EFFECT OF MACROECONOMIC FACTORS ON SELECTIVE MUTUAL FUND PERFORMANCE IN MALAYSIA

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(1) This undergraduate FYP 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.

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

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LIST OF ABBREVIATIONS

ARCH	Autoregressive Conditional Heteroskedasticity
ASN	Amanah Saham Nasional
BPG	Breusch-Pagan-Godfrey
BPLM	Breusch-Pagan Lagrange Multiplier
EMH	Efficient Market Hypothesis
ER	Exchange Rate
ETF	Exchange-Traded Funds
FEM	Fixed Effect Model
GDP	Gross Domestic Product
GLS	Generalized Least Square
GST	Goods and Services Tax
INF	Inflation Rate
IR	Interest Rate
IV	Independent Variables
JB	Jarque-Bera
MPT	Modern Portfolio Theory
MS	Money Supply

NAV	Net Asset Value
PNB	Permodalan Nasional Berhad
POLS	Pooled Ordinary Least Square
PVAR	Panel Value at Risk
REM	Random Effect Model
ROI	Return on Investment
SRI	Socially Responsible Investment
TOL	Total Outside Liability
USD	United State Dollar
VAR	Value at Risk
WLS	Weighted Least Square

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ABSTRACT

The purpose of the study is to analyze and understand the factors that influence the mutual funds' performance in Malaysia and allows stakeholders to have a better understanding on the factors affecting their performance. The 10 underperforming open-end funds in Malaysia from year 2009 to 2018 is examined. Mutual fund has played an important role in Malaysian economy, there is a risk that the investor will lose their money if the mutual funds they have invested are not performing and highly correlated with macroeconomic factors. Therefore, the relationship of between interest rate, exchange rate, inflation rate, gross domestic product, money supply and performance of selective mutual fund performance in Malaysia will be examined. Panel regression is applied for this research and the Pool Ordinary Least Square had been conducted in this research. To execute the statistics results were Jarque-Bera test, multicollinearity, heteroskedasticity, autocorrelation, as well as hypothesis testing. The result found out there are significant relationship between exchange rate, inflation rate, gross domestic product and money supply with selective mutual fund performance and interest rate is the only independent variables has insignificant relationship with selective mutual funds' performance in Malaysia. This research was provided the benefit to the society such as financial investors, investment advisor and financial professional, policy maker and financial market regulator as well as corporate.

CHAPTER 1: INTRODUCTION

1.0 Introduction

For the first chapter will give a comprehensive view of the subject. The background of research, problem statement, objective as well as the significance of the research is involved in this section.

1.1 Background of Study

A mutual fund constitutes a group of investments that pools the capital from investors with similar investment intentions to invest in holdings of securities operated and decided by a fund manager. In advanced financial markets, mutual funds are known as developed and mature financial intermediaries. Mutual fund performs a significant role in getting new resources from the institution and its efficient assignation to the productive resources of the economic system such as labour, land, organization and capital over the world. However, mutual funds at the stage of embryonic in emerging markets. The growth in Asian markets stated rises significantly in spite of the number of mutual funds is lower than United States markets (Qureshi, Ismail, & Chan, 2016).

According to Norma &Shabri (2010), there is a record that Malaysia mutual fund established since 1959 with its first fund management which is Malayan Unit Trust Limited. The Unit Trust group is controlled by Australian Investors. During the

early stage of establishment, very limited knowledge educated among public, directly influence the level of trading mutual fund. In 1960 and 1970, the Asia Unit Trusts Berhad and ASM MARA Unit Trust Management ruled the market. (Norma et al., 2010). In 1979, the moment when Permodalan Nasional Berhad (PNB) introduced along with state government sponsored mutual funds, history of mutual fund hit another milestone, boosting up the industry. After that, SekimAmanahSaham Nasional (ASN) introduced to public in 1981 which also stand as the first encouraging fund (Norma et al., 2010). From what have occurred within the period of year, resulting in public investors started to have interest in trading mutual fund. Besides, mutual fund is considered as an investment product that will result in minimum losses (Rubio, Hassan & Hesham, 2012). This is because of the nature of mutual fund which is low risk with high diversification.

The unit trust sectors have a pretty bright begin in the 21st century. With the development of the parts of the world, the mutual fund industry in Malaysia has been developing rapidly. From the year 2009 to 2013, the Federation of Investment Managers Malaysia (FIMM) records that total Net Asset Value (NAV) of the mutual funds has grown from RM191.75 billion to RM335.51 billion, which is increased by 75.01%. Mutual funds remained to be the greatest part of the Malaysian collective investment scheme (CIS) industry in the year 2018. Up to 31 December 2018, the total NAV was RM426,180,000 and representing 25.06% of Bursa Malaysia's market capitalization. The NAV of the Malaysian mutual funds maintained positive growth.

See &Jusoh (2012) mentioned that mutual funds have been the quickest developed organization in the global over the last ten years as they applied the diversification method to control the risk management tools. The total net asset value of mutual funds rising as well as the selling number of shares implies that mutual funds seemly a popular alternative for investment. It indicates the mutual fund's institution performs a crucial role within the economy of Malaysia.

Harris & Gurel (1986) revealed that mutual funds investment is driven by investor's sentiments against economic fundamentals. Nevertheless, Oh & Parwada (2007) illustrate that investors based on recent market performance to make their investment choices. It is crucial to examine this statement to investigate the role of mutual funds for designing investment decisions based on exposure to the volatility of finances and getting bad economic conditions.

This study attempts to analyze and understand the factors that have an influence on mutual fund performance in Malaysia. The types of mutual fund examined is open-end fund in Malaysia, which is the most common mutual funds in Malaysia.

