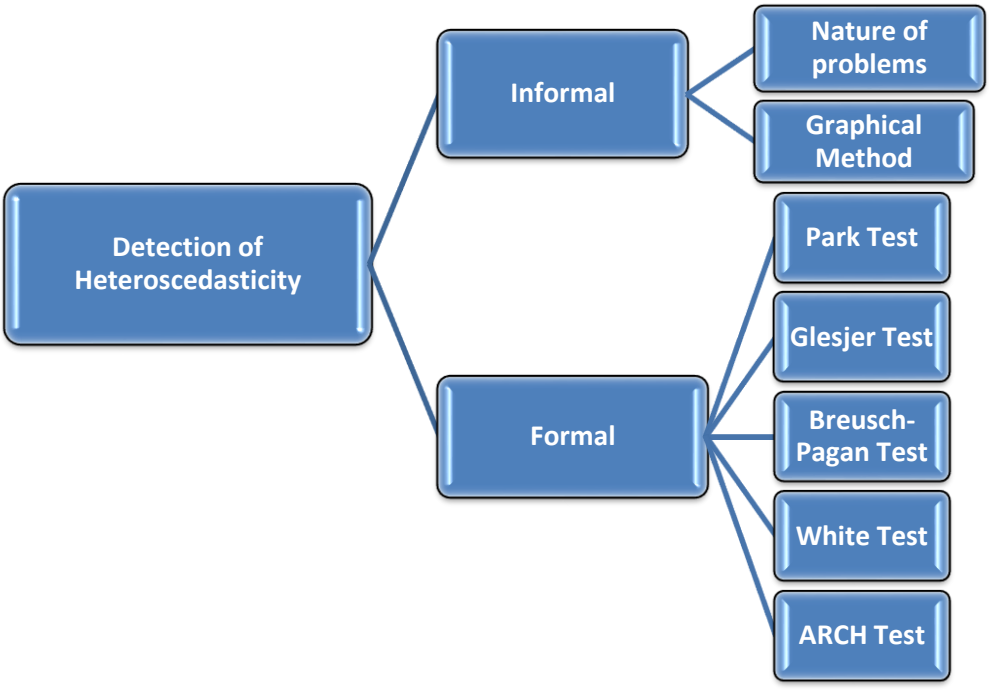
Heteroscedasticity happens for a few reasons. First and foremost, the model misspecification, which mean an incorrect data or incorrect functional form for linear model may leads to heteroscedasticity problem. Secondly, including too much of independent variables might cause more

error to exist and eventually cause heteroscedasticity problem. Thirdly, heteroscedasticity also arises with the presence of outlier as it leads to extrapolation. Also, the incorrect data provided by the respondent will cause measurement error as well as heteroscedasticity problem. Last but not least, an extremely positive or negative value in independent variables also will leads to heteroscedasticity problem.

There are several impact of heteroscedasticity in the disturbances of a linear model, including unbiased but consistent, and they no longer the Best Linear Unbiased Efficient (BLUE), hence, the inefficient parameter estimates would eventually affect the hypothesis to be invalid with the presence of heteroscedasticity (White, 1980).

There are several tests that can be applied in order for detection whether there is heteroscedasticity problem exists, such as:

Figure 3.4 Processes to Detect Heteroscedasticity



This study employed the Autoregressive Conditional Heteroscedasticity (ARCH) because our model is time series data. Firstly, the null hypothesis states that error term are homoscedasticity, while alternatives hypothesis as heteroscedasticity. Secondly, this study rejects the null hypothesis by comparing the p-value and significance level (assume 5%). Reject the null

hypothesis if the p-value is smaller than the significance level (assume 5%), otherwise, do not reject null hypothesis, which indicate the model does not suffer from heteroscedasticity problem. It means that the variance of error term is constant.

Some solving action would have to carry out if any heteroscedasticity problem has found in the model. For instances, logs can be added into the dependent or independent variables or re-specifying the model by transforming the variables in order to reduce the problem.

3.5.6 Autocorrelation

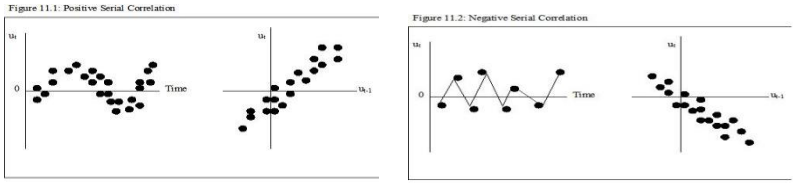
Autocorrelation is mean that the correlation between elements of series of observation ordered in time series data or in cross sectional data (Kendall and Buckland,1971)

There are two way to detect auto correlation problem in the model. It can be find out by using graphical way or running the formal test, example of the test are:

1. The Durbin Watson Test
2. The Breusch-Godfrey Test
3. The Durbin's h Test (for the existing of lagged in dependent variables)
4. Engle's ARCH Test

The following graphs show the model with positive and negative autocorrelation problem.

Figure 3.5Distribution of Error Term



Consequence of autocorrelation are first, when the error terms (μ's) are seriously correlated then the OLS estimator are unbiased but optimality property (Minimum variances property) is not satisfy .Second, if the error term μ's are autocorrelated then the OLS variance is greater than the variance of estimate calculated by other method then the usual t and F test of significance are no longer misleading conclusion about the estimate regression. Third, if the disturbance terms are autocorrelated then the OLS estimate are non-asymptotic. Fourth, the variance of random term is may be seriously under estimated if the μi's are autocorrelated (Greene,2000)

There are some measure can be taken as a remedial for autocorrelation problem. First, identify the independent variable that caused the model tend to be specification bias. Second, generalised least square model or GLS model can be used to transform the model which have exhibit the pure correlation problem. Third, if lager sample size can use Newey-West method to get standard error of OLS estimators that are correlated from autocorrelation. This method is derivate from whites' heteroscedasticity(Gujarati & Porter, 2009).

3.6 Conclusion

In the nutshell, this chapter has provided clear explanation on the research design, data collection and processing methods. Econometric model applied in this study is also clearly stated in this chapter. Lastly, this chapter also covered and provided explanation for all econometric methods and statistical test applied in this research.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter highlights the diagnostic checking for this study using various method including Jarque-Bera normality test (JB test), regression specification test (Ramsey's Regression Specification Error Test), Heteroskedasticity Test (Breusch-Pagan-Godfrey test), Autocorrelation (Breusch-Godfrey Serial Correlation LM Test) and multicollinearity test. This study uses all tools available from Eviews 6 to conduct the test for robustness of this study.

4.1 Diagnostic Checking

4.1.1 Jarque-Bera Normality Test (JB Test)

Hypothesis

H_0: The error term is normality distributed.

