

**INFLUENCE OF MACROECONOMIC FACTORS ON  
MALAYSIAN STOCK RETURNS**



**UNIVERSITI UTARA MALAYSIA**

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**INFLUENCE OF MACROECONOMIC FACTORS ON  
MALAYSIAN STOCK RETURNS**



**Thesis Submitted to  
School of Economic, Finance and Banking,  
Universiti Utara Malaysia,  
In Partial Fulfillment of the Requirement for the Master of Sciences  
(Finance)**

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## ABSTRAK

Kajian ini mengkaji faktor-faktor makroekonomi yang mempengaruhi pasaran saham di Malaysia. Antara faktor-faktor makroekonomi yang dikaji adalah bekalan wang, inflasi, harga minyak, kadar pertukaran mata wang dan indeks pengeluaran industri. Manakala pasaran saham Malaysia yang dikaji adalah FTSE Bursa Malaysia KLCI (FBM KLCI) dan FTSE Bursa Malaysia EMAS Indeks (FBM EMAS Indeks). Hasil kajian mendapati hanya tiga pembolehubah makroekonomi yang penting dapat mempengaruhi FBM KLCI manakala dua lagi tidak mempengaruhi secara penting. Bagi FBM EMAS Index pula, semua pembolehubah makroekonomi tidak dapat mempengaruhi secara penting kecuali bekalan wang. Walaubagaimanapun, kedua-dua pasaran saham ini menunjukkan hubungan yang sama iaitu hanya inflasi mempengaruhi secara positif manakala empat pembolehubah lain mempengaruhi secara negatif. Akhir sekali, krisis kewangan 2008 menunjukkan tiada kesan penting keatas kajian ini.

Katakunci : bekalan wang; inflasi; harga minyak; kadar pertukaran mata wang; indeks pengeluaran industri; FBM KLCI; FBM EMAS Indeks

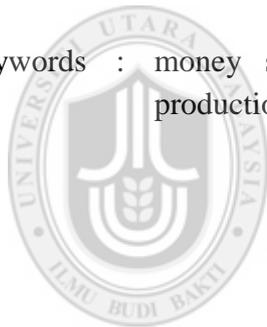


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## ABSTRACT

This paper studies macroeconomic factors that influence stock market in Malaysia. Macroeconomic factors used in this study are money supply, inflation, oil price, exchange rate and industrial production index. Meanwhile, Malaysian stock market returns studied are FTSE Bursa Malaysia KLCI (FBM KLCI) and FTSE Bursa Malaysia EMAS Index (FBM EMAS Index). The findings showed only three macroeconomic variables are significantly influenced FBM KLCI while the rest two are not significant. Meanwhile, for FBM EMAS Index, all macroeconomic variables are not significantly influenced except for money supply. However, both stock returns show the same relationship which is only inflation has positive influences while the rest four variables are negatively influence. Lastly, the financial crisis 2008 indicates that there is no significant impact on this study.

Keywords : money supply; inflation; oil price; exchange rate; industrial production index; FBM KLCI; FBM EMAS Index.



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## LIST OF ABBREVIATIONS

|            |  |
|------------|--|
| ABT        | : Arbitrage Pricing Theory                         |
| ADF        | : Augmented Dickey-Fuller                          |
| CPAM       | : Capital Asset Pricing Model                      |
| CPI        | : Consumer Price Index                             |
| D2LEMAS    | : Second Differnced FBM EMAS Index                 |
| D2LIP      | : Second Differenced Industrial Production Index   |
| DFC        | : Dummy Financial Crisis                           |
| DLEXR      | : First Differenced Exchange Rate                  |
| DLM2       | : First Differenced Money Supply                   |
| EXR        | : Exchange Rate                                    |
| FBM EMAS   | : FTSE Bursa Malaysia Emas Index                   |
| FBM KLCI   | : FTSE Bursa Malaysia Kuala Lumpur Composite Index |
| FBM SCI    | : FTSE Bursa Malaysia Small Cap Index              |
| FBM Top100 | : FTSE Bursa Malaysia Top 100 Index                |
| INF        | : Inflation  |
| IP         | : Industrial Production Index                      |
| KLSI       | : Kuala Lumpur Syariah Index                       |
| MFT        | : Morden Financial Theory                          |
| M2         | : Money Supply                                     |
| MYR        | : Malaysia Ringgit                                 |
| OP         | : Oil Price  |
| RHBII      | : Rashid Hussain Berhad Islamic Index              |
| SEE        | : Shanghai Stock Exchange Index                    |
| VIF        | : Variance Of Inflation Factors                    |

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

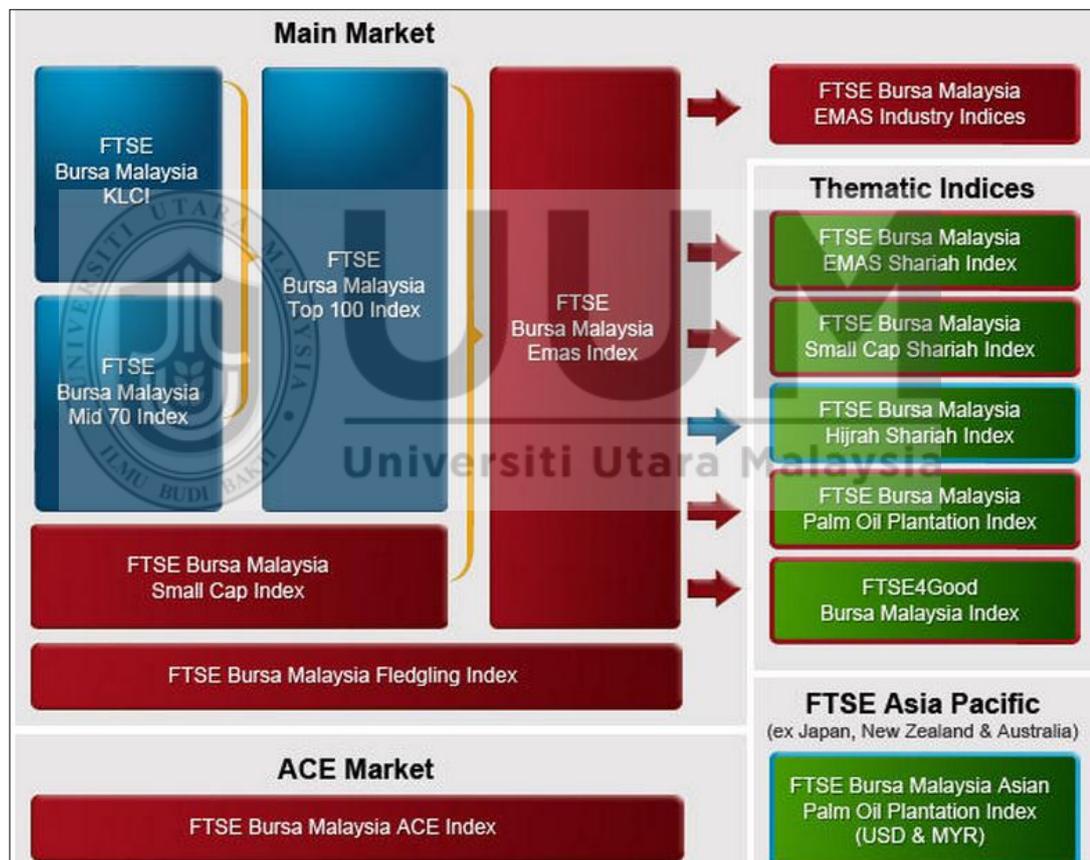
This study is conducted to examine the relationship between two of the Malaysian stock market returns and five macroeconomic factors. The Malaysian equity markets involved in this study are FTSE Bursa Malaysia KLCI (FBM KLCI) and FTSE Bursa Malaysia EMAS Index (FBM EMAS Index). Meanwhile, the five macroeconomic factors involved are money supply, inflation, exchange rate, oil price and industrial production index. This chapter provides background study, impact of financial crisis 2008, problem statements, research questions and objective, significance of study and study organization.

### 1.1 Background Study

In recent decades, equity market became a central issue in Malaysia as it is one of the important factors to represent economic activities. Ibrahim and Yusoff (2001) argued that interaction between macroeconomic and stock price is one of the focus that financial economists, policy makers and investors attempted to understand. They also mention that Malaysia's stock price seem to be driven more by the changes in domestic factor.

FTSE Group has partnered with Bursa Malaysia to create the definitive family of indices for the Malaysian market - the FTSE Bursa Malaysia Index Series. The FTSE Bursa Malaysia Index Series is designed to represent the performance of companies, providing investors with a comprehensive and complementary set of indices, which

measure the performance of the major size and industry segments of the Malaysia and regional market. All Malaysian companies listed on Bursa Malaysia Main Market and ACE Market are eligible for inclusion, subject to passing the FTSE international standards of liquidity and investability. The series divides the market into size segments (Large cap, Mid cap, Small cap and Fledgling), and includes Shariah-compliant indices, as well as themed indices representing the palm oil plantation sector. (FTSE Monthly Report, September 2015)

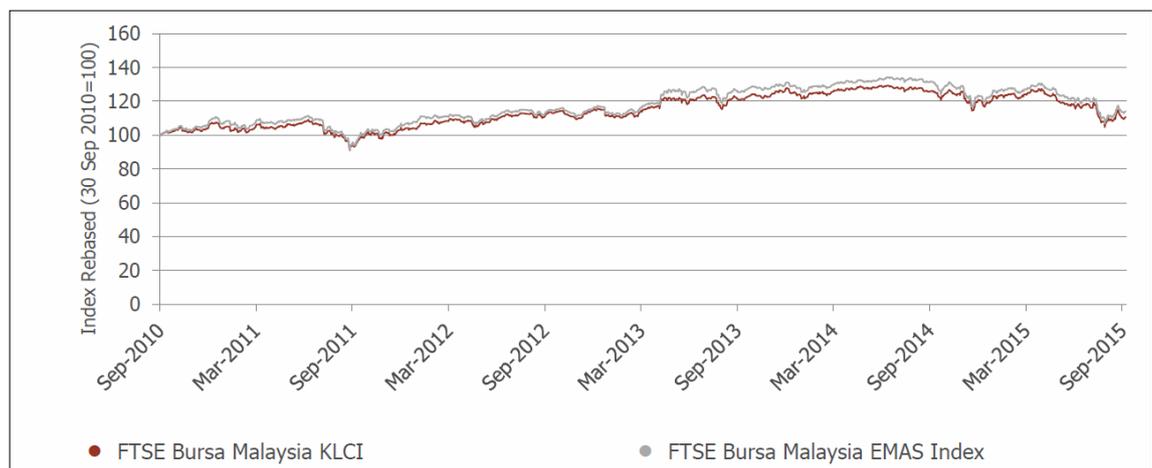


**Figure 1.1**  
**Overview of Malaysia main market**  
**Source: Bursa Malaysia official website, 2015**

Figure 1.1 shows an overview of main stock market which can be group into main market and ACE market. The main market, which is the focus market in this study is categorized into FBM KLCI and FBM EMAS Index. FBM KLCI is an index that

comprises of the 30 largest companies by full market capitalisation that meet stated eligibility requirements. Meanwhile, FBM EMAS Index comprises the constituents of the FBM Top 100 Index and the FBM Small Cap Index. It also cover 98% of the main board.

FBM KLCI is a free float adjusted market-capitalisation weighted index representing the performance of the largest Malaysian blue chip companies, which pass the size, free float, and liquidity screens. The index represents approximately 60 per cent of the Bursa Malaysia Main Market and as at the end of September 2015 there were 30 constituents in the index. Meanwhile, FBM EMAS Index is a free float adjusted market-capitalisation weighted index representing the performance of approximately 98% of the Bursa Malaysia Main Market which pass the size, free float, and liquidity screens. As at the end of September 2015 there were 276 constituents in the index (FTSE monthly report, Sept 2015).



**Figure 1.2**  
***FBM KLCI and FBM EMAS Index five years performance***  
**Source: FTSE monthly report (September 2015)**

Figure 1.2 shows the performance in five years for FBM KLCI and FBM EMAS Index. Generally, FBM EMAS Index outperforms FBM KLCI although in September 2015, FBM KLCI shows a slight increase of 0.52%.