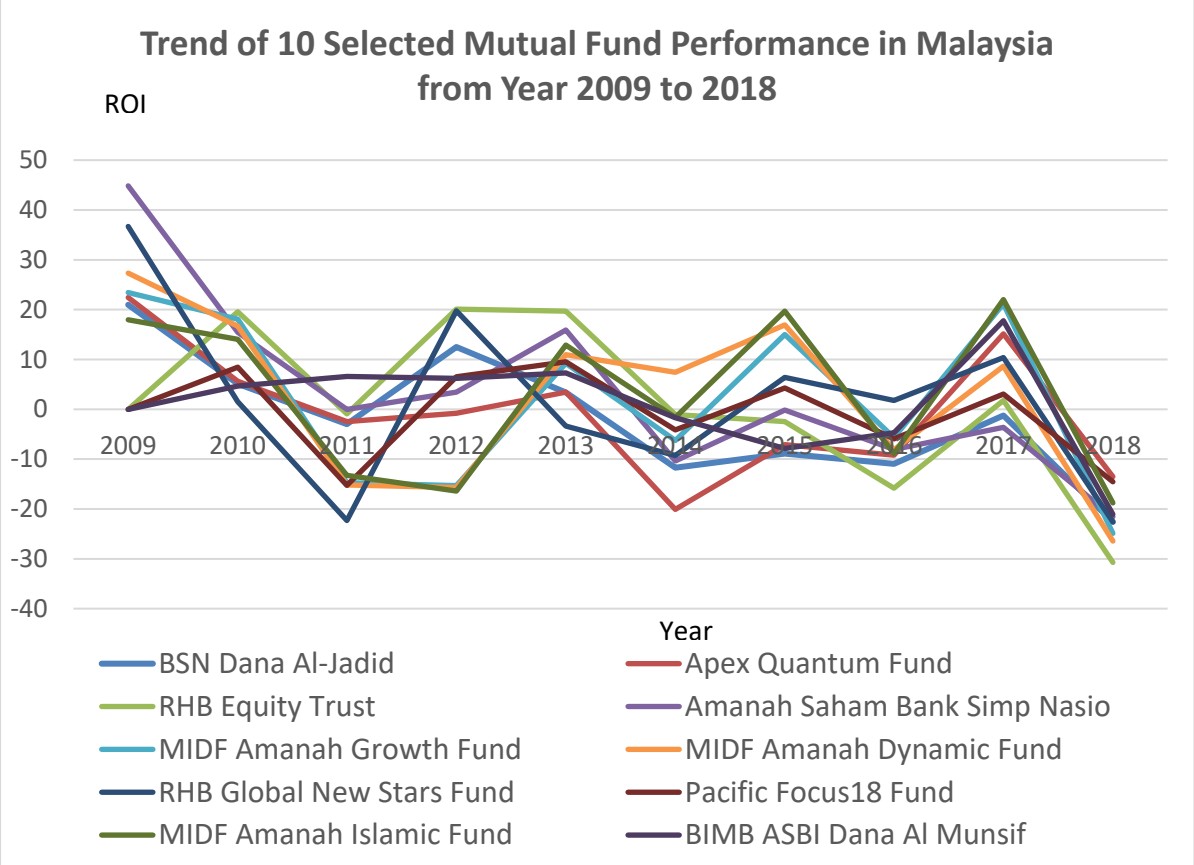
1.2 Problem Statement

Mutual funds have played a significant role in Malaysian economy today. It has experienced phenomenal growth and became one of the most popular investment means for Malaysian. The growth of this industry has reflected the willingness of the investors to accumulate wealth through the means of mutual fund. It has consequently means that the mutual funds will benefits to the economy as well as the investors. It has helps the investors to accumulate capital and enjoy the tax benefits at the same time. However, there is also a risk that the investors will lose all the money they are invested. This is because every investment involves risk. Hence, the selections of mutual funds are crucial as it may affect the investor's wealth.

As from the studied regarding to the mutual fund by Taiband Isa (2007) stated the Malaysia's mutual fund did not shows a good return throughout the time of their analysis. Similarly, the studies by Shamsher and Annuar (1995), Tan (1995) and Leong and Aw (1997) indicated Malaysia's mutual funds have poor performance

which the average return is unpleasant than the market. Thus, it can be seen that Malaysia's mutual funds not only has poor performance in the given period, but also in the past decades. In order to investigate the reason behind, numerous scholars have concerning and studied the factors of mutual fund performance.

Figure 1.1: 10 Selected Mutual Fund Performances in Malaysia from year 2009 to 2018.



Note. The data adapted from Bloomberg.

In respect of this, this study looks into the 10 underperforming mutual funds in Malaysia. It would be of interest to stakeholders to understand the contributing factors to the underperforming mutual funds. Empirically, researchers found that macroeconomic variables are important to mutual fund performance. The selected mutual funds include the various classifications of funds. For example, Growth

Fund, Equity Fund, Islamic Fund, Balanced Fund and etc. Units of mutual funds are measures in the percentage of return on investment (%). The ROI of all given mutual funds were the highest in the year of 2009, while the worst performance falls on the year 2018. However, it can be seen that there was a serious fluctuation during this ten years in all given mutual funds performances as shown in Figure 1.1. Thus, the fluctuation of the mutual fund is one of the reason to carry out this research.

In addition to the above, mutual fund performance is impact by interest rate. Based on Hussain (2017), the scholar showed an inverse relationship exists among the macroeconomics variables of interest rate and the mutual fund performances. However, a research found the correlation of this variable and the mutual fund performance are positively related (Kariuki, 2014).

Besides, mutual fund performance and exchange rate are connected. Ibrahim and Aziz (2003) revealed the exchange rate have an inverse correlation with the funds return. Yet, Pan, Fok and Liu (2007) pointed out exchange rate have no correlation on the stock market in long run.

While for the inflation rate, it seems to experience a change over the mutual fund performance. According to the research by Qureshi, Khan, Rehman, Ghafoor and Qureshi (2019), a result of inverse correlation has arises in the variable of inflation rate and fund performance. To measure the total fund flows, market returns and investors' future expectation, the panel VAR model is used in the analysis. From the studied by Krishnamurthy, Pelletier and Warr (2018), they get the same result which the falls of inflation rate will increase the return of mutual funds in Malaysia

Macroeconomic variables such as GDP are correlated with the mutual fund returns. As stated in past studied, Ingrid (2015) found that the GDP have an inverse correlation towards the mutual fund performances. However, a study conducted by

Kariuki (2014) concluded the changes in GDP growth will consequently maximize the fund returns, which has remarkably impact the Kenya mutual fund performance.

The performance of mutual funds is also affected by the money supply. A result of positive and significant correlation is found in the variable of money supply and firm performance by using the co-integration analysis (Kariuki, 2014). Unfortunately, the results are differences by the studied of Singh, Mehta and Varsha (2011), which indicates that the correlation among the supply of money and the portfolio performance in Taiwan are negatively related.

Based on the results by the past studied, there is evidence that most of the macroeconomic variables have a mixed result towards the mutual funds performances. Thus, the purpose of this study is to close the gap by examining whether there is a significant relationship between the macroeconomic variables and the selected mutual fund in Malaysia.

1.3 Research Objectives

1.3.1 General Objective

To investigates the significant relationship between the macroeconomic variables and performance of mutual fund in Malaysia. This study looks into 10 underperforming funds which are covering from 2009 to 2018 years. It is to allow stakeholders to have a better knowledge about the factors affecting their performance.

1.3.2 Specific Objective

1. To examine the significant relationship between interest rate and performance of selected mutual fund in Malaysia.
2. To examine the significant relationship between exchange rate and performance of selected mutual fund in Malaysia.
3. To examine the significant relationship between inflation rate and performance of selected mutual fund in Malaysia.
4. To examine the significant relationship between gross domestic product and performance of selected mutual fund in Malaysia.
5. To examine the significant relationship between money supply and performance of selected mutual fund in Malaysia.