H_1: The error term is not normality distributed.

Significance level

$\alpha = 0.05$

Decision rule

Reject H_0 if p-value of Jarque-Bera statistic is less than $\alpha = 0.05$. Otherwise, do not reject H_0.

Table 4.1 JB Normality Test Output

Jarque-Bera	Probability
0.762680	0.682946

Decision

Do not reject H_0 since p-value of Jarque-Bera statistic (0.682946) is more than significance level ($\alpha = 0.05$).

Conclusion

There is insufficient evidence to conclude that the error term is not normally distributed at significance level $\alpha = 0.05$. Therefore, the model does not face normality problem.

4.1.2 Regression Specification Test (Ramsey's Regression Specification Error Test)

Hypothesis

H_0: Model is correctly specified.

H_1: Model is incorrectly specified.

Significance level

$\alpha = 0.05$

Decision rule

Reject H0 if p-value of is less than $\alpha = 0.05$. Otherwise, do not reject H_0.

Table 4.2 Ramsey's Regression Specification Error Test Output

F- Statistics	Probability
0.125810	0.7255

Decision

Do not reject H0 since p-value (0.7255) is more than significance level (0.05).

Conclusion

There is insufficient evidence to conclude that the model is incorrectly specified at significance level $\alpha = 0.05$

4.1.3 Heteroskedasticity Test (Breusch-Pagan-Godfrey test)

Hypothesis

H0: There is not heteroskedasticity problem.

H1: There is heteroskedasticity problem.

Significance level

$\alpha = 0.05$

Decision Rule

Reject H_0 if the P-value is smaller than the significance level, $\alpha = 0.05$. Otherwise, do not reject H0.

Decision Making

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.773326	Prob. F(4,29)	0.5515
Obs*R-squared	3.277080	Prob. Chi-Square(4)	0.5126
Scaled explained SS	1.775376	Prob. Chi-Square(4)	0.7770

Since the P-value, 0.5126 is greater than the significance level, $\alpha = 0.05$, do not reject H0.

Conclusion

There is insufficient evidence to conclude that there is heteroskedasticity problem in the model at 5% significance level.

4.1.4 Autocorrelation (Breusch-Godfrey Serial Correlation LM Test)

Hypothesis

H_0: There is not autocorrelation problem.

H_1: There is autocorrelation problem.

Significance level

$\alpha = 0.05$

Decision Rule

Reject H_0 if the p-value is less than the significance level, $\alpha = 0.05$. Otherwise, do not reject H_0.

Decision Making

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.055384	Prob. F(2,27)	0.9462
Obs*R-squared	0.138915	Prob. Chi-Square(2)	0.9329

Since the P-value, 0.9329 is greater than the significance level, $\alpha = 0.05$, do not reject H_0.

Conclusion

There is insufficient evidence to conclude that there is autocorrelation problem in the model at 5% significance level.

4.1.5 Multicollinearity Test

Detection of Multicollinearity (4 Methods)

4.1.5.1 High R^2 but few significant t-ratio

Dependent Variable: KLCI
Method: Least Squares
Date: 06/23/15 Time: 12:07
Sample: 1980 2013
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	23.74633	14.82988	1.601249	0.1202
INF	28.97065	1.693967	17.10225	0.0000
GDP	20.93754	5.662064	3.697863	0.0009
EXC	10.70877	1.661624	6.444760	0.0000
C	-2727.480	284.9492	-9.571811	0.0000

R-squared	0.934313	Mean dependent var	794.4709
Adjusted R-squared	0.925253	S.D. dependent var	415.2933
S.E. of regression	113.5407	Akaike info criterion	12.43725
Sum squared resid	373853.3	Schwarz criterion	12.66172
Log likelihood	-206.4333	Hannan-Quinn criter.	12.51380
F-statistic	103.1224	Durbin-Watson stat	1.997425
Prob(F-statistic)	0.000000		

Interpretation: Our model consists of high R^2 which is 0.934313 with a major of significant t-ratio which is inflation rates, gross domestic product (GDP), and exchange rate. But only with one insignificant t-ratio which is interest rates. Thus, this method suggests this model does not suffer from serious multicollinearity problem.

4.1.5.2 High pairwise correlation among X's

Table 4.3 Correlation Analysis

	KLCI	INT	INF	GDP	EXC
KLCI	1.000000	-0.318710	0.855870	0.106762	-0.421134
INT	-0.318710	1.000000	-0.526848	0.188786	*0.511867*
INF	0.855870	-0.526848	1.000000	-0.219124	-0.785225
GDP	0.106762	0.188786	-0.219124	1.000000	0.370743
EXC	-0.421134	*0.511867*	-0.785225	0.370743	1.000000

Interpretation: Correlation is a method to indicate the relationship between two quantitative variables. In other words, it is a measurement of the strength of the association between these two variables. These correlation ranges from -1 to +1. However, only correlation between Exchange rate and Inflation rate indicates a strong negative relationship of -0.785225 while other variables remained weak and moderate relationship based on Pearson's correlation coefficient range table:

Table 4.4 Pearson's Correlation Coefficient Range Table

< 0.2	**Very weak relationship**
0.2 – 0.4	**Weak relationship**
0.4 – 0.6	**Moderate relationship**
0.6 – 0.8	**Strong relationship**
> 0.8	**Very strong relationship**

4.1.5.3 Variance inflation Factor, VIF = (1/1-R^2_{aux})

Decision Rule

There is serious multicollinearity problem if VIF is more than 10. Otherwise, there is no serious multicollinearity problem.

Decision Making

Calculating VIF:

Table 4.5 Variance Inflation Factor (VIF)

VARIABLES	$\mathbf{\frac{1}{1-R_i^2} = VIF}$	**VARIANCE INFLATION FACTOR (VIF)**
INTEREST RATES	$\frac{1}{1-0.303300} = 1.435338022$	1.44
INFLATION	$\frac{1}{1-0.643703} = 2.806647263$	2.81
EXCHANGE RATES	$\frac{1}{1-0.667624} = 3.008640816$	3.01
GROSS DOMESTIC PRODUCT	$\frac{1}{1-0.151692} = 1.178817128$	1.18

Conclusion

Base on the VIF calculated, the highest VIF is only 3.01. This indicates that there is no serious multicollinearity problem among the variables.

4.1.5.4 Tolerance (TOL) factors = (1/VIF)

Table 4.6 Tolerance Factors

VARIABLES	**TOLERANCE FACTOR (TOL)**
INTEREST RATES	$\frac{1}{1.435338022} = 0.6967$
INFLATION	$\frac{1}{2.806647263} = 0.6967$
EXCHANGE RATES	$\frac{1}{3.008640816} = 0.3324$
GROSS DOMESTIC PRODUCT	$\frac{1}{1.178817128} = 0.8483$

4.2 Hypothesis testing

4.2.1 Hypothesis for Model Fit (F- Test)

In order to test the overall significance of the estimated regression model, this research decided to use F- test with P- value at significance level of 0.05 to examine it.