In 2008, there is a sub-prime crisis that impacts the financial sectors of economies around the world. As in Malaysia, the crisis had significant impact not only on the real sector but also in financial sectors especially in stock market. However, Malaysia did not experience the direct impact of the crisis. Kassim, Majid and Hamid (2011) argued that FBM KLCI recorded the smallest average decline compared to the US and Japanese stock market during the crisis period. The volatility of FBM KLCI also shows less volatile. In addition, Malaysian sectorial indices are the most stable during this crisis period as compare to other two countries' stock market. The justification behind their result is attributed to the fact that Malaysia does not significantly affected by US Subprime Lending.

## **1.2 Problem Statements**

There are many studies that investigate the relationship of macroeconomic and stock market return in Malaysia context (Ibrahim & Wan, 2001; Ibrahim & Aziz, 2003; Rahman, Sidek & Tafri, 2009; Yusof & Majid, 2007). However, most of these studies are limited to examine FBM KLCI as a proxy for stock market return. In addition, some authors used other indices to examine the interaction. Yusof and Majid (2007) do not only studied the impact of macroeconomic variables on FBM KLCI but also on Islamic stock market which is known as Rashid Hussain Berhad Islamic Index (RHBII).

The Malay Mail Online (2014) reported that the weaker oil price is contributed by the lower closing price in FBM KLCI and FBM EMAS. The decline in oil price about 29 cents bring FBM EMAS Index to declined about 343.69 points to 12195.4. The changes in FBM EMAS Index shows that FBM EMAS Index is influenced by oil price and other macroeconomic factors.

According to Maskay and Chapman (2007), money supply is one of the important element in the federal government for making their policy monetary. There are many studies that examine money supply with stock market return. However, there are some of the findings reveal that there is no positive significant relationship between money supply and market return in long run. This situation is due to the Asian crisis that make irregularity interaction between market return and macroeconomic variables (Ibrahim & Wan, 2001; Ibrahim & Aziz 2003).

The Statistics Portal (2015) reported that the inflation rate for 2015 should be decreased compared to previous year about 1.7%. Meanwhile, the projected following years will be constant at 3%. Financial Advisor (2008) clarified that inflation is good for a common stock as it can boost earnings growth. It can also be as stock predictor due to the stable momentum over years. However, this clarification is in contrast with Fama (1981), Chen, Roll and Ross (1986), Gan et. al (2006). Subeniotis et.al. (2011) and Hsing, Budden and Philip (2012). They found that the negative relationship exists between inflation and stock return. In addition, Khil and Lee (2000) documented only Malaysia have a have a positive link of inflation and stock return among the 10 Pacific-rim countries. The findings show that Malaysia stock return act as hedge instruments against inflation.

The fluctuation of oil price will highly influenced the stock market by influencing the other sectors like manufacturing such as increase in production costs. Previous study shown that, there is a negative relationship between oil price and stock return. Hosseini, Ahmad, and Lai (2011) find a negative relationship between oil price and India stock market in long run but positive relationship in Chinese stock market.

In Malaysia, exchange rate is highly dependent on international trade as it is a developing country (Ibrahim & Wan, 2001). This is contrary to the study conducted in developed countries such as G-7 Countries (Canada, France, Germany, Great Britain, Italy, Japan, and United States) which is not significantly influenced by exchange rate in the long run but significant in the short run for one day (Nieha & Lee, 2001). In addition, study in Malaysia finds that FBM KLCI is not in positive relationship but significant with exchange rate due to the Asian crisis. This situation contributes to the value decreasing in exchange rate and stock price.

Industrial production index is an indicator to measure industrial growth of a country. Tsoukalas (1988) argued that this industrial production index has the ability to predict stock prices. Thus, industrial production index is one of the macroeconomic variables that can be used as determinants on stock return.

Overall study is conducted to see the relationship of FBM KLCI and FBM EMAS Index with the five macroeconomic variables; money supply, inflation, oil price, exchange rate and industrial production index. This study important as it is amongst the earliest study that examines the influenced of FBM EMAS Index with five

macroeconomic variables. Thus, the results could be compared to other Malaysian stock return proxy such as FBM KLCI. Besides, the inclusion period of 2008 Asian financial crises contributes to the literature of Malaysian equity market.

### **1.3 Research Questions**

There are many macroeconomic factors that can influence the market return of a country. In this study, five main macroeconomic factors are selected to be examined in the relationship to Malaysian stock market return. This study intends to answer the following question:

- a) Do money supply, inflation, oil price, exchange rate and industrial production index have significant relationship with FBM KLCI?
- b) Do money supply, inflation, oil price, exchange rate and industrial production index have significant relationship with FBM EMAS Index?

### **1.4 Research Objectives**

According to the research questions, the main objective of this study is to determine how macroeconomic factors influence the movement of stock market return in Malaysia. Thus, the objective is:

- a) To investigate the significant relationship of money supply, inflation, oil price, exchange rate and industrial production index with FBM KLCI.
- b) To examine the significant relationship of money supply, inflation, oil price, exchange rate and industrial production index with FBM EMAS Index.

## **1.5 Significance of Study**

This study is conducted on macroeconomic influences in Malaysian market indices which is different from other previous study in terms of the dependent variables used. This study adds one new dependent variable; FBM EMAS Index. Previously, researchers never use these variables. One of the uses of FBM EMAS is to see how macroeconomic variables influence the overall main market.

This study is expected to contribute related parties such as economists, policy makers and investors. Economists play an important role in managing country's economy. Thus, this study will become very significant to them as they will know which of the macroeconomic factors that mostly influences the Malaysian stock market return. This is important so that efforts to improve economic sectors can be focused.

This study also important for policy makers as it can help them to improve country's economy by proposing economic factors that can boost Malaysian stock market. This would in turn, help to enhance capital market.

Investors play an important role in investment markets, especially in an equity market. Thus, all the data regarding investments or stock markets are important to be analysed. This study can help them to know some of the important macroeconomic factors that influence stock market. Therefore, they can make a decision either to invest or not, based on the economic situations in order to avoid from making negative investment returns.

Lastly, this study can contribute to the body of knowledge about which macroeconomic factors are more likely to influence the emerging market such as Malaysia.

## **1.6 Organization of Study**

The organization of this study is divided into five chapters. The first chapter in this study is introduction. In this chapter background of study, problem statements, research questions and objectives, significance of study and the study organization is explained. The next chapter is Chapter 2 that elaborates about the previous study and the literature review of macroeconomic factors influence stock market. Chapter 2 also consists of all the hypotheses involved in this study and the research framework. Chapter 3 describes research methodology used. This chapter clarifies the method used in this study. The descriptive of data also explain in this chapter followed by the regression model and the other research analysis used in this study. The fourth chapter is on empirical result. This chapter revealed the findings of the study. The interpretation of data is also explained in this chapter. The final chapter is discussion and conclusion. This chapter discusses in detail about the findings, limitations and suggestions for further study.

## **1.7 Conclusion**

This chapter conclude the introduction part of this study. This study is conducted to see the significant relationship between macroeconomic variables toward FMB KLCI and FBM EMAS Index. Herewith in this study explained the backgrounds of study, problem statements, research questions and objectives, significance of study and finally summarise the organization of study.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.0 Introduction

This chapter highlights the theoretical and empirical evidence from the previous studies that focus on understanding and identifying macroeconomic factors that influence Malaysian stock market return, emphasising on FBM KLCI and FBM EMAS Index. It offers the significant features and influences of the stock markets that give impact to the economies of the country, Malaysia. This chapter also provides prior relevant researches for better understanding on Malaysian stock market.

Due to the uprising global economic transformation, economic activities cannot be overlooked as they will directly influence the economies of a country. The effects of this transformation on stock markets and the important interaction between macroeconomic variables and stock market return have to be further researched to enhance Malaysian economic performance. According to Janor, Halid and Rahman (2005), stock market return can act as an indicator to predict economic condition of a country.

Despite of various studies that examine relationship between stock market performances and related to macroeconomic environment in other countries, only a few has focused on Malaysian stock market return and none of them has focused on FBM EMAS Index.

## **2.1 Underlying Theory**

Basically, there is no single theory that could explain specific direction of relationship between financial markets and macroeconomic factors. This is because more economic variables are endogenous in nature. In other word, economic variable having an internal cause and can be explained in some ultimate sense.

### **2.1.1 Modern Financial Theory**

Modern financial theory claims that the stock market returns could be affected by macroeconomic variables. According to Chen, Roll and Ross (1986), macroeconomic variables which are the spread between long and short interest rates, expected and unexpected inflation, industrial production index and the spread between high and low grade bonds, are all significantly priced. In addition, there is none of market portfolio and aggregate consumption are priced separately. They also found that oil price risk is not separately rewarded in the stock market.

### **2.1.2 Arbitrage Pricing Theory**

The arbitrage pricing theory (APT) describes the price of a mispriced asset is expected to be. APT was developed by Ross (1976) that link stock returns to several variables that characterize several sources of income volatility. The theory has been tested by Chen, Roll and Ross (1986) who examine relationship between macroeconomic variables and stock return in the US stock market. It is often viewed as an alternative to the capital asset pricing model (CAPM), since the APT has more flexible assumption requirements. While the CAPM requires the market's expected return, APT uses the risky asset's expected return and the risk premium of a number

of macro-economic factors. Arbitrageurs use the APT model to make profit by taking advantage of mispriced securities. A mispriced security will have a price that differs from the theoretical price predicted by the model. By going short an overpriced security, while concurrently going long the portfolio APT calculations were based on, the arbitrageur is in a position to make a theoretically risk-free profit.

## **2.2 Independent variables**

Independent variables are variables that can affect dependent variables. In previous studies, there are many researchers who studied macroeconomic factors that influence market return. After a thorough review on the previous studies, this study come out with the most relevant independent variables that are money supply, inflation, oil price, exchange rate and industrial production index.

### **2.2.1 Money supply (M2)**

Maskay and Chapman (2007) defined money supply as one of the element in monetary policy for the federal government. There will be either anticipated or unanticipated of money supply by the people. Besides, based on Schwartz (2015), money supply can be divided into several groups such as M1, M2 and M3. This is according to the type and the account size in which the instrument is kept. Meanwhile, Lee and Wong (2009) explains; M1 consists of currency held by public plus demand deposit. M2 is equal to M1 plus savings and time deposits with licensed banks and held by the public, while M3 is equal to M2 plus deposits with restricted licensed banks and deposit taking companies and held by the public.

Theoretically, the relationship between money supply and stock price can be either positive or negative. Monetary portfolio theory suggests that money supply changes will adjust the equilibrium position of money, thus will alter the assets price and composition in an investor's portfolio (Cooper, 1974; Roxeff, 1974). Besides, Rogaliski and Vinso (1977) shows that money supply changes may have an influence on real economic variables, thereby having a lagged impact on stock returns. Both mechanisms suggest that there is a positive relationship between changes in money supply and stock returns.

This result is also supported by other researchers (Bailey (1989); Tsoukalas (1988); Al-Aharkas (2004); Gan, Lee, Ypng & Zhang (2006); Yusof & Majid (2007); Hosseini, Ahmad & Lai (2011) and Hsing, Budden & Philip (2012)). The study of US money supply announcement on Canadian stock, bond and currency prices indicates that the weekly changes on US M1 and the periodic shifts in US monetary policy gives direct impact to Canadian financial market and economy (Bailey, 1989). However, smaller result is not observed the weekly money supply influences of US. For US M1, since changes in indicators of Canadian monetary policy cannot explain the financial market of the country.

In Cypriot, Tsoukalas (1988) confirms that the macroeconomic variables (industrial production index, CPI, money supply and exchange rates) and Cypriot stock prices have a strong connection. The strong relationship is also consistent with evidence in Jordan stock market by Al-Aharkas (2004), major Latin American countries by Hsing, Budden and Philip (2012) and China by Hosseini, Ahmad, and Lai (2011). Studies in major Latin American countries (Argentina), shows that money supply

must increase as the percentage of GDP increase to strengthen the Argentine stock market.

In addition, Gan, Lee, Yong, and Zhang (2006) indicate that New Zealand Stock Exchange of the 40 largest companies (NZSE40) is consistently determined by the interest rate, money supply and real GDP during 1990-2003. They also suggest to investors who are interested in investing within New Zealand market should give more attention to the three variables mentioned rather than the exchange rate and inflation rate index (CPI) as the New Zealand investment perception is a mixture of other established stock market.