1.4 Research Questions

1. Is there a significant relationship between interest rate and performance of selected mutual fund in Malaysia?
2. Is there a significant relationship between exchange rate and performance of selected mutual fund in Malaysia?
3. Is there a significant relationship between inflation rate and performance of selected mutual fund in Malaysia?
4. Is there a significant relationship between gross domestic product and performance of selected mutual fund in Malaysia?
5. Is there a significant relationship between money supply and performance of selected mutual fund in Malaysia?

1.5 Significance of Study

This research is discussing the significant correlation among macroeconomic variables and performance of mutual funds in Malaysia. 5 macroeconomic variables that will be adopted comprise interest rate, exchange rate, inflation rate, gross domestic product, and money supply as the element that impact Malaysia's 10 underperforming mutual funds. This research would be exceptionally helpful information to the domestic and foreign investors, government, mutual fund managers and so on.

Firstly, this study will aid investors to understand the risk factors that will affect their investment especially for those who do not have particular knowledge and skills in how to invest. Thus, investors will emphasize which key factors should be considered and their impact on profits. It also will help in improving the capacity of decision making by knowing the factor's impact upon mutual fund performance.

Secondly, this research could be a material that policymakers need to refer to. Policymakers could refer to the impact of macroeconomic variables in the past to create a new policy or revise the present policies. The study will aid in deepening the understanding of matters concerning the mutual fund business. Besides, it would assist the different policy makers and financial agencies to establish measures and mechanisms that are related to the economic field.

The study will aid mutual fund managers to understand the general perspective of factors that possess influenced the representation of mutual funds in the past. Thus, they will utilize the available information to make decisions. This will show

whether their expectation is being met and the effect on the returns produced. It will help the fund manager better comprehend making choices, hence manage the fund effectively as well as efficiently.

In summary, the research will propose a new field for further reading that influencing the mutual fund business. In the pace with the growth of Malaysia's mutual funds, it will be focus on the presently available information as well as the anticipated market changes.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Chapter 2 obtains reviews on previous studies about the correlation within the selected independent variables and the selected dependent variable. It shows a clearer view of the research by proposing different viewpoints from different researchers. 5 independent variables that will be determined including interest rate, exchange rate, inflation rate, gross domestic product and money supply. This review intends to identify whether the results are significant among the macroeconomic variables and the selected mutual funds' performance in Malaysia. Meanwhile, the related theories in this study are Modern Portfolio Theory (MPT) and the Efficient Market Hypothesis (EMH) theory. The following section will be adopting the conceptual framework of different researchers from previous studies. On the other hand, a proposed conceptual framework will be developed for this research which indicates the expected relation between the selected variables.

2.1 Review of Literature

2.1.1 Mutual Fund Performance

Ferreira and Miguel (2006) examines the variables of mutual fund performance in 19 countries from year 1999 to 2005 with a sample of 10568. The explanatory variables in this study consist of the characteristic of fund, such as management tenure and structure, size, age, fees while the country characteristic are familiarity, economic development, investor production and financial development. There are univariate regression results and multivariate results in this research. The result for fund attributes show that fund age, management tenure has inversely changes the mutual fund performance whereas size and fees are positively influence on performance of mutual funds. Furthermore, it provides evidence which prove that the country characteristics of economic development, market capitalization of listed companies and trading activity are positively correlated tofund performance.

As stated in the research by Gusni, Silviana and Hamdani (2018), they observe the evidence in Indonesia and investigate the determinants regarding to the equity mutual fund returns. The factors examined are portfolio manager's capabilities such as inflation, selection skills in stock, fund size. By using random effect model, it indicates that both variables (stock selection skill and inflation) have positive and significant correlation with the return of equity mutual fund. Nevertheless, the factors of funds size and market timing skill are insignificant towards the return of equity mutual funds.

Kumar and Dash (2008) argued that the macroeconomic variables were significantly influence the mutual fund return and variance of returns in India. They develop Granger causality test to examine the consequence of macroeconomics factors. From overall result, 35.29% of returns and the variances of returns from the sample scheme shown that it is unaffected by any macroeconomic variables. The factors are exchange rate, interest rate,

inflation and the price of crude oil. Hence, the result concludes the macroeconomic factors are not significant to the mutual fund performance.

A research conducted by Gupta and Sinha (2016), they examine the impact of economic events likes Britain Exit from European Union (Brexit), Goods and Services Tax (GST) on India's mutual fund performance by applying Ordinary Least Square. The p-value in this finding is beyond the significance level of 5%, so mutual fund performance and the economic events are insignificant correlation. However, a result of positive influences from Brexit and inverse correlation from GST on the mutual fund performance in the case of regression equation.

2.1.2 Interest Rate and Mutual Fund Performance

Through the study of Finan (2016), the price charged by the creditor to borrowers as the cost of credit is called an interest rate. Individuals bonds have their duration, credit risk and convexities but the interest rate have a primarily function on the return of portfolios and mutual funds. There are same effects in the variable of fund size and management effectiveness in the funds. Hence, interest rate changes will affect the bond and mutual fund returns. Although it is only a small relation in the interest rate and mutual fund performance but an inverse correlation is found based on statistical data in USA by using fixed effect model (Philpot, Hearth, Rimbey& Schulman, 1998).

From the study of Ingrid (2015), a positive correlation is found among the variable of interest rate and mutual fund performances in Kenya. It indicates the correlation when the long-term interest rate rose sharply. Besides, there

is a research in Ghana which the study shows that the selected mutual funds are significant and inversely influence by the interest rate in the application of random and fixed effect model. The reason behind is the high rate of interest will result in high financing cost and leaves individual and businesses who have the surplus fund for invest purpose. Thus, this could make the mutual fund in Ghana invest more on debt instrument than the equity and result in high interest which caused the poor outcome of mutual funds (Marfo, 2016).Hence, the hypothesis state:

H_0: There is no significant relationship between interest rate and selected mutual fund performance.

H_1: There is significant relationship between interest rate and selected mutual fund performance.

2.1.3 Exchange Rate and Mutual Fund Performance

Exchange rate is a currency which can exchange with another currency at ratio or rate (Gary, 2014). The movements of exchange rate usually relie on the credit markets conditions, the changes in interest rate between countries, and the development of central bank's monetary policies (Singhet al., 2011).

Mixed result is found in the literature of the correlation among the variables of stock return and exchange rate. Pan et al. (2007) stated that the rate of exchange has zero correlation to the stock market in long run while in the short timescale, the rate of exchange is proven to possess causality with the stock market by applying the pair-wise causality analysis.