Hypothesis

H_0: $\beta_1=\beta_2=\beta_3=\beta_4=0$

H_1: At least one of theβ_i is not equal to zero, where i = 1,2,3,4

Decision rule

Reject H_0, if the p-value is less than the significance level 0.05. Otherwise we do not reject H_0.

Decision making

Reject H_0 since the Prob(F- statistic) = 0.000000 is less than the significance level of 0.05.

Conclusion

There is sufficient evidence to conclude that at least one of the β_i is not equal to zero, where i= 1,2,3,4 at significance level of 0.05. This result shows that the model is overall significant.

4.2.2 Hypothesis testing (t- test)

In order to test whether each independent variable is significant or not, this research decided to use t- test with p- value approach at significance level of 0.05 to examine it.

Hypothesis

H_0= There is no significant relationship between independent variable and dependent variable.

H_1= There is significant relationship between independent variable and dependent variable.

Decision rule

Reject H_0 of the p- value is lesser than the significance level, otherwise do not reject H_0.

4.2.2.1 Interest rate

Hypothesis

H_0:β_1=0

H_1:$\beta_1 \neq 0$

Decision rule

Reject H_0 of the p- value is lesser than the significance level, otherwise do not reject H_0.

Decision Making

Do not reject H_0 since the p-value (0.1202) is greater than the significance level (0.05).

Conclusion

There is insufficient evidence to conclude that $\beta_1 \neq 0$. This result shows that there is no significant relationship between interest rate and KLCI stock market index.

4.2.2.2 Inflation rate

Hypothesis

H_0:β_2=0

H_1:$\beta_2 \neq 0$

Decision rule

Reject H_0 of the p- value is lesser than the significance level, otherwise do not reject H_0.

Decision Making

Reject H_0 since the p-value (0.0000) is lesser than the significance level (0.05).

Conclusion

There is sufficient evidence to conclude that $\beta_2 \neq 0$. This result shows that there is significant relationship between inflation rate and KLCI stock market index.

4.2.2.3 Gross Domestic Product

Hypothesis

H_0:β_3=0

H_1:$\beta_3 \neq 0$

Decision rule

Reject H_0 of the p- value is lesser than the significance level, otherwise do not reject H_0.

Decision Making

Reject H_0 since the p-value (0.0009) is lesser than the significance level (0.05).

Conclusion

There is sufficient evidence to conclude that $\beta_3 \neq 0$. This result shows that there is significant relationship between Gross Domestic Product and KLCI stock market index.

4.2.2.4 Exchange rate

Hypothesis

$H_0: \beta_4 = 0$

$H_1: \beta_4 \neq 0$

Decision rule

Reject H_0 of the p- value is lesser than the significance level, otherwise do not reject H_0.

Decision Making

Reject H_0 since the p-value (0.0000) is lesser than the significance level (0.05).

Conclusion

There is sufficient evidence to conclude that $\beta_4 \neq 0$. This result shows that there is significant relationship between exchange rate and KLCI stock market index.

4.3 Interpretation

4.3.1 Parameters interpretation

$\hat{\beta}_1 = 23.74633$

When interest rate (INT) increases by 1 percentage point, on average, KLCI stock index will increased by 23.74633 basis point, holding other variable constant.

$\hat{\beta}_2 = 28.97065$

When the consumer price index (CPI) increases by one basis point, on average, KLCI stock market index in Malaysia will increase by 28.97065 basis points, ceteris paribus.

$\hat{\beta}_3 = 20.93754$

When the Gross Domestic Product growth (GDP) increases by one percent point, on average, the stock price index in Malaysia will be increased by 20.93754 basis points, holding other variables constant.

$\hat{\beta}_4 = 10.70877$

When the exchange rate index increases by one basis point, on average, KLCI stock market index in Malaysia will increase by 10.70877 basis points, while holding other variables constants.

4.3.2 Goodness of fit

R-squared= 0.934313

There are 93.4313% of the total variation in the KLCI stock index can be explained by the total variation in Interest rate, inflation rate, gross domestic product and exchange rate.

Adjusted R-squared= 0.925253

There are 92.5253% of the total variation in the KLCI stock index can be explained by the total variation in Interest rate, inflation rate, gross domestic product and exchange rate after taking the sample size and degree of freedom into account.

4.4 Conclusion

This chapter basically covers five robustness tests which includes testing for normality problems, model specification errors, multicollinearity among variables, heteroskedasticity as well as autocorrelation problems. Lastly, this chapter covers hypothesis t-testing to estimate the parameters of each variable in the regression model as well as to test the significance of model as a whole.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter provides a summary of the results generated and covers a comprehensive discussion on the major findings of this study. Implications derived based on the findings is also covered in this chapter following the limitations and recommendations of this research. Finally, this chapter ends with a conclusion.

5.1 Summary of Results

Table 5.1 Summary Results of OLS Regression

Variables	**P-value**	**Results**
Interest rate	0.1202	Insignificant
Inflation rate	0.0000	Significant
Gross domestic production growth rate	0.0009	Significant
Exchange rate	0.0000	Significant
Diagnostic Checking		
Jarque-Bera (JB) Normality test	0.682946	Error term is normally distributed
Ramsey Reset test	0.7255	Model is correctly specified
Variance Inflation Factor	Highest VIF = 3.01	No serious multicollinearity problem
Tolerance Factor	Lowest TOL = 0.3342	No serious multicollinearity problem

Breusch-Pagan-Godfrey Heteroskedasticity test	0.5126	No heteroscedasticity problem in this model
Breusch-Godfrey Serial Correlation LM test	0.9329	No autocorrelation problem in this model

5.2 Discussion of major findings

5.2.0 Expected sign vs. Actual output

Based on the empirical result generated, this research found that only GDP growth rate and exchange rate have the same sign with what this study expected. On the other hand, interest rate and inflation rate have the opposite sign, which is inconsistent with what this study expected.

5.2.1 Interest rate

The interest rate used in this research is 3-month Treasury bill rate issued by Malaysia government. As T- bill rate is risk free rate and it is the minimum return that investors required, it is useful to examine how interest rate will affect stock market index.