However, Kraft and Kraft (1977) have found that there is no causal relationship between US money supply and stock return. This is consistent with Ibrahim and Wan (2001), Ibrahim and Aziz (2003), Hosseini, Ahmad, and Lai (2011) and Hussin, Muhammad, Abu, and Awang (2012). According to Ibrahim and Wan (2001), stock prices are more likely to be affected by the changes in domestic factors especially in money supply. They reveal that the negative relationship between M2 and stock price in Malaysia only occur in long run but not in short run. Ibrahim and Aziz (2003) found negative relationship between M2 and FBM KLCI in the long run. They attribute the negative relationship caused by Asian crisis that create irregularity in the interaction between stock market and macroeconomic variables.

According to Fama (1981), he has concluded that the stock market is influenced by the degree of excess liquidity. The effect in monetary policy changes is relatively direct and quick. Monetary expansion reduced short-term interest rate as far as the

liquidity effect dominates the combined expected price effect and income effect. In turn, stock market will boost as stock price and interest rate should be negatively correlated.

Thus, according to the previous studies, the first hypothesis is developed.

### **Hypothesis 1**

H<sub>1</sub>: There is a significant relationship between money supply (MS2) with FBM KLCI and FBM EMAS Index.

#### **2.2.2 Inflation (INF)**

The relationship between inflation and common stock returns has been extensively studied in previous. Theoretically, stocks are assumed to be inflation neutral for unexpected inflation which means always have a negative relationship with stock prices. Unexpected inflation may directly affect the stock market index negatively through unexpected innovations in the price level. Inflation uncertainty may also influence the discount rate, thus decreasing the present value of future corporate cash flows.

Subhani, Osman and Gul (2010) argue that a price index is a measure of the aggregate price level relative to a selected base year. CPI is a principle measure of price fluctuations at retail level and it represents the cost of purchasing goods and services consumed by private household. In other words, CPI is a proxy of inflation because the annual percentage changes in a CPI act as inflation. Besides, government also plays an important role in adjusting consumer's payment.

Furthermore, high inflation rates will increase the cost of living and a shift of resources from investments to consumption. This leads to a fall in the demand for market instruments that lead in the reduction of the stock volume traded. The monetary policy also responds to the increase in the rate of inflation with economic tightening policies, which in turn increases the nominal risk-free rate and hence raises the discount rate in the valuation model.

Fama (1981) and Chen, Roll and Ross (1986) support this negative relationship. They stated that nominal contracts that disallow the immediate adjustment of the firm's revenues and costs could prevent cash flows to grow at the same rate as inflation. The argument is supported by Gan et. al. (2006), Subeniotis et. al. (2011) and Hsing, Budden and Philip (2012).

However, Fisher's effect forecast that the stock market will positively influenced by expected inflation. Tsoukalas (1988) has found that the regression result have a positive relation between CPI and stock Cypriot stock market. The relationship of both variables along with monetary policy and industrial production index imply that the Cypriot stock market has become more efficient. The stock price will reflects macroeconomic policies implemented by Cypriot monetary and fiscal authorities.

The result is similar with Hosseini, Ahmad and lai (2011), Pal and Mittal (2011) and Hussin et al. (2012) who found that the inflation shock was having a positive relationship which made a good inflation in stock for long run period. In addition, Adam and Tweneboah (2008) conclude that inflation positively correlates with stock

prices due to stock market partly or fully hedge against inflation. Ibrahim and Aziz (2003) specified this relationship through the concept of value protection, the equities are serves as a hedge instruments against inflation as inflation represent claims on real assets.

Based on earlier studies, the second hypothesis is developed.

## **Hypothesis 2**

H<sub>1</sub>: There is a significant relationship of inflation (INF) with FBM KLCI and FBM EMAS Index.

### **2.2.3 Oil Price (OP)**

Recently, oil price becomes an important factor in predicting the stock return as it will affect many sector in the industry such as manufacturing, servicing, tourism and others. Therefore, it will be reflected in transportation cost as well as their selling price. It constitutes the major part of the input for manufacturing costs. Then, inflation will happen when the cost of production raises due to the extra increase in cost and the cost will be transposed to consumers which eventually reduce their purchasing power. Consequently, oil price has a negative relationship with stock returns.

In Jones and Kaul (1996) study on oil price and stock market returns, they found out that there is highly influenced by oil prices in both the United Kingdom and Japan stock and thus lead to changes in stock price. However, Japan and Canada had greater influence by oil prices compared to the United State and the United

Kingdom. Other researchers had different result in which oil price did not have any influence on stock returns (Chen, Roll & Ross, 1986).

According to Bashar and Sadorsky (2006), they found that emerging countries such as Argentina, Brazil, Chile and others react positively to oil prices and statistically significant. Authors highlight that oil price risk plays an important role in pricing emerging market stock return. Similarly, Rault and Arouri (2009) have shown that there is cointegration of oil prices and stock market in GCC countries since GCC countries are major oil producers and exporters. Thus, it make their stocks market are likely to be susceptible to oil price shocks.

In addition, Ravichandran and Alkhatlan (2010) also studied on GCC countries. The result is consistent with Rault and Arouri (2009). There is a long term influences of oil prices on GCC stock prices prevail, as oil price affect transmit to macroeconomic indicators that influence liquidity of these markets. The findings suggest that the effect of oil price changes transmit to fundamental macroeconomic indicators which in turn affect the long term equilibrium linkage between these markets.

However, there are some previous studies shown a negative relation that is reliable with the concept of oil price. Hosseini, Ahmad and Lai (2011) present a negative relationship between oil price and India stock market in long run. Meanwhile, in the same study, the authors found a positive relationship on China stock market. This finding has been supported by Millera and Rattib (2009) where they reveal a long run negative relation between oil price and stock price.

By referring to the previous studies from Jones and Kaul (1996), Bashar and Sadorsky (2006) and Rault and Arouri (2009), the third hypothesis is developed.

### **Hypothesis 3**

H<sub>1</sub>: There is a significant relationship of oil price (OP) with FBM KLCI and FBM EMAS Index.

#### **2.2.4 Exchange Rate (EXR)**

The impact of exchange rate on the economy will depend on level of international trade and the trade balance. Hence, the impact will be determined by the relative dominance of import and export sectors of the economy.

In Malaysia economy context, , the Central Bank of Malaysia has been highly active in achieving multiple objectives of stable price level, stable exchange rate, sustainable output growth and low unemployment (Ibrahim & Aziz, 2003). Certain objectives can be important, thus the Central Bank have to shift policy stance. For example, the contractionary effects of oil price shocks prompted easy monetary policy in 1973, which was then reversed to tight monetary policy in 1974 to contain inflationary pressures. Similarly, the Central Bank shifted to stabilizing the exchange rate in 1986 and allowed the interest rate to increase despite its expansionary stance in 1985 to cope with the recession. The active participation may have intended effects in the short run but generates risk premiums and uncertainty in the long term, prompting a negative relation between money supply and stock prices.

Pal and Mitta (2011) and Hsing, Budden, and Philip (2012) reveals the positive long run relationship between exchange rate and stock prices in India and Argentina respectively. The findings are consistent with study in Cypriot by Tsoukalas (1988). He reveals that the strong relationship between stock price and exchange rates should not be surprising since the Cypriot economy depends on import sectors such as tourism, offshore banking etc. Thus, the exchange markets innovation are transmitted to stock market and vice versa.

However, there are some studies that show negative relationship. Nieha and Lee (2001) studies on G-7 countries indicates that there is no long run significant relationship between stock prices and exchange rates. Meanwhile, in the short run, significant relationship only exist for one day in certain G-7 countries. It also suggested that the record of stock price and the value of the dollar cannot be depended on when predicting the future in the US, either in short or long run.

In Malaysian context, there are also studies that find negative relationship. Ibrahim and Aziz (2003) studied on the FBM KLCI found the negative relationship between stock price and exchange rates due to the Asian crisis that gives the irregular interaction on variables and FBM KLCI. This finding is consistent with Yusof and Majid (2007) where the exchange rates are negatively skewed with RHBII and FBM KLCI. Moreover, the result is also consistent with recent observations during the Asian crisis that both stock prices and exchange rates substantially decreased in value. In addition, there was a negative relationship between exchange rate and Kenya stock market. The decline in stock return supported the negative and significant coefficient of exchange rate (Kirui, Wawire, & Onono, 2014).

Hence, by looking on previous studies on impact of exchange rates on stock prices, the forth hypothesis is developed.

**Hypothesis 4:**

H<sub>1</sub>: There is a significant relationship of exchange rate (EXR) with FBM KLCI and FBM EMAS Index.

**2.2.5 Industrial Production Index (IP)**

Industrial production index has been one of the important factor in determining economic condition of a country. According to Tsoukalas (1988), industrial production index has the ability to predict stock prices. Meanwhile, Hussin et al. (2012) found the positive influence of industrial production on Kuala Lumpur Syariah Index (KLSI). The same result also figured by Al-Aharkas (2004) where industrial production index become one of the positive determinant factors influence Jordanian stock market. The positive relationship is consistent with Chen, Roll and Ross (1986), Hosseini, Ahmad and Lai (2011), Ibrahim and Aziz (2003) and Ibrahim and Wan (2001).

Industrial production index has a positive long run relationship with FBM KLCI based on the study of Ibrahim and Wan (2001). In addition, this relationship is due to the changes in the stock prices that reflect the expectation of future economic conditions. In another research on the same market of FBM industrial production index also indicate a positive relationship (Ibrahim & Aziz, 2003). This result is anticipated as it directly influence firm's expected future cash flow.

Meanwhile, based on Hosseini, Ahmad and Lai (2011), the positive connection between stock market index and industrial production index in India is a result of an increase in real activities. The real activities will influence the stock prices due to its effect on dividends. In addition, study in Pakistan shows a positive relationship between industrial production and stock return. Through a small portion of GDP, industrial production index performs as the real activity in Pakistan (Alam & Rashid, 2014).

However, there are some researchers who have negative result on the linkage between market return and industrial production index. Subeniotis et al. (2011) studied on European market shows a negative connection with industrial production index which represent the industrial growth of a country. Meanwhile, in Malaysia context, Yusof and Majid (2007) compare Islamic and conventional stock markets. The result shows a negative relation with industrial production index in both markets.

The same relationship is revealed by Hosseini, Ahmad and Lai (2011) where in China market, Shanghai Stock Exchange index (SSE) has negative connection with industrial production index due to an increase in the productivity of real capital which raises expected future output. As a result, higher expected market return will make investors to borrow against expected future output and then increase the demand for fund that lead to increase the interest rate. Interest rate increase will cause the present value of future cash flow decrease and therefore the earning received will be lower which in turn reducing share prices.

Therefore, the fifth hypothesis is built based on the previous research.

### **Hypothesis 5:**

H<sub>1</sub>: There is a significant relationship of industrial production index (IP) with FBM KLCI and FBM EMAS Index.

### **2.3 Conclusion**

This chapter discusses the previous studies that had been done to find the influences of macroeconomic variables on market returns. Based on the literature review, a research framework is proposed. The next chapter will discuss the research methodology used in this research.



## **CHAPTER 3**

### **METHODOLOGY**

#### **3.0 Introduction**

This study is conducted to determine the relationship between stock market returns and the macroeconomic factors. This study employs multiple regression in order to analyse the data. Multiple regression a statistical techniques to predict the dependent variable on the basis of the dependent variable's value on several other explanatory (independent) variables.

#### **3.1 Sample Selection Procedure**

This study focuses on Malaysian stock market indices which are FBM KLCI and FBM EMAS Index. By referring to the official Bursa Malaysia website, FBM KLCI consists of the most 30 active companies traded in the main board, while FBM EMAS Index cover 98% of listed companies on the main board of Bursa Malaysia. FBM EMAS consists of FTSE Bursa Malaysia Top 100 Index (FBM Top100) and FTSE Bursa Malaysia Small Cap Index (FBM SCI). FBM SCI comprises those eligible companies within 98% of Bursa Malaysia but not including constituents of FBM Top100 index. The time lapse of 8 years from 2007 until 2014 will be used as it is a normal economic cycle according to the Juglar economic cycle theory implemented by Clemént Juglar. He is an economist who identified a medium economic cycle of between 7 to 11 years. This cycle are one of the business cycle theory that able to identify economic cyclical trends. In Juglar cycle, the trends in investment levels and unemployment can be identified (Economic Made Simple, 2015).

FBM KLCI and FBM EMAS will be dependent variables in this study. Meanwhile, there are five independent variables in this study which are money supply, inflation, oil price, exchange rate and industrial production index. The earlier relationship between these two types of variables can be expressed in the regression formula.

### **3.2 Data Collection Method**

The types of data that has been used in this study is the secondary data. Sources of secondary data can be extracted from several sources such as books, government publication of economic indicators, census data, data bases, etc. Data on macroeconomic variables and market indices were extracted from Data stream databases. In this study, the data collected are from Thomson Reuters Datastream Professional.

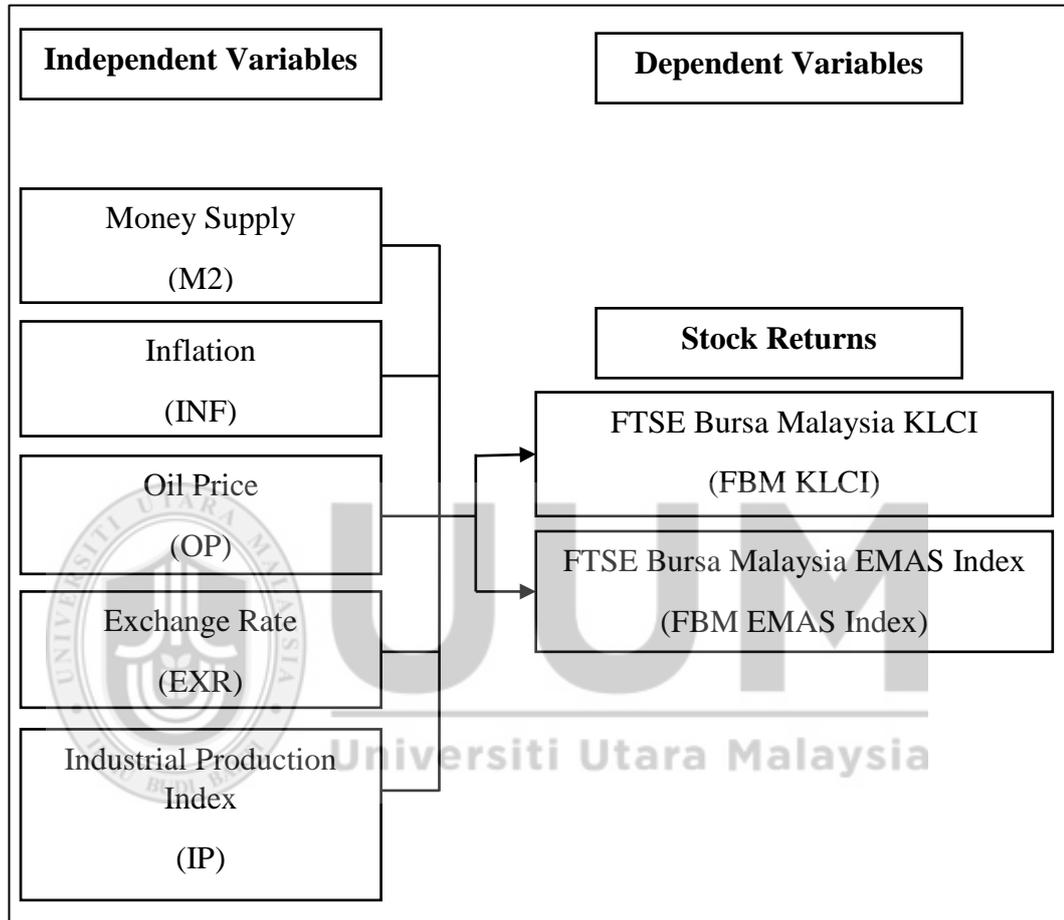
The study employs time-series data that spans from January 2007 until December 2014. The period of 8 years is selected following the Juglar economic cycle theory. The economic cycle within 7 to 11 years can predict the investment level and unemployment including inflation and other economic variables.

All collected dependent and independent are in quarterly basis. The data for FBM KLCI, FBM EMAS and inflation are extracted in index units; money supply, oil price and industrial production index are in Malaysian Ringgit (MYR); while for exchange rate it is collected in MYR to US dollar (USD). In specific, column 3 and column 4 Table 3.1 summarize variables definition and associated units. Kandir (2008) emphasized that the data gathered converted to natural logarithm to reduce the gap between the variables.

### 3.3 Theoretical Framework

Researchers designed theoretical framework as to explain the research conducted.

The theoretical framework of this study is illustrated in Figure 3.1.



**Figure 3.1**  
*Theoretical framework of Study*

### 3.4 Data Description

To measure Malaysian stock market return, this study uses two common indices which are FBM KLCI and FBM EMAS Index. Those indexes are normally used to reflect the Malaysian equity market performance. While, FBM KLCI involves the most 30 active companies of the main market and FBM EMAS Index reflects 98% of the main board. Money supply is represented by M2 money aggregate (M2). This study employ consumer price index (CPI) for computing inflation. CPI is also used

as a measure of the aggregate price level. The oil price per barrel in MYR is used to measure the oil price variable. Meanwhile, to measure exchange rate, this study use bilateral Ringgit exchange rate versus US dollar. The use of bilateral Ringgit-US dollar rate is justified based on its importance to Malaysian international transaction and economy (Ibrahim & Aziz, 2003). Finally, last variable used to measure real output is real industrial production index (IP). The following Table 3.1 summarize the description of data.

**Table 3.1**  
*Description of related variables*

| Variables        | Proxy             | Explanation  | Units                | Measures used by  |
|------------------|-------------------|--|----------------------|---|
| FBM<br>KLCI      | LKLCI             | Quarterly active composite market in Malaysia                                | Index                | Ibrahim and Aziz (2003);<br>Rahman, Sidek and Tafri (2009);<br>Ibrahim and Wan (2001)                           |
| FBM<br>EMAS      | LEMAS,<br>D2LEMAS | Quarterly capitalization weighted index of Top 100 Index and Small Cap Index | Index                | -   |
| Money<br>Supply  | LM2,<br>DLM2      | Quarterly second category of money supply in Malaysia                        | MYR<br>(milli<br>on) | Maskay and Chapman (2007);<br>Lee and Wong (2009);<br>Al-Aharkas (2004)   |
| Inflation        | LCPI              | Quarterly Consumer price Index (CPI)   | Index                | Subhani, Osman and Gul (2010);<br>Fama (1981);<br>Chen, Roll and Ross (1986);<br>Hosseini, Ahmad and Lai (2011) |
| Oil Price        | LOP               | Quarterly oil price of one barrel in MYR                                     | MYR                  | Jones and Kaul (1996);<br>Bashar and Sadorsky (2006);<br>Rault and Arouri (2009)                                |
| Exchange<br>Rate | LEXR,<br>DLEXR    | Quarterly MYR to US dollar USD   | MYR:<br>USD          | Hsing, Budden and Philip<br>(2012);<br>Yusof and Majid (2007);<br>Nieha and Lee (2001)                          |
| Industrial       | LIP,              | Quarterly  | MYR                  | Hussin et. al. (2012);  |

|                  |       |   |  |  |
|------------------|-------|---|--|--|
| Production Index | D2LIP | industrial production index in Malaysia |  | Subeniotis et. al. (2011);<br>Yusof and Majid (2007) |
|------------------|-------|---|--|--|

### 3.5 Data Analysis

The analysis of data will be analysed after the multiple regression is run using Eview version 7. It consists of data descriptive, coefficient, R-squared, adjusted R-squared and hypothesis testing using t-statistic and F-statistic.

#### 3.5.1 Multiple Regression Analysis

Regression can be defined as a statistical measure that attempts to indicate the relationship strength between two variables which are dependent and independent. Coakes and Ong (2011) enhance that the result of regression in an equation will present the best prediction of dependent variable from several independent variables. There are two type of regression, one is linear regression that uses one independent variable to predict outcome. Another one is multiple regression model where it is used to predict outcome with two or more than two independent variables.

The standard multiple regression equation is:

$$Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + u_t \quad \dots \text{(Eq. 3.1)}$$

Where;

- Y : dependent variable
- X : independent variables
- $\beta$  : slope (coefficient)
- $u_t$  : error term

The two multiple regressions used in this study are:

a) KLCI Multiple regression

$$\mathbf{LKLCI} = \beta_0 + \beta_1\text{LM2} + \beta_2\text{LCPI} + \beta_3\text{LOP} + \beta_4\text{LEXR} + \beta_5\text{LIP} + u_t \quad \dots \text{ (Eq. 3.2)}$$

b) EMAS Multiple regression

$$\mathbf{LEMAS} = \beta_0 + \beta_1\text{LM2} + \beta_2\text{LINF} + \beta_3\text{LOP} + \beta_4\text{LEXR} + \beta_5\text{LIP} + u_t \quad \dots \text{ (Eq. 3.3)}$$

Where;

|   |   |
|---|---|
| LKLCI   | : Natural logarithm of FTSE Bursa Malaysia KLCI       |
| LEMAS   | : Natural logarithm of FTSE Bursa Malaysia EMAS Index |
| LMS   | : Natural logarithm of Money Supply                   |
| LINF  | : Natural logarithm of Inflation                      |
| LOP   | : Natural logarithm of Oil Price                      |
| LEXR  | : Natural logarithm of Exchange Rate                  |
| LIP   | : Natural logarithm of Industrial Production Index    |
| $\beta_0$                                     | : Intercept   |
| $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ | : Slope (coefficient) of parameters                   |
| $u_t$   | : Error term  |

The dependent variable used in first equation is FBM KLCI and for the second one is FBM EMAS Index. Both models share the same independent variables those are money supply, inflation, exchange rate, oil price and industrial production index.

$\beta_0$  is the constant slope or y-intercept for the regressions. Meanwhile, the set of beta one until five ( $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ ) explains the coefficient or the slope for independent variable or parameters, both for KLCI and EMAS. Lastly,  $u_t$  define the error term or

the residual that cannot be explained by the model. It is also known as disturbance term.

In order to include the impact of 2008 Asian Financial crises, the basic models are reestimated by including dummy variable in both models.

a) KLCI Multiple regression include Dummy Financial Crisis

$$\mathbf{LKLCI} = \beta_0 + \beta_1\text{LM2} + \beta_2\text{LCPI} + \beta_3\text{LOP} + \beta_4\text{LEXR} + \beta_5\text{LIP} + \alpha + u_t \quad \dots \text{(Eq. 3.4)}$$

b) EMAS Multiple regression include Dummy Financial Crisis

$$\mathbf{LEMAS} = \beta_0 + \beta_1\text{LM2} + \beta_2\text{LCPI} + \beta_3\text{LOP} + \beta_4\text{LEXR} + \beta_5\text{LIP} + \alpha + u_t \quad \dots \text{(Eq. 3.5)}$$

Where;

$\alpha$  : Dummy Financial Crisis (alpha)

The analysis of both model is conducted using Eview seventh version. The result will indicate the coefficient value, R-Squared, T-Statistic, F-Statistic and some other important statistic that are used to conduct other statistical test.

### 3.5.2 Coefficient ( $\beta$ )

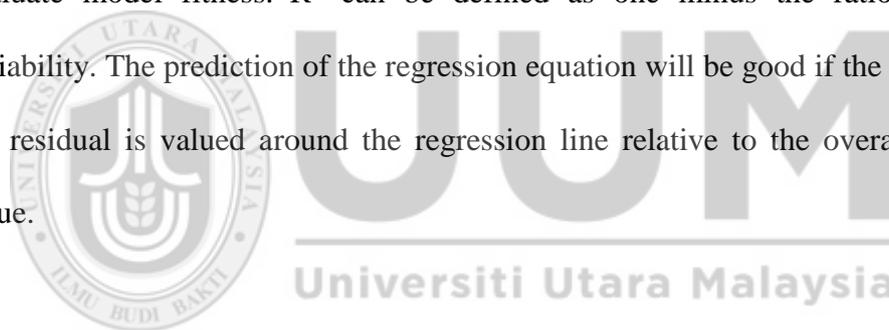
Coefficient is the best measure to explain the influences of independent variable towards dependent variable. In multiple regressions,  $\beta$  can be interpreted as a

marginal effect.  $\beta$  is a marginal effect of explanatory variable (X) on dependent variable (Y) but holding all the other explanatory variables constant (Koop, 2008).