Ibrahim and Aziz (2003) found the exchange rate is inverse influence on the stock prices. This negative result will bring effect to the international trade countries. It found that Malaysia is the country that highly dependent on international trade. The depreciation of Malaysia Ringgit led to stimulate exports and concurrently it will raise the cost of production as well as intermediate goods. The stock market will experience a rise in fluctuation due to the exchange rate movement. An unexpected move of exchange rate led to currency risk in country. Therefore, the currency depreciates cause an increasing in stock market return.

In brief summary, the mixed outcome in these researches might be because of the types of country under study and statistical procedure adopted. Nevertheless, the following hypothesis is developed:

H_0: There is no significant relationship between exchange rate and selected mutual fund performance.

H_1: There is significant relationship between exchange rate and selected mutual fund performance.

2.1.4 Inflation Rate and Mutual Fund Performance

Labonte (2011) indicates the inflation rate is general price level rising constantly in rate or ratio in a country. Krishnamurthy et al. (2018) have implemented a study regarding to the negative relations in the flows of equity fund and inflation. The reason is investor will suffer from inflation misconception and inaptly discount of real cash flow at nominal discount rates, thus lead to decrease in prices that investors will investing in mutual fund. (Modigliani & Cohn, 1979; Krishnamurthy et al., 2018) In this study, the researchers used Gorden growth model of valuation, log-linear valuation

model and Value at Risk (VAR) method to interpret the investor's mispricing and the value of stock during the high inflation period. From the result, the researchers found that both inflation and forecast of inflation illusion show a significant variation in the both positive and negative mispricing of their estimated period. Positive mispricing indicates that there is high inflation illusion and underpriced of stocks while negative mispricing indicates that a lower inflation rate compared to investor reference rate and stock may overestimated.

According to the study of Qureshi et al. (2019), the researchers investigate on the relationship between different categories of mutual funds, estimation of investors' expectations and business cycle movements in the BRICS market. The researchers used macroeconomic variables, which is including the inflation rate, to examine the connection with financial market securities. Qureshi et al. (2019) measure the total fund flows, market returns and investors' future expectation by using panel VAR model. From the result, inflation rate is negative yet insignificant relationship with the flows of mutual fund. In addition, Qureshi et al. (2019) also use the Monte Carlo simulation to strengthen the outcome from PVAR whereas it also takes inflation as insignificant to the mutual fund flows. Thus, this study hypothesis that:

H_0: There is no significant relationship between inflation rate and selected mutual fund performance.

H_1: There is significant relationship between inflation rate and selected mutual fund performance.

2.1.5 Gross Domestic Product and Mutual Fund Performance

GDP is aggregate of private expenditure, investment as well as government spending (Pathak, 2018). A study that conducted by Emily Chelangat Kariuki in 2014 which investigate the correlation of macroeconomic factors and funds performances. 70% of Kenya mutual funds performances are construed by the macroeconomics factors by using Ordinary Least Square. This research came to a conclusion that the GDP is significant and positive correlation with the return of mutual funds in Kenya.

Aarugonda (2017) argue that the GDP has positive causal relation to the redemption of mutual fund and negatively correlated to mutual fund subscription by using the VAR model in India. The mutual fund return are the money which the investors will redeem after achieving the goals. It can be called as mutual fund redemption. By using the VAR model, mutual fund redemption is expected to grow up due to coefficient value of redemption based on GDP is positive related. Therefore, the GDP and mutual fund redemption related to mutual fund performance has positive relationship. However, from VAR model, it also reveals that the subscription of mutual fund tends to drop due to coefficient value of subscription based on GDP is examined to be negative. It leads to an inverse correlation among the variable of GDP and the mutual funds subscription.

Ingrid (2015) had studied about the factors affecting Kenya's mutual fund performance. One of the determinants for this research is GDP growth rate. The research design for this study was descriptive. The census method was used by researcher which two registered fund managers had been involved and issued with two questionnaires in this case study. Overall, this research

shows a result of GDP and mutual fund performance has an inverse relationship.

While Lobao and Levi (2016) carried out a research in Portugal which examining the correlation of macroeconomic factors, return in stock market and the flows of mutual funds among year 2000 to 2012. Granger causality F-statistic test has applied in this analysis. It is use to test whether flows of mutual funds will be affected by the GDP growth or vice versa. Hence, it provided a result stated that the flows of mutual funds in Portugal consist the information of GDP growth which are significant (Lobao& Levi, 2016). The flows of mutual funds and funds performances are connected because funds with high inflow significantly outperform compared to the funds with low inflow (Rohleder, 2015). Therefore, the hypothesis is:

H_0: There is no significant relationship between gross domestic product and selected mutual fund performance.

H_1: There is significant relationship between gross domestic product and selected mutual fund performance.

2.1.6 Money Supply and Mutual Fund Performance

Money is a liquidity asset and serves as a mean of purpose to exchange and for the repayment of liability. Mixed result is found in the literature of correlation among the variables of money supply and performance of mutual funds.

Kariuki (2014) study came to a conclusion that the Kenya's mutual fund performance are positive related to money supply. The outcome indicates

the money supply is positive correlation with ROI of the mutual fund. While Humpe and Macmillan (2009) investigate that whether the macroeconomics variables will influence the Japan and US stock prices. A correlation is found in the variable of money supply which significantly bring positive effect to the US firm's performance by using the co integration analysis.

However, there is a contradiction when the studied of Singh et al. (2011) pointed out that the correlation of money supply are negative influence on the portfolio return of large and medium companies in Taiwan, which also found an insignificant result in the variable of money supply and the return of stock. The studied by Singh et al. (2011) is based on the portfolio return instead of a single stock return.

As a conclusion, the different results of the studied might be due to the different type of statistical procedure employed and country's economic situation. Nevertheless, based on the above empirical findings, the hypothesis is:

H_0: There is no significant relationship between money supply and selected mutual fund performance.

H_1: There is significant relationship between money supply and selected mutual fund performance.

2.2 Review of Theoretical Model

2.2.1 Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT) is one of the economic theories developed by Markowitz (1952) and released on the Journal of Finance with the head of "Portfolio Selection". MPT model helps investors to construct the portfolio of mutual fund by optimize and minimize the expected return from market risk and achieve higher compensate. Moreover, MPT model is commonly apply in environment research of agriculture studies and forestry fields of study. (Matthies, Jacobsen, Knoke, Paul, &Valsta, 2019). The reason is that, from the viewpoint of investing in particular estate uses or controlling political power as environmental assets, research has constantly been associated with economic gains and risk problems.

From the study of Fabozzi, Gupta, and Markowitz (2002), the researchers state that there are applications that extract from the MPT model, which is the area of asset allocation, portfolio management and portfolio construction. In the field of asset allocation, there is also supported the study of Stalebrink, Kriz, and Guo (2010). Stalebrink et al. (2010) studied the degree to which public pension plans distribute assets in a way with the consistent of optimal portfolio named the MPT model. Next, the study of Uhl and Rohner (2018) used strategic asset allocation to determine the risk and optimize the portfolio by enhance the risk level of the client's portfolio.