This research shows that interest rate positively affect stock market index. This result is inconsistent with most of the study. The reason is that this research used 3- month T- bill rate which is different from other researches which used long term interest rate. Mukherjee and Naka (1995) stated that although there is an ordinary negative correlation among the market return and the long-term government bond rate, yet there is a controversial positive correlation among the short-term call money rate and the return. Nasseh and Strauss (2000) also supported this view as they found a similar results which is positive relationship between short- term interest rate and

stock price but negative relationship between long- term interest rate and stock price in six European markets.

There are three sectors that will be benefited from a rise of interest rate, which is consumer discretionary, technology and financial sector.O'Hare, chief market analyst at Briefing.com reported by Brecht (2015) stated that the beginning part of a rise in interest rate should be beneficial to the consumer sector, higher rates are almost certainly the result of an improvement in economic growth that is an advanced levels of employment will establish a formidable sense of job security, better wage growth and a rise of lending activity, which will eventually leads to higher levels of spending (Brecht, 2015). When individuals have higher wages, the demand of nonessential goods, luxury goods and investment will increase. This will improve the company stock price as demand of goods and service and investment in companies stock is higher.

Financial sector will also benefited from a rise in interest rate as the interest margin which is the difference between borrowings and lending cost is higher, this will bring higher profit to the financial sector, in other words rise in interest rate will bring positive effect to financial sector. Blain, chief executive officer at New Bern, North Carolina-based BlueSky Wealth Advisor, reported by Brecht (2015) pointed out that, financial market are beneficial from the rising of interest rates due to an interest margin expands, profit raising, and the increased economic activity that affected the interest rate increase generally means more loan demand.

Tech companies tend to carry low debt load and a stable fixed- capital structure. This paradigm frequently leads to widening margins when sales accelerate, which would also leads to a rise in dividends (Wyatt Investment Research, 2014). As higher interest rates usually indicate economic growth, it would bring positive effect to technology sector because the spending in technology goods will increase due to higher wages and the demand of technology stocks will be higher as it pays out more dividends which imply that technology corporation is making

profit.KLCI stock index consists of companies from seven sectors which are financial, plantation, telecommunications, gaming, utilities, consumers and transportation sectors. All these sectors are highly related to financial and consumer spending activities, which will be benefited from a rise in interest rate. This may be the reason why Malaysia stock market index has positive relationship with interest rate.

Nevertheless, this research shows that the linkage between stock market index and interest rate is not significant. The Islamic banking sector in Malaysia has outperformed conventional banking sector in recent years. Malaysian Islamic banking sector has average annual asset growth rate of 18.6 percent from 2008 to 2012 compared to the conventional bank growth of 9.3 percent. In 2013, Malaysia was the largest Sukuk (bond) issuer which issued 69 percent of total issuance in the world.

Malaysia also has the largest number of funds by domicile which is 28 percent and in term of Islamic funds' assets by domicile and Malaysia (22 percent) is the second largest Islamic fund market just below Saudi Arabia (44 percent) (Malaysia International Islamic Financial Centre, 2014). All these data shows that Malaysia has shifted their focus on mode of finance from conventional to Islamic in recent years. As Islamic finance prohibits the use of interest (Riba) and Malaysia has focused more on Islamic finance rather than conventional finance, interest rate may not have significant relationship with stock market index.

The development if Islamic financial system is represented by Islamic law, also known as Shari'ah, which forbid interest (Riba), uncertainty (Gharar), gambling (Maysir), and promotes risk sharing, profit-sharing, asset-backed financial transactions, and ethical investment (Shamsuddin, 2014). It is clear that with the prohibition of interest (Riba), Islamic finance does not focus on interest as the main source when conducting business, thus stock market should not have sensitivity towards interest rate. This is supported by Shamsuddin(2014), who examines the interest rate sensitivity of Islamic equity of Dow Jones (DJ) Islamic Market Index, has found that

there volatility or changes in long-term interest rate do not influence DJ Islamic Market Index, DJ Islamic emerging market and Islamic non-US market portfolios.

5.2.2 Inflation rate

According to the Fisher effect hypothesis discussed earlier in chapter 2, it states that nominal interest rates equivalent to the combination of real interest rate and expected inflation rate. Therefore, for the purpose of maintaining a balance in that equation, nominal interest rates will increase when the expected inflation rate increases. This finding is supported by Firth (1979) in U.S market and Gultekin (1983) in countries other than U.S.Firth (1979) claimed that the stock market provided some hedge against inflation in the UK but his findings are in contrast with the work of other researchers in the U.S.A. On the other hand, Yang and Doong (2004), Apergis (2003), Abrugi (2008) and Emara (2012) argued that inflation rate is significant negatively related to stock market return. They explained that a higher domestic inflation rate may lead to depreciation of home currency and may encourage foreign investors to withdraw or reduce their investment in the home market due to higher market uncertainty.

Nevertheless, based on the result generated, this study claims that inflation rate in Malaysia has significant positive relationship with the Malaysia stock market, which is in agreement with Gultekin (1983), Firth (1979) and Adam and Tweneboah (2008).In other words, Malaysian stock market may provide some degree of hedging towards inflation in Malaysia. In fact, inflation rate has the most impact on the Malaysia stock market among all variables. Besides, another possible explanation for the positive linkage between stock market and inflation in Malaysia is that the inflation rate in Malaysia is relatively low, less than 10 percent, compared to other country with negative correlation between inflation rate and stock market with inflation rate more than 10 percent such as Brazil (Abugri, 2006).

Moreover, based on the inflation level standards of Henry (2002), countries with inflation rates less than 10 percent will fall under the low inflation category. His study claims that country with originally low inflation rate does not enjoy benefits in terms of an increase in stock market condition from disinflationary actions. According to addition raw data obtained from World Bank website, this study found that Malaysia hit its highest inflation peak of 9.7 percent, which is still considered low by Henry (2002). This means that Malaysia would not have enjoyed any improvement in the stock market condition if government take disinflationary actions given that some authors argued that the relationship between inflation rate and stock market return is negative.

5.2.3 GDP growth rate

The result of this study shows GDP significant positively affects the stock market index which means that an increase GDP will increase the stock price. It is consistent with the result from Noormahayu, Norsilawati, Zarul&Fauzi(2013) who investigate the elements that determine the stock market return. Researchers found gross domestic product shows positive relationship with the stock market in term of long run. In addition, Christopher et al. (2006) also supported the result by examined stock market in New Zealand.

In 1985, Malaysia's GDP growth rate has recorded a -1.12% growth rate while this cause the KLCI decreases from 353.64 to 285.98. In addition to that, Malaysia suffers the financial crisis in 1997 and has a -7.36% of GDP growth rate. While the KLCI decline from 1097.54 to 457.61. The same condition in 2009, GDP growth with -1.51% leads to a decrease of roughly 160 point. This can be explained by GDP reflect the health of economic of the nation. When the economy is healthy and growing, the firm will be affected positively with a better earning. The higher profit would

encourage investors and firm invests more in stock market. Simultaneously, a negative growth rate of GDP will have a negative effect on stock market.