### **3.5.3 Measure of Fit (R-Square, $R^2$ )**

Lewis-Beck (n.d.) explained  $R^2$  in his essay,  $R^2$  measures the explanatory or predictive power of a regression model. It is important to evaluate the performance of the estimated regression equation in regression analysis. The  $R^2$  is the leading performance measure for a simple or multiple regression models.

$R^2$  also known as determinant coefficient where it is commonly used in statistics to evaluate model fitness.  $R^2$  can be defined as one minus the ratio of residual variability. The prediction of the regression equation will be good if the variability of the residual is valued around the regression line relative to the overall variability value.



#### **3.1.1 Adjusted $R^2$**

The purpose of the adjusted  $R^2$  is to evaluate the goodness to fit after the total number of explanatory variables used in the model is adjusted. The value of  $R^2$  is considered higher if it is near to one. For example, the adjusted  $R^2$  is 0.8765 means that macroeconomic variables included in the regression explain 87.65% of the variation in the regression model after adjusting for the number of explanatory variables in the model.

#### **3.1.2 T-statistic**

T-statistic is used to determine whether there is a significant relationship between the two type of variables; dependent and independent. Gujarati and Porter (2009) clarify that, a significant test is a procedure by which sample results are used to verify the truth or falsity of a null hypothesis.

T-value is composed of the regression coefficient over standard error of coefficient. It can be expressed in the following formula:

$$T_{\text{value}} = \frac{\text{Regression Coefficient}}{\text{Standard Error of Coefficient}}$$

T-value will be compared to the critical t-value by referring to the t-table. The key idea behind this significant test is that of a test statistic and the sampling distribution of such a statistic under the null hypothesis. It is common to use the 95% confident interval at degree of freedom to obtain the critical value. Degree of freedom can be defined as the number of observation (n) minus the number of variable (k). The decision to accept or reject  $H_0$  is depend on the t-value on t-table by referring the folowing scale:

If Calculated t-value < Critical t-value; accept  $H_0$

If Calculated t-value > Critical t-value; reject  $H_0$

#### **3.5.4 F-Statistic**

F-statistic is used to test the hypotheses. F-value can be obtained after running an ANOVA test or regression analysis. The value will be able to find out if the means between two populations are significantly different. It is similar to a T-statistic from a T-Test; A-T test will tell you if a single variable is statistically significant and F-

test will tell you if a group of variables are jointly significant. F-value can be calculated using the below formula:

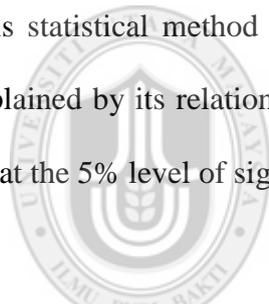
$$F_{\text{value}} = \frac{R^2 / (k - 1)}{(1 - R^2) / (n - k)}$$

In f-statistic, there are two degree of freedom involved to obtain the critical value which are  $(k - 1)$  and  $(n - k)$ . The value obtain will be used to determine whether null hypothesis is accept or otherwise as referred the following scale:

If Calculated F-value < Critical F-value; accept  $H_0$

If Calculated F-value > Critical F-value; reject  $H_0$

This statistical method will explain how much variability of a factor is caused or explained by its relationship to other factors. (P-values is less than 0.05, then reject  $H_0$  at the 5% level of significant).



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### **3.6 Diagnostic Test**

A regression diagnostic is one of a set of procedures available for regression analysis that seek to assess the validity of a model in any of a number of different ways. This study used three diagnostic ways which are multicollinearity, autocorrelation and heteroscedasticity.

#### **3.6.1 Stationary Test (Unit Root)**

Unit root test is a test to ensure the time series variables is stationary or non-stationary. Augmented Dickey-Fuller (ADF) test is type of test used to test the stationary of the variables. The null hypothesis for ADF test is “a variable” has unit root meaning that the variable is not stationary. The value of t-statistic will be

compared to critical value. If t-statistic value is greater than critical value the null hypothesis is rejected (variable is stationary). Then the P-value must be below than 5% to reject the null hypothesis.

### 3.6.2 Multicollinearity test

Gujarati and Porter (2009) stated in their book that originally, multicollinearity meant the absences of a perfect linear relationship among some or all explanatory variables in regression model. In another words, it is a phenomenon when two or more independent variables (predictor) in a multiple regression model are highly correlated with one another. In this situation, the correlation will change due to the small changes in the model. However, multicollinearity unable to reduce the predictive power of model as a whole. It only affect the calculation related to the individual predictor.

A multiple regression model with correlated predictor can identify how the whole predictor forecast the outcome. Yet, it still does not give valid result regarding any individual predictor even indicate which predictor are redundant with respect to other.

Variance-Inflating Factor (VIF) shows how the estimator variance is inflated by the presences of multicollinearity. VIF is defined as:

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

An optimum value for VIF should be in range 1 until 10. If the value exceeds 10, it indicates that the independent variables have high correlation which leads to a

multicollinearity problems. However, if multicollinearity problem exists, there is not much that can be done to correct the problem other than to drop out some of the highly correlated variables from the regression (Koop, 2008).

### 3.6.3 Autocorrelation Test

The term autocorrelation may be defined as correlation between members of observation series ordered in time (for time series data or space (for cross sectional data). One of the basic assumption is that the error term ( $\epsilon_t$ ) are mutually independent or uncorrelated. But, this assumption is not valid for certain cases such as for time series data where the successive error tends to highly correlated. In other words, there is a correlation between successive values of  $\epsilon_t$ . this type of correlation is known as autocorrelation (Gujarati & Porter, 2009).

### 3.6.4 Heteroscedasticity Test

The possible existence of heteroscedasticity is a major concern in the application of regression analysis that including the variance analysis. This is because the presence of heteroscedasticity can invalidate statistical test of significant that assume the effect and error or residual variance are uncorrelated and normally distributed.

Gujarati and Porter (2009) in their book defined that heteroscedasticity shows that the conditional variance of  $Y_i$  (dependent variables) increase as  $X$  (independent variables) increase. It explains that the variance of  $Y_i$  are not same. Symbolically,

$$E(u_i^2) = \sigma^2$$

### **3.7 Conclusion**

This chapter has discussed the method of this research which comprise of sample selection procedure, data collection method, data description and data analysis. Data analysis explanations include of the multiple regression analysis, R-square, T-statistic, F-statistic and autocorrelation. The following chapter will discuss the findings of the study.



## CHAPTER 4

### RESULTS AND DISCUSSIONS

#### 4.0 Introduction

This chapter provides empirical results of the factors influencing Malaysian market return. The interaction between dependent and independent variables are explained in details throughout this chapter. This chapter explains the findings on the multiple regression estimations and the coefficient to see the relationship on all independent variables towards dependent variables. Multicollinearity, autocorrelation and heteroscedasticity are tested to ensure the set of data employed do not have any problem. As a pre-requisite of time series data, unit root test are first to be tested for identifying the stationary of the data used.

#### 4.1 Regression Diagnostic Checking

A regression diagnostic is one of a set of procedures available for regression analysis that seek to assess the validity of a model in any of a number of different ways. This study used three diagnostic ways which are multicollinearity, autocorrelation and heteroscedasticity.

##### 4.1.1 Unit Root Test

Unit root test is a test to ensure the time series variables is stationary or non-stationary. Augmented Dickey-Fuller (ADF) test is type of test used to test the stationary of the variables. The null hypothesis for ADF test is “a variable” has unit root meaning that the variable is not stationary. The value of t-statistic will be compared to critical value. If t-statistic value is greater than critical value, the null

hypothesis is rejected (variable is stationary). Then the P-value must be below than 5% to reject the null hypothesis.

For this study, ADF tests are implemented with trend and intercept. With the exception of LKLCI, LCPI and LOP, the ADF test for the variables in levels indicate that they are non-stationary. When first differenced, LM2 and LEXR are stationary but the rest two variables are not. However, the rest two variables, LIP and LEMAS are stationary in second differenced. Since the tests show an existence of unit root in come variables, then the data are converted into the first differenced are LM2 and LEXR, while LIP and LEMAS in second differenced. Results of unit root test are shown in Appendix 6.

#### 4.1.2 Multicollinearity Test

Multicollinearity also known as collinearity, is a phenomenon when two or more explanatory variables in multiple regression are highly correlated. In other word, one explanatory variable can be linearly predicted from the others with a substantial degree of accuracy. The problem arise when the value of t-statistic is low while p-value is high. At this moment the value of coefficients are insignificant and should be dropped from regression. In an extreme case, it is possible to find that all coefficients are insignificant using t-statistic, while the  $R^2$  is quite large and significant. This means that explanatory variables together provide a great deal of explanatory power, but multicollinearity makes it impossible for regression to decide which particular explanatory variables are providing the explanation (Koop, 2008).

#### **Hypothesis:**

$H_0$ : There is no multicollinearity problem.

$H_1$ : There is a multicollinearity problem.

The decision to accept or reject  $H_0$  depends on the variance of inflation factors (VIF) value by referring the following scale (Baum, 2006):

VIF < 10; accept  $H_0$

VIF > 10; reject  $H_0$

**Table 4.1**  
*Variance Inflation Factors*

| Variance Inflation Factors |                          |                          |
|----------------------------|--------------------------|--------------------------|
| Variable                   | Centered VIF<br>FBM KLCI | Centered VIF<br>FBM EMAS |
| DLM2                       | 1.6797                   | 1.6797                   |
| LCPI                       | 1.4482                   | 1.4482                   |
| LOP                        | 1.0763                   | 1.0763                   |
| DLEXR                      | 1.4591                   | 1.4591                   |
| D2LIP                      | 1.0568                   | 1.0568                   |

Based on Table 4.1, all the VIF values are below 10 and the  $H_0$  is accepted. It means that there is no multicollinearity problem with both models.

A part of multicollinearity test, this study also employ correlation matrix. Correlation analysis is performed to show the association between two variables. It is important to run the correlation analysis in order to overcome multicollinearity problems in the subsequent analyses. Pallant (2006, 2007) highlights a few guidelines regarding the strength of variables relationship. It is considered small when the correlation lies between 0.1 to 0.29; medium when correlation between 0.3 to 0.49 and large for correlation is greater than 0.5, several regression are run to ensure that relevant variables are included in separate models to ensure that the results do not suffer from multicollinearity problem.

**Table 4.2**  
**Correlation Matrix**

|       | DLM2    | LCPI    | LOP     | DLEXR   | D2LIP   |
|-------|---------|---------|---------|---------|---------|
| DLM2  | 1       | -0.5183 | 0.1150  | -0.5047 | -0.1505 |
| LCPI  | -0.5183 | 1       | -0.0624 | 0.4105  | -0.0213 |
| LOP   | 0.1150  | -0.0624 | 1       | 0.1122  | -0.1486 |
| DLEXR | -0.5047 | 0.4105  | 0.1122  | 1       | 0.0372  |
| D2LIP | -0.1505 | -0.0213 | -0.1486 | 0.0372  | 1       |

Table 4.2 presents the correlation analysis of the explanatory variables. The correlation matrix shows that all the correlation value of pair variables are below than 0.5, meaning that the correlation are in small and medium range. Thus, this analysis supports that there is no multicollinearity in this study.

#### 4.1.3 Autocorrelation Test

Autocorrelation of a random process that describes the correlation between values of the process at different times, as a function of the two times or of the time lag. The Breusch–Godfrey serial correlation LM test is a test for autocorrelation in the errors in a regression model. It makes use of the residuals from the model being considered in a regression analysis, and a test statistic is derived from these.

#### Hypothesis:

$H_0$ : There is no autocorrelation problem.

$H_1$ : There is an autocorrelation problem.

The decision to accept or reject  $H_0$  depends on the P-value of Chi-Squared value under Breusch-Godfrey Serial Correlation LM Test by referring the following scale (Stock & Watson,2006):

Prob. Chi > 0.01; accept  $H_0$

Prob. Chi < 0.01; reject  $H_0$

**Table 4.3**  
**Breusch-Godfrey Serial Correlation LM Test**

| Breusch-Godfrey Serial Correlation LM Test: |             |             |                     |             |             |
|---|-------------|-------------|---------------------|-------------|-------------|
|   | FBM<br>KLCI | FBM<br>EMAS |                     | FBM<br>KLCI | FBM<br>EMAS |
| F-statistic                                 | 3.5683      | 1.0331      | Prob. F(2,24)       | 0.0166      | 0.4363      |
| Obs*R-squared                               | 16.2979     | 7.6848      | Prob. Chi-Square(2) | 0.0122      | 0.2621      |

Based on table 4.3, with lag of 7, both model have P-value of Chi-squared bigger than 0.01 and meaning that the  $H_0$  is accepted. Thus, this is evidence that both model have no autocorrelation problem.

#### 4.1.4 Heteroscedasticity Test

Heteroscedasticity refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it.

##### Hypothesis:

$H_0$ : There is no heteroscedasticity problem.

$H_1$ : There is a heteroscedasticity problem.

The decision to accept or reject  $H_0$  depends on the P-value of F-stat under that heteroscedasticity test of Breusch-Pagan-Godfrey by referring the following scale (Spanos, 1986):

Prob. F > 0.01; accept  $H_0$

Prob. F < 0.01; reject  $H_0$

**Table 4.4**  
**Heteroskedasticity Test: Breusch-Pagan-Godfrey**

| Heteroskedasticity Test: Breusch-Pagan-Godfrey |             |             |               |             |             |
|--|-------------|-------------|---------------|-------------|-------------|
|  | FBM<br>KLCI | FBM<br>EMAS |               | FBM<br>KLCI | FBM<br>EMAS |
| F-statistic                                    | 0.2966      | 6.0478      | Prob. F(5,24) | 0.9100      | 0.0010      |

Based on table 4.4, the P-value of F-stat for both model are above 0.01. This indicated that the  $H_0$  is rejected. Thus there is no heterocedasticity problem in both models.

## 4.2 Description Analysis

**Table 4.5**  
*Description Result*

| Descriptive Result |         |        |        |         |         |
|--------------------|---------|--------|--------|---------|---------|
|                    | DLM2    | LCPI   | LOP    | DLEXR   | D2LIP   |
| Mean               | 0.0094  | 4.5863 | 5.5451 | -0.0019 | -0.0013 |
| Median             | 0.0074  | 4.5906 | 5.5486 | -0.0005 | -0.0044 |
| Maximum            | 0.0710  | 4.6129 | 6.0349 | 0.0293  | 0.0516  |
| Minimum            | -0.0039 | 4.5322 | 5.0240 | -0.0402 | -0.0582 |
| Std. Dev.          | 0.0129  | 0.0206 | 0.2740 | 0.0158  | 0.0236  |

Table 4.5 indicates that the mean of DLM2, LCPI, LOP, DLEXR and D2LIP are 0.0094, 4.5863, 5.5451, -0.0019 and -0.0013 respectively. The higher mean is obtained in oil price and the lowest mean is the exchange rate. Standard deviation indicates the variability and diversity of the data. A low standard deviation shows the data are close to mean whereas high standard deviation shows that the data are spread out over a large range of values. The oil price shows high standard deviation of 0.2740 and money supply has the lowest one at 0.0129.

## 4.3 Multiple Regression Estimated

The multiple regression models in this study is analysed using ordinary least square technique.

### 4.3.1 $R^2$ and Adjusted $R^2$

**Table 4.6**  
 *$R^2$  and Adjusted  $R^2$*

|                    | FBM KLCI | FBM EMAS |
|--------------------|----------|----------|
| R-squared          | 0.6125   | 0.2735   |
| Adjusted R-squared | 0.5318   | 0.1221   |

The purpose to  $R^2$  is to evaluate the performance of the estimated regression equation in regression model. The  $R^2$  is the leading performance measure for a simple or multiple regression models. The value of  $R^2$  is around one to zero ( $1 > R^2 > 0$ ). For FBM KLCI analysis, the  $R^2$  is quite high about 0.6125. This figure shows that the all macroeconomic variables explain around 61.25% of the variation in the regression model. In other words, 61.25% of the variation in FBM KLCI can be explained by five macroeconomic variables.

FBM EMAS Index also show a lower value of  $R^2$  compare to FBM KLCI. For FBM EMAS Index the  $R^2$  value is 0.2735. This figure means that 27.35% of the variation in FBM EMAS Index can be explained by the five macroeconomic variables. In other words, the 98% of the stock return in Malaysian main board can be explained by the money supply, inflation, oil price, exchange rate and industrial production index. This differences shows that FBM KLCI is more likely to be explained by macroeconomic variables compared to FBM EMAS Index.

For both regression, FBM KLCI and FBM EMAS Index, the adjusted  $R^2$  is lower than  $R^2$ . Both have 0.5318 and 0.1221 for their adjusted  $R^2$  respectively. This adjusted  $R^2$  is to see the goodness of fit after adjusting for the number of explanatory variables used in the model. For FBM KLCI, the figure means that macroeconomic variables explain 53.18% of the variation in the regression model. Meanwhile, for FBM EMAS Index, macroeconomic variables explain 12.21% of the variation in the regression model.

### 4.3.2 Hypothesis Testing

Hypothesis testing is the use of statistics to determine the probability that a given hypothesis is true.

#### 4.3.2.1 T-Statistic

T-statistic is an individual measure of some attribute of a sample used in statistical testing of hypothesis.

##### **Hypothesis:**

$H_0$ : There is no significant relationship between dependent and independent variables.

$H_1$ : There is a significant relationship between dependent and independent variables.

##### **Research questions:**

- a) Do money supply, inflation, oil price, exchange rate and industrial production index have significant relationship with FBM KLCI?
- b) Do money supply, inflation, oil price, exchange rate and industrial production index have significant relationship with FBM EMAS Index?

The decision to accept or reject  $H_0$  depends on the t-value on t-table by referring the following scale (Koop, 2008):

If Calculated t-value < Critical t-value; accept  $H_0$

If Calculated t-value > Critical t-value; reject  $H_0$

Degree of freedom = number of observation (n) – number of variables (k)  
= 30 – 5  
= 25

**Table 4.7**  
**Individual Hypothesis Testing Result**

| Variable | FBM KLCI    |        |                       | FBM EMAS    |        |                       |
|----------|-------------|--------|-----------------------|-------------|--------|-----------------------|
|          | t-Statistic | Prob.  | Decision              | t-Statistic | Prob.  | Decision              |
| DLM2     | -0.9797     | 0.3370 | Accept H <sub>0</sub> | -2.2922     | 0.0310 | Reject H <sub>0</sub> |
| LCPI     | 2.3805      | 0.0256 | Reject H <sub>0</sub> | 0.2397      | 0.8126 | Accept H <sub>0</sub> |
| LOP      | -3.5055     | 0.0018 | Reject H <sub>0</sub> | -0.9510     | 0.3511 | Accept H <sub>0</sub> |
| DLEXR    | -3.9080     | 0.0007 | Reject H <sub>0</sub> | -1.1933     | 0.2444 | Accept H <sub>0</sub> |
| D2LIP    | -0.3493     | 0.7299 | Accept H <sub>0</sub> | -0.2011     | 0.8423 | Accept H <sub>0</sub> |

\*FBM KLCI: LCPI (significant 5%); LOP and DLEXR (significant 1%); DLM2 and D2LIP (not significant)

\*FBM EMAS: DLM2 (significant 5%), LCPI, LOP, DLEXR and D2LIP (not significant)

This hypothesis testing is to answer the research questions one by one of this study. Based on Table 4.7, for FBM KLCI, only three variables are significant which are inflation (LCPI), oil price (LOP) and exchange rate (DLEXR). Another two variables which are money supply (DLM2) and industrial production index (D2LIP) are not significant. Meanwhile, for FBM EMAS Index, only money supply (DLM2) is significant at 5% level. The rest are not significant at all.

#### 4.3.2.2 F-Statistic

F-statistic is a hypothesis testing to measure a group of variables is jointly significant.

**Table 4.8**  
**Jointly Hypothesis Testing Result**

|                   | FBM KLCI | FBM EMAS |
|-------------------|----------|----------|
| F-statistic       | 7.5867   | 1.8068   |
| Prob(F-statistic) | 0.0002   | 0.1496   |

By looking at the P-value for F-statistic on Table 4.8, only FBM KLCI have F-value greater than critical value at 10% significant level while FBM EMAS is not significant. It shows that all explanatory variables are jointly influences FBM KLCI.

However, all explanatory variables are not jointly influences FBM EMAS Index . It explain that, money supply, inflation, oil price, exchange rate and industrial production index are able to explain FBM KLCI together. Meanwhile for FBM EMAS Index, all independent variables unable to influence the index together.

#### 4.4 Multiple Regression Estimated Coefficient

These estimated coefficients may be interpreted as elasticity measures since the variables are expressed in natural logarithms.

**Table 4.9**

*Regression Estimation: FBM KLCI*

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | -7.6581     | 7.1571     | -1.0700     | 0.2953 |
| DLM2     | -2.5956     | 2.6494     | -0.9797     | 0.3370 |
| LCPI     | 3.6812      | 1.5464     | **2.3805    | 0.0256 |
| LOP      | -0.3508     | 0.1001     | ***-3.5055  | 0.0018 |
| DLEXR    | -7.9111     | 2.0243     | ***-3.9080  | 0.0007 |
| D2LIP    | -0.4019     | 1.1508     | -0.3493     | 0.7299 |

\*, \*\* & \*\*\* indicate significant level at 10%, 5% and 1% respectively.

**Table 4.10**

*Regression Estimation: FBM EMAS*

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | -0.3323     | 2.0934     | -0.1587     | 0.8752 |
| DLM2     | -1.7763     | 0.7749     | ** -2.2922  | 0.0310 |
| LCPI     | 0.1084      | 0.4523     | 0.2397      | 0.8126 |
| LOP      | -0.0278     | 0.0293     | -0.9510     | 0.3511 |
| DLEXR    | -0.7066     | 0.5921     | -1.1933     | 0.2444 |
| D2LIP    | -0.0677     | 0.3366     | -0.2011     | 0.8423 |

\*, \*\* & \*\*\* indicate significant level at 10%, 5% and 1% respectively.

$$\begin{aligned} \text{LKLCI} = & -2.5956 \text{ LM2} + 3.6812 \text{ LCPI} - 0.3508 \text{ LOP} - 7.9111 \\ & \text{LEXR} - 0.4019 \text{ LIP} - 7.6581 \end{aligned} \quad \dots \text{ (Eq. 4.1)}$$

$$\begin{aligned} \text{LEMAS} = & -0.17763 \text{ LM2} + 0.1084 \text{ LCPI} - 0.0278 \text{ LOP} - 0.7066 \\ & \text{LEXR} - 0.0677 \text{ LIP} - 0.3323 \end{aligned} \quad \dots \text{ (Eq. 4.2)}$$

## **Money Supply (M2)**

The relationship between money supply and with both FBM KLCI and FBM EMAS Index show a negative relationship. The coefficient explains that every 1% increase in money supply, FBM KLCI will decrease 2.59% while FBM EMAS Index decreases 1.77%, provided that other predictors are held constant. This findings suggests that when money supply in market increases, it is not caused by inflation only, but also inflation uncertainty. Inflation uncertainty and expectations of future contraction may also accompany changes in money supply and generate risk premium for holding shares. Thus, the risk adverse investors will reduce their investment in market shares. However, this relationship only significant on FBM EMAS Index but not in FBM KLCI. One possible justification is that with inflation uncertainty that accompany increase in money supply, investors will shun away from investing specifically in the thirty largest capitalizations of companies. However, money supply is significantly negative with the market return represented by overall sizes of companies which is proxy by FBM EMAS Index.

The relationship is supported by Ibrahim and Wan (2001) and Ibrahim and Aziz (2003) where they find negative significant relationship between money supply and Malaysian stock market. In addition, in earlier US study, stock market earlier study that US stock market significantly negative with money supply (Kraft & Kraft, 1997). The result is also consistent with Fama (1981) study which finds that the stock market is influenced by the degree of excess liquidity. Due to the effect of monetary policy changes, monetary expansion will reduce short term interest rate as far as the liquidity effect dominates the combined expected price effect and income effect. In

turn, stock market will boost as stock price and interest rate should be negatively correlated.

### **Inflation (INF)**

The relationship between of inflation and Malaysian stock market returns are positive. When inflation increase by 1%, FBM KLCI will also increase by 3.68% while FBM EMAS Index increases 0.10%, provided that other predictors are held constant. This result explains that the stock price is a good hedge against inflation. Inflation hedge typically involves in investing where an assets is expected to maintain or increase its value over a specific time period. In other word, the hedge could involve taking a higher position in assets which will make the value decreases slower than a decrease in the currency value. However, the results are only significant in FBM KLCI and not for FBM EMAS Index. This suggests that, only FBM KLCI is a good hedge against inflation.

The result is supported by Khil and Lee (2000) where the study is to examine whether common stock can be a good hedge against inflation for ten Pacific-rim countries. The result show only Malaysia has a positive link between stock returns and inflation. Another study by Ibrahim and Aziz (2003) also reveals the same relationship in Malaysian market as FBM KLCI acts as hedge instruments against inflation.

### **Oil Price (OP)**

Result shows that relationship between Malaysian stock market and oil price are negative. The coefficient values explain that when oil price increase 1%, FBM KLCI

will decrease 0.35%, while FBM EMAS Index will decrease 0.02%, provided that other predictors are held constant. This finding suggests that with an increase in oil price, other products cost also increases. Thus, consumers need to spend more on other consumptions which will in turn reduce investment expenses. However, this relationship is only significant for FBM KLCI but not in FBM EMAS Index. Therefore, only FBM KLCI is negatively significant by oil price. A finding of this study is consistent with Hosseini, Ahmad and Lai (2011) where Indian stock market is positively influenced by oil price in long run. In Chinese stock market, Millera and Rattib (2009) reveals that oil price also has a long run relationship with stock return.

#### **Exchange Rate (EXR)**

Both FBM KLCI and FBM EMAS Index show negative sign with exchange rates. When exchange rate increase by 1%, FBM KLCI will decrease by 7.91% and FBM EMAS Index will decrease by 0.70%, provided that other predictors are held constant. When a country highly depends on imports, currency depreciation raises input prices and reduce firms' profit margin. Currency depreciation will generate expectations of future depreciation and subsequently drive portfolio investments out of the country. However, this influence is only significant on FBM KLCI but not in FBM EMAS Index. This means that exchange rate is negatively significant only to shares returns of large capitalized companies.

The result are supported by Ibrahim and Aziz (2003) and Ibrahim and Wan (2001) where FBM KLCI are negatively significant with exchange rate. They stated that due to Asian crisis 1998, there is existence of irregular interaction on variables and FBM

KLCI. It is also corroborate with Yusof and Majid (2007) where RHBII and FBM KLCI are negatively influenced by exchange rate due to the Asian crisis effect.

### **Industrial Production Index (IP)**

The relationship between industrial productions index is negative on FBM KLCI and FBM EMAS Index. Meaning that, every 1% increase in industrial production, FBM KLCI will decrease 0.04% while FBM EMAS Index will decrease 0.06%, provided that other predictors are held constant. Increase in industrial production index is due to the increase in productivity of real capital which raises expected future outputs. As results, a higher expected market return will make investors to borrow and thus increase the demand of funds which will leads to raise in interest rate. Raise in interest rate will cause the present value of future cash flow decrease and the earning will be lower thus reduce the share price. However, both FBM KLCI and FMB EMAS Index are not significant with industrial production index.

In China, Shanghai Stock Exchange index (SSE) has a negative link with industrial production index due to an increase in productivity of real capital (Hosseini, Ahamd & Lai, 2011). Similarly, in Malaysia stock market, Yusof and Majid (2007) find that in Islamic and conventional market, both stock markets are negatively influence by industrial production index.

In conclusion, the findings summarize that money supply, oil price, exchange rate and industrial production index have negative relationship towards FBM KLCI and FBM EMAS Index. Meanwhile, inflation shows a positive link towards Malaysian stock market return.

#### 4.5 Robustness Analysis

To capture the effect of financial crisis 2008, a dummy variable (DFC) is added into regression model. The dummy for financial crisis' year is denoted as "one", while "zero" denotes for uninvolved years. The result shows that DFC is not significant toward FBM KLCI and FBM EMAS.

**Table 4.11**  
*Regression Estimation Including DFC: FBM KLCI*

| Dependent variable : FBM KLCI |             |            |             |        |
|-------------------------------|-------------|------------|-------------|--------|
| Variable                      | Coefficient | Std. Error | t-Statistic | Prob.  |
| C                             | -3.6961     | 7.8288     | -0.4721     | 0.6413 |
| DLMS2                         | -1.3936     | 2.8116     | -0.4957     | 0.6248 |
| LCPI                          | 2.7509      | 1.7187     | 1.6006      | 0.1231 |
| LOP                           | -0.2946     | 0.1098     | -2.6837     | 0.0133 |
| DLEXR                         | -7.5142     | 2.0336     | -3.6950     | 0.0012 |
| D2LIP                         | -0.4615     | 1.1417     | -0.4043     | 0.6898 |
| DFC                           | -0.1327     | 0.1110     | -1.1962     | 0.2438 |

**Table 4.12**  
*Regression Estimation Including DFC: FBM EMAS*

| Dependent variable : FBM EMAS |             |            |             |        |
|-------------------------------|-------------|------------|-------------|--------|
| Variable                      | Coefficient | Std. Error | t-Statistic | Prob.  |
| C                             | -1.5534     | 2.2820     | -0.6807     | 0.5028 |
| DLMS2                         | -2.1467     | 0.8195     | -2.6194     | 0.0153 |
| LCPI                          | 0.3951      | 0.5010     | 0.7887      | 0.4383 |
| LOP                           | -0.0452     | 0.0320     | -1.4117     | 0.1714 |
| DLEXR                         | -0.8289     | 0.5928     | -1.3983     | 0.1754 |
| D2LIP                         | -0.0493     | 0.3328     | -0.1482     | 0.8835 |
| DFC                           | 0.0409      | 0.0323     | 1.2649      | 0.2186 |

This probability value of t-statistic for financial crisis (alpha DFC) show the variable is not significant for both model. Thus supports the arguments that financial crisis in 2008 has no significant impact on Malaysian stock market return. Full results of models that incorporate dummy variable are shown in Appendix 7.

#### **4.6 Conclusion**

Overall, this chapter presents and explains the results obtained on the diagnostic test and estimation of multiple regressions. The hypothesis testing is also explained in this chapter and the results showed that all variable are significant towards Malaysian equity markets. Besides, the relationship between explanatory variables and dependent are interpreted using the coefficient value of the regression estimated.



## CHAPTER 5

### CONCLUSION AND RECOMMENDATION

#### 5.0 Introduction

This final chapter presents the findings' summary of this study. This chapter also will validate the research objectives and hypotheses based on the findings. It includes the theoretical and policy implication, limitations of the study and suggestions or recommendations for the further research.

#### 5.1 Summary of Findings

As discuss in Chapter 4, the diagnostic results showed that there is no problem on the test. The study has no multicollinearity, autocorrelation and heteroscedasticity problems. As a pre-requisite of time series data, the unit root test is implemented. At level, only inflation, exchange rate and FBM KLCI are stationary; at first differenced only money supply and exchange rate; and at second differenced only industrial production index and FBM EMAS are stationary. Descriptive analysis indicates oil price has a highest mean and standard deviation of 5.5251 and 0.2740, respectively. Meanwhile, exchange rate has a highest mean and money supply has lowest mean. Standard deviation is an indicator to know the variability of data. Low standard deviation indicates the data are close to mean while high standard deviation shows data are spread out over a large range.

The fit of goodness ( $R^2$ ) of FBM KLCI and FBM EMAS is 61.25% and 21.37%, respectively. Both  $R^2$  values clarify all macroeconomic variables are quite good in explaining the variation of regression models. Individual hypothesis testing results indicates that, in FBM KLCI, only money supply, oil price and exchange rate

significantly explain the regression models and the remaining two are not significant. Meanwhile, in FBM EMAS only money supply is significant and the rest four of variables are not significant to explain the regression. In addition, the probability value of F-statistic shows that only FBM KLCI, while FBM EMAS is not significant. Meaning that, all explanatory are able to influences FBM KLCI jointly but not in FBM EMAS.

The value of coefficient explains how strong an explanatory variable can influence dependent variables while other explanatory variables are held constant. For money supply, a 1% increase in the variables will lead FBM KLCI to decrease by 2.59%, while FBM EMAS decrease by 1.77%. The negative relationship explains that the changes in money supply will generate risk premium for holding shares, therefore the risk adverse will reduce the number of shares traded before the risk getting bigger. For inflation, 1% increase in CPI, FBM KLCI and FBM EMAS will increase 3.68% and 0.10%, respectively. It shows a positive relationship where Malaysian equities can act as hedge instruments against inflations. The value of assets will decrease but slower than the decreasing in currency value which contributes to inflation. Meanwhile, an increase 1% in oil price FBM KLCI and FBM EMAS will decrease 0.35% and 0.02% respectively. The negative relationship suggests that increasing in oil price will lead to an increment in other costs. Consumers need to spend more on the other costs thus will reduce the investments expenses. In the meantime, 1% increase in exchange rate will make FBM KLCI decrease 7.91% and FBM EMAS decrease 0.70%. The negative relationship explains that when MYR getting bigger than USD, the value of MYR will be lower, therefore investors will reduce their investment in Malaysian stock market and invest in the other market with a strong

value of currency. The final variable is industrial production index, where 1% increases in industrial production index will decrease 0.04% in FBM KLCI and 0.06% in FBM EMAS. The negative relationship between industrial production and Malaysian stock returns explains that when industrial production index increase due to the increase in real capital, firms will expect for a higher future outputs and income. Therefore, they will start to borrow and increase the demand of fund. Thus, the interest rate will getting higher and make the present value of cash flow lower consequently decrease the earning and reduce the price of shares.

To capture with financial crisis 2008, the Dummy Financial Crisis (DFC) is implemented in the regression models. The finding of analysis shows that financial crisis 2008 has no significant impact on Malaysian stock market return. This suggest that the financial crisis 2008 has no significant impact in this study

## **5.2 Policy Implication**

There are some policies can be implemented by the government, economists, policy makers and other related parties. Some of the policies are monetary policy, fiscal policy and income policy.

### **5.2.1 Monetary Policy**

Monetary policy is an action by central bank and other regulatory committee in controlling the size and growth of money supply in the market. Consequently, it will affect the interest rates. In maintaining monetary policy some action can be done such as modifying interest rate, buying and selling government bond and changing the statutory reserve requirement rate. This will improve the performance of

Malaysian stock returns indirectly. In an effort to tighten the economic, government will implement the monetary policy tools such as money supply controlling. Market players should be more aware of any announcement by the Ministry of Finance such as the ratio of reserve requirements ratio and open market purchase either buying or selling the bond. Buying the bond will make the money supply in the market decrease while selling the bond will increase. With an increase or decrease of the money supply volume in the market, it will directly influence the fluctuation of stock market.

### **5.2.2 Fiscal Policy**

To control inflation, unemployment and interest rates, government could implement fiscal policy. Through fiscal policy, the economy of a country can be controlled. By changing the government spending and adjusting tax, the economic performance of a country will be changed. For instant, in controlling the exchange rates, government should implement appropriate policy to ensure the stability of exchange rates. This is because depreciation in currency will subsequently leads to the decline in stock return. Thus, investors' confidence towards Malaysian stock market could be secured with the ability of the government in stabilizing the currency, GDP and interest rates. These will in turn reduce the negative impact to Malaysian stock return.

### **5.2.3 Income Policy**

Another effort by government in strengthening economy is by implementing income policy. This can be implemented through government control of labour income and capital. One of the controlling mechanisms is by limiting wages and price hike, while this policy is likely to control inflation. It might also change the distribution of

income among workers, industries, location and occupational group. The policy also will influence the tax paid by consumers, thus limit their purchasing power.

Given several possible policies that could be executed by government, policy makers need to decide which policy is the best for Malaysian economic. Careful strategies need to be formulated when implementing policies as it will affect the fundamental of macroeconomic factors which consequently may have indirect impact to Malaysian stock market.

### **5.3 Limitation**

There are some limitations that exist in this study. The first limitation is the independent variables used in this study. This study only limit to five explanatory variables that are most cited in previous study to test the relationship of macroeconomic variables and stock return especially in Malaysian market.

Second limitation involves data unavailability. Some of the data collected are available from 1960 such as CPI and money supply but some are only available on 2007 onwards. To make it standardize, all data were collected starting from January 2007 until December 2014. Incomplete data also exist in FBM EMAS Syariah Index, as it only made available from August 2008. As a result, this index was excluded from this study as dependent variable as the time period for this study is from January 2007 until December 2014.

Besides, since this study only focuses on country level data variables factors and industries that may influence the results. Because of focusing on one single test only,

the result of this study may not be very accurate for policy maker to make their decisions.

Finally, this study is only limited to Malaysia context. Thus, the research implication is only suitable for the researchers of market players who are interested in Malaysian stock market. However, other researchers also can use this study as comparison with other emerging countries.

#### **5.4 Suggestion and Recommendation for Future Research**

The future research on Malaysian equity market could include several other independent variables such as the gold price, market pressure index (MPI), interest rate, unemployment rate and other different variables to better explain Malaysian stock returns. They also can examine the other equity market in Malaysia such as FBM EMAS Syariah Index.

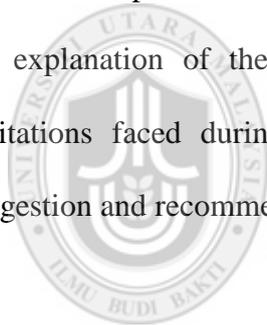
This study is conducted from January 2007 to December 2014 and only includes the subprime crisis in 2008 which is expected not to have a directly impact on Malaysian market. This is because Malaysia never deals with US on subprime lending. However, this study did not cover the financial crisis in 1997. Therefore, the future research on the same field should consider longer sample period in order to capture the significant effect of different economic event that will influence Malaysian market.

The different frequency of data such as weekly, monthly and yearly can be used to test the consistency of the findings as well as the reliability of study. The variation type of test can be considered to make the result more reliable and significant.

Finally, researchers should consider to investigate other countries stock market as this study only limit on Malaysia context. The researcher on Malaysian market also can include more indices from other countries as a comparison research. This will make the findings more exciting.

## **5.5 Conclusion**

This final chapter concludes that the finding's summary of this study. It also includes the explanation of the theoretical application used in this study. Besides, the limitations faced during the conduct of this study are addressed. Finally, the suggestion and recommendations for future study are also enlightened in this chapter.



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## REFERENCES

- Adam, A. M., & Tweneboah, G. (2008). Macroeconomic Factors and Stock Market Movement: Evidence from Ghana. *MPRA Papper No. 11256, posted 26*.
- Al-Aharkas, A. (2004). The Dynamic Relationship Between Macroeconomic Factors and The Jordian Stock Market. *International Journal of Applied Econometrics and Quantitative Studies, 1(1)*.
- Alam, Z., & Rashid, K. (2014). Time Series Analysis of Relationship between Macroeconomic Factors and the Stock Market Returns In Pakistan. *Journal of Yasar University, 9(36)*.
- Bailey, W. (1989). The Effect of US Money Supply Announcements on Canadian Stock, Bond and Currency Prices. *The Canadian Journal of Economics, 22(3), 607-618*.
- Bashar, S. A., & Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal 17, 224-251*.
- Baum, C.F. (2006). *An Introduction to Modern Econometrics Using Stata*. Texas: State Press.
- Chen, N.-F., Roll, R., & Ross, S. A. (1986). Economic Forces and the Stock Market. *the journal of Business, Vol. 59, No. 3, 383-403*.
- Coakes, S. J., & Ong, C. (2011). *SPSS: analysis without anguish: version 18 for Windows/*. Australia: Jhon Wiley & Sons Australia, Ltd.
- Cooper, R. V. L. (1974). Efficient Capital Markets and the Quantity Theory of mone. *Journal of Finance, 24, 887-921*.

- EADS, R. S. (2008). *Financial Advisor*. Retrieved 2015, from Inflation Impact:  
<http://www.fa-mag.com/news/inflation-impact-1985.html>
- Economic Made Simple*. (15 October, 2015). Retrieved from Policonomics:  
<http://www.policonomics.com/clement-juglar/>
- Fama, E. F. (1981). Stock Return, Real Activity , Inflation and Money. *The American Economic Review*, 71(4), 545-565.
- FTSE Group. (September 2015). *FTSE Monthly Report*. FTSE.
- Gan, C., Lee, M., Yong, h. A., & Zhang, J. (2006). Macroeconomic variables and stock market interactions: New Zealand evidence. *Investment Management and Financial Innovations*, 3(4).
- Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics International Edition*. New York: McGraw-Hill Education.
- Habibullah, M. S., & Baharumshah, A. Z. (1996). Money , Output and Stock Prices in Malaysia: An Application of the Cointegration Tests. *international Economic Journal*, 10(2), 121-130.
- Hosseini, S. M., Ahmad, Z., & lai, Y. W. (2011). The Role of Macroeconomic variables on Stock Market Index in China and India. *International Journal of Economics and Finance*, 3(6).
- Hsing, Y., Budden, M. C., & Philip, A. S. (2012). Macroeconomic determinants of the stock market index for a major Latin American country and policy implication. *business and Economic Research ISSN 2161-4860*, 2(1).
- Hussin, o. Y., Muhammad, F., Abu, M. F., & Awang, S. A. (2012). Macroeconomic Variables and Malaysian Islamic Stock Market: A Time Series Analysis. *Journal ob Business Studies Quarterly*, 3(4), 1-13.

- Ibrahim, M. H., & Aziz, H. (2003). Macroeconomic Variables and the Malaysian Equity Market: a View Through Rolling Subsamples . *Journal of Economics Studies*, 30(1), 6-27.
- Ibrahim, M. H., & Wan, S. W. (2001). Macroeconomic Variables, Exchange Rate and Stock Price: A Malaysian Perspective. *IIUM Journal of Economics and Management*, 9(2).
- Ibrahim, M. H., & Yusoff, W. S. (2001). Macroeconomic Variables, Exchange Rate and Stock Price: A Malaysian perspective. *IIUM Journal of Economics and Management* 9.
- J. Pallant. *SPSS Survival Manual : a step by step guide to data analysis using SPSS*, 4th Edition, Crows Nest, New South Wales, 2006.
- Janor, H., Halid, N., & Rahman, A. A. (2005). Stock Market and Economic Activity in Malaysia. *Investment Management and Financial Innovation*.
- Jones, C. M., & Kaul, G. (1996). Oil and the Stock Markets. *The Journal of Finance*, 11(2).
- Kaasa, A. (2003). Factors Influencing Income Inequality in Transition Economies. *Tartu University Press*, 18.1-40.
- Kassim, S. H., Majid, M. S., & Hamid, Z. (2011). The 2007 global financial crisis and the Malaysian stock market: a sectoral analysis. *Afro-Asian J. Finance and Accounting*, 2(3), 185-209.
- Khill, J., and B-S. Lee. "Are Common Stocks a Good Hedge Against Inflation? Evidence From the Pacific-rim Countries." *Pacific-Basin Finance Journal* 8 (2000):457-82.

- Kirui, E., Wawire, N. H., & Onono, P. O. (2014). Macroeconomic Variables, Volatility and Stock Market Returns: A Case of Nairobi Securities Exchange, Kenya. *International Journal of Economics and Finance*, 6(8).
- Koop, G. (2008). *Introduction To Econometrics*. West Sussex, England: John Wiley & Sons Ltd.
- Kraft, J., & Kraft, A. (1977). Determinants of Common Stock Prices: A time Series Analysis. *The Journal of Finance*, 32(2).
- Lee, J., & Wong, A. (2009). Impact on Financial Liberalization on Stock Market Liquidity: Experience in China. *Hong Kong Monetary Authority*, 3, 1-22.
- Lewis-Beck, M. (n.d.). R-Squared. Department of Government, 224 Littauer Harvard University Cambridge, MA 02138.
- Maskay, B., & Chapman, D. M. (2007). Analysing the relationship between change in money supply and stock market prices. *Department of Economics, Illinois Wesleyan University*.
- Maysami, R. C., Lee, C. H., & Hamzah, M. A. (2004). Relationship between Macroeconomic Variables and Stock Market Indices: Cointegration Evidence from Stock Exchange of Singapore's All-S Sector Indices. *Jurnal Pengurusan*, 24, 47-77.
- Mei-Pochtler, D. A. (2015). *The Statistics Portal*. Retrieved from Statista: <http://www.statista.com/statistics/319033/inflation-rate-in-malaysia/>
- Millera, J. I., & Rattib, R. A. (2009). Crude Oil and Stock market: Stability, Instability and Bubbles. *Energy Economics*, 31(4), 559-568.

- Mukherjee, T. K. and Naka, A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market: an application of a vector error correction model. *Journal of Financial Research*, 18, 223-37.
- Nieha, C. C., & Lee, C. F. (2001). Dynamic relationship between stock prices and exchange rate for G-7 countries. *The Quarterly Review of Economics and Finance* 41, 477-490.
- Pal, K., & Mittal, R. (2011). Impact macroeconomic indicators on Indian capital market. *The Journal of Risk Finance*, 12(2), 84-97.
- Rahman, A. A., Sidek, N. Z., & Tafri, F. H. (2009). Macroeconomic determinants of malaysian stock. *Africant Journal of Business management* , 3(3), 095-106.
- Rault, C., & Arouri, M. E. (2009). On the influence of oil prices on stock markets: Evidence from panel analysis in GCC countries. *William Davidson Institute Working Paper Number 961*.
- Ravichandran, K., & Alkhatlan, K. A. (2010). Impact of Oil Prices on GCC Stock Market. *Research Applied Economics ISSN 1948-5433*, 2(1).
- Rogaliski, R. J. and Vinso, J. D. (1977). Stock returns, money supply and the directions of causality. *Journal of Finance* 32, 1017-1030.
- Ross, S. (1976). The Arbitraj Theory of Capital Asset Pricing. *Journal of Economic Theory*, 13(3), 341-360.
- Rozeff, M. S. (1974). Money and Stock Prices. *Journal of Financial Economics*, 2, 245–302.
- Schwartz, A. J. (27 April, 2015). *the Concise Encyclopedia of Economics Money Supply*. Retrieved from Economist at the National Bureau of Economic Research: <http://www.econlib.org/library/Enc/MoneySupply.html>

- Spanos, A. (1986). *Statistical Foundation of Econometric Modelling*. Cambridge: Cambridge University Press.
- Stock, J.H. & Watson, M.W. (2006). *Introduction to Econometrics*. (2nd ed.). Boston: Addison Wesley.
- Subeniotis, D. N., Papadopoulos, D. L., Tampakoudis, I. A., & Tampakoudi, A. (2011). How Inflation, Market capitalization, Industrial Production and the Economic Sentiment Indicator Affect the EU-12 Stock Market. *European Research Studies*, 17(1).
- Subhani, M.L., Osman, A., & Gul, A. (2010). Relationship Between Consumer Price Index (CPI) and KSE-100 Index Trading Volume In Pakistan and Finding The Endogeneity In The Involved Data. *Relationship between CPI and Stock Trading*, 1, 1-12.
- The Malay Mail Online*. (2014, December 1). Retrieved October 2015, 2015, from Bernama: <http://www.themalaymailonline.com/money/article/weaker-oil-prices-send-kl-shares-lower>
- Tsoukalas, D. (1988). Macroeconomic factors and stock prices in the emerging Cypriot equity market. *Managerial Finance*, 29(4), 87-92.
- Yusof, R. M., & Majid, M. S. (2007). Stock Market Volatility Transmission in Malaysia: Islamic Versus Conventional Stock Market. *J.KAU: Islamic Econ.*, 20(2), 17-35