Furthermore, Blancard and Monjon (2011) use MPT model to investigate the relationship between screening intensity and Socially Responsible Investment (SRI) mutual fund. The research result show negative relationship due to the lack of Socially Responsible Investment (SRI) fund through diversification. As a result, Blancard and Monjon (2011) states that all rational investors should hold a securities' market portfolio which denote as the value-weighted portfolio.

In conclusion, researchers constantly apply Modern Portfolio Theory (MPT) to examine the correlation between the mutual fund and different kinds of risk. This is because MPT model can achieve investors' wants by minimizing the mutual fund's risk and maximize the return on the invested portfolio.

2.2.2 Efficient Market Hypothesis (EMH) Theory

Efficient Market Hypothesis (EMH) is an investment theory that defines as the current stock's price is reflected by all publicly available information. Investors will only gain abnormal returns when there is less efficient in the market.

In the year 1970, the efficient market hypothesis had created by Farma and it is known as all transparent information will reflect by security prices. Even it is possible to do insider trading, but it is still illegal. Most of the financial products nowadays are assume in the efficient market hypothesis. The benchmark of blind faith into EMH will cause passive investing, diversification. There are three assumptions in EMH. First, all investors will perceive all information fairly. Therefore, investors with the equal investment will get the same profit, and they will not obtain much profit compared to others. The investors only can achieve the equal return due to an equal possession of information in the second condition. Lastly, there are no investor can outperform the market or average annual rate of return with the best efforts of all investors and funds (Ingrid, 2015).

Besides, there is a study about efficient market hypothesis state that the purpose of investors implicates EMH is to the extent the speculative is costly. EMH is a passive strategy that beats the active management strategy by bounding eventually. In the past several decades, EMH reflects the real condition of the market, including transaction costs, financing, agency cost, real-world fictions and also costly information. Nowadays, EMH allows arbitrageurs to profit from the market through comparative advantages such as expertise, lower transaction costs, lower management or agency fees and financial structures. Those arbitrageurs provide the liquidity market and let the market respect to the information by fairly and efficiently, despite some notable anomalies (Ang, Goetzmann, & Schaefer, 2010).

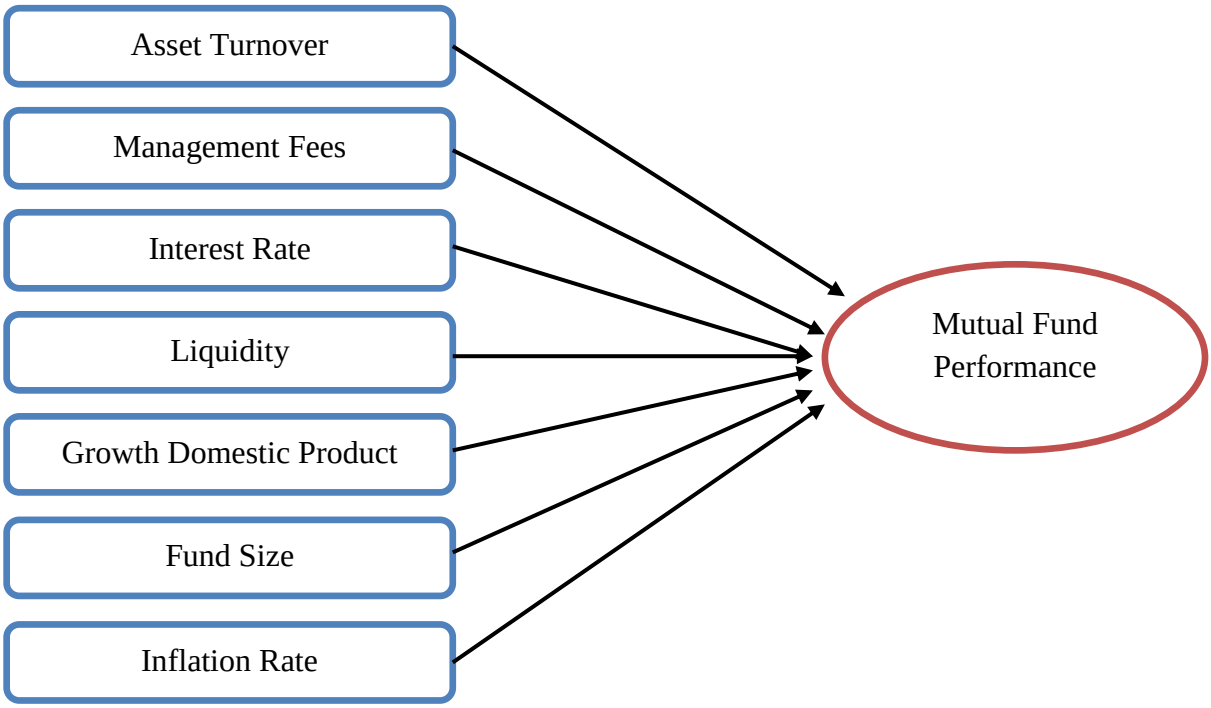
According to Hu, Chao and Lim, (2015), the study is argued that there are an interaction between arbitrageurs and noise trader in the market. Even the rational investor, the problem of mispricing is still existing because of the rational investors will faced the limit of arbitrage which discouraging them exploiting any mispricing. In the EMH theory, when the mispricing is due to the noise traders, it will disappear soon due to exploit by arbitrageur. The sentiment will affect the stock valuation of an investor.

In the study of Kon and Jen (2014), the EMH theory is strongly supported to use the Efficient Market Hypothesis (EMH) to investigate how well selected mutual fund is performing. Extract from the conclusion, most of the individual funds are able to produce significantly excellent selectivity performance in the measurement intervals.

2.3 Conceptual Framework

2.3.1 Previous Conceptual Framework

Figure 2.1.1: Determinants of Mutual Fund Performance in India and Pakistan.