In the 11th Malaysia Plan the Malaysian government set the goal of 5-6% of growth rate in the next five years, based on sustained local demand (Chin, 2015). This is because the continuous structural change will enhance the momentum for economic growth, including productivity advancement and innovation. Therefore gives the economic a boost in the near future. This will gain further momentum for growth, higher household income per capital as well as increased welfare of the people of Malaysia. In other words, the economy of Malaysia will be able to grow at a faster pace.

In addition to that, this movement may be one of the justifications for the results of this study which found positive linkage between the equity market return and the GDP growth rate in Malaysia. Normally, economists look at GDP to measure economic growth. The findings of this study is supported by Chin (2015) whom implied that productivity advancement by improved capital efficiency and the contribution of multi-factor productivity (MFP) productivity from multiple inputs will be important for the nation's economic and financial growth. According to the findings of this study, the stock market in Malaysia will benefit from the improvement of productivity of the country. This finding is consistence with Kalyanaraman and Tuwajri (2014) that increase in Malaysia's GDP can affect the company earning eventually give a positive impact to the stock market.

5.2.4 Exchange rate

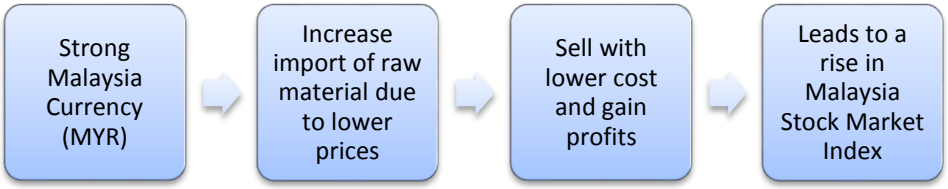
This study investigates whether the exchange rate has affected the stock index in Malaysia. While literature suggests that the actuality of significant

interactions between them, the empirical results provides that exchange rates is significance to the stock index.

The results of this study found that exchange rate is positive correlated with the stock market index, which is in the same line with the literature review discussed in chapter 2, evidence from United States and Australia by Phylaktis and Ravazzolo (2005), Aggrawal (1981), Richards, Simpson and Evans (2009). This means that, an increase in exchange rates would lead to a rise in stock market index.

First and foremost, this relationship could be explained by using demand and supply theory, where the changes of the currency value would affect the volume international trade (Hooper and Kohlhagen, 1978) and eventually affect the nation's stock index (Huang, Nakamor and Wang, 2005). When a buyer in a country demand goods and services from seller in another country, is it necessary for the buyer to enter into foreign exchange market first, in order to buy that particular country's currency, before proceed to purchase the foreign products. For instances, assume that Malaysia has a strong Ringgit Malaysia, and the Ringgit Malaysia is very valuable compared to other currencies. With this opportunity, Malaysia could increase their import due to lower prices, and offer these foreign goods to the customer at lower prices which eventually increase the quantity demanded for these products. These would probably increase our profits; consequently, the profits would leads to the growth of the nation's stock index.

Figure 5.1Relationship Between Exchange Rate and Stock Market Index



Another possible explanation for the relationship between exchange rate and stock market is the dependency of the nation's commodities revenue income. Based on the Malaysian news, the person in charge of economic planning, The Malaysian Insider (2015) reported that Datuk Seri Abdul

Wahid Omar claimed that Malaysia is too dependent on oil industry in the sense of contribution to national income. Theoretically, there is a strong correlation between the commodities and the exchange rates if a country is more dependent on a primary domestic industry. This has supported by Fong (2006), which the author has stated that the commodity price movements will be associated with the exchange rates if and only if a country's export has involved major of that specific commodities. In other words, the commodity price movement is sensitive to the strength of the particular currencies (Fong, 2006).

Recently, Liau and Chong (2014) from Bloomberg have reported a news regarding the stock slump and exposed a risk to crude oil revenues on the 1st of December 2014. They said that after the dropped of the Malaysia ringgit (MYR) amount to 2.5 percent in two days, the Malaysia KLCI Index of shares fell 2.3 percent, mostly was dragged down by gas, oil and plantation stocks. This shows that the relationship between exchange rates and stock index is positively correlated even after taking the correlation between commodities price and currency value into account.

Besides, foreign direct investments (FDI) also act as an important role in between the relationship among exchange rates and stock index. Investors tend to invest more in countries with strong and stable currency value in order to safeguard their capital while earning income that is less subjected to inflation risk. Hence, a strong currency will eventually lead to a better performing stock market by attracting foreign direct investments to stimulate growth and expand domestic business in the country.

5.3 Implications of this study

5.3.1 Interest rate

5.3.1.1 Policy Makers

When implementing monetary policy, policy makers should take into account the effectiveness of interest rate in affect Malaysia stock market. This study found positive yet insignificant relationship between interest rate and stock market. Hence, it is important for policy makers to know that interest rate may not be the most effective tools to stimulate the Malaysia stock market.

5.3.1.2 Economist and Researchers

The result shows that interest rate is positively and insignificantly affects stock market is inconsistent with most of the studies, which stated that interest rate has negative relationship and significantly affects stock market. This implies that when doing research, researchers need to determine whether the specific country is Islamic finance-oriented or conventional finance-oriented as this will bring effect to the result of studies.

5.3.1.3 Market Investors

Investors need to have sufficient knowledge of conventional or Islamic finance when making investment in securities, as there is some difference between the way conventional and Islamic conduct business.The main difference is prohibition and allowance of interest. This makes a huge difference as changes in interest rate will have immediate effect on investors' portfolio value. By having sufficient knowledge investors can protect themselves from the fluctuation of interest rates.

5.3.1.4 Corporate Management Teams

Although normally an increase in interest rate would bring negative influence to a corporation as the cost of capital of a corporation will be higher, but when there is a rise in interest, there is usually an economic growth which could bring positive effects to company that produce consumer discretionary, financial product or services and technology product. This benefit may outperform the negative effect and bring positive effect to corporation when there is a rise in interest rate.

5.3.2 Inflation rate

5.3.2.1 Policy Makers

The results of this study may be used by policy makers when making economic policy decisions to prevent causing a crash in the stock market. Policy makers in Malaysia may have to take into account the fluctuations in stock market return when controlling the overall price of goods in Malaysia since the stock market is correlated with the movement of inflation in Malaysia. Hence, Malaysia policy makers can implement inflation rate stabilization efforts when they wish to maintain a stable stock market. This study also suggests that increasing inflation rate may provide certain benefits such as an increase in the stock market return. However, policy makers should also consider the impact of fluctuation upon the stock market when inflation rate is not controlled properly.

5.3.2.2 Market investors

Results in this study suggest that inflation rate is significant and positively related to stock market return. In order words, investors may be able to hedge against inflation risk by investing in Malaysia stock market. This study implies that investing in Malaysia stock market is one of the possible methods to provide stability in the purchasing power in the event of increasing

inflation rate. Hence, investing in Malaysia stock market may serve as an efficient channel to store monetary value and prevent loss in purchasing power.

5.3.2.3 Corporate Management Teams

The results of this study also provide some implications to corporate and firms with shares listed on Bursa Malaysia. Assuming Malaysia stock market is very efficient; the stock price reflects the future expectations and conditions of a company. Normally, steady increase in inflation rate is a sign of growing economy. Hence, company that wishes to raise funds in countries with increasing inflation rate but at the same time wishes to attract investors may look for countries with steady increasing trend in inflation rate. By doing so, the corporate may provide a higher possibility of increasing stock return to hedge against the inflation rate risk and at the same time maintain its stock price stability. This will help the corporate to gain more certainty over its stock return to investor and in turn attract more investors.

5.3.3 GDP growth rate

5.3.3.1 Policy Makers

Based on this study, policy makers may want to take into consideration the GDP growth rate to prevent a market crash such as during the Asian Financial Crisis in 1997 and 2008 Global Financial Crisis. It is an important note to policy makers that not only the amount of GDP is important but also the growth rate. A slowing down growth rate may impose negative impact on Malaysia stock market and may lead to various stock market troubles.

5.3.3.2 Economist and Researchers

In general, higher GDP will lead to a better performing stock market. However, this study suggests that the greater the growth rate, the better the performance of Malaysia stock market. Not only the volume of GDP but also the speed of improvement in GDP may bring benefits to Malaysia stock market. Hence, economist may be able to improve Malaysia stock market by identifying what factors contribute most to the growth of GDP. In addition to that, market researchers may be able to boost Malaysia economy by identifying and developing potential and new market sector in Malaysia.

5.3.3.3 Market investors

Current GDP growth rate reflects the current condition and moving pace of Malaysia economy. Hence, Investors may study and analyze the current situation of Malaysia before making an investment in Malaysia stock market. Malaysian investors may be able to reduce investment risk by having a clear understand knowledge about the current condition as well as the future aspects of Malaysia economy which can be reflected through the growth rate of GDP. Besides, foreign investors may also gain higher return by investing in a market that possesses high growth rate in which is reflected by high GDP growth rate. More importantly, international investors may be able to reduce the market risk in their portfolio by taking into account the current market and economy condition of the target country because this study found positive relationship between GDP growth rate and stock market return.

5.3.3.4 Small and Medium Enterprise

SMEs act as an important role in contributing to the GDP of a nation. The development of human capital and the management capability is crucial for the performance of the SMEs firm in order to expand the contribution to Malaysia's GDP. SMEs may utilize the support given by the government

fully to strengthen their management skills, financial and learning capacities in order to contribute more to Malaysia's GDP. In turn, SMEs that are listed on Bursa Malaysia may find favour in their stock performances when the GDP in Malaysia is doing well. SMEs may also focus on productivity instead of being solely profit-oriented because an increase in the productivity of Malaysia may provide favourable movements in the stock performance in Malaysia.

5.3.4 Exchange rate

5.3.4.1 Policy Makers

Considering the impact of heavy reliance on specific sources of income, Malaysian government may diversify its income from various sources. By doing so, Malaysian government may reduce the impact of Ringgit currency fluctuations when Malaysia suffers from the fall of oil prices, which later will cause the stock market to decline. For example, Malaysian government may want to develop and nourish sectors such as banking, tourism, construction and services to diversify its income sources. Besides, by doing so, it can help to accommodate the losses from oil and gas sector (Kamari, 2015). The Prime Minister's Department Datuk Seri Abdul Wahid Omar also says that, soon the Malaysia's oil and gas revenue dependency will be reduce to 22 percent in 2015 from 31 percent in 2014 (The Malaysian Insider, 2015).

In addition to that, this study has proven that the nation's exchange rate is move in the same way as the nation's stock market. Therefore, it is an important decision for the Malaysia Government to choose whether should imply fixed exchange rate or remain it to be floated in order to sustain the value of the Malaysia Ringgit. For instances, in the past, former Prime Minister Tun Dr Mahathir Mohamad once has pegged Malaysia Ringgit for almost five years despite the Asian financial crisis in 1998 in order to maintain and control the value of the currency against depreciation. However,

a common thing that the Malaysia Government need to take note is, pegging exchange rates require huge amounts of the country's reserve for the Malaysia Government to buy or sell the local currency constantly. Nevertheless, this may provide more certainty and stability for the stock market in Malaysia in which will be more appealing for investors including foreign investors.

5.3.4.2 Economist and Researchers

When conducting the research, it is crucial for the economist and researcher to identify the currency movement from different country because various countries may have different policy and issues that might act as one of the factor affecting the fluctuation of exchange rates. Hence, the effect of movement of exchange rates towards the fluctuation of stock market from different country can be measure accurately.

5.3.4.3 Market Investors

It is better for the foreign market investor to identify and perform some analysis such as fundamental or technical analysis to get sufficient information and knowledge regarding the movement of exchange rates before participating into it. This is to ensure that the investor could minimize the risk of losses to a certain desire level of risk based on different investor's perspective. Besides, investors may reduce risk by analyzing any situation in which may affect exchange rate fluctuation to be able to anticipate any movement in the stock market.

5.3.4.4 Corporate Management Teams

The multinational firm would need to be more concern on the movement of currency in the market due to the reason that their business transaction is

strongly related with the fluctuation of exchange rates. If this issue cannot be well taken care, it could leads to a loss of the multinational firm because of foreign exchange risk and eventually causes the stock market to fall. In addition to that, manufacturing firms may find it favourable during an increase in the local currency value due to lower raw material purchase cost. Hence, this may send off false signals indicating an increase in efficiency and effectiveness while the actual reason for the good performance is purely due to currency exchange effect and may only be temporal.

5.4 Limitations of this study

5.4.1 Stock Index Restrictions

The stock market index used in this research is FTSE Bursa Malaysia KLCI index which consists of 30 largest companies in FTSE Bursa Malaysia Emas Index (FBMEMAS) by full market capitalization. FBMEMAS is the constituents of the FTSE Bursa Malaysia Top 100 index and FTSE Bursa Malaysia Small Cap Index (FTSE Bursa Malaysia Index Series, n.d.). This indicates that KLCI index includes companies that is Shariah compliant and non- Shariah compliant companies, in other words KLCI index does not exclude Shariah compliant companies. This is the limitation of this research as this research found that independent variable interest rate will not have any effect on Islamic index nor Islamic product, in essence the effect of interest on KLCI index cannot be captured accurately as it includes both Shariah compliant and non- compliant companies.

5.4.2 Debatable sample size

This study consists of only 34 sample size. One of the reasons that this study did not include a larger sample is due to the restraint of the methodology. This study employed the Ordinary Least Square method in estimating the parameters and significance of the selected macro-economic variables. This study runs the risk of having autocorrelation and heteroscedasticity problem if sample size is too big. Besides, this paper is only limited to analyzing the linkage between the selected macroeconomic variables and Malaysia stock market in a general sense unlike the others, which studied the relationships in difference ways such as long-term, short-term, unidirectional or bidirectional effects and requires a larger sample size of more than 100. However, the results from this study have proven its robustness through several diagnostic checking procedures and are found to be free from autocorrelation, heteroskedasticity and serious multicorrelation problem.

5.4.3 Limitations of linear regression method

Linear regression method technically is not the best model specification choice when considering “linear” relationships between the independent and dependent variables, since in reality there are no such optimal situations (Dowling and Reinke, 2008). In ecology, there are seldom situation when the data is modelled adequately by regression model, which have to fulfilled a whole series of assumptions, including normality, homoscedasticity, fixed X (explanatory variables), independence, and no model specification bias. The problem arises when all the assumption is violated, because the model need be rejected (Schneider, Hommel and Blettner, 2010). Secondly, linear regression method also creates a problem when considering modelling a non-linear relationships variable.

5.4.4 Findings is subjected to Malaysia only

The results generated and implication of this study is exclusively for Malaysia only. This is because all data and information gathered are from Malaysia. In addition to that, findings of this study may not be similar to findings of previous studies due to its nature diversity from other countries such as interest rate structure and exchange rate structure. Besides, the findings of this study may not be applicable to countries with difference culture and investor behaviour

5.5 Recommendations for future research

5.5.1 Substitution of FTSE stock index

Interest rate will have significant impact on conventional finance- oriented countries rather than Islamic finance- oriented countries. Also, interest rate will not affect stock market index that only consist of companies that are complying with Shari'ah law. To capture the relationship and effect between interest rates and stock market index more accurately, future researchers are recommended to indicate the mode of finance of the countries and the stock market index that they want to use. Further studies can use FTSE Bursa Malaysia HidhrahShari'ah index to give more robust result.

5.5.2 Conduct further research in different countries with dual financial system

This study encourages future researchers to extend this study into various stock markets globally to gain a better understanding on the impacts of the selected macro-economic variables on the stock market, especially interest

rate. However, one should always be aware of the differences in terms on nature, culture, structure and behaviour of the government, citizens and country as it has proven to be an essential role in determining the relationships and impact of the variables on the stock market. In addition to that, this study recommends future research to be conducted in countries similar to Malaysia such that it has the elements of both conventional and Islamic banking to gain a better understanding on the impact of interest rate on stock market return.

5.6 Conclusion

This chapter provides a summary for the results generated and includes a comprehensive discussion of each independent variables base on the results generated. Furthermore, this chapter offers several implications for each variable towards a variety of participants. Lastly, this chapter addresses the limitations of this study following suggestion to overcome it in future research.

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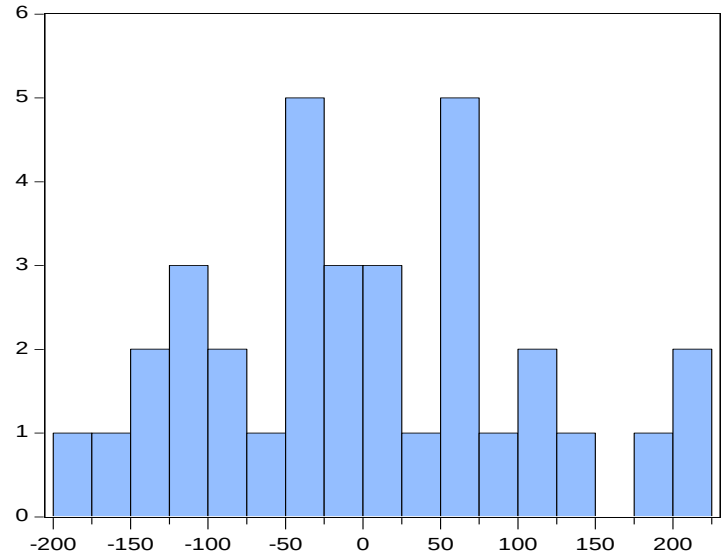
APPENDIX

Appendix 4.1:Jarque-Bera Normality Test Output



Series: Residuals	
Sample 1980 2013	
Observations 34	
Mean	-4.14e-13
Median	-17.55814
Maximum	217.4087
Minimum	-198.1337
Std. Dev.	106.4372
Skewness	0.263436
Kurtosis	2.489344
Jarque-Bera	0.762680
Probability	0.682946

Appendix 4.2: Ramsey's Regression Specification Error Test Output

F-statistic	0.125810	Prob. F(1,28)	0.7255
Log likelihood ratio	0.152427	Prob. Chi-Square(1)	0.6962

Test Equation:

Dependent Variable: KLCI

Method: Least Squares

Date: 06/23/15 Time: 12:02

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	23.20632	15.13535	1.533253	0.1364
INF	25.46310	10.03734	2.536837	0.0170
GDP	20.08770	6.228645	3.225051	0.0032
EXC	8.968097	5.189436	1.728145	0.0950
C	-2320.268	1183.954	-1.959762	0.0600
FITTED^2	6.16E-05	0.000174	0.354697	0.7255

R-squared	0.934607	Mean dependent var	794.4709
Adjusted R-squared	0.922930	S.D. dependent var	415.2933
S.E. of regression	115.2917	Akaike info criterion	12.49159
Sum squared resid	372181.0	Schwarz criterion	12.76095
Log likelihood	-206.3571	Hannan-Quinn criter.	12.58345
F-statistic	80.03624	Durbin-Watson stat	2.017243
Prob(F-statistic)	0.000000		

Appendix 4.3: Heteroscedasticity Test: Breusch-Pagan-Godfrey Test Output

F-statistic	0.773326	Prob. F(4,29)	0.5515
Obs*R-squared	3.277080	Prob. Chi-Square(4)	0.5126
Scaled explained SS	1.775376	Prob. Chi-Square(4)	0.7770

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 06/23/15 Time: 12:03

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-26761.43	34663.14	-0.772043	0.4463
INT	1043.481	1804.007	0.578424	0.5674
INF	186.8203	206.0655	0.906606	0.3721
GDP	760.5539	688.7717	1.104218	0.2786
EXC	137.3868	202.1312	0.679691	0.5021

R-squared	0.096385	Mean dependent var	10995.69
Adjusted R-squared	-0.028252	S.D. dependent var	13620.79
S.E. of regression	13811.86	Akaike info criterion	22.03950
Sum squared resid	5.53E+09	Schwarz criterion	22.26396
Log likelihood	-369.6714	Hannan-Quinn criter.	22.11604
F-statistic	0.773326	Durbin-Watson stat	2.177774
Prob(F-statistic)	0.551486		

Appendix 4.4: Autocorrelation Test: Breusch-Godfrey Serial Correlation LM Test Output

F-statistic	0.055384	Prob. F(2,27)	0.9462
Obs*R-squared	0.138915	Prob. Chi-Square(2)	0.9329

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 06/23/15 Time: 12:03

Sample: 1980 2013

Included observations: 34

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-0.828553	16.25524	-0.050971	0.9597
INF	0.072924	1.774708	0.041091	0.9675
GDP	0.197770	5.887100	0.033594	0.9734
EXC	0.105576	1.790207	0.058974	0.9534
C	-14.52856	300.0546	-0.048420	0.9617
RESID(-1)	-0.013062	0.204412	-0.063901	0.9495
RESID(-2)	0.066173	0.207693	0.318609	0.7525

R-squared	0.004086	Mean dependent var	-4.14E-13
Adjusted R-squared	-0.217229	S.D. dependent var	106.4372
S.E. of regression	117.4302	Akaike info criterion	12.55081
Sum squared resid	372325.8	Schwarz criterion	12.86506
Log likelihood	-206.3637	Hannan-Quinn criter.	12.65797
F-statistic	0.018461	Durbin-Watson stat	1.948159
Prob(F-statistic)	0.999967		

Appendix 4.5: Multicollinearity Test: Auxiliary Model 1

Dependent Variable: INT

Method: Least Squares

Date: 06/23/15 Time: 12:04

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.027019	0.020263	-1.333410	0.1924
GDP	0.011150	0.069677	0.160018	0.8739
EXC	0.018754	0.020168	0.929895	0.3598
C	4.051066	3.429223	1.181336	0.2467

R-squared	0.303300	Mean dependent var	4.224706
Adjusted R-squared	0.233630	S.D. dependent var	1.596740
S.E. of regression	1.397827	Akaike info criterion	3.617845
Sum squared resid	58.61758	Schwarz criterion	3.797417
Log likelihood	-57.50337	Hannan-Quinn criter.	3.679084
F-statistic	4.353381	Durbin-Watson stat	0.678919
Prob(F-statistic)	0.011646		

Appendix 4.6: Multicollinearity Test: Auxiliary Model 2

Dependent Variable: INF

Method: Least Squares

Date: 06/23/15 Time: 12:05

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-2.070777	1.552993	-1.333410	0.1924
GDP	0.429474	0.605194	0.709647	0.4834
EXC	-0.691146	0.127082	-5.438580	0.0000
C	155.6055	11.66609	13.33828	0.0000

R-squared	0.643703	Mean dependent var	72.88223
Adjusted R-squared	0.608074	S.D. dependent var	19.54717
S.E. of regression	12.23731	Akaike info criterion	7.956987
Sum squared resid	4492.555	Schwarz criterion	8.136559
Log likelihood	-131.2688	Hannan-Quinn criter.	8.018227
F-statistic	18.06650	Durbin-Watson stat	0.195002
Prob(F-statistic)	0.000001		

Appendix 4.7: Multicollinearity Test: Auxiliary Model 3

Dependent Variable: GDP

Method: Least Squares

Date: 06/23/15 Time: 12:05

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	0.038441	0.054169	0.709647	0.4834
INT	0.076487	0.477988	0.160018	0.8739
EXC	0.093671	0.050777	1.844765	0.0750
C	-7.552773	9.084170	-0.831421	0.4123

R-squared	0.151692	Mean dependent var	5.943824
Adjusted R-squared	0.066861	S.D. dependent var	3.790033
S.E. of regression	3.661139	Akaike info criterion	5.543556
Sum squared resid	402.1181	Schwarz criterion	5.723128
Log likelihood	-90.24046	Hannan-Quinn criter.	5.604796
F-statistic	1.788169	Durbin-Watson stat	1.632660
Prob(F-statistic)	0.170677		

Appendix 4.8: Multicollinearity Test: Auxiliary Model 4

Dependent Variable: EXC

Method: Least Squares

Date: 06/23/15 Time: 12:06

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.718314	0.132077	-5.438580	0.0000
INT	1.493852	1.606474	0.929895	0.3598
GDP	1.087650	0.589587	1.844765	0.0750
C	150.3020	15.07488	9.970359	0.0000

R-squared	0.667624	Mean dependent var	110.7256
Adjusted R-squared	0.634386	S.D. dependent var	20.63226
S.E. of regression	12.47551	Akaike info criterion	7.995542
Sum squared resid	4669.147	Schwarz criterion	8.175114
Log likelihood	-131.9242	Hannan-Quinn criter.	8.056781
F-statistic	20.08638	Durbin-Watson stat	0.232396
Prob(F-statistic)	0.000000		

Appendix 4.9: OLS FinalOutput

Dependent Variable: KLCI

Method: Least Squares

Date: 06/23/15 Time: 12:07

Sample: 1980 2013

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	23.74633	14.82988	1.601249	0.1202
INF	28.97065	1.693967	17.10225	0.0000
GDP	20.93754	5.662064	3.697863	0.0009
EXC	10.70877	1.661624	6.444760	0.0000
C	-2727.480	284.9492	-9.571811	0.0000

R-squared	0.934313	Mean dependent var	794.4709
Adjusted R-squared	0.925253	S.D. dependent var	415.2933
S.E. of regression	113.5407	Akaike info criterion	12.43725
Sum squared resid	373853.3	Schwarz criterion	12.66172
Log likelihood	-206.4333	Hannan-Quinn criter.	12.51380
F-statistic	103.1224	Durbin-Watson stat	1.997425
Prob(F-statistic)	0.000000		

Appendix 5.0: Correlation Output

	KLCI	INT	INF	GDP	EXC
KLCI	1.000000	-0.318710	0.855870	0.106762	-0.421134
INT	-0.318710	1.000000	-0.526848	0.188786	0.511867
INF	0.855870	-0.526848	1.000000	-0.219124	-0.785225
GDP	0.106762	0.188786	-0.219124	1.000000	0.370743
EXC	-0.421134	0.511867	-0.785225	0.370743	1.000000