STUDY ON BEHAVIOR OF STOCK MARKET VOLATILITY IN PERSPECTIVE OF MALAYSIA

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DECLARATION

We hereby declare that:

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

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

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

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
ARCH	Autoregressive Conditional Heteroskedasticity
ASEAN	The Association of Southeast Asian Nation
DW	Durbin Watson
EXRATE	Exchange Rate
FBMKLCI	Bursa Malaysia Kuala Lumpur Composite Index
FDI	Foreign Direct Investment
LG	LOG
M3	Money Supply 3
OLS	Ordinary Least Square
SIC	Schwarz Information Criteria
U.S	United State
VIF	Variance Inflation Factor

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PREFACE

Stock market is a platform in which shares of corporations are traded in public. Investors often seek for the opportunity to earn more income through the stock market. In fact, if they are able to predict the flow of the stock market volatility, favorable profit can be earn through these transaction. However with a more diversified portfolio, investors can reduce their risk of making losses.

It is therefore a need for investors to have knowledge of the stock market and the macroeconomic factors. Macroeconomic factors such as inflation rate, exchange rate, foreign direct investment and money supply play an indispensable role in Malaysia stock market. Hence with dynamic investigation on stock market volatility, these will lead to a more precise and dependable prediction of the stock price movement. Indeed, Asian financial crisis has brought an imperative impact on the stock price over the past decades. The focus of the study is to test the long term relationship and granger causality between the Malaysian stock market with the five macroeconomic variables.

ABSTRACT

This paper examines the relationships between Kuala Lumpur Composite Index and five macroeconomic variables from January 1993 to September 2012 which contains a quaterly data set of 79 observations. This paper employs Augmented Dickey - Fuller test (ADF) to determine the stationary relationship. For the diagnostic checking, there are no multicollinearity, no heteroscedasticity, no model specification problem and it is normally distributed but there is existence of autocorrelation problem in the multiple regression models. Additionally, this paper investigates the short run and long run dynamic linkages by using Granger Causality test and Ordinary Least Square (OLS) respectively. The results indicate that KLCI is consistently examined by inflation rate, exchange rate, foreign direct investment and Asian financial crisis in the long run. For the money supply, there is a short run and long run linkage with KLCI.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

In this new era of globalization, stock market return has become indispensable to developing countries especially Malaysia as it symbolizes the growth of the economy. This is the reason why government and central bank have a close watch on the stock market behavior. Hence, the significant correlation between macroeconomic factors and stock prices are crucial to policy makers, economists and investors (Kutty, 2010). This would help all the stakeholders to have a greater access to the market efficiency during portfolio management. However, in a developing country like Malaysia, there are few researchers investigating the causality impact of the macroeconomic factors against the equity market volatility, taking into consideration of Asian financial crisis. Thus, this research would focus on how inflation rate, exchange rate, foreign direct investment, money supply and Asian financial crisis would affect the quarterly movement of Kuala Lumpur Composite Index (KLCI).

1.1 Research Background

Malaysia stock market was established in 1960 with the consistent expansion of the equity market in the past 50 years has successfully brought Malaysia market globally. Today, Malaysia equity market is found to be one of the largest stock market trading within the Southeast Asia region. Malaysia stock market is now governed by the exchange known as Bursa Malaysia subsequent to the demutualization exercise in the year 2004. The Main Market in Bursa Malaysia comprises the largest 30 companies by full market capitalization which forms the composite weighted stock market index, and become the indicator for the performance of the Malaysia stock market, it is named as the Kuala Lumpur Stock Exchange Composite Index (KLCI). (Chong & Puah, 2009)

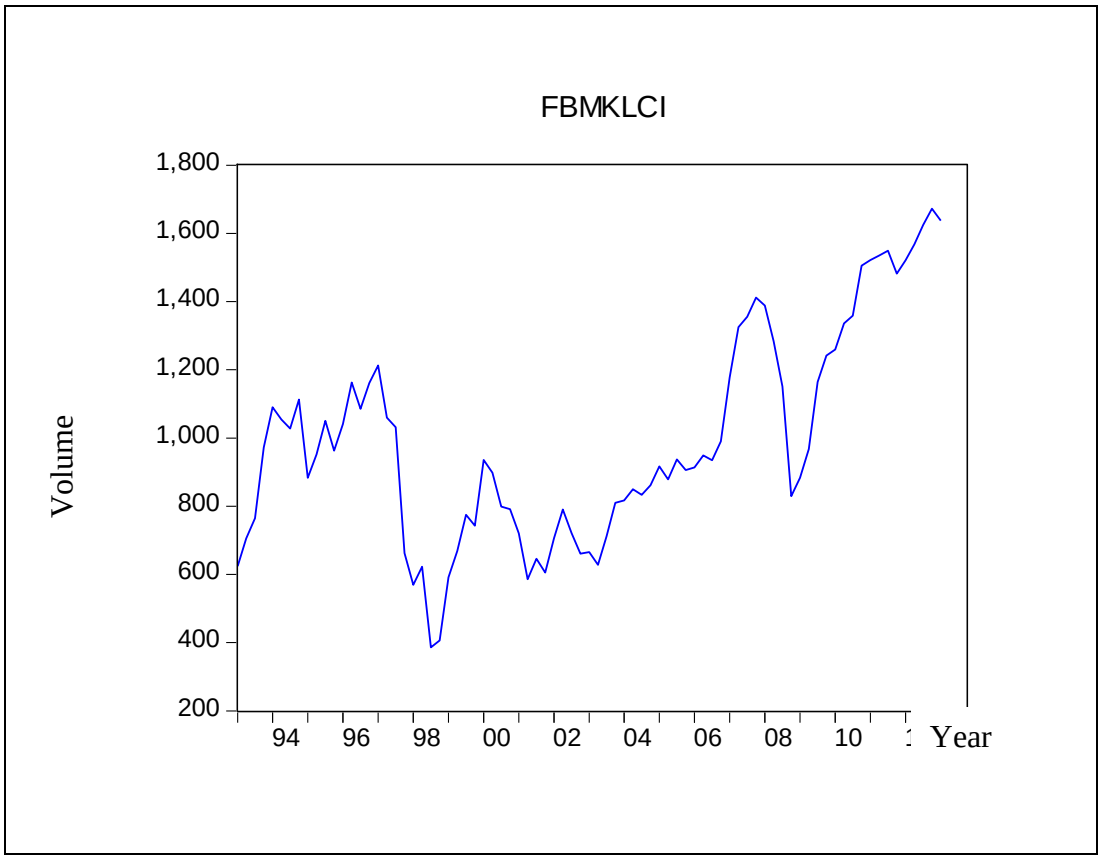
The stock price movement is the important indicator for the economy and it act as a vital function in enhancing the stock market performance. Theoretically, the expectation of the investors on the company's future performance is reflected on the stock price volatility. The aggregate companies profit will eventually determine a country's level of economy activities and hence, when there is market efficient, the stock return will perfectly reflect the underlying fundamental. As a result, stock price would be used as the determinants of the equity market return and activity level of the economy. However, if the economic activity reflects the movement of the stock price, the stock market will be the determinants for the economic activities. Hence, it is significant to determine the causality between the macroeconomic factors and the equity market volatility. (Noorahayusolah , 2011)

However during year 1997 and 1998, Asian financial crisis has made a tremendous outbreak to the Malaysian economy and in turn fluctuate the KLCI severely. KLCI show a peak performance before financial crisis 1997-1998. The KLCI points fall down drastically from year 1996 to 1997. Before 1996, KLCI points had reached more than 1200 points and most investor believes that this trend will continue to sustain. However, it drops to 500 points due to financial bubble burst (Asmy, Rohinila, Hassama, & Fouad, 2009). Hence it is motivating to investigate the volatility of the Malaysia stock market with relevant macroeconomic variables during Asian financial crisis.

Furthermore, there are some research papers investigating on how the macroeconomic variables affect the equity market volatility. Majorities are examining on the developed country but it is significant to determine the correlation between the macroeconomic factors and equity market in developing countries such as Malaysia. Apart from that, macroeconomic factors such as money supply, inflation rate, exchange rate and foreign direct investment without considering the factors of financial crisis are commonly investigated by ample of researchers. However the effect of Asian financial crisis has lead to a vigorous movement of stock price during year 1997 and 1998. In order to contribute to this line of study in developing country like Malaysia, this paper extend its research on the macroeconomic factors of money supply, inflation rate, foreign direct

investment, exchange rate and Asian financial crisis on the equity market volatility.

Table 1.1: The historical trends of stock market in Malaysia from 1993-2012



Sources: Data Stream from 1993 to 2012

1.2 Problem Statement

Malaysia stock market played an imperative role in fostering capital formation and sustaining economic growth. It also serves as a facilitator between savers and users. Furthermore, apart from diversifying the risk, stock market also helps in gathering funds and distributing wealth. Moreover, economic growth is highly dependent on the equity market growth as the assurance with resources inflow of the most productive investment opportunity. Since stock market movement is uncertain, there are several indicators that are significant in determining the

correlation between the equity market volatility with the respective factors in Malaysia. The paper proposed that inflation rate (Geetha, Mohidin, Chandran, & Chong, 2011), exchange rate (Ooi & Ghazali et al., 2009), foreign direct investment (Adam & Tweneboah, 2009), money supply (Herve, Chanmalai, & Shen, 2011) and Asian financial crisis (Yang, Kolari & Min ,2002) contain a vital relationship with stock price. In addition, this paper intends to investigate the dynamic short run and long run relationship among the equity market volatility and the respective macroeconomic factors. Hence, the stock market volatility has a proportional effect to the expansion of economic activities in Malaysia.

1.3 Research Objective

1.3.1 General Objective

The objective of this research is to investigate the factors affecting the stock price uncertainty of Malaysia equity market. This present paper also used to examine the impact of the respective economic factors against the stock price in developing economic with the consideration of the Asian financial crisis from year 1997 to year 1998. With this research, the government is able to prevent fluctuation against crisis through specified control on money supply, inflation, exchange rate, and interest rate. This research paper attempts to find whether there are long run relationships or short run causality between Malaysia equity market and economic factors. This research contributes to the previous literature by investigate the effects of macroeconomic factors, which affect on the behavior of the Malaysian equity market by taking the consideration of Asian financial crisis. The issue of equity market volatility has been become a great focus in the finance research and formally studied by many researchers. Since Narayanan (1997) state that Malaysian stock market has a favorable investment climate and political stability, it is well incorporated with the global equity market worldwide as it would affect the financial decision of

domestic and global investor. In the study of Maysami, Lim & Hamzah (2004) stock market participants can utilize the information from the finding to analyze the movement of the equity market by using the significant information on macroeconomic variables.

1.3.2 Specific Objective

1. To investigate the dynamic interaction between Malaysia stock prices, inflation, exchange rate, foreign direct investment, Asian financial crisis and monetary policy.

2. To examine the significant correlation between Malaysia stock return against the respective macroeconomic factors.

3. To investigate the causation that runs between the variables.

4. To verify the long run relationship and short run causality between dependent variables against independent variable.

5. This paper examine the significant effect of Asian financial crisis to Malaysia stock market

1.4 Research Questions

There are few research questions that are concerned in the present research consecutively to meet the objectives of the research. Clarification of the research question will be conducted along the chapters to come into consensus.

1) What are the factors resulting stock price volatility and investment climate in Malaysia?
2) Do macro-economic activities influence stock price volatility?

3) Is there any causal relationship among variables in explaining stock market?
4) What is the functional relationship of money supply and FDI with stock return?
5) What is the dynamic relation of inflation rates on stock prices movement?
6) Do exchange rates fluctuations effect stock prices direction in long run and short run?
7) What is the level of Asian financial crisis in affecting Malaysia stock market?
8) What are the significant policy implications and future research recommendation that imply from the dynamic correlation between the stock market return and the respective macroeconomic determinants?

1.5 Hypotheses of the Research

This research is performed to examine the significance relationship of money supply, inflation rate, exchange rate, Asian financial crisis and foreign direct investment on equity price behavior. (Noorahayusolah, 2011)

I. To test whether all variables are cointegrated

Ho: the variables are non-conintegrated.
H1: the variables are cointegrated.

II. To test the casual relationship among the variables.

A) To test the relationship between inflation rates and stock markets.

Ho: there is no significant relationship between inflation rates and stock markets
H1: there is significant relationship between inflation rates and stock markets.

B) To test the relationship between interest rate and stock markets

Ho: there is no significant relationship between interest rates and stock markets

H1: there is significant relationship between interest rates and stock markets

C) To test the relationship between money supply and stock markets

Ho: there is no significant relationship between money supply and stock markets

H1: there is significant relationship between money supply and stock markets

D) To test the relationship between exchanges rates and stock markets.

Ho: there is no significant relationship between exchange rates and stock markets

H1: there is significant relationship between exchange rates and stock markets

E) To test the relationship between financial crisis and stock markets.

Ho: there is no significant relationship between financial crisis and stock markets

H1: there is significant relationship between financial crisis and stock markets

1.6 Significance of Study

Basically, this research is study about the significant effect that macroeconomic factors may have on Malaysian equity market return. In depth analysis of this

correlation can assist stock market participants to diversify their portfolio favorably. It is obvious that the major movement of economic variables can lead to fluctuation in the stock market. This paper is significant to augment the understanding of investor in estimating the sensitivity of Malaysian equity market index to the vital impact of macroeconomic variables.

Besides that, the findings from this research are anticipated to have critical effect for investors, policy authorities and fund managers. Portfolio managers and investors may look into the findings in this paper for estimating the future movement and direction of the equity prices, for formulating investment decision, indentifying accessible investment prospect, and minimizing the chances of losses in the equity market. Moreover, the stock market authority, which is the policy makers, may find the information in the research finding is useful in predicting future economic and stock market problem, with monitoring stock market to enhance the equity market industry.

1.7 Chapter Layout

In chapter 2, our research will cover the evidence from articles. All the variables that are considered in our study will be proven by the articles of past researcher. Stock market volatility is known as dependent variable and the independent variables are including inflation rate, foreign direct investment, exchange rate, Asian financial crisis and interest rate. From the literature review, our study will prove that inflation rate, foreign direct investment, exchange rate, Asian financial crisis and interest rate can be the factors of stock market volatility. Chapter 3 will cover the methodology that will test in chapter 4. For instance, Heteroscedasticity, autocorrelation, granger-causality test and unit root test. In chapter 4, our study uses all the method in chapter 3 to identify whether our data achieve our research objective. However, our study has modified the model 1, model 2 and model 3 to get the better results. In chapter 5, it will conclude that our test has met the research objective and also support the results from previous journals.

1.8 Conclusion

In the nutshell, this chapter has discussed about the problem statement, research objective, research question, and significant of variables. These will figure out the relationship of the stock market volatility and the independent variables which are inflation rate, foreign direct investment, exchange rate, Asian financial crisis and interest rate. Besides that, this chapter also stated the aim of the research which is examine the significant relationship between the macroeconomic factors and the contribution of existing articles about the behavior of equity market.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

The researcher paper has reviewed a series of journal about this topic. However, this study finds that ample of researchers favor developed countries on abroad but has less favor on the developing countries like Malaysia. Therefore, this paper will mainly focus in developing countries in Asian which is Malaysia and the significant relationship will be investigated from the empirical results.

2.1 Review of Literature

Stock price is an important indicator for portfolio management. Volatility and fluctuation of stock market would alter an investor investment decision. Thus, many of the researchers are interested to identify the significant effect between the macroeconomic variable and stock market volatility. Due to different countries and cultures, the researchers are using different macroeconomic variables identifying the relationship of these factors on the stock price. Some studies have been conducted in developed or developing country. For example, Sari (2005) investigates the relationship between inflation, stock returns, and real activity in Turkey while Stavarek (2005) determined the interaction between exchange rate and stock price in EU and USA. On the other hand, Maysami and Koh (2000) examined that the long run relationships between macroeconomic factors such as price level, money supply, interest rate and exchange rate on Singapore' stock market index. The important objective is to determine the relationship between Singapore stock market and the stock markets in U.S. and Japan.

Furthermore, Raze, Iqbal, Ahmed, Ahmed & Ahmed (2012) investigate the impact between FDI and Pakistan Stock Market from year 1988-2009 but they only focus on the foreign direct investment in their studies. In addition, some researcher also testing the effect of FDI on different stock price in their respective countries. For

instance, Claessens, Klingebiel, & Schmukler (2001) determine the structure impact of foreign direct investment and stock market development in Asia and Latin America. On the contrary, Menike (2006) examine the effects of macroeconomic factors on stock price in emerging Sri Lankan stock market.

Besides of using foreign direct investment, inflation, exchange rate and money supply as the macroeconomic factors, many researchers also found that Asian financial crisis during 1997 and 1998 significantly effect on the volatility of stock market along the year. For instance, Kolari and Min (2002) study the long-run co integration relationships and short-run causal linkages among US, Japanese, and 10 Asian stock markets in Asian financial crisis1997-1998. The results show that the stock market was strong in the long run co integration relationship. However most of the researchers do not include Asian financial crisis into their studies. For example, Al, Hussien, Ali & AA (2011) attempt to investigate the main economic factors such earning per share and dividend per share, oil price, gross domestic product, consumer price index, Interest rate and Money supply which are influencing the prices of stock in the UAE stock markets.

Based on the previous researcher and until present, there is no investigation on these combination macroeconomic variables on the effect on stock market volatility in Malaysia. Hence, this study attempts to figure out the relationship between these variable on KLCI stock return in Malaysia.

2.1.1 Stock Market Variability

Standard Stock Valuation model such as the dividend growth model (Gordon 1959) assumes that the intrinsic value of stock is determined by expected cash flows and rate of return. Moreover, the arbitrage pricing theory (Ross 1987) which raises up a statement that the interest rate and inflation drive changes in share prices. Based on related theories, the earlier studies stated that changes on future cash flows and required returns would therefore have impact on stock return.

Majority of the studies have been carry out by the researchers to expose the determinant of stock return. Supposedly, stock price volatility forecasting is a significant task in the field of financial markets since it seized the attention of stock market participants. Volatility is not the similar as risk, and it is interpret as uncertainly. It becomes the main consideration in making any portfolio creations and investment decisions. (Lux & Marchesi, 2000)

Maysami and Lee and Mohamad (2004) argue that stock price affect corporate profit, corporate performance and substantially the industry growth and generally reflect the level of economic activity. The researcher emphasize the Efficient Market Hypothesis theory, in which stock price reflect all available information in the market. Furthermore, the dynamic relationship and causal relationship results among macroeconomic factors can be use building up the nation's macroeconomic policy, such as the monetary policy.

In the light of the earlier studies, there are many macroeconomic variables having the impact on share pricing in the stock market in various degree. According to Al-Shubiri (2010), stock market has a positive relationship with the real economic development. There are a variety of measures of stock market activity which are having a positive relationship with the measures of productivity improvement, real economic growth and capital accumulation of the country.

2.1.2 Inflation Rate of Malaysia as a Determinant of Stock Price Volatility

Inflation is categorized into two categories which are expected inflation and unexpected inflation. Expected inflation means that there was a plan which created by the economics and consumers year by year. It is less of people holding the cash over time to avoid the condition of depreciation

value of the money. While, unexpected inflation is dependent on the estimation by the economics and consumers. .(Geetha, Mohidin, Chandran, and Chong, 2011)

According to the study from Geetha, Mohidin, Chandran, and Chong (2011) identified the relationship between the inflation and stock market in three development country which are US, Malaysia, and China. This study is also used to identifed that there is significant in short run and long run relationship between inflation and the stock market in US, Malaysia and China. The result shows that there is long run relationship between stock markets and the inflation rate in Malaysia, US and China. China has a short run relationship between the stock market and inflation but there is no short run relationship between the stock market and inflation rate in Malaysia and US.

Saryal (2007) determines the effect between inflation and stock market volatility. There are two specific questions in his research which are how does nominal stock return series determine the inflation and stock market volatility and does the relation differs between countries with different rates of inflation. The countries such as Canada and turkey have been used to do comparison in the study due to the different type of inflation. However, in his result, it shows that the inflation has brought a high effect in Turkey's stock market rather than in Canada. With same research, Sari (2005) also investigates the relationship between inflation and stock returns in the high inflation economy in Turkey. Both of their results show a negative relationship between inflation and stock returns.

Noorahayusolah (2011) had done the research about the beta or systematic risk (CAPM) and found that this is one of the factors which can influence the stock markets. Therefore, in his research, he studied the relationship between inflation rate and stock price. The monthly data which used by him is around the period from 2000 to 2009 in Malaysia. The objective in the research is to examine the macroeconomics factors forces that can influence the stock market price index in Bursa Malaysia. However, the

result shows that the inflation rate has a negative relationship with the stock market.

In addition, Elshareif (2010) examines the relationship between stock returns and inflation in the equity market in Malaysia by using quarterly data from year 1987 to year 2006. According to Elshareif (2010), the two important aspects in this study are the consistent empirical rejection of the GFH for the equity market returns of several developed markets which in turn motivates the analysis of this hypothesis for emerging markets. Second, there is a increasing need to deal with the question as to whether the Malaysian equity market provides an effective hedge against inflation. As the results it shows that the stock returns are found to be independent of inflationary trends. There is a proof of the negative relationship between stock returns and inflation rates

2.1.3 Exchange Rate Determinant of Stock Price

Exchange rate is defined as the rate using to exchange one currency value to another for the purpose to purchase goods or make investment in foreign country. Firm that involved in across-boarded transaction is said to expose to foreign exchanges risk such as interest rates risk, inflation risk and price risk. Baharumshah et al. (2002) indicated that the exchange rate is the key determinant to analyze stock market volatility. A rise in stock price tends to increase the domestic wealth investors and facilitate the demand of currencies to rise and vice versa. Meanwhile, in the study of Ooi & Ghazali (2009) in examined the long run relationship and dynamic casual relationship between stock prices and exchange rate in Malaysia and Thailand. Analysis on daily data of exchange rates from 1993 to 2003 showed significant impact on stock prices in both pre and post-crisis period in Thailand and post crisis for Malaysia. This finding suggests that two markets are closely link to each other, there is interaction between foreign exchange and the countries in a Post Crisis. Based on Singapore's time series data, Shew (2008) investigate the influences of exchange rates on stock market after the period of financial crisis. Granger causality is

tested between the variables from 1990-2006. No causal relationship appeared in the long term. Different result is obtained depend on different time series of Singapore.

Phylaktis and Ravazzolo (2003) examined both long run and short run effect of exchange rates on stock market on a group of Pacific Basin countries. By using co integration test, the analysis suggested close relationship is existed between foreign exchange market and stock market, which contains implication for exchange rate policies. The degree of exchange rates flexibility is positively associated to the stock market. Rahman, Mohd Sidek and Tafriz (2008) examined macroeconomics as the determinant of the stock market ranging from January 1986 to March 2008. Using VEMR frame work, the result showed macroeconomic have significant long run effect on Malaysia's Stock market. Interest rates is significantly lead to stock market changes regardless of the co-integrated relationship among the variables. Market performance changes as exchange rates posted a positive coefficient relationship.

In contrast, Stavarek (2005) determined the interaction between stock price and exchange rate in EU and USA from year 1970 to 1992. The analysis does not found long run relationship between variables. However, the causality effect on the long run is strong for the period 1993 to 2003 in developed countries. The direction of relation is not consistence and diverse among countries. Agrawal (2010) indentify the dynamic intervention between Rupee-Dollar exchange rates and the volatility of stock return. There is a negative correlation between these two variables. This carried the same result with Menike (2006). In investigating the impact of macroeconomic determinants on stock market in Sri Lanka from the period of 1991 to 2002, Colombo' stock exchange volatized with changes of exchange rate in a negative direction.

Kenani (2012) studied the long run and short run relationship between exchange rates and stock price in Malawi. By analyzing the monthly data from the period of January 1999 to January 2010, the finding showed that

no causality relationship is existed between the stock market and exchange rates. It suggested that investment decision in both foreign exchange market and stock market should rely on pass information regardless of their respective market but not the other market. Same investigation carried out by Uddin and Rahman (2009) in South Asia which are India, Pakistan and Bangladesh. Granger causality result appeared the same resulted. Variables are not predictable on other variable's pass value, market participants are unable to pick up the forecast of one market from other market information.

Beer & Hebein (2008) tested the exchange rates effect on stock price movement for four developed countries, Canada, U.S., Japan, U.K and five emerging Asian countries, Singapore, Hong Kong, South Korea, India and Philippines. By using EGARCH framework, they reported there is no absolute jumpiness in the stock market for developed countries, but significant interaction for the emerging countries economics. Singh (2010) investigated the relationship between stock market and key macroeconomic variables in India. By collecting monthly variable's data from period of April 1995 to March 2009, with the assist of correlation and unit root test, the test for granger causality showed that the causality effect is weak between macro-economic and stock market index. Exchange rate is not responsible to influence the vibes in stock market index as well the volatility in it, as it may led to some other external factors. The reason behind could be the stock market in Indian is less active and it is not a good representative for Indian financial health.

2.1.4 Foreign Direct Investment Determinant of Stock Price Variability

Foreign direct investment is the main source of international finance cash inflow. It provides a channel for technology, interpersonal skill and capital into the country and theory proved that economic growth shift in a positive direction against market performance (Mohtadi & Agarwal, 2001, Rahman & Salahuddin, 2009).

Adam & Tweneboah (2009) justify the way of FDI in influencing stock market development in Ghana and proved that norminal exchange rates. He also makes an argument that the existence of this tri-way causal relationship stimulated the growth of an economy and will in fact trigger the respective stock market development. This research is supported by Alfaro (2003) who investigate on the relationship between foreign direct investment and economic development. The result showed that economic condition reacts negatively to the direction of FDI in a primary sector of economy but situation altered when investment is made in manufacturing sector. Adverse result is without and a negative relationship is applied. Nieuwerburgh, Buelens & Cuyvers (2005) also clarify that there are strong positive facts that growth of an economic in a country is derived from the stock market development. Capital market developments carry similar correlation with economic growth which in term influences the direction of economic growth. (Brasoveanu, Semenescu, Catarama & Dragota, 2008).

Raze, Iqbal, Ahmed, Ahmed & Ahmed (2012) investigated the impact between FDI and Pakistan Stock Market from year 1988-2009. The result shows that Stock market react positively to the changes of foreign direct investment. Errunza (1983) figured up that foreign direct investment inflow holds long run effect on stock market development and thereby increase the number of participant involved in stock. Claessens, Klingebiel, & Schmukler (2001) investigated the significant consequence of foreign direct investment on stock market development in Asia and Latin America.

FDI is an attraction point to beat the barriers of investment with existing stock market. Foreign direct investment is strong correlated to market stock market development.

Gilani, Nawaz & Nazir (2010) analyzed the relationship between foreign direct investment and stock market development from the year 1985 to 2008 and positive relationship among variables is determined. This reflects the same out outcomes with the study of Halalmeh & Sayah (2010), Kalim & Shahbaz (2009) and Baker, Foley & Wurgler (2004), where a positive relationships is existed between stock market development and foreign direct invest.

2.1.5 Money supply

Money supply is one of the mechanisms of monetary policy for the Federal. Money supply means the total quantity of money existing in the market at a precise of period (Johson, 1994). There are multiple categories in the money supply, which are M1, M2 and M3. For the first measurement, M1 includes checking accounts, travelers' checks, currency and checking account deposits. Whereas M2 consist of all the elements in M1 with additional time deposits, institutional money market, mutual funds and savings accounts. M3 is the total of M2 plus large time deposits and short-term repurchase agreement (Deardorff, 2001).

Maysami and Koh (2000) examined that long run of stock market and money supply in Singapore. Moreover, to determine the relative relationships between the Singapore stock market and the stock markets in U.S. and Japan. The authors detected the money supply has co integration with the changes level of Singapore stock market. Furthermore, the researcher pointed that the Singapore stock market is significantly and positively co-integrated with stock markets of Japan and the United States.

Herve, Chanmalai, and Shen (2011) analyze the relationship between macroeconomic variables namely, industrial production index (IPI), consumer price index (CPI), domestic interest rate (IR), real exchange rate (EXR) and real money supply (M2) and the movement of stock prices in Cote d'Ivoire. The stock price index (SPI), BRVM10 was utilized by the authors to represent Cote d'Ivoire stock market. The authors also examine the relative long-run and short-run relationships on stock market index and the economic variables. Co integration analyses provided proof in supporting long run relationship between share prices and macroeconomic variables recognized over the study period.

Sohail, and Hussain (2009) examine the long-run and short-run relationships between five macroeconomic factors and stock prices in Lahore Stock Exchange. Macroeconomic factors and LSE25 Index found to have two long run relationships. Money supply has a positive significant in the long run relationship towards stock returns. . The study suggested that an appropriate monetary policy should be implementing by monetary managers in order to control inflation. Therefore, the volatility of the stock markets return can be minimized.

Pilinkus (2009) attempt to examine the relationships between a group of macroeconomic variables and the Lithuanian stock market index. The objective of this research is to study whether a group of macroeconomic factors may act as a primary indicator for stock market returns or serving as a significant indicator for macroeconomic factors. The Granger causality tests result shows that minority of the variables act significantly to both stock market returns and stock market index. It found a bidirectional causality relationship in between stock market index and money supply (M1 & M2). Thereby, confirmed to the relationships between stocks market returns and money supply in Lithuania.

2.1.6 Asian Financial Crisis

Theoretically, financial crisis cause great uncertainty in global stock market. (Tella, Yinusa and Olusola, 2009). Around the world stock markets have fallen, large financial institutions have collapsed and governments were forced to come up with rescue packages to bail out their financial systems.

Beak & Jun (2011) investigated the cross market linkage of financial contagion. The test imploded data on the total return index of Asian countries in 1997-1998 proven a significant upward movement in the linkage between Asian markets include both crisis and non crisis countries. Particularly, China and Taiwan less affected by the crisis. This study confirms that international contagion prevails among stock markets. Yang, Kolari and Min (2002) study the long-run co integration relationships and short-run causal linkages among US, Japanese, and 10 Asian stock markets in Asian financial crisis1997-1998. The results show that the stock market was strong in the long run co integration relationship.

Yang & Lim (2004) compared all tests results in tranquil periods versus crisis periods. It argued that long term co- movement do not exists among East Asian stock market. However, it increased in response after 1997 crisis. This finding is further confirmed by the VAR model that shocks or impacts of disturbance to a market are very short lived. Leeves (2005) applied rolling regression method investigate the asymmetric volatility of shock impact to Indonesia stock market over 1997-1998. The results found increase volatility in 1997-1998 and consequently decrease in 1999. It stated a significant that negative shocks caused great volatility to the stock price.

Lim, et al., (2008) examined the efficiency of the eight Asian stock markets happened in the Asian financial crisis 1997. The study specimen that crisis negatively affected the efficiency on the counties stock markets.

The efficiency of Asian stock markets impaired, Hong Kong stock market was the major casualty hits by the crisis effect. Ali & Afzal (2012) investigate the impact of global financial crisis on Indian and Pakistan stock market by exercise EGARCH model. The result of the coefficient show negative significant impact to stock return and positive significant impact to the volatility in stock return

Tella, Yinusa and Olusola (2009) claim that the degree of persistence of volatility is high in the holistic country, Africa and Cairo stock markets; implying that the volatility clustering is short-lived in the Johannesburg and Nigeria stock markets during the global economic crisis, but has a more overarching effect in the Cairo stock market. Sed'a (2011) has done a research on the Czech and Polish stock markets by estimating the risk volatility in the stock markets and comprehensively examines the financial turmoil effect. Based on results of the Jump-Diffusion GARCH model which considering heteroscedasticity, there is no statistically significant jump behavior in both stock markets before the crisis. However, it jump risk is highly statistical significance in both stock markets during the crisis.

2.2 Review of Relevant Theoretical Model

2.2.1 Stock Return

2.2.1.1 Efficient Market Hypothesis (EMH)

In Efficient Market Hypothesis (EMH), the information is available to reflect the stock prices. EHM consists of three form, strong form, semi-strong form and weak form. Strong form of EMH always reflects the relevant information and the formation of prices. Semi-strong form always reflects the public information. Lastly, weak form of EMH always reflects

to the historical prices. (Fama, 1969) It is also examined together with the relationship between efficiency and predictability. The effectiveness of a stock market can be reflected by the information of the individual stock and whole stock market. In addition, study of past stock price can helps to predict the futures prices and analyze the financial information such as profit, value of assets, etc. the objective of EMH is used to help the investors to select low price but valuable stock to achieve greater profit. Malkiel (2003)

2.2.1.2 Capital Asset Pricing Model (CAPM)

According to Fama and French (2004), Capital Asset Pricing Model (CAPM) is a model used to estimate the cost of capital for firms and evaluate the portfolio's investment. The advantages of CAPM are the power to identify the relationship between risk and return. CAPM also can be used to measure the potential of the assets to get a return or loss. However, simplification of CAPM assumption has become one of the problems because of unrealistic of the assumptions in real world such as no taxes and no transaction cost. (Jecheche). In Fama (2004), there are empirical problems in CAPM and it caused inconsistency with the theory. CAPM always identify the risk of stock which has relationship with the market portfolio.

2.2.1.3 Random Walk Theory

Random Walk Theory is a theory that specified price move randomly and unpredictably. According to Fama (1965) every security consists of intrinsic value that depends on the potential earning of the security. Samuelson (1965) stated that proper anticipated prices changes randomly and stock price which fluctuated with the real activity is hardly to predict using pass information. There is a correlation between the company's size

and its return. A small and liquid company is found to gain a better return than a large company (Fama and French 1988).

2.2.2 Inflation Rate

2.2.2.1 Fisher Effect Theory

Inflation rate indicates the increase of the price level of all commodities. High inflation rate will reduce the volume of output, demand and increase the unemployment rate. High inflation and interest rate may contribute a serious economy problem. Therefore, government has to develop a monetary policy to control this problem. Regardless to Fisher equation, a percentage increase in the degree of inflation rate causes a percentage increase in the nominal interest rate. This one-for-one relationship between the rate of inflation and nominal interest rate is named as Fisher Effect. The Fisher relationship shows that the increase of inflation will in turn increase the nominal interest rate or wise versa. Hence, Government has to control the interest rate to sustain the stability of the economy. (Fatimah & Shamim, 2012) When the interest rate increases, the stock price will decrease as they have inverse relationship.

2.2.3 Exchange Rate

2.2.3.1 Markowitz's Portfolio Theory

From Markowitz's portfolio theory, portfolio that awarded a high return have to be reviewed when exchange rate change (Markowits 1952). A depreciation in currency value will lead to a swift in portfolio value from domestic country as it lessen the foreign investor's return when funds are

transferred back to the home currency. However for international domestic investor, depreciation of local currency will required higher cost to purchase foreign stocks, forcing a exchange into domestic stock and increase the domestic stock prices. The changing in value of earning and cost of fund influences the competitiveness of a firm and reflect stock price. (Yau & Nieh 2006)

2.2.4 Foreign Direct Investment

Garcia and Liu (1999), Demirguc-Kunt and Levine (1996), Yartey and Adjasi (2007) stated that when economy grew and financial restructured, the financial market tend to develop. This would lead to development of stock market as stock market development is embedded in general financial sector development of the financial system. Hence, when the economy began to develop, FDI would increase simultaneously and will bring long run relationship to the stock market development. Conversely, when the economy worsens, less capital inflow into the country will eventually reduce the FDI.

2.2.5 Money Supply

2.2.5.1 Real Activity Theory

Present value of the future cash flows is the determinant of the prices of the specified stock, the future cash flow is discounted at market interest rate. Discount rate has a significant relationship with money supply. However, there are competing theories on how money supply influences the stock prices. Sellin (2002) found that the money supply will influence stock return. The changes in money supply affect outlook about future monetary policy. The researcher suggests that a positive money supply

shock will cause people to expect contraction of monetary policy in the future. The successive raising the demand for bonds will increase the interest rate. With rate of interest rise up, the discount rates increase too, this make the present value of future earnings decrease. Consequently, stock prices decrease too. Moreover, Sellin (2002) argues that the decrease in economic activities consequently increases in rate of interest, which additional decrease the stock prices.

Alternatively, the researcher rise up an opposition statement stated that a positive money supply shock will cause the stock return to increase. The researcher argues that the changes in the money supply will grant information about the demand on money, signaling an increase in economic activity. The richer the economic activities mean higher cash flows, which make the stock prices to increase (Sellin, 2001).

2.3 Proposed Theoretical / Conceptual Framework

Table 2.1: Conceptual Framework

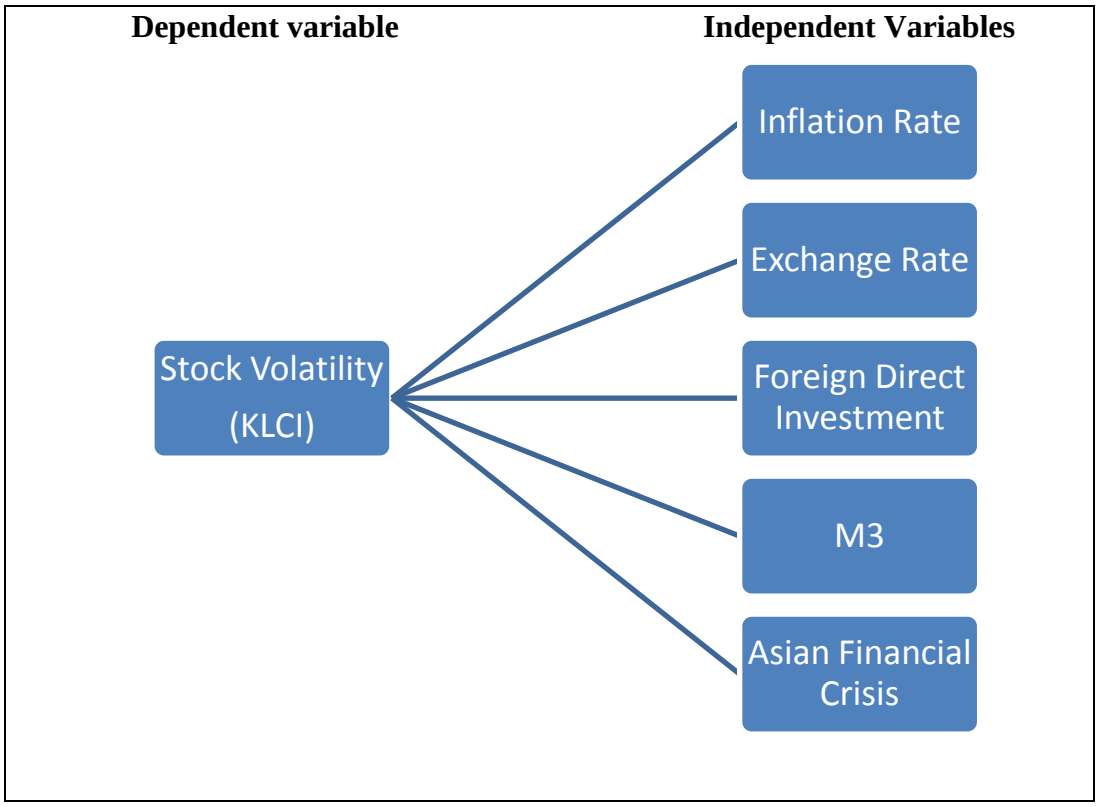


Table 2.2: Proposed Model

$$(LOG)FBMKLCI_t = \beta_c + \beta_1 LOG(CPI)_t + \beta_2 EXRATE_t + \beta_3 FDI_t + \beta_4 LOG(M3)_t + \beta_5 CRISIS_t + \mu_t$$

2.4 Hypotheses Development

From the previous literature model, by examining the relationship of money supply, inflation rate, exchange rate and foreign direct investment on equity price behavior, with adding the consideration of the Asian financial crisis. (Noorahayusolah, 2011)

I. To test whether all variables are cointegrated

Ho: the variables are non-conintegrated.
H1: the variables are cointegrated.

II. To test the casual relationship among the variables.

A) To test the relationship between inflation rates and stock markets.

Ho: there is no significant relationship between inflation rates and stock markets
H1: there is significant relationship between inflation rates and stock markets.

Inflation causes a major problem when examining the stock market. During the high inflation, the stock markets financial assets are unable to keep up because of the increasing in prices of goods. It creates great volatility in stock market. The stock will depreciate in value if the government failed to solve the inflation problem. Therefore, the inflation rate is one of the factors to impact stock market. (Geetha, Mohidin, Chandran, and Chong, 2011). In conclusion, this paper shows that there is significant relationship between inflation rate and stock market.

B) To test the relationship between exchange rate and stock markets

Ho: there is no significant relationship between exchange rates and stock markets

H1: there is significant relationship between exchange rates and stock markets

Theoretically, there is a strong relationship between exchange rate and stock market movement. Prior to the Asian financial crisis, vast studies have been carried by researcher to examine the relationship between the exchange rates and stock price violation for developing and developed countries. Causal linkage between the variables had aroused and caught the researchers' attention in order to improve the economics status of the countries. Foreign exchange rate influences firm's value. (Yau & Nieh 2006) An appreciation in exchange rates increased the competitiveness of importer in domestic market. Thus, rise in sales level created a profit and increase the stock price. In the other hand, exporter may lose their competitiveness in the international market and result a decrease in value. Hence, this paper rejects Ho saying that there is a relationship between exchange rate and stock market movement.

C) To test the relationship between foreign direct investment and stock markets.

Ho: there is no significant relationship between foreign direct investment and stock markets

H1: there is significant relationship between foreign direct investment and stock markets

While FDI promote growth, GDP growth also attracts more FDI inflows. In other word, a high growth of GDP in a country upraises FDI inflows in addition to being a consequence of these inflows. When capital inflow increases, people tend to have more money to

invest. In consequences, stock market expends.(Iriani) In conclusion, this paper rejects Ho and have sufficient evidence to reject Ho. There is significant relationship between foreign direct investment and the stock markets

D) To test the relationship between money supply and stock markets

Ho: there is no significant relationship between money supply and stock markets

H1: there is significant relationship between money supply and stock markets

Theoretically, there should be a negative relationship between money supply and stock prices because inflation rate is expected to increase when money growth rate increase. The Increase in price level raise is firm's production cost which in turn reduces its future cash flows which consequently reduces the value of its stocks. However, there are equally strong arguments for a positive relationship which are supported by an explanation that an increase in the money supply stimulates the economy, the main part of which is contributed by the increases in corporate earnings, and in another point of view which market participants will have excessive fund to invest in stock market (Maysami, Lee & Hamzah, 2004). In a nut shell, there is enough evidence to rejects H0 in this hypothesis which mean that there is relationship between the stock market return and money supply.

E) To test the relationship between financial crisis and stock markets.

Ho: there is no significant relationship between financial crisis and stock markets

H1: there is significant relationship between financial crisis and stock markets

According to Manda (2010), most asset classes experienced significant pullback during the financial crisis in 2008. The markets have become extremely volatile as the correlation between asset classes increased significantly. There is a strong relationship between volatility and market performance. When volatility increases, preceding risk increases and thus the returns to investors decrease. Yang & Lim(2004) studies on the East Asian crisis suggest that during a period of financial crisis, market instability and market participant tend to move in tandem across a range of countries. Shocks transmitted to the markets have caused a greater instability to the stock market price. Hence, this paper rejects Ho.

2.5 Conclusion

In chapter 2, there is few literature reviews had been studied in our study to show the findings of past review. These can help us to identify the finding parts in chapter 4. In this chapter, our study also proposed our own models to determine whether there is having the same results with the past review. However, the hypothesis testing is the main test objective in our study.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter clarifies data collection method and methodology used in conducting the research. The study evaluates the joint relationship between various macroeconomic factors and Malaysia stock market with the considering of financial crisis. Data collection and diagnostic testing are carried out in order to complete the research study. Various methodologies have been conducted for analysis which included the OLS test, Unit roots test and Granger Causality test.

3.1 Research Design

In this study, quantitative research is carried out to run the research objective. Empirical technique and sample data is applied to measure the dynamic effect of macroeconomic variables and financial crisis against stock market. E-view 6 software is used as the empirical tool to compute the variables data into empirical result for further investigation, where all the variable data is collected from the data stream.

3.2 Data Collection

Secondary data is drawn on this research study, as it provides quality data for research and time saving (Boslaugh 2007). Historical closing price of Malaysia stock indexes and 4 macroeconomic variables data were obtained from data stream. Data of Malaysia stock indexes (KLCI) works as the dependent variable, whereas data of foreign direct investment, inflation rates, exchange rates and money supply work as the independent variables.

3.2.1 Secondary data

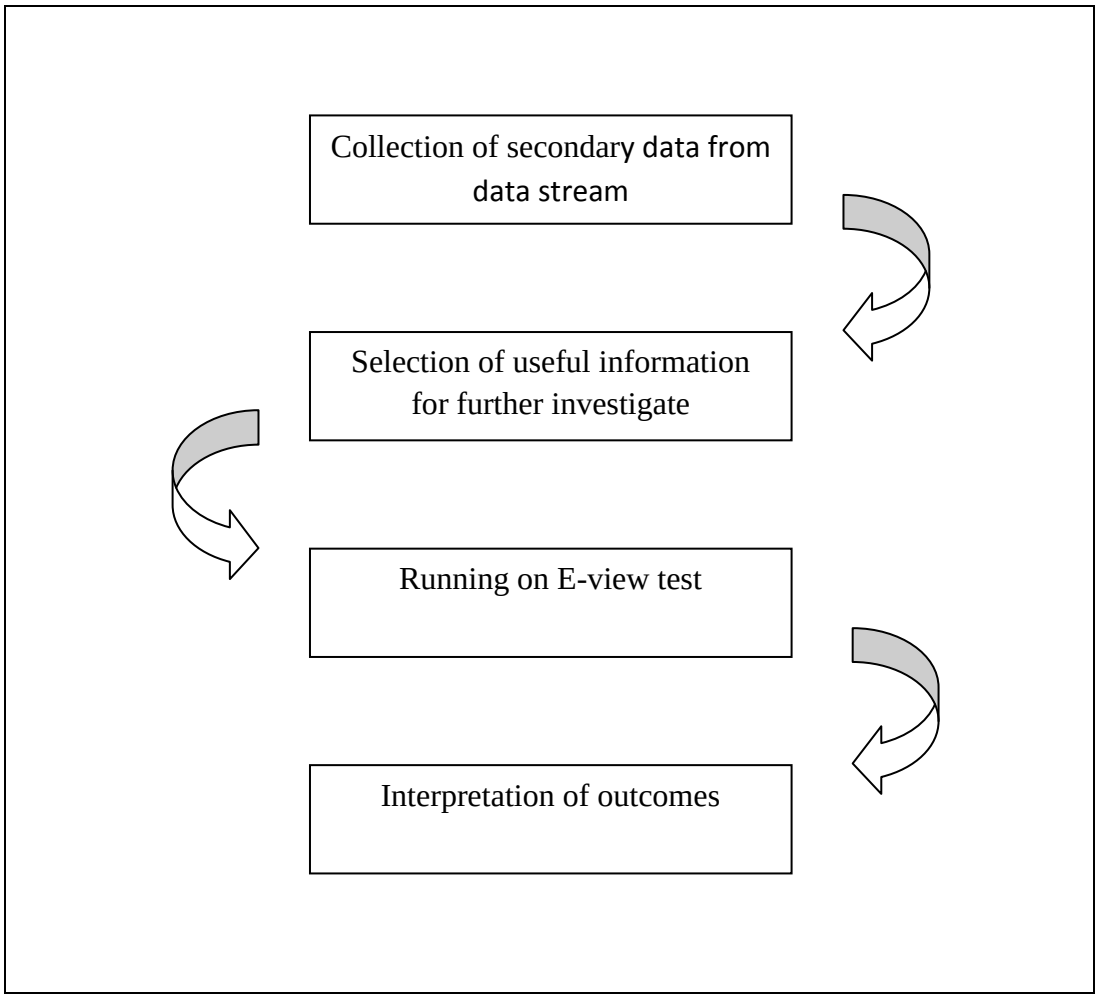
The data collected covered the period of 20 years, starting from January 1993 to September 2012 in a quarterly form with a total of 79 observations. Quarterly data was selected as it offers a clearer and sharper focus on events and also because data for interim quarter is often unaudited (Jeter & Shivakimar,1997).

Table 3.1 Source of Data

Variables	**Units**	**Proxy**
KLCI Stock Price Index	Index	KLCI
Consumer Price Index	Index	CPI
Foreign Exchange Rate	Percent (%)	FX
Foreign Direct Investment	RM million	FDI
Money Supply	RM million	M3

3.3 Data Processing

Figure 3.1 Diagram of Data Processing



Fundamentally, data preparation process comprised of four steps, collection of data, selection of quality data, running of test statistic and interpretation of outcome. Firstly, secondary data are collected via reliable data sources namely 'data stream'. Useful data are selected from the data stream, rearranged and transformed for E-view analysis. Lastly compared and interpreted the finding to our research objective.

3.4 Methodology

3.4.1 Unit Root Test

To fit the study with proper test, unit root test is practiced to indicate the possibility of non stationary of variables in time series data. It is important to consider unit root test as it determines the order of each integration for each series as well as to render the data stationary to test the effect of stationary on its behavior and property. High R squares could occur in a regression even if the two are totally unrelated if variables are trending over time, which also called as spurious regression. If the regression is not stationary, the standard assumption for asymptotic analysis is not valid. Hence, we cannot carry the hypotheses test about the regression parameters.

In this case, we follow the procedure of unit root test by employing classical unit roof test, namely Augmented Dickey - Fuller test (ADF) (Dickey Fuller, 1979). The reason for selecting it as our test analysis process is that ADF test is the most basic unit root test in time series data, and it is efficient in investigating the relationship between independent variable and dependent variable in the long run. ADF test verified the null hypothesis so as i (1) for time series $y_t$is against i (0) alternatively by using p lags of the dependent variable, asumming ARMA structure is obtained.

Table 3.2: Model of Unit Root Test

$$\Delta\gamma_t = \mathrm{B}_1 + \beta_2 t + \delta\gamma_{t-1} + \alpha\, i \sum_{i=1}^{p} \Delta\ \gamma_{t-1} + \varepsilon_t$$

Where, γ_t = { $EXC, INT_t MS_t\ FDI_t$ }, Δ represents the differencing operator, t works as the time trend, with number of lagged term. ε is white

noise for error term { $\beta_1, \beta_2, \delta, \alpha_i, \ldots\ldots, \alpha_p$ } is the parameter set to be estimated.

Table 3.3: Hypotheses of ADF Test

$H_0 : \delta = 0$ (y_t is non-stationary)
$H_1 : \delta = 1$ (y_t is stationary)

The null hypothesis is reject if consists of negative value and significant diverse from zero. Meanwhile the accept of null hypothesis mean variable does not perform stationary and consist of unit root

3.4.2 Ordinary Least Square (OLS)

Ordinary least square (OLS) is a measuring tool that is used to estimate unknown parameter in a regression model. This allowed the estimation of real population relationship between variables and detect for any existences of economic problem (Madhuchhanda & Mishra 2004). In this paper OLS test is carried out to understand the long run relationship among variables. Techniques used included Multicollinearity, Heteroscedasticity, ARCH test, Autocorrelation, and Durbin Watson test.

3.4.2.1 Multicollinearity

Multicollinearity happens when there are multiple predictors in a single model which are correlated and give redundant information. It can mislead the test result, thus cannot be certain on significant of the model (Paul). The reason for the event of multicollinearity problem could lead by the wrong usage of dummy variables for equation or including similar variable which are highly correlated (Gujariti & Porter, 2009). For this section, simple methods such as the examination of correction matrix and the

calculation of variance inflation factor (VIF) are used to detach multicollinearity problem and indentify the casual linkage between variable.

Table 3.4: Variance Inflation Factors (VIF)

$$VIF = \frac{1}{1 - R2}$$

R^2 represents the coefficient of determination for model estimated. If the VIF $\geq$ 10, then there is a multicollinearity problem.

3.4.2.2 Heteroscedasticity

Heteroscedasticity test purposed to check on the fitting of a regression model via the behavior of standard deviation and sample's variance. A time series regression consists of same variances of distribution. The existence of heteroskedasticity means that variance of distribution is not constant, there is diverse variances across the disturbance. On the other hand, it reflects homoskedastic if all the measurement are constant. White (1980) stated that heteroskedasticity influences the efficiency of estimated parameter and covariances matrix. This will cause misleading the result for hypothesis testing.

3.4.2.3 ARCH Test

A time series that consist of conditional heteroscedasticity is said to have ARCH effects. In order to test whether heteroscedasticity exist in the residual, LM test (Lagrange multiple) is used to examine significant level of ARCH effect (Eagle 1982) To check the null hypotheses so that there is no ARCH effect up to order q in residual, the regression test is run as following:

Table 3.5: Model of ARCH Test

$$e^2 = B^0 + B^1 e_{t-1}^2 + \cdots + B_q e_{t-q}^2 + V_t \ (1)$$

From equation (1), $R^2$is obtained as Engle's LM test statistic. The equation of number of observation (T) is multiply with, $R^2$of the test regression. This can be sum up as LM=T*R-$X^2(q)$. If there is ARCH effect, LM test will be significant and vice versa.

3.4.2.4 Autocorrelation

Autocorrelation can be classified as the measurement of correlation coefficient. The objective of autocorrelation is to determine the performance of data in a times series model. According to Durbin & Watson, (1950) Durbin-Watson test is used to identify whether it has autocorrelation problem. It is also referred as a serial correlation or lagged correlation, a correlation between a series of number over a successive time interval. The results of autocorrelation are ranging from +1 to -1. A positive autocorrelation considered as a perfect positive correlation, while the negative autocorrelation considered as a perfect negative correlation.

3.4.2.5 Durbin Watson Test

Durbin Watson test shows the degree of independent of a residual in a regression model and is effective to identify autocorrelation. Repeating data in time series may causes a positive in autocorrelation a positive or negative autocorrelation can be detected easily through the study on the value of Durbin -Watson statistic. Way to run Durbin Watson test includes few steps, a failure appear in first order can be measured again at the second order, where the latest order shows the most appropriate result

(Watson & Durbin, 1951). It is not valid if the model consists of lag dependent variable.

Table 3.6: Model of Durbin Watson Statistic

$$DW = \frac{\sum_{k=2}^{n-1}(\varepsilon_k - \varepsilon_{k-1})^2}{\sum_{k=1}^{n} \varepsilon_t^2}$$

Table 3.7: Criteria of DW Test:

RejectH_0 (+ve)		Do not reject		Reject H_0 (-ve)
0 dL	dU		4-dU	4-dL 4

3.4.3 Granger-Causality Test

A Granger-causality test examines the causal relationship between two variables and how effective a variable can be explained by another variable and wise versa. Granger-causality test consist of two outcome, which are uni-direction and bi-direction. It is crucial to run a granger test to indentify the short run effect between the independent variable and dependent variable as it determines the causal linkage among variables.

Granger (1969) stated that direct granger-causality is a suitable method to test the interaction between stock price movement and the force of economic changes. It examines the usefulness of a time series data in explaining outcome and assisting forecast. In this case, this research attempt to quantify whether the fluctuations of economic factors are reasonable to explain Malaysia stock market volatility. E-view software is used to stimulate statistical result for granger test's effect efficiency and assist in future analysis.

According to Rohilina, Hassamam and Fouad, (2009), it is effective to test short-run casual relationship between the dependent variable and each of the variables by using granger causality test .Two important steps are covered in test the granger causality. First, all the data must be in stationary form. Second, the stationary property of data has to be examined. Granger causality is normally investigated using linear regression model. By considering bivariate autoregressive model, model of two variables, X1 and X2 can be classified as below:

Table 3.8: Model of Granger Causality Test

$$X1(t) = \sum i = 1pA11, iX1(t-i) + \sum i = 1pA12, iX2(t-i) + E1(t)$$

$$X2(t) = \sum i = 1pA21, iX1(t-i) + \sum i = 1pA22, iX2(t-i) + E2(t)(1)$$

3.5 Conclusion

This part briefs the method used in testing the significant relationship between the forces of macroeconomic and market volatility. Econometric models were conducted for the analysis of this research. It allows investors to have a better understanding on stock market behavior, thereby alternative advantages can be taken and abnormal profits can be earned in the regular stock market with disregard to the existence of market co integration.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter reviews the descriptive statistics, unit root test, model specification test, description of empirical model and diagnostic test were conducted to check for any multicollinearity, heteroscedasticity and autocorrelation problems. Last, it is followed by granger causality test.

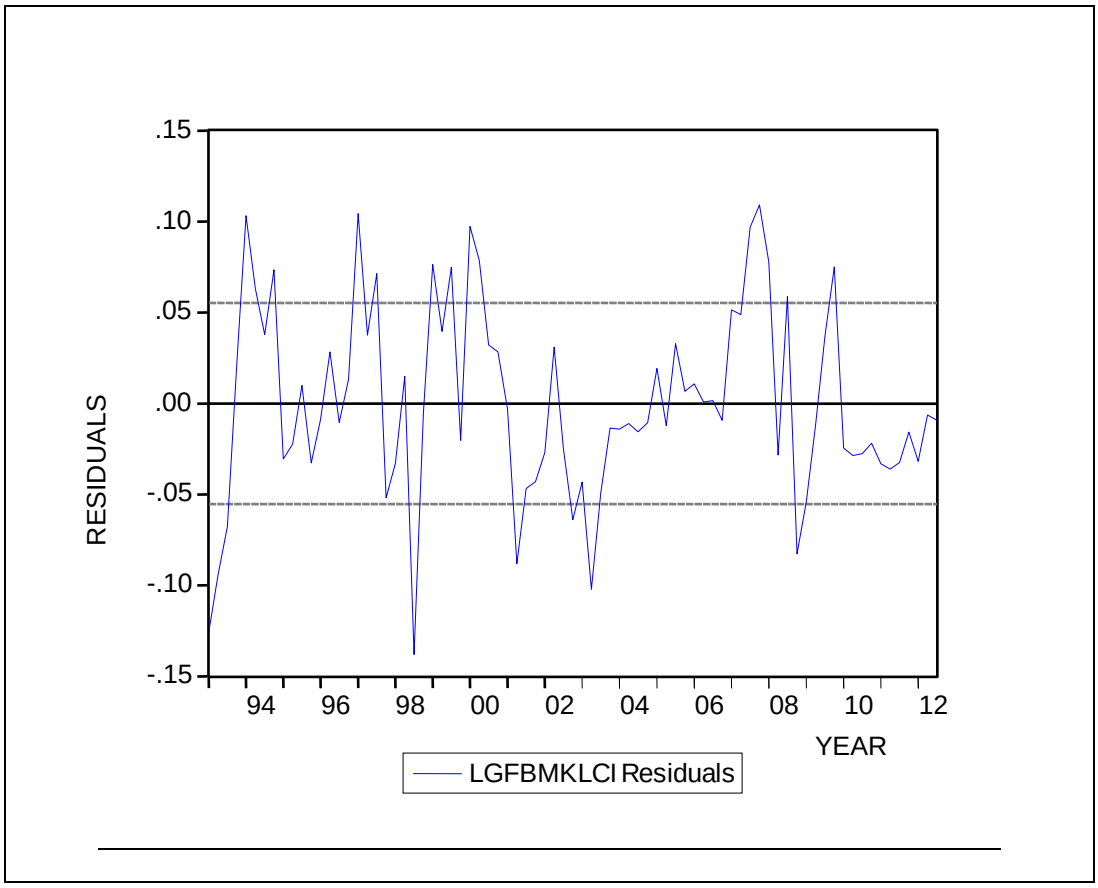
4.1 Descriptive Statistic

Table 4.1: Common Sample of Variables

	LGFBMKLCI	LGCPI	EXRATE	FDI	LGM3	CRISIS
Mean	2.970023	2.494931	4.012278	167.4099	5.718563	0.101266
Median	2.971076	2.547898	4.078000	153.2350	5.699946	0.000000
Maximum	3.210837	2.689309	5.030000	595.4460	6.125543	1.000000
Minimum	2.586554	2.271842	2.868000	-127.5010	5.215778	0.000000
Std. Dev.	0.136232	0.115989	0.655214	103.1498	0.238740	0.303608
Skewness	-0.292673	-0.892754	-0.114903	0.957472	-0.194069	2.643421
Kurtosis	2.857678	2.379459	1.636698	6.931043	2.212666	7.987676
Jarque-Bera	1.194501	11.76149	6.291703	62.93703	2.536380	173.8909
Probability	0.550323	0.002793	0.043030	0.000000	0.281340	0.000000
Observations	79	79	79	79	79	79

Table 4.1 shows a quantitative figure of descriptive statistics of each variable. However the figure reflects a huge discrepancy in digit because some variables are expressed in natural logarithm term. From the P-value above, LGFBMKLCI and M3 are normally distributed at significant level of 10%.

Figure 4.1: FBMKLCI Index Residual Graph Performance from 1993-2012.



Sources: DataStream

According to figure 4.1 the residual graph inclines to fluctuate randomly around zero in an upward and downward trend. This represents no violation of the assumption of zero means. The residuals change in average magnitude with the fitted values. It shows evidence that there is no constant variance.

Table 4.2 Unit Root Test of Augmented Dicky Fuller

	LGFBMKLCI		**LGCPI**		**EXRATE**		**FDI**		**LGM3**		**CRISIS**	
	Level	**First Diff**	**Level**	**First Diff**	**Level**	**First Diff**	**Level**	**First Diff**	**Level**	**First Diff**	**Level**	**First Diff**
Intercept	-1.658 (0)	-7.83711 (0) ***	-2.35946(3)	-3.77802(2) ***	-2.0876 (1)	-6.35993(0) ***	-2.39148 (1)	-15.209 (0) ***	-1.7446 (1)	-5.97535(0) ***	-2.45332(0)	-8.94427(0) ***
Intercept & Trend	-2.09214(0)	-7.7983(0) ***	-2.08332(3)	-3.95973(2) **	-2.30385(1)	-6.37742(0) ***	-3.21123(1) *	-15.241(0) ***	-1.90074(4)	-6.14782(0) ***	-2.64028(0)	-8.89439(0) ***

Note: *, **, ***, represent sign of significant at 10%, 5% and 1%. Core value of parentheses is the number of lags. Lag length for the ADF unit root test is based on Schwarz Information Criteria (SIC). The unit root test trend of time series. The null hypothesis ADF is the presence of the unit root.

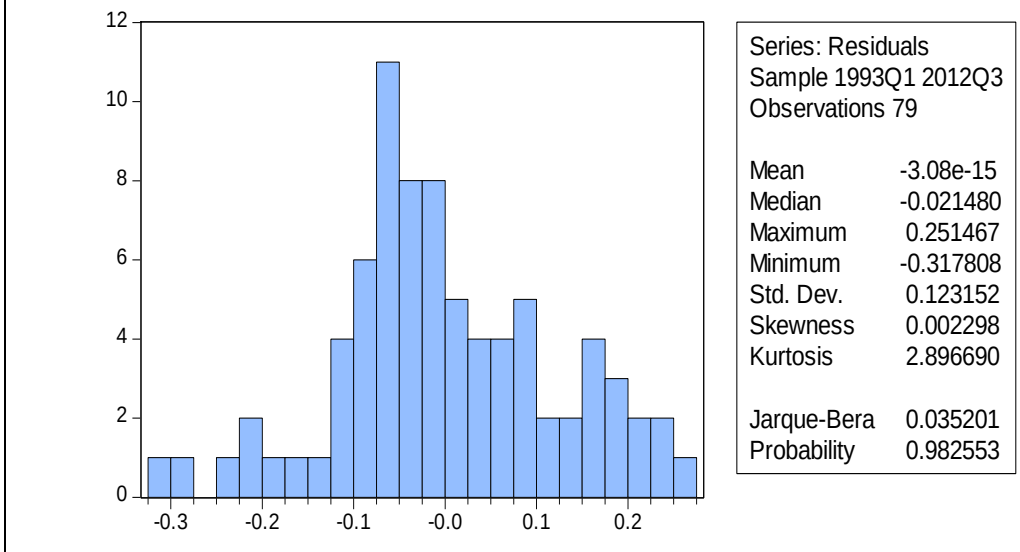
4.2 Unit Root Test

The test is applied to each variable used in the model. Dicky Fuller test is to test the stationary level of each variable. Based on the result on table 4.2, there is presence of unit root at first different. Each of the variables are integrated at order one, I (1). The Dicky Fuller test reveals that all variables are non stationary in level, but are stationary in the first differences at 1%. The shocks have a permanent effect.

4.3 Model Specification Test

4.3.1 Normality Test

Figure 4.2: Jarque-Bera Test Result



Note: Assumption of Central Limit Theorem.

The Jarque-Bera test is used to determine the normality of the error term. From Figure4.2, the p-value for Jarque-Bera test is higher than the alpha value at 1%. We can conclude that the error term is normally distributed.

4.3.2 Ramsey RESET Test

Table 4.3: Ramsey RESET Test Result from Eview

F-statistic	2.910894	Prob. F(1,72)	0.0923
Log likelihood ratio	3.131023	Prob. Chi-Square(1)	0.0768

Furthermore, Ramsey RESET Test is used to test whether the model is correctly specified or not. From the table 4.3, the p-value is higher that the alpha value at 1%. The model is correctly specified.

4.4 Description of the Empirical Model

After conforming to the model specification and unit root result, next step is to formulate the empirical model. Imploded time series date from 1993-2012. OLS regression method was used to investigate the significance of the long term relationship between stock price and the macro economic variables of the model.

Tables 4.4: Economic Model 1

$$(LOG)FBMKLCI_t = \beta_c + \beta_1 LOG(CPI)_t + \beta_2 EXRATE_t + \beta_3 FDI_t + \beta_4 LOG(M3)_t + \mu_t$$

Table 4.5: OLS Regression Result of Model 1

	Parameter Estimates	**Standard Error**	**Test Statistic**	**P-value**
$LOG(CPI)_t$	-1.161547***	0.099894	-11.62777	0.0000
$EXRATE_t$	0.014108	0.018283	0.771650	0.4428
FDI_t	0.000192**	7.6E-05	2.572970	0.0121
$LOG(M3)_t$	0.607970***	0.240906	9.557843	0.0000

R-squared : 0.812385

Note: *, **, ***, represent the sign of significant at 10%, 5% and 1%.

Where,

$(LOG)FBMKLCI_i$ = Natural logarithm of KLCI stock price Index (FBMKLCI)

$LOG(CPI)_t$ = Natural logarithm of Consumer Price Index (CPI)

$EXRATE_t$ = Foreign Exchange Rate (FX)

FDI_t = Inflow of foreign direct investment to Malaysia (FDI)

$LOG(M3)_t$ = Natural logarithm of Money Supply (M2+large deposits and other large, long-term deposits)

$€_t$ = Error term in period t

The test result on Model 1 found that 2 variables are significant at 1%, one variables is significant at 5% and only one insignificant independent variable which is EXRATEt with p-value of 0.4428 more than significant value of 0.1, 0.05and 0.01. The determinant of coefficient, R-squared 0.812385 is high enough. Mean that 81.24% of the variation of (LOG)FBMKLCIt can be explained by the total variation of $LOG(CPI)_t$, $EXRATE_t$, FDI_t and $LOG(M3)_t$. However, there is standard error for the variables FDI_t.

Table 4.6: Economic Model 2

$$(LOG)FBMKLCI_t = \beta_c + \beta_1 LOG(CPI)_t + \beta_2 EXRATE_t + \beta_3 FDI_t + \beta_4 LOG(M3)_t + \beta_5 CRISIS_t + \mu_{ts}$$

Table 4.7: OLS Regression Result of Model 2

	Parameter Estimates	**Standard Error**	**Test Statistic**	**P-value**
$LOG(CPI)_t$	-1.142504***	0.091286	-12.51563	0.0000
$EXRATE_t$	0.032368	0.038418	0.842533	0.4022
FDI_t	0.000425***	0.000157	2.709817	0.0084
$LOG(M3)_t$	0.581929***	0.044012	13.22200	0.0000
$CRISIS_t$	-0.193384***	0.048562	-3.982189	0.0002

R-squared : 0.845867

Adjusted R-squared : 0.835310

Probability (F-statistic) : 0.000000

Note: *, **, ***, represent sign of significant at 10%, 5% and 1%.

Where,

$(LOG)FBMKLCI_i$ = Natural logarithm of KLCI stock price Index (FBMKLCI)

$LOG(CPI)_t$ = Natural logarithm of Consumer Price Index (CPI)

$EXRATE_t$ = Foreign Exchange Rate (FX)

FDI_t = Inflow of foreign direct investment to Malaysia (FDI)

$LOG(M3)_t$ = Natural logarithm of Money Supply (M2+large deposits and other large, long-term deposits)

$CRISIS_t$ = 1 if Asian financial crisis in 1997-1998

= 0 if otherwise

$€_t$ = Error term in period t

Following, Model 2 is modified to observe the crisis effect.

In Model 2, the model has improved by adding crisis from years 1996-1998, The FDI had become more significant at 1% compare as previous 5%. As its p-value is decrease from 0.0121 to 0.0084. There is no more standard error for FDI. P-value of EXRATE is decreased from 0.4428 to 0.4022 but still insignificant. Although $EXRATE_t$ is insignificant, economic theory has proven that foreign exchange rate is significantly related stock price. Hence this independent variable cannot be omitted. The R-squared of Model 2 has also increased to 0.845867, 84.58% of total variation of $(LOG)FBMKLCI_i$ can be explained by total variation of LOG(CPI), $EXRATE_t$, FDI_t, $LOG(M3)_t$ and $CRISIS_t$. Adjusted R-squared also shows that total variation of $(LOG)FBMKLCI_i$ can be explained by total variation of LOG(CPI), $EXRATE_t$, FDI_t, $LOG(M3)_t$ and $CRISIS_t$ given the degree of freedom of 74. F-test also proved that our whole model is significant.

4.4.1 Empirical Result Interpretations

Table 4.8: Empirical Result

Model1: $(LOG)FBMKLCI_t = 2.302544 + -1.161547\ LOG(CPI)_t + 0.014108\ EXRATE_t + 0.000192\ FDI_t + 0.607970\ LOG(M3)_t + \mu_t$
Model 2: $(LOG)FBMKLCI_t = 2.413901 - 1.142504\ LOG(CPI)_t + 0.014057\ EXRATE_t + 0.000185\ FDI_t + 0.581929\ LOG(M3)_t + -0.083986\ CRISIS_t + \mu_t$

Coefficient for $LOG(CPI)_t$ is -1.142504. It means that 1% increase in CPI will reduce FBMKLCI index by 1.142504%, ceteris paribus. While the coefficient for the $EXRATE_t$ is 0.014057, when there is a unit increase in exchange rate will increase FBMKLCI index by 1.4057%, ceteris paribus. The coefficient for FDI_t is 0.000185, one unit increase in FDI will increase FBMKLCI index by 0.0185%, ceteris paribus. Furthermore, the coefficient of $M3_t$ is 0.581929. When money supply increase 1%, FBMKLCI index will increase by 0.581929%, ceteris paribus. Last, coefficient for $LOG(M3)_t$ is 0.581929. One unit increase in Crisis will increase FBMKLCI index by 8.3986%, ceteris paribus

4.5 Diagnostic testing

4.5.1 Multicollinearity

Table 4.9 Result of Correlation Test of Variables

	LGFBMKLCI	**LGCPI**	**EXRATE**	**FDI**	**LGM3**	**CRISIS**
LGFBMKLCI	1.000000	-0.209528	0.123765	0.503082	0.491487	-0.332086
LGCPI	-0.209528	1.000000	0.763511	0.016256	0.680710	-0.080834
EXRATE	0.123765	0.763511	1.000000	0.184094	0.736062	-0.120146
FDI	0.503082	0.016256	0.184094	1.000000	0.339124	-0.111441
LGM3	0.491487	0.680710	0.736062	0.339124	1.000000	-0.195967
CRISIS	-0.332086	-0.080834	-0.120146	-0.111441	-0.195967	1.000000

Multicollinearity is to check the relationship or correlation between independent variables in the model. From table 4.9, there are two pairs of independent variables are highly correlated, suspect of multicollinearity problem. Therefore, VIF is computed to determine the existence of the multicollinearity problem.

Table 4.10: VIF of Exchange Rate and CPI

$R^2_{EXRATE, LGCPI} = 0.582949$	$VIF_{EXRATE, LGCPI} = 1/(1-R^2_{EXRATE, LGCPI})$ $= 1/(1-0.582949)$ $= 5.745442$

The estimation from VIF shows that it has no serious multicollinearity problem between Exchange rate and CPI. (5.745442<10)

Table 4.11: VIF of Exchange Rate and M3

$R^2_{EXRATE, LGM3} = 0.541788$	$VIF_{EXRATE, LGM3} = 1/(1-R^2_{EXRATE, LGM3})$ $= 1/(1-0.541788)$ $= 2.18239$

The estimation from VIF shows that it has no serious multicollinearity problem between Exchange rate and M3. (2.18239<10)

Tables 4.10 and 4.11 on the VIF calculation results proved that there is no multicollinearity problem in the model.

4.5.2 Heteroscedasticity (ARCH Test)

Table 4.12: Arch test Result from Eview

F-statistic	1.523325	Prob. F(1,76)	0.2209
Obs*R-squared	1.532692	Prob. Chi-Square(1)	0.2157

ARCH test is a particular specification test to determine heteroscedasticity problem of financial time series. Table 4.12 shows that the P-value is greater than the 1% alpha value. It shows that the variances of error term are constant, no heteroscedasticity problem exist.

4.5.3 Autocorrelation

Table 4.13: Least Square Result from Eview

Dependent Variable: LGFBMKLCI				
Method: Least Squares				
Date: 03/26/13 Time: 00:12				
Sample (adjusted): 1993Q1 2012Q3				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGCPI	-1.142504	0.091286	-12.51563	0.0000
EXRATE	0.014057	0.016685	0.842533	0.4022
FDI	0.000185	6.81E-05	2.709817	0.0084
LGM3	0.581929	0.044012	13.22200	0.0000
CRISIS	-0.083986	0.021090	-3.982189	0.0002
C	2.413901	0.221616	10.89227	0.0000
R-squared	0.845867	Mean dependent var		2.970023
Adjusted R-squared	0.835310	S.D. dependent var		0.136232
S.E. of regression	0.055286	Akaike info criterion		-2.879701
Sum squared resid	0.223124	Schwarz criterion		-2.699743
Log likelihood	119.7482	Hannan-Quinn criter.		-2.807604
F-statistic	80.12369	Durbin-Watson stat		1.075128
Prob(F-statistic)	0.000000			

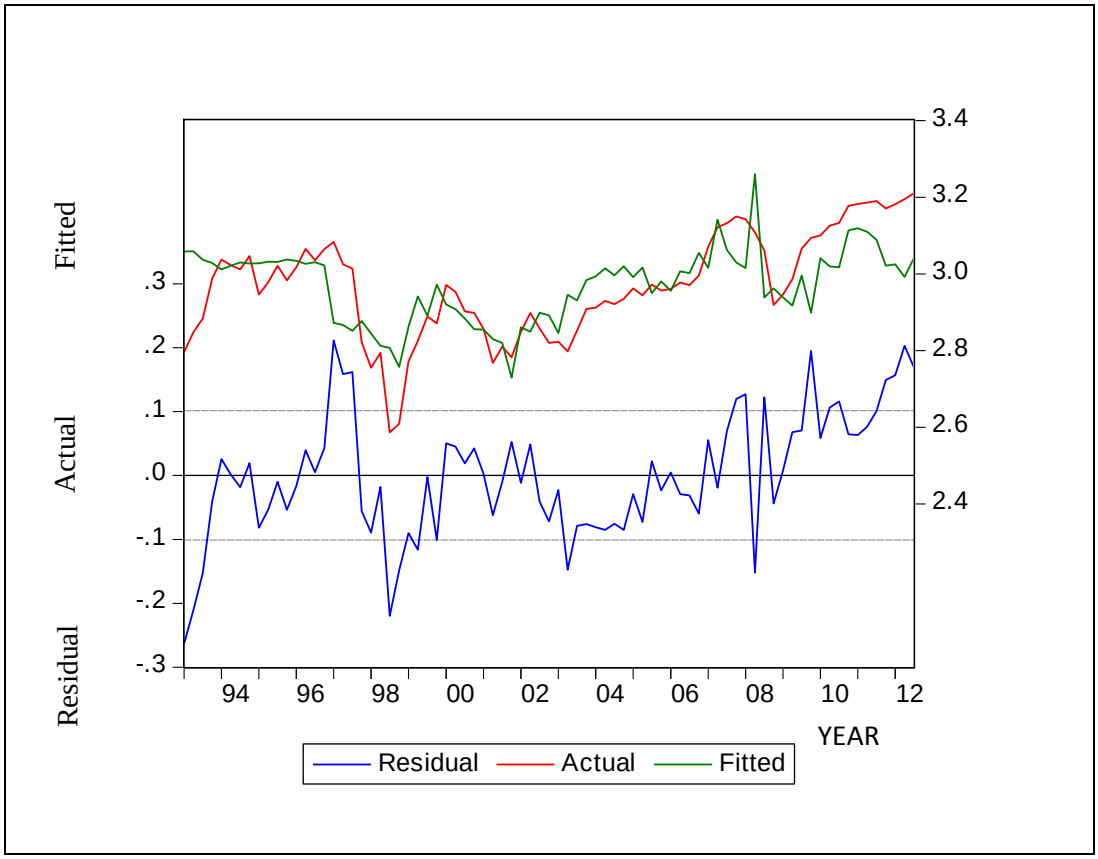
Table 4.14: Durbin Watson Test Model

Durbin Watson Statistics = 1.075128	N=79	K=4
1-Percent Two-Sided Level of Significance		
d_L = .1.39	d_U = 1.60	

H_0= no serial correlation H_1= serial correlation

Based on Table 4.14, The Durbin Watson Statistic is lower than the lower critical value which implicate that there is existing positive autocorrelation problem in the model. There is serial correlation in the error term. Next step is to examine the order of the autocorrelation.

Figure 4.3: Residual, Actual & Fitted Graph



Sources: Data Stream from 1993 to 2012

Based on figure 4.3, the chronological pattern of the residual graph showing first order serial correlation, the model is confirmed to have pure autocorrelation problem.

Gujarati & Porter (2009) review that the positive sign of autocorrelation mean the residual tend to move in same direction over at one time period, an appropriate transformation can used solve this problem. Douglas & Hibbs(1973) explained the nature of autocorrelation problem exist in a time series data. The authors review the consequence of the estimation and inference on the hypothesis result and purpose generalized least square (GLS) to solve the problem

4.6 Granger Causality Test

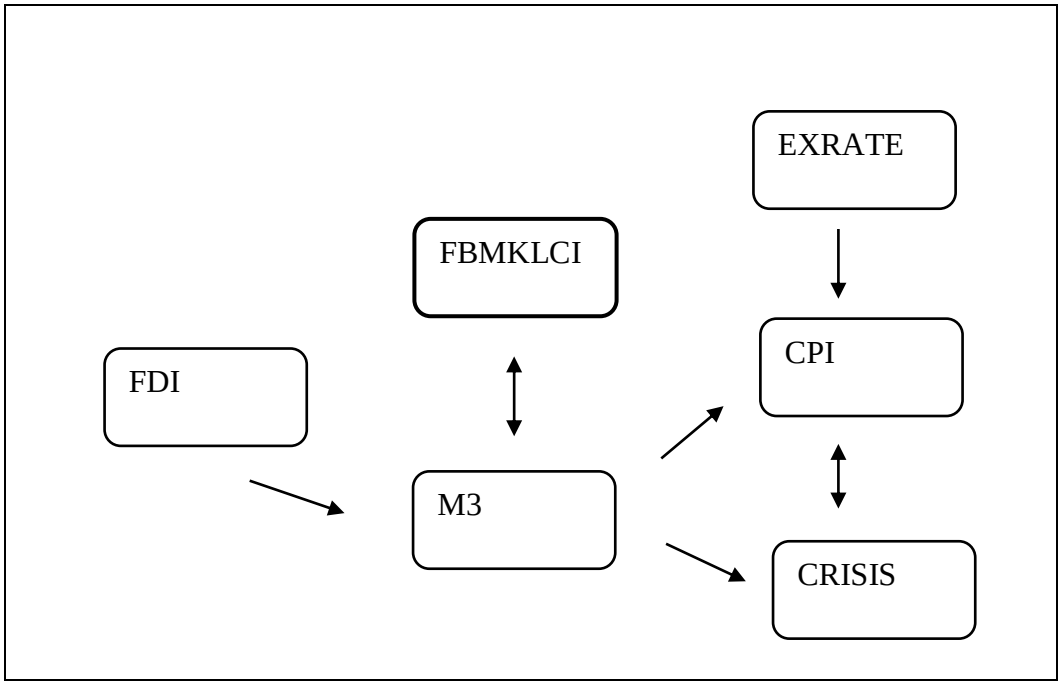
Table 4.15: Granger Causality Test Result

	LGFBMKLCI	**LGCPI**	**EXRATE**	**FDI**	**LGM3**	**CRISIS**
LGFBMKLCI		1.204303	3.131012	1.297261	9.503580***	3.244474
LGCPI	0.279633		4.967166*	4.180606	4.754490*	6.223954**
EXRATE	1.313662	0.738705		0.114782	1.043180	1.717424
FDI	1.041219	0.060189	0.966139		1.267844	1.970067
LGM3	5.915521*	0.111606	1.406135	8.381627**		1.223792
CRISIS	2.040058	10.60732***	1.765258	0.213264	4.631519*	

Note: *, **, *** represent sign of significant at 10%, 5% and 1% .

The Granger Causality test is conducted for the objective to modify short run causality between variables and stock price. From table 4.15, CPI, Exchange Rate, FDI and Crisis do not Granger Cause to FBMKLCI. Money Supply is Granger Cause FBMKLCI at 1% significant level. Money Supply and FBMKLCI has bi-directional causality relationship between each other in the short run.

Figure 4.4: Causality Relationship between Variables



4.7 Conclusion

Chapter 4 presented the empirical results clearly in tables and figures form together with precise interpretations written on the test results. The summary of the major findings and the whole research study will be further discussed in the next chapter.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

The final chapter highlights the overall result analysis of the research topic. By using the sample data from January 1993 to September 2012, the effect of macroeconomic factors on Malaysia equity market uncertainty is examined and carried forward to a conclusion. A brief review on the long run relationship and short run causality of factors namely inflation rate, exchange rate, degree of foreign direct investment, money supply and Asian financial crisis on stock market is provided with supporting literature review. Meanwhile, a simple discussion on the limitations and recommendations for the research study is also included.

5.1 Summary on Statistical Analyses

Table 5.1: Summary of Econometric Problems

Econometric problems	**Description on results**
Multicollinearity	Passed, no multicollinearity problem
Heteroscedasticity	Passed, no heteroscedasticity problem
Autocorrelation	Failed, there is autocorrelation problem
Model specification	Passed, no model specification problem

Normality test	Passed, model is normally distributed

The econometric model has passed many of the econometric problems except autocorrelation test. It suggests a problem of autocorrelation that might affect the reliability of the model result. Generalize least square method can be used to solve this problem.

Table 5.2: Summarize of Major Findings

Dependent Variable	**Independent Variable**	**Unit Root Test**	**Ordinary Least Square**	**Granger Causality Test**
LGFBMKLCI	LGCPI	Stationary	Significant at 1% (Negative)	Not significant
LGFBMKLCI	EXRATE	Stationary	Not Significant (Positive)	Not significant
LGFBMKLCI	FDI	Stationary	Significant at 1% (Positive)	Not significant
LGFBMKLCI	LGM3	Stationary	Significant at 1% (Positive)	Significant at 1%
LGFBMKLCI	CRISIS	Stationary	Significant at 1% (Negative)	Not significant

The table above shows the relationship of corresponding determinants and FBMKLCI. All the independent and dependent variables are stationary, they are not containing unit root. There are positive relationships between EXRATE, FDI, LGM3 and LGFBMKLCI, but there are only FDI and LGM3 are significant at 1%, however EXRATE is not significant. While, LGCPI and CRISIS have an inverse relationship with LGFBMKLCI and both are significant at 1%. In short run,

LGM3 is having a short run relationship with LGFBMKLCI significant at 1%, which mean money supply granger cause the stock market index in short run. From the findings, it shows that it a bi-directional causality relationship between money supply and stock market index in the short run.

5.2 Discussions of Major Findings

This study investigated the dynamic correlation between macroeconomic factors and equity market using quarterly data during the period of January year 1993 to September year 2012. Before going deep of the research, this paper has gone through the diagnostic checking in order to identify the best model that free from econometric problems for this paper. This paper has found out that it is a best model by inclusion of the natural logarithm. The OLS regression model was apply to examine the long run relationship between macroeconomic factors and Malaysia equity price. Furthermore, the Granger Causality Test was applying to determine the short run causality. Based on the final regression model and empirical model with the include of financial crisis as an additional variable, long run interaction relationships are found in almost all of the selected variables on the KLCI stock price except the exchanges rates. In granger causality test, money supply is the only variable that consists of granger causal effect on KLCI stock price. Exchange rate, foreign direct investment, consumer price index and financial crisis failed to represent a clear granger effect on the KLCI stock price in the empirical study.

Regardless to the OLS test result, inflation rate found to contain a strong inverse relationship with KLCI equity price in long run. This result found to match with the findings of previous research of Saryal (2007), Sari (2005) Kosnandi (2011) and Elsharieif (2009) who stated that stock return react inversely to the impact of inflation rate. Thus there is negative relationship between equity markets with inflation rate. Meanwhile the findings from the granger causality test show that causality between the stock price and inflation is compatible with the finding of Geetha, Mohidin, Chandran, and Chong (2011). It indicates that there is long run

relationship but no short run causality between inflation rate and Malaysia equity market index. Stock market return is negatively associated to contemporaneous inflation and caused only the decline of equity prices in long run.

The finding indicates that there is no significant long run correlation between the exchange rate and the KLCI equity price index. This is not in line with the previous research studies included Baharumshah, et al. (2002), Ghazali, et al (2009) and Phylaktis and Ravazzolo (2003) who suggested that the exchange rate is a strong indicator of market uncertainty. Shew (2008) stated that it may lead by the different outcome effect of exchange rate on KLCI stock price regardless to various periods of time series. Alternatively, the granger causality result showed that there is no short run causality between the exchange rate and KLCI equity price. This is in line with the studies of Kenani, et al (2012) and Uddin and Rahman (2009) in developing country which determined that there is no any causal relationship between stock price and exchange rate. The forecast of stock price is only available with the respective market information but not the others. Singh (2010) and Beer and Hebein (2008) suggested that the eliminating this variables may lead to other external factor such as the lack of participation in stock market of developing country.

Based on the previous research, the researcher found that no short run causality but long run correlation found between foreign direct investment and equity market index, FBKLCI. According to OLS estimator, there is a positive correlation between FDI and KLCI while Granger Causality test also show that there is no short run relationship between these two variables. These result is also strengthen with the previous literature based on Adam and Tweneboa, Garcia and Liu (1999), Yartey and Adjasi (2007), Demirguc-Kunt and Levine (1996) which states that when economy grew and financial restructured, the financial market tend to develop. This would lead to development of stock market as the stock market growth is embedded in universal financial sector development of the financial system. However there are arguments that overall economic growth may not be significant but according to Alfaro (2003), the situation will altered when investment is made in manufacturing sector and it will show positive connection between the FDI and the economic growth.

The researchers analyze empirical test on relationship between Asian financial crisis and Malaysia stock price, FBKCLI index. OLS regression test imply a stationary long run relationship for each variables including crisis as a independent variable affecting stock price in the OLS regression model. The finding shows a significant negative relationship in the long run impact Malaysia stock price. However, Granger test result is showing that no short run relationship can be found between financial crisis and FBMKLCI index price. The former were coherent with the previous literature Leeves (2005), Lim, et al (2008) and Ali & Afzal (2012) state that stock price tend to move negatively in crisis period. The finding is supported by previous literature review to the first attempt classified that long run relationship can be found and market became more integrated after the crisis (Yang, Kolari and Min, 2002). Beak & Jun (2011) confirmed also to the contagion effect among the stock market. The granger test shows a contradict result to the previous literature where short-run causal linkages between these market throughout financial crisis, Sed'a (2011) state that stock market volatility increase significantly during the crisis period.

Moreover, the results from the findings shown that the money supply has a direct and positive significant correlation with FBMKLCI index price. This result found to be consistent with previous research by Herve, Chanmalai, and Shen (2011) found that the Co integration analyses provided proof in supporting long run correlation between equity prices and real money supply found during the study period. Besides, Sohail, and Hussain (2009) found out that money supply have a positive relationship with the stock returns. While Maysami and Koh (2000) results shows that the movement in Singapore's stock market return has a co-integrating relationship with money supply. According to the empirical findings founded in Pilinkus (2009), bidirectional causality relationships be present between stock market index and money supply. This was in line with the finding of the present paper. Asmy, Rohilina, Hassama, and Fouad (2009) findings show that stock prices affected by the changes in money supply positively in the short run. Ibrahim and Yusoff (2001) findings shows that the money supply is positively carry impact to the stock market in short run. The findings showed that money supply is a good variable to be highlight and applied by the government as financial policy instruments in order to monitor the stability of stock market.

The main intention of this paper is to examine the short run casualty and long run relationship between the economic factors and equity price index in Malaysia. All those findings are useful tools for stock market participants, and that will be discussing in detail during the following section. All of the factors that have been employed are considered important variables to help out the stock market participant in predicting and analyzing the trend of the equity market.

5.3 Implication of the Study

This paper provides the study and analysis of Malaysia current stock price index movement. From the findings that are found in this paper indicate that a favorable portfolio investment can be made through the in-depth analysis on the trend of current stock determinants such as money supply, inflation rate, exchange rate, Asian financial crisis and foreign direct investment. This served as a guideline for Malaysia investors who are interested to invest in Malaysia equity market but at the same time concerned about the volatility of stock market movement.

From the research, the people will have a better perceptive on the correlation between macroeconomic factors and equity market and how these factors work on Malaysia stock market. Policy maker, central bank (Bank Negara Malaysia), economist, and stock market participants may found that the results in this paper useful for indicating the future movement and direction of stock prices, for formulating investment strategy, indentifying presented investment prospect, and minimizing the chances of significant losses in the market.

Based on OLS result from findings, all of the variables have significant relationship with stock return, except foreign exchange rate. Money supply and foreign direct investment have positive significant relationship with stock return. Besides, Asian Financial Crisis and inflation are having an inverse significant relationship towards equity market return.

Money supply is one of the vital monetary policy tools that will be implemented by government in increase or decreasing the money supply in the market. Stock market participants should be more attentive of any announcement of new policy from Ministry of Finance like open market operation and reserve requirement ratio. With tighten or broaden of the money supply in the economic, it will affect the volatility of stock market.

From the results in findings, consumer price index and stock market index have a significant inverse relationship. Investors should be alert about inflation in the market. As there is a negative correlation between equity return and consumer price index, when the country is facing inflation, the purchasing power of customers would normally reduce. As a result, investors would have less money for investment due to lower purchasing power and higher living cots. The majority of investors would sell out their portfolio investment such as stocks or shares that lead to stock market return drop due to supply is now more than demand. Policy maker should implement appropriate fiscal and monetary policy to control the inflation as well as minimizing the impact to stock market.

Moreover, the stock market authority may benefit from the results found as it is useful in preventing any uncertain catastrophe by monitoring stock market with adjusting the significant macroeconomic variable. Last but not least, it is suggested that the monetary authorities can influence the equity market movement by implementing policy as the findings show that the equity price index is significantly affected by the money supply in the market, foreign direct investment and consumer price index, which mean the inflation rate.

5.4 Limitations of the Study

Like other researches, this research paper has some limitations and difficulties. The limitation of the research study is the samples size used in this study is not large enough. Larger sample size will have a higher probability of detecting a statistically significant result whereas a smaller sample size may be misleading and susceptible to error. This is because the sample coverage from DataStream is limited. The model consist only data from year 1993-2012, observation 79 for the sample size. For qualitative studies, a larger sample size enables to round off the population mean and approximate to normal distribution. In particularly, among variables that are significantly indifferent.

However, OLS estimator is not the best tools for interpretation of series data as linearity in variables is a major concern during the analysis. Lack of linear association between predictor and outcome may lead to model specification error. This may lead to biased, inefficient coefficient due to poor reliability and co linearity. Apart from that, OLS is too responsive to outliers than some other estimators, which may affect the result will not that accurate. When the population mean is estimated, if there are present of outliers, then the sample median is preferred to the sample mean. As median is less sensitive to outliers and it will has smaller variance than OLS (mean) when there are outliers.

In additional, this research is limited to Malaysia's time series data but not panel data. Result conducted in this study only considered as case based on Malaysia, while other countries may have their unique status, background and political factors that will directly influence the related stock market. The result and information provided in this study is only useful for the Malaysia investor and policy maker. Thus this paper only applicable as a reference for investor and policy maker in local but not apply Malaysia case into others respective country's policy accurately.

Moreover, one of the limitations is neglecting the severity level of crisis. It is important to compare the Asian financial crisis and stock market integration over

time. This paper found to hold a lesser inference on the finding result based on the period before crisis and after crisis. Instead of using OLS and Granger to test the long run relationship and short run casualty with the stock price, the issues with estimate the magnitude of crisis to the variables change on stock price would be more reliable to the research study.

The next limitations of the research paper would be the limitation of variables. This paper purposed four dependent variables money supply, inflation, exchange rate, foreign direct investment, and Asian financial crisis to study the relationship of macroeconomic factors and equity price. Forgone any omitted variables can cause bias result. Furthermore, extraneous variables can also alter the result value of the study. For example, election, war, communist attack and natural disaster happen in a country could have certain impact to the stock market performance

5.5 Recommendations for Future Research

Since the research has sample size problem. The researchers recommended for future research study to increase the sample size, possible by twenty years or above. The model is using quarterly data and the frequency can be set monthly or daily to increase the sample size. Thus this enable the researchers to obtain concise result with assuming normality in future research, as well as increase the reliability of the study.

To overcome the limitation of OLS estimator, the future research is encouraged to use alternative statistical method to better support the research objective. Thus this may enhance usefulness of the statistical result. For instance, replace OLS model with VAR model. The selection criteria vary according to the scope of measurement. The fundamental idea of selecting statistical approached to best fit a model is worth challenging.

Instead of using time series data for the analysis, the future researchers are recommended to carry out their study by using panel data instead of just using

time series data. Panel data provides multiple observations for each variable in the sample, larger number of data point is obtained and improving the efficiency of an econometric estimate. Researchers are encouraged to make comparison between Malaysia and other countries in order to convey more useful information worldwide investor in future research study.

It would be recommended for future studies to investigate the relationship of the macroeconomic factor and the stock price around the 2007-2008 Asian financial crises. The data should be separated into three sub period, namely pre-crisis, crisis and post-crisis. Future researcher should consider of the crisis effect in order to increase accuracy and avoid bias result.

For an accurate research work, four variables are not sufficient enough to perform the overall stock market. Future researches can improve their study by adding more variables and exploring sector wise stock index to eliminate the risk of model specification problem. Additional information or fact can be added to investigate the relationship between equity price and macroeconomic factors with the existing of external factor that influences stock market volatility.

5.6 Conclusion

In a nutshell, this paper has found that Asian Financial Crisis and consumer price index is inversely interrelated while money supply and foreign direct investment have a positive correlation with equity market return. However, foreign exchange rate turns to become positive but insignificant in stock return. Besides, there are a number of tests that are implemented to examine the short run casualty and long run relationship towards stock market return. Moreover, this research has discussed some of the limitations and recommendations in order to contribute to future researchers. In an additional word, this research has accomplished the main objective which is to investigate the significant correlation between money supply, foreign exchange rate, foreign direct investment, consumer price index and Asian Financial Crisis towards stock market return in addition to the short run casualty and long run dynamic impact.

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APPENDICES

Appendix 4.2:

Unit Root Test Results

Null Hypothesis: LGFBMKLCI has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.657997	0.4485
Test critical values:	1% level		-3.514426	
	5% level		-2.898145	
	10% level		-2.586351	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGFBMKLCI)				
Method: Least Squares				
Date: 03/05/13 Time: 08:53				
Sample (adjusted): 1993Q2 2013Q1				
Included observations: 80 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGFBMKLCI(-1)	-0.075353	0.045448	-1.657997	0.1013
C	0.229270	0.135270	1.694912	0.0941
R-squared	0.034043	Mean dependent var		0.005233
Adjusted R-squared	0.021659	S.D. dependent var		0.056481
S.E. of regression	0.055866	Akaike info criterion		-2.907047
Sum squared resid	0.243437	Schwarz criterion		-2.847496
Log likelihood	118.2819	Hannan-Quinn criter.		-2.883171
F-statistic	2.748954	Durbin-Watson stat		1.687108
Prob(F-statistic)	0.101335			

Null Hypothesis: LGFBMKLCI has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.092144	0.5420
Test critical values:	1% level		-4.076860	

	5% level		-3.466966	
	10% level		-3.160198	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGFBMKLCI)				
Method: Least Squares				
Date: 03/05/13 Time: 08:56				
Sample (adjusted): 1993Q2 2013Q1				
Included observations: 80 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGFBMKLCI(-1)	-0.111785	0.053431	-2.092144	0.0397
C	0.321066	0.152533	2.104894	0.0386
@TREND(1993Q1)	0.000408	0.000318	1.283033	0.2033
R-squared	0.054262	Mean dependent var		0.005233
Adjusted R-squared	0.029697	S.D. dependent var		0.056481
S.E. of regression	0.055636	Akaike info criterion		-2.903200
Sum squared resid	0.238342	Schwarz criterion		-2.813874
Log likelihood	119.1280	Hannan-Quinn criter.		-2.867387
F-statistic	2.208950	Durbin-Watson stat		1.662448
Prob(F-statistic)	0.116729			

Null Hypothesis: D(LGFBMKLCI) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-7.837114	0.0000
Test critical values:	1% level		-3.515536	
	5% level		-2.898623	
	10% level		-2.586605	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGFBMKLCI,2)				
Method: Least Squares				
Date: 03/05/13 Time: 08:56				
Sample (adjusted): 1993Q3 2013Q1				
Included observations: 79 after adjustments				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGFBMKLCI(-1))	-0.883325	0.112711	-7.837114	0.0000
C	0.004000	0.006393	0.625791	0.5333
R-squared	0.443723	Mean dependent var		-0.000784
Adjusted R-squared	0.436499	S.D. dependent var		0.075344
S.E. of regression	0.056558	Akaike info criterion		-2.882100
Sum squared resid	0.246310	Schwarz criterion		-2.822114
Log likelihood	115.8430	Hannan-Quinn criter.		-2.858068
F-statistic	61.42035	Durbin-Watson stat		2.005413
Prob(F-statistic)	0.000000			

Null Hypothesis: D(LGFBMKLCI) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-7.798297	0.0000
Test critical values:	1% level		-4.078420	
	5% level		-3.467703	
	10% level		-3.160627	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGFBMKLCI,2)				
Method: Least Squares				
Date: 03/05/13 Time: 08:57				
Sample (adjusted): 1993Q3 2013Q1				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGFBMKLCI(-1))	-0.884415	0.113411	-7.798297	0.0000
C	0.000130	0.013171	0.009858	0.9922
@TREND(1993Q1)	9.45E-05	0.000281	0.336726	0.7373
R-squared	0.444552	Mean dependent var		-0.000784
Adjusted R-squared	0.429935	S.D. dependent var		0.075344
S.E. of regression	0.056887	Akaike info criterion		-2.858275
Sum squared resid	0.245944	Schwarz criterion		-2.768296
Log likelihood	115.9018	Hannan-Quinn criter.		-2.822226
F-statistic	30.41326	Durbin-Watson stat		2.006260
Prob(F-statistic)	0.000000			

Null Hypothesis: LGCPI has a unit root				
Exogenous: Constant				
Lag Length: 3 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.359461	0.1567
Test critical values:	1% level		-3.520307	
	5% level		-2.900670	
	10% level		-2.587691	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGCPI)				
Method: Least Squares				
Date: 03/05/13 Time: 08:48				
Sample (adjusted): 1994Q1 2012Q3				
Included observations: 75 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGCPI(-1)	-0.054380	0.023048	-2.359461	0.0211
D(LGCPI(-1))	0.575378	0.112758	5.102777	0.0000
D(LGCPI(-2))	-0.309843	0.126235	-2.454491	0.0166
D(LGCPI(-3))	0.220580	0.113364	1.945772	0.0557
C	0.137818	0.057720	2.387717	0.0197
R-squared	0.321472	Mean dependent var		0.003233
Adjusted R-squared	0.282699	S.D. dependent var		0.025569
S.E. of regression	0.021655	Akaike info criterion		-4.762825
Sum squared resid	0.032826	Schwarz criterion		-4.608326
Log likelihood	183.6059	Hannan-Quinn criter.		-4.701135
F-statistic	8.291140	Durbin-Watson stat		1.940710
Prob(F-statistic)	0.000016			

Null Hypothesis: LGCPI has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 3 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.083319	0.5463
Test critical values:	1% level		-4.085092	
	5% level		-3.470851	
	10% level		-3.162458	

*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGCPI)				
Method: Least Squares				
Date: 03/05/13 Time: 08:48				
Sample (adjusted): 1994Q1 2012Q3				
Included observations: 75 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGCPI(-1)	-0.064520	0.030970	-2.083319	0.0409
D(LGCPI(-1))	0.584850	0.114985	5.086311	0.0000
D(LGCPI(-2))	-0.302002	0.127913	-2.360995	0.0211
D(LGCPI(-3))	0.233926	0.117146	1.996888	0.0498
C	0.159845	0.073212	2.183329	0.0324
@TREND(1993Q1)	7.96E-05	0.000161	0.493526	0.6232
R-squared	0.323859	Mean dependent var		0.003233
Adjusted R-squared	0.274863	S.D. dependent var		0.025569
S.E. of regression	0.021773	Akaike info criterion		-4.739682
Sum squared resid	0.032710	Schwarz criterion		-4.554283
Log likelihood	183.7381	Hannan-Quinn criter.		-4.665654
F-statistic	6.609949	Durbin-Watson stat		1.947399
Prob(F-statistic)	0.000044			

Null Hypothesis: D(LGCPI) has a unit root				
Exogenous: Constant				
Lag Length: 2 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.778019	0.0047
Test critical values:	1% level		-3.520307	
	5% level		-2.900670	
	10% level		-2.587691	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGCPI,2)				
Method: Least Squares				
Date: 03/05/13 Time: 08:50				
Sample (adjusted): 1994Q1 2012Q3				

Included observations: 75 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGCPI(-1))	-0.540443	0.143049	-3.778019	0.0003
D(LGCPI(-1),2)	0.126933	0.125325	1.012835	0.3146
D(LGCPI(-2),2)	-0.201972	0.116670	-1.731140	0.0878
C	0.001763	0.002618	0.673188	0.5030
R-squared	0.339917	Mean dependent var		9.53E-05
Adjusted R-squared	0.312026	S.D. dependent var		0.026934
S.E. of regression	0.022341	Akaike info criterion		-4.712967
Sum squared resid	0.035436	Schwarz criterion		-4.589367
Log likelihood	180.7362	Hannan-Quinn criter.		-4.663615
F-statistic	12.18741	Durbin-Watson stat		1.923406
Prob(F-statistic)	0.000002			

Null Hypothesis: D(LGCPI) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 2 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.959731	0.0142
Test critical values:	1% level		-4.085092	
	5% level		-3.470851	
	10% level		-3.162458	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGCPI,2)				
Method: Least Squares				
Date: 03/05/13 Time: 08:52				
Sample (adjusted): 1994Q1 2012Q3				
Included observations: 75 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGCPI(-1))	-0.586727	0.148173	-3.959731	0.0002
D(LGCPI(-1),2)	0.152432	0.126938	1.200843	0.2339
D(LGCPI(-2),2)	-0.184190	0.117391	-1.569022	0.1212
C	0.007781	0.005808	1.339725	0.1847
@TREND(1993Q1)	-0.000143	0.000123	-1.160181	0.2499
R-squared	0.352370	Mean dependent var		9.53E-05
Adjusted R-squared	0.315363	S.D. dependent var		0.026934

S.E. of regression	0.022286	Akaike info criterion	-4.705346
Sum squared resid	0.034768	Schwarz criterion	-4.550847
Log likelihood	181.4505	Hannan-Quinn criter.	-4.643656
F-statistic	9.521608	Durbin-Watson stat	1.918533
Prob(F-statistic)	0.000003		

Null Hypothesis: EXRATE has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.087603	0.2502
Test critical values:	1% level		-3.515536	
	5% level		-2.898623	
	10% level		-2.586605	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(EXRATE)				
Method: Least Squares				
Date: 03/05/13 Time: 08:59				
Sample (adjusted): 1993Q3 2013Q1				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXRATE(-1)	-0.066124	0.031675	-2.087603	0.0402
D(EXRATE(-1))	0.336870	0.106738	3.156052	0.0023
C	0.272169	0.128882	2.111766	0.0380
R-squared	0.145784	Mean dependent var		0.009430
Adjusted R-squared	0.123304	S.D. dependent var		0.192576
S.E. of regression	0.180313	Akaike info criterion		-0.551014
Sum squared resid	2.470962	Schwarz criterion		-0.461035
Log likelihood	24.76505	Hannan-Quinn criter.		-0.514965
F-statistic	6.485217	Durbin-Watson stat		1.897392
Prob(F-statistic)	0.002509			

Null Hypothesis: EXRATE has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic			-2.303847	0.4268
Test critical values:	1% level		-4.078420	
	5% level		-3.467703	
	10% level		-3.160627	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(EXRATE)				
Method: Least Squares				
Date: 03/05/13 Time: 09:00				
Sample (adjusted): 1993Q3 2013Q1				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXRATE(-1)	-0.107279	0.046565	-2.303847	0.0240
D(EXRATE(-1))	0.371358	0.110221	3.369214	0.0012
C	0.372552	0.153231	2.431308	0.0174
@TREND(1993Q1)	0.001581	0.001314	1.202715	0.2329
R-squared	0.161947	Mean dependent var		0.009430
Adjusted R-squared	0.128425	S.D. dependent var		0.192576
S.E. of regression	0.179785	Akaike info criterion		-0.544801
Sum squared resid	2.424206	Schwarz criterion		-0.424829
Log likelihood	25.51963	Hannan-Quinn criter.		-0.496736
F-statistic	4.831055	Durbin-Watson stat		1.911898
Prob(F-statistic)	0.003962			

Null Hypothesis: D(EXRATE) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.359928	0.0000
Test critical values:	1% level		-3.515536	
	5% level		-2.898623	
	10% level		-2.586605	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(EXRATE,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:00				

Sample (adjusted): 1993Q3 2013Q1				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXRATE(-1))	-0.688853	0.108311	-6.359928	0.0000
C	0.006476	0.020750	0.312120	0.7558
R-squared	0.344395	Mean dependent var		-6.33E-05
Adjusted R-squared	0.335880	S.D. dependent var		0.226033
S.E. of regression	0.184203	Akaike info criterion		-0.520571
Sum squared resid	2.612655	Schwarz criterion		-0.460585
Log likelihood	22.56255	Hannan-Quinn criter.		-0.496539
F-statistic	40.44869	Durbin-Watson stat		1.881180
Prob(F-statistic)	0.000000			

Null Hypothesis: D(EXRATE) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.377424	0.0000
Test critical values:	1% level		-4.078420	
	5% level		-3.467703	
	10% level		-3.160627	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(EXRATE,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:10				
Sample (adjusted): 1993Q3 2013Q1				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXRATE(-1))	-0.696385	0.109195	-6.377424	0.0000
C	0.032964	0.043038	0.765931	0.4461
@TREND(1993Q1)	-0.000644	0.000916	-0.703191	0.4841
R-squared	0.348633	Mean dependent var		-6.33E-05
Adjusted R-squared	0.331491	S.D. dependent var		0.226033
S.E. of regression	0.184810	Akaike info criterion		-0.501740
Sum squared resid	2.595766	Schwarz criterion		-0.411761
Log likelihood	22.81872	Hannan-Quinn criter.		-0.465691
F-statistic	20.33880	Durbin-Watson stat		1.881074

Prob(F-statistic)	0.000000			

Null Hypothesis: FDI has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.391483	0.1474
Test critical values:	1% level		-3.516676	
	5% level		-2.899115	
	10% level		-2.586866	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(FDI)				
Method: Least Squares				
Date: 03/05/13 Time: 09:11				
Sample (adjusted): 1993Q3 2012Q4				
Included observations: 78 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-0.344824	0.144189	-2.391483	0.0193
D(FDI(-1))	-0.370381	0.123277	-3.004450	0.0036
C	64.64950	26.77141	2.414871	0.0182
R-squared	0.326972	Mean dependent var		6.183718
Adjusted R-squared	0.309024	S.D. dependent var		126.5137
S.E. of regression	105.1644	Akaike info criterion		12.18663
Sum squared resid	829467.0	Schwarz criterion		12.27727
Log likelihood	-472.2786	Hannan-Quinn criter.		12.22292
F-statistic	18.21832	Durbin-Watson stat		1.859517
Prob(F-statistic)	0.000000			

Null Hypothesis: FDI has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.211229	0.0898
Test critical values:	1% level		-4.080021	
	5% level		-3.468459	

	10% level		-3.161067	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(FDI)				
Method: Least Squares				
Date: 03/05/13 Time: 09:11				
Sample (adjusted): 1993Q3 2012Q4				
Included observations: 78 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-0.494996	0.154145	-3.211229	0.0020
D(FDI(-1))	-0.301326	0.123370	-2.442458	0.0170
C	36.13829	28.73350	1.257706	0.2125
@TREND(1993Q1)	1.320962	0.565685	2.335154	0.0222
R-squared	0.373162	Mean dependent var		6.183718
Adjusted R-squared	0.347750	S.D. dependent var		126.5137
S.E. of regression	102.1750	Akaike info criterion		12.14117
Sum squared resid	772539.8	Schwarz criterion		12.26203
Log likelihood	-469.5057	Hannan-Quinn criter.		12.18955
F-statistic	14.68431	Durbin-Watson stat		1.851662
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FDI) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-15.20903	0.0001
Test critical values:	1% level		-3.516676	
	5% level		-2.899115	
	10% level		-2.586866	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(FDI,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:12				
Sample (adjusted): 1993Q3 2012Q4				
Included observations: 78 after adjustments				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-1.547024	0.101717	-15.20903	0.0000
C	7.309830	12.27344	0.595581	0.5532
R-squared	0.752697	Mean dependent var		4.125103
Adjusted R-squared	0.749443	S.D. dependent var		216.5194
S.E. of regression	108.3803	Akaike info criterion		12.23448
Sum squared resid	892718.8	Schwarz criterion		12.29491
Log likelihood	-475.1446	Hannan-Quinn criter.		12.25867
F-statistic	231.3147	Durbin-Watson stat		2.030731
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FDI) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-15.24099	0.0001
Test critical values:	1% level		-4.080021	
	5% level		-3.468459	
	10% level		-3.161067	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(FDI,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:12				
Sample (adjusted): 1993Q3 2012Q4				
Included observations: 78 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-1.550380	0.101724	-15.24099	0.0000
C	-15.48894	25.24989	-0.613426	0.5415
@TREND(1993Q1)	0.563103	0.545085	1.033055	0.3049
R-squared	0.756166	Mean dependent var		4.125103
Adjusted R-squared	0.749664	S.D. dependent var		216.5194
S.E. of regression	108.3325	Akaike info criterion		12.24599
Sum squared resid	880194.2	Schwarz criterion		12.33663
Log likelihood	-474.5936	Hannan-Quinn criter.		12.28228
F-statistic	116.2932	Durbin-Watson stat		2.054120
Prob(F-statistic)	0.000000			

Null Hypothesis: LGM3 has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.744597	0.4051
Test critical values:	1% level		-3.517847	
	5% level		-2.899619	
	10% level		-2.587134	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGM3)				
Method: Least Squares				
Date: 03/05/13 Time: 09:13				
Sample (adjusted): 1993Q3 2012Q3				
Included observations: 77 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGM3(-1)	-0.007122	0.004082	-1.744597	0.0852
D(LGM3(-1))	0.314922	0.108705	2.897029	0.0050
C	0.048575	0.023738	2.046244	0.0443
R-squared	0.170639	Mean dependent var		0.011520
Adjusted R-squared	0.148224	S.D. dependent var		0.008554
S.E. of regression	0.007894	Akaike info criterion		-6.807152
Sum squared resid	0.004612	Schwarz criterion		-6.715835
Log likelihood	265.0753	Hannan-Quinn criter.		-6.770626
F-statistic	7.612646	Durbin-Watson stat		1.998298
Prob(F-statistic)	0.000985			

Null Hypothesis: LGM3 has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 4 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.900737	0.6442
Test critical values:	1% level		-4.086877	
	5% level		-3.471693	
	10% level		-3.162948	
*MacKinnon (1996) one-sided p-values.				

Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGM3)				
Method: Least Squares				
Date: 03/05/13 Time: 09:13				
Sample (adjusted): 1994Q2 2012Q3				
Included observations: 74 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGM3(-1)	-0.060352	0.031752	-1.900737	0.0616
D(LGM3(-1))	0.231098	0.113756	2.031524	0.0462
D(LGM3(-2))	-0.047990	0.115711	-0.414740	0.6797
D(LGM3(-3))	0.028414	0.115743	0.245493	0.8068
D(LGM3(-4))	0.181729	0.111519	1.629573	0.1079
C	0.327997	0.169142	1.939185	0.0567
@TREND(1993Q1)	0.000594	0.000318	1.867917	0.0661
R-squared	0.161363	Mean dependent var		0.010799
Adjusted R-squared	0.086261	S.D. dependent var		0.007878
S.E. of regression	0.007531	Akaike info criterion		-6.849889
Sum squared resid	0.003799	Schwarz criterion		-6.631937
Log likelihood	260.4459	Hannan-Quinn criter.		-6.762945
F-statistic	2.148583	Durbin-Watson stat		1.705690
Prob(F-statistic)	0.059049			

Null Hypothesis: D(LGM3) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.975347	0.0000
Test critical values:	1% level		-3.517847	
	5% level		-2.899619	
	10% level		-2.587134	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGM3,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:14				

Sample (adjusted): 1993Q3 2012Q3				
Included observations: 77 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGM3(-1))	-0.634395	0.106169	-5.975347	0.0000
C	0.007246	0.001540	4.704279	0.0000
R-squared	0.322522	Mean dependent var		-0.000172
Adjusted R-squared	0.313489	S.D. dependent var		0.009657
S.E. of regression	0.008001	Akaike info criterion		-6.792819
Sum squared resid	0.004801	Schwarz criterion		-6.731941
Log likelihood	263.5235	Hannan-Quinn criter.		-6.768468
F-statistic	35.70478	Durbin-Watson stat		2.034496
Prob(F-statistic)	0.000000			

Null Hypothesis: D(LGM3) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.147816	0.0000
Test critical values:	1% level		-4.081666	
	5% level		-3.469235	
	10% level		-3.161518	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGM3,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:14				
Sample (adjusted): 1993Q3 2012Q3				
Included observations: 77 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGM3(-1))	-0.670974	0.109140	-6.147816	0.0000
C	0.009919	0.002526	3.926905	0.0002
@TREND(1993Q1)	-5.62E-05	4.22E-05	-1.331468	0.1871
R-squared	0.338373	Mean dependent var		-0.000172
Adjusted R-squared	0.320491	S.D. dependent var		0.009657
S.E. of regression	0.007960	Akaike info criterion		-6.790520
Sum squared resid	0.004689	Schwarz criterion		-6.699202
Log likelihood	264.4350	Hannan-Quinn criter.		-6.753993

F-statistic	18.92274	Durbin-Watson stat		2.007654
Prob(F-statistic)	0.000000			

Null Hypothesis: CRISIS has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.453324	0.1307
Test critical values:	1% level		-3.511262	
	5% level		-2.896779	
	10% level		-2.585626	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(CRISIS)				
Method: Least Squares				
Date: 03/05/13 Time: 09:14				
Sample (adjusted): 1993Q2 2013Q4				
Included observations: 83 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CRISIS(-1)	-0.138333	0.056386	-2.453324	0.0163
C	0.013333	0.017506	0.761660	0.4485
R-squared	0.069167	Mean dependent var		0.000000
Adjusted R-squared	0.057675	S.D. dependent var		0.156174
S.E. of regression	0.151603	Akaike info criterion		-0.911299
Sum squared resid	1.861667	Schwarz criterion		-0.853013
Log likelihood	39.81889	Hannan-Quinn criter.		-0.887883
F-statistic	6.018800	Durbin-Watson stat		1.871946
Prob(F-statistic)	0.016300			

Null Hypothesis: CRISIS has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.640284	0.2641
Test critical values:	1% level		-4.072415	
	5% level		-3.464865	

	10% level		-3.158974	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(CRISIS)				
Method: Least Squares				
Date: 03/05/13 Time: 09:15				
Sample (adjusted): 1993Q2 2013Q4				
Included observations: 83 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CRISIS(-1)	-0.155704	0.058972	-2.640284	0.0100
C	0.045670	0.036629	1.246816	0.2161
@TREND(1993Q1)	-0.000730	0.000726	-1.004992	0.3179
R-squared	0.080772	Mean dependent var		0.000000
Adjusted R-squared	0.057791	S.D. dependent var		0.156174
S.E. of regression	0.151594	Akaike info criterion		-0.899748
Sum squared resid	1.838456	Schwarz criterion		-0.812320
Log likelihood	40.33956	Hannan-Quinn criter.		-0.864625
F-statistic	3.514777	Durbin-Watson stat		1.863366
Prob(F-statistic)	0.034429			

Null Hypothesis: D(CRISIS) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-8.944272	0.0000
Test critical values:	1% level		-3.512290	
	5% level		-2.897223	
	10% level		-2.585861	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(CRISIS,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:15				
Sample (adjusted): 1993Q3 2013Q4				
Included observations: 82 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CRISIS(-1))	-1.000000	0.111803	-8.944272	0.0000

C	0.000000	0.017461	0.000000	1.0000
R-squared	0.500000	Mean dependent var		0.000000
Adjusted R-squared	0.493750	S.D. dependent var		0.222222
S.E. of regression	0.158114	Akaike info criterion		-0.826915
Sum squared resid	2.000000	Schwarz criterion		-0.768214
Log likelihood	35.90350	Hannan-Quinn criter.		-0.803347
F-statistic	80.00000	Durbin-Watson stat		2.000000
Prob(F-statistic)	0.000000			

Null Hypothesis: D(CRISIS) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-8.894392	0.0000
Test critical values:	1% level		-4.073859	
	5% level		-3.465548	
	10% level		-3.159372	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(CRISIS,2)				
Method: Least Squares				
Date: 03/05/13 Time: 09:16				
Sample (adjusted): 1993Q3 2013Q4				
Included observations: 82 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CRISIS(-1))	-1.000697	0.112509	-8.894392	0.0000
C	0.007406	0.036109	0.205100	0.8380
@TREND(1993Q1)	-0.000174	0.000742	-0.234743	0.8150
R-squared	0.500349	Mean dependent var		0.000000
Adjusted R-squared	0.487699	S.D. dependent var		0.222222
S.E. of regression	0.159056	Akaike info criterion		-0.803222
Sum squared resid	1.998606	Schwarz criterion		-0.715171
Log likelihood	35.93208	Hannan-Quinn criter.		-0.767871
F-statistic	39.55510	Durbin-Watson stat		2.000002
Prob(F-statistic)	0.000000			

Appendix 4.4:

OLS Regression Results

Dependent Variable: LGFBMKLCI				
Method: Least Squares				
Date: 03/23/13 Time: 22:06				
Sample (adjusted): 1993Q1 2012Q3				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGCPI	-1.161547	0.099894	-11.62777	0.0000
EXRATE	0.014108	0.018283	0.771650	0.4428
FDI	0.000192	7.46E-05	2.572970	0.0121
LGM3	0.607970	0.047693	12.74752	0.0000
C	2.302544	0.240906	9.557843	0.0000
R-squared	0.812385	Mean dependent var		2.970023
Adjusted R-squared	0.802244	S.D. dependent var		0.136232
S.E. of regression	0.060582	Akaike info criterion		-2.708439
Sum squared resid	0.271593	Schwarz criterion		-2.558474
Log likelihood	111.9833	Hannan-Quinn criter.		-2.648358
F-statistic	80.10629	Durbin-Watson stat		0.941871
Prob(F-statistic)	0.000000			

Dependent Variable: LGFBMKLCI				
Method: Least Squares				
Date: 03/23/13 Time: 22:09				
Sample (adjusted): 1993Q1 2012Q3				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGCPI	-1.142504	0.091286	-12.51563	0.0000
EXRATE	0.014057	0.016685	0.842533	0.4022
FDI	0.000185	6.81E-05	2.709817	0.0084
LGM3	0.581929	0.044012	13.22200	0.0000
CRISIS	-0.083986	0.021090	-3.982189	0.0002
C	2.413901	0.221616	10.89227	0.0000
R-squared	0.845867	Mean dependent var		2.970023
Adjusted R-squared	0.835310	S.D. dependent var		0.136232

S.E. of regression	0.055286	Akaike info criterion		-2.879701
Sum squared resid	0.223124	Schwarz criterion		-2.699743
Log likelihood	119.7482	Hannan-Quinn criter.		-2.807604
F-statistic	80.12369	Durbin-Watson stat		1.075128
Prob(F-statistic)	0.000000			

Appendix 4.5:

Regression Test for VIF

Dependent Variable: EXRATE				
Method: Least Squares				
Date: 03/20/13 Time: 04:22				
Sample (adjusted): 1993Q1 2012Q3				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGCPI	4.313010	0.415733	10.37448	0.0000
C	-6.748383	1.038330	-6.499264	0.0000
R-squared	0.582949	Mean dependent var		4.012278
Adjusted R-squared	0.577533	S.D. dependent var		0.655214
S.E. of regression	0.425872	Akaike info criterion		1.155636
Sum squared resid	13.96528	Schwarz criterion		1.215622
Log likelihood	-43.64763	Hannan-Quinn criter.		1.179668
F-statistic	107.6298	Durbin-Watson stat		0.164147
Prob(F-statistic)	0.000000			

Dependent Variable: EXRATE				
Method: Least Squares				
Date: 03/20/13 Time: 04:23				
Sample (adjusted): 1993Q1 2012Q3				
Included observations: 79 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGM3	2.020095	0.211712	9.541720	0.0000
C	-7.539761	1.211729	-6.222318	0.0000
R-squared	0.541788	Mean dependent var		4.012278
Adjusted R-squared	0.535837	S.D. dependent var		0.655214
S.E. of regression	0.446394	Akaike info criterion		1.249761
Sum squared resid	15.34360	Schwarz criterion		1.309747
Log likelihood	-47.36555	Hannan-Quinn criter.		1.273793
F-statistic	91.04441	Durbin-Watson stat		0.187695
Prob(F-statistic)	0.000000			

Appendix 4.6:

Granger Causality Test Results

VEC Granger Causality/Block Exogeneity Wald Tests	
Date: 03/07/13 Time: 18:35	
Sample: 1993Q1 2013Q4	
Included observations: 76	

Dependent variable: D(LGFBMKLCI)			
Excluded	Chi-sq	df	Prob.
D(LGCPI)	1.204303	2	0.5476
D(EXRATE)	3.131012	2	0.2090
D(FDI)	1.297261	2	0.2090
D(LGM3)	9.503580***	2	0.0086
D(CRISIS)	3.244474	2	0.1975
All	20.14877	10	0.0279

Dependent variable: D(LGCPI)			
Excluded	Chi-sq	df	Prob.
D(LGFBMKLCI)	0.279633	2	0.8695
D(EXRATE)	4.967166*	2	0.0834
D(FDI)	4.180606	2	0.1236
D(LGM3)	4.754490*	2	0.0928
D(CRISIS)	6.223954**	2	0.0445
All	23.92698	10	0.0078

Dependent variable: D(EXRATE)			
Excluded	Chi-sq	df	Prob.
D(LGFBMKLCI)	1.313662	2	0.5185
D(LGCPI)	0.738705	2	0.6912
D(FDI)	0.114782	2	0.9442
D(LGM3)	1.043180	2	0.5936
D(CRISIS)	1.717424	2	0.4237
All	3.776708	10	0.9569

Dependent variable: D(FDI)			
Excluded	Chi-sq	df	Prob.
D(LGFBMKLCI)	1.041219	2	0.5942
D(LGCPI)	0.060189	2	0.9704
D(EXRATE)	0.966139	2	0.6169
D(LGM3)	1.267844	2	0.5305
D(CRISIS)	1.970067	2	0.3734
All	5.491882	10	0.8560

Dependent variable: D(LGM3)			
Excluded	Chi-sq	df	Prob.
D(LGFBMKLCI)	5.915521*	2	0.0519
D(LGCPI)	0.111606	2	0.9457
D(EXRATE)	1.406135	2	0.4951
D(FDI)	8.381627**	2	0.0151
D(CRISIS)	1.223792	2	0.5423
All	15.20575	10	0.1247

Dependent variable: D(CRISIS)			
Excluded	Chi-sq	df	Prob.
D(LGFBMKLCI)	2.040058	2	0.3606
D(LGCPI)	10.60732***	2	0.0050
D(EXRATE)	1.765258	2	0.4137
D(FDI)	0.213264	2	0.8989
D(LGM3)	4.631519*	2	0.0987
All	18.82135	10	0.0426