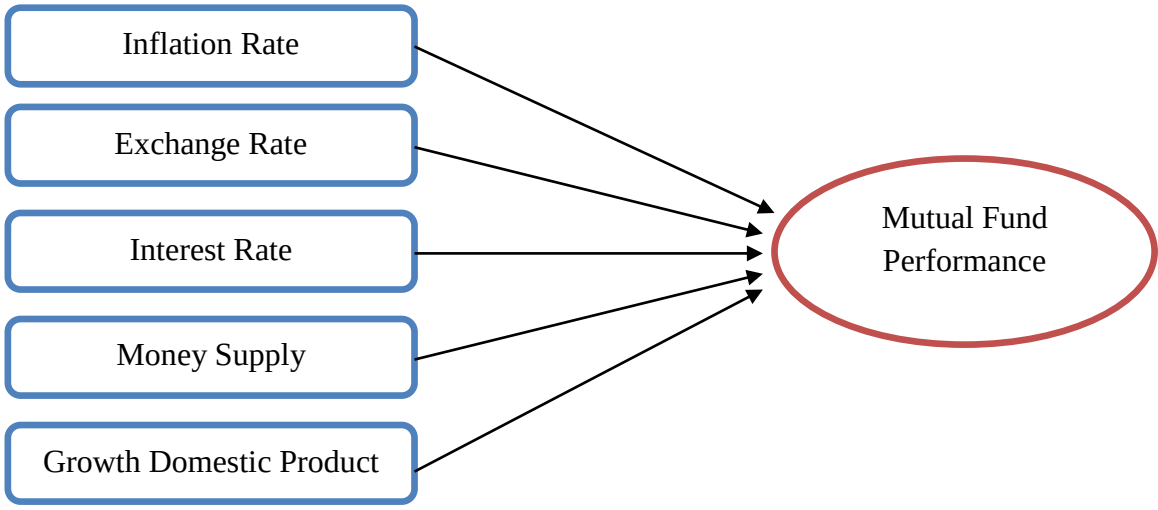
Note. Adapted from Hussain (2017).

The above framework is based on the research studied by Hussain (2017), who purpose to examine how the country and fund specific factors influence the representation of the mutual fund. The study by Hussain is based on the country of India and Pakistan. There are two major categories of independent variables being studied which are fund specific characteristics (real interest rate, growth domestic product, inflation) and country specific factors (fund size, asset turnover, management fee and liquidity). Only two tests are being used by Hussain (2017), which are the Hausman test and Fixed Effect Model (FEM). The outcome of the empirical analysis indicates that the real interest rate, liquidity, GDP and fund size have an adverse

outcome on the mutual fund performances. Yet, the asset turnover, management fees and consumer price index signify positively to the performance of the mutual fund.

This study presumed that not only the fund specific factors bring impact to the mutual fund return, but the level of variables is also significant to mutual fund return. Thus, he suggests the investors should make an investment decision based on the specific characteristic of funds as well as the factors of changes in the country level.

Figure 2.1.2: Determinants of Mutual Fund Performance in Kenya.



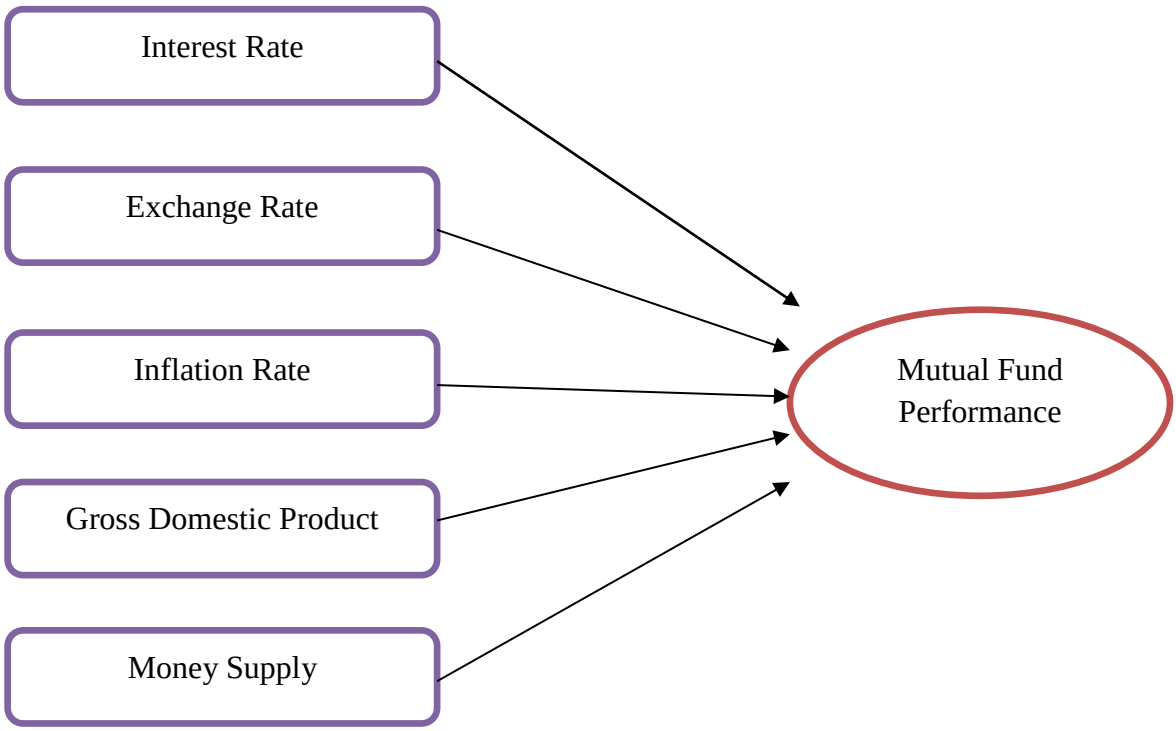
Note. Adapted from Kariuki (2014).

According to this previous conceptual framework, it can be seen that only macroeconomic variables are being used. The objectives stand to discover the factors of macroeconomic variables on the performance of the mutual fund in Kenya (Kariuki, 2014). The data used are 5 years period which is

from the year 2009 to 2013. It consists of 11 mutual funds of sample data running in Kenya and has an equity portfolio licensed by the Capital Markets Authority. Based on the study, it figured out that the exchange rate is the only one has a significant also adverse result on the performance of the mutual fund in Kenya, while the others including inflation rate, interest rate, money supply and GDP possess significant and positive impacts the performance of the mutual fund operating in Kenya.

2.3.2 Proposal Conceptual Framework

Figure 2.1.3: Determinants of Mutual Fund Performance in Malaysia.



Based on the conceptual framework, five macroeconomic variables are adopted. The macroeconomic variables that proposed in this research

including interest rate, exchange rate, inflation rate, gross domestic product (GDP) and money supply. The predicted relationship between the interest rate and performance of the mutual fund is adverse, which stated that the larger the rate of interest, the lower the Return on Investment (ROI) will be. While in line with the relevance of the exchange rate and performance of the mutual fund as it also presumes to be in an opposite relationship. It implies that mutual fund performance will rise as the exchange rate drop.

Besides, the inflation rate is predicted to possess a positive effect, as the larger the inflation rate, the greater the performance. While for the assumption of gross domestic product (GDP), the performance of the mutual fund is expected to fall as the GDP growth. Last but not least, the expected relationship for money supply and mutual fund performance are negatively related, as the money supply increase, the demand decrease, thus fewer people demand local goods and service which indirectly influence the mutual fund performance.

2.4 Conclusion

The research has been reviewed each related study on the factors covered interest rate, exchange rate, inflation rate, gross domestic product (GDP) and money supply that influence the mutual fund performance. Moreover, there are two theories have been applied in this research which comprised Modern Portfolio Theory (MPT) and Efficient Market Hypothesis Theory (EMH). When observing the empirical studies of the selected independent variables performed by past researchers, most of the previous studies have shown significant and mixed results. Table 2.1 shows the summary results by the previous researchers and the expected sign for each independent variable. Thus, the subsequent chapter will be conducting various tests to examine the precision of the results collected from past readings.

Table 2.1: Summary of past researches result and expected relationship.

Independent Variables	Past Researches	Expected Relationship
Interest Rate	Positive relationship: Ingrid, 2015 Negative relationship: Philpot et al., 1998 Marfo, 2016	Significant and Negative
Exchange Rate	Positive relationship: Singh et al., 2011 Negative relationship: Ibrahim & Aziz, 2003	Significant and Negative
Inflation Rate	Negative relationship: Krishnamurthy et al., 2018 Qureshi et al., 2019	Significant and Positive
Gross Domestic Product	Positive relationship: Kairiuki, 2014 Aarugonda, 2017	Significant and Negative

	Negative relationship: Ingrid, 2015	
Money Supply	Positive relationship: Kairiuki, 2014 Negative relationship: Singh et al., 2011	Significant and Negative

CHAPTER 3: METHODOLOGY

3.0 Introduction

A panel regression applied for this research aimed ford is cover the consequence of macroeconomics on performance of selective mutual fund in Malaysia. To analyze the data, several mathematical model and techniques are developed to this study. Benefits of using panel model include the ability to analyze what is the outcome of macroeconomics factors on mutual funds' performance in past 10 years. Thus, there are some testing methodologies used are discussed in this chapter.

3.1 Research Design

Quantitative research method on secondary data with adaption of cross-sectional together with time series data is base of this study. The observation is from year 2009 until 2018 based on ten selected mutual funds which are BSN Dana Al-Jadid, Apex Quantum Fund, RHB Equity Trust, Amanah Saham Bank Simpanan Nasional, MIDF Amanah Growth Fund, MIDF Amanah Dynamic Fund, RHB Global New Stars Fund, Pacific Focus18 Fund, MIDF Amanah Islamic Fund, BIMB Asbi Dana Al Munsif.

3.2 Method of Data Collection

Secondary data of Malaysia are collected into this research. The secondary data of dependent variable and independent variables was accumulated based on panel data analysis from different sources like Bloomberg and World Bank Data for year 2009 to 2018.

Table 3.1: Summary of Variables and Sources of Data.

Variables	**Unit Measurement**	**Data Sources**
Return on Investment	% ROI	Bloomberg
Interest Rate	%	World Bank
Exchange Rate	RM/USD	Bloomberg
Inflation	%	World Bank
GrossDomestic Product	%	World Bank
Money Supply	RM Million	Bloomberg

Note. Developed for the research.

3.3 Variables Specification of Measurement

3.3.1 Selected Mutual Fund Performance

Return on investment of selected mutual fund had used as dependent variable in this study and expressed in percentage of return on investment. The data is gathered from Bloomberg.

3.3.2 Independent Variables and Measurement

3.3.2.1 Interest Rate

For interest rate, it is adjusted rate of lending in percentage (%) and based on inflation and measured by the GDP deflator.

3.3.2.2 Exchange Rate

Exchange rate is expressed in nominal currency per United State Dollar (USD). It indicates currencies' value of one country as to another. It represents how many units you can buy the foreign currency exchange with one units of home currency.

3.3.2.3 Inflation Rate

The Laspeyres formula is usually used in measured the inflation in percentage (%). It reflects the changes in cost of the percentage in annual term to the consumer obtain a pool of services and goods in possible of changes a certain interval of fixed on average, such in a term of yearly.

3.3.2.4 Gross Domestic Product (GDP)

GDP in percentage (%) means grand total of monetary value for all of the goods and services which is finished and plus the taxes of any product then exclude the subsidies which is not included in the product value. The fabricated assets without deduct for depletion or for deprecation and natural resources which are degradation are not included in the calculation.

3.3.2.5 Money Supply

Through the controlling the money of flowing in the world economic system and adjust the interest rate, the supply of money is analyzed, and policies is developed and revolving around it. Changes in money supply usually will bring an effect to the price level, inflation and business cycle.

3.4 Econometric Model

The empirical model is proposed in this research to forecast the changes the changes in 10 selective mutual funds' performance in Malaysia with the changes in interest rate, foreign direct investment, inflation rate, gross domestic product and money supply. The functional form of return on investment for selected mutual fund is construed as below:

$$ROI_{it} = \beta_0 + \beta_1 IR_{it} + \beta_2 Log(ER_{it}) + \beta_3 INF_{it} + \beta_4 GDP_{it} + \beta_5 Log(MS_{it})$$

Where,

ROI = Return on Investment (%)

IR = Interest Rate (%)

ER = Exchange Rate (RM per US Dollar)

INF = Inflation (%)

GDP = Gross Domestic Product (%)

MS = Money Supply (RM Million)

3.4.1 Pooled Ordinary Least Square (POLS)

Based on the research of Thomas (2005), Pool regression model (POLS) is the one where data come from different unit pooled together. It is also a model that has constant coefficients by refer to the slopes and intercept. Most of the research pooled alldata and run an ordinary least square regression model.

3.4.2 Fixed Effect Model (FEM)

According to Oscar (2007), fixed effect model is only aimed for analyzing the outcome brings by the variables that difference over time when the research is interested. The relation of the outcome variables and estimator are inside an entity. For example, person, company and country. All the

entity will own its each characteristic that in possible to affect the estimator variables.

Moreover, scholars need to assume the result and estimator from will become bias and affect by the individual variables when using the fixed effect model. Then, the scholars must take this situation under control. This is reasonable due to there is an assumption about the relation between the estimator variables and error term. The time invariant's effect will be removed so the result outcomes of the estimator will not be affected by the outcome variable.

Thus, there is another assumption about the fixed effect model stated that every entity is unique, and the constant and error term should not be having a correlation with each other. Then, another reason which supports this assumption is due to the unique of characteristic, which is time invariant, so it is better that do not have a correlation with other individual characteristics. If the correlation still happened for the error term, then inference may be suffering in something wrong. Fixed effect model is not suitable in particular case and need to remodel as the main principle for Hausman test.

Below is the equation for the fixed effect model:

$$Y_{it} = \beta_1 + X_{it} + \alpha_1 + \mu_{it}$$

-α_i (i=1,2,…n) is the unknown intercept for each entity

- Y_{it} is represent the dependent variable

-X_{it} is the independent variables(IV)

-β_1 is the coefficient for that IV

-μ_{it} represent error term

Important: Fixed effect model is not suitable with the data which is include cluster variation is in minimum amount or the variables changing slow over time.

The predicted coefficients of the fixed effect models must be unbiased because the time invariant is omitted due to the fixed effect model controls for the differences for time invariant of each individual.

Fixed effect models are aim for investigate the reasons of changes inside an entity. The constant of each entity cannot change by the time invariant. Besides, fixed effect model cannot work when use to investigate when the dependent variables which caused by time variant.

According to the research conduct by Bell, Fairbrother and Jones (2019), the fixed effect model can be reduced to:

$$y_{it} = \beta_1(x_{it} - x_i) + (v_i + \varepsilon_{it})$$

The model will provide an estimate within effect β1, which is unbiased between effects and are different from them. This study also argues that there are many researches cannot apply the fix effect model and the substantive phenomenon only presents a partial picture by this model.

3.4.3 Random Effect Model (REM)

Based on research of Reyna (2007), the one of the random effect models means the variation is random and without correlation with the estimator and independent variables across the entity inside the model. The random effect model is fit for this research when there is an origin to believe that there is some influence on dependent variables of the differences across the entities. Time invariant variables can be involved in the model is one of benefit of applying the random effect model.

Below shows the equation of random effect model:

$$Y_{it} = \beta X_{it} + \alpha + \mu_{it} + \varepsilon_{it}$$

There is an assumption in random effect model is about error term in this model will not correlated with the estimator because the time invariant variables can act as explanatory variables. Thus, the individual variables need to specific in the random effect model about it is possible affect other variables or not due to there are some unavailable variables can cause the omitted variable to become bias in this model (Bell et al., 2019).

Thus, Andrew, Malcom and Kelyvn (2019) were argued that the random effect representing the normal distribution had drawn away level 2 entities. However, the mathematical of the normality of coefficient is driven more and convenience than empirical reality.

3.5 Economic Techniques

3.5.1 Poolability Test

The researcher has using poolability F test in this study to discover that pooled ordinary least square (POLS) model or fixed effects model (FEM) will more appropriate for this study.

Below is showing the hypothesis for the poolability F test:

H_0: Pooled ordinary least square (POLS) is endorsed in this study.

H_1: Fixed effect model (FEM) is endorsed in this study.

The decision rule of poolability F test is when p-value less than significant level (5%), reject null hypothesis. Other than that, null hypothesis is not being rejected. When null hypothesis not accepted, it defines that FEM model is suitable than POLS model in this study. Based on the research of Gujarati and Porter (2009), fixed effect is more suitable or the goodness of fit in the FEM increased when rejects the null hypothesis.

3.5.2 Breusch-Pagan Lagrange Multiplier Test

The Breusch-Pagan Lagrange Multiplier (BPLM Test) is used for determined the goodness of fit whether random effect model (REM) or pooled ordinary least square (POLS) is fit for this research:

The hypothesis of BPLM test is shown below:

H_0: Pooled ordinary least square (POLS) is endorsed in this study.

H_1: Random effect model (REM) is endorsed in this study.

For BPLM test, whenever the p-value less than significant level which is 5%, the null hypothesis should be rejected or else don't reject the null hypothesis. It means that REM is more fit for this research than POLS model if reject the null hypothesis. In the other hand, the POLS model is more suitable and there is no individual effect if the alternative hypothesis is rejected.

3.5.3 Hausman Test

Hausman test is usually devised for specification tests of model specifications and model selection in econometrics (Hausman, 1978). It can be used to compare the estimators of the estimated models. According to Hausman (1978), if the null hypothesis true and error term of estimators is uncorrelated with the efficient estimator, it will be easier to use Hausman test in the regression. For example, null hypothesis one provides a consistent and efficient results whereas null hypothesis two provides consistent but inefficient result; alternative hypothesis one gives inconsistent result while alternative hypothesis two shows consistent result (Karlsson, 2014).

The general form of Hausman test statistic (Karlsson, 2014):

$$H = (\hat{\beta}^{I} - \hat{\beta}^{II})`[Var(\hat{\beta}^{I}) - Var(\hat{\beta}^{II})]^{-1}(\hat{\beta}^{I} - \hat{\beta}^{II})$$

And it is under $\chi^2(k)$ distributed.

Hausman test is fitting in comparing the estimates of the effect of fixed and random models and choosing the correct model by identifying the presence of endogeneity in explanatory variables in panel data.

H_0: Random effects model is favorable. There is no relationship between the error term and independent variables in model.

H_1: Fixed effects model is favorable. There is relationship between the error term and the independent variables in model.

If the test statistic is larger than the critical value, the null hypothesis will be rejected.

3.6 Diagnosis Checking

3.6.1 Normality

According to Julia and Joseph (2008), JB test is the most popular and famous test that utilized in economic sector for normality statistics. There statistic of Jarque-Bera test is total of third and fourth moments by the standardized of sample which is follow degree of freedom with 2.

H_0 : Error terms are normally distributed.

H_1 : Error terms are not normally distributed.

For the Jaque-Bera test, reject null hypothesis when the p-value is smaller when compare to the significant level. Do not reject null hypothesis. Hence,

when the sample size is larger than 2000, the test statistic needs to be compared with distribute of chi square denoted with degree of freedom of 2. The sample size needs to be large enough for getting the correct chi-square statistic. When the sample and test statistic result greater than chi squared, the normal distribution will not be happened.

3.6.2 Multicollinearity

Multicollinearity is defined as it is a relationship or connection between independent variables in the model (Jamal, 2017). Normally, it happens in most of the data, especially panel data.

Firstly, to detect multicollinearity, the model is expected to have high R-square but less significant t-ratios in the estimated model which means that the overall measurement on high goodness of fit and the t-ratio of the coefficients is possible to be statistically insignificant. Second way to detect is the high pair-wide of two or more variables have correlated or not. When the pair-wide correlation between two variables is more than 0.8 will be considered as high and serious multicollinearity problem (Bohrnstedt& Carter, 1971). Thirdly, VIF is aimed for find out the multicollinearity problem. When VIF is more than or equal to 10 indicate it has serious and high multicollinearity issue inside the model; VIF are equal to 1 which show that there is no multicollinearity problem. However, if the VIF is greater than 1 but smaller than 10 is considered as there is low multicollinearity problem. According to Schroeder, Lander and Levine-Silverman (1990), the formula of VIF is$VIF = \frac{1}{1-R_{x1x2}}$. Fourthly, researchers can use tolerance (TOL) for detection means that TOL is smaller than 0.01, it indicated a significant multicollinearity are happened in the model and the variables must be changed (Afifi &Clark, 1984). However, when TOL is equal to 1

indicate this model did not suffer multicollinearity problem. The formula of TOL= $\frac{1}{VIF}$.

To solve the multicollinearity problem, Schroeder (1990) stated that first solution has to change one model to become two or more than two models and eliminate an independent variable. Furthermore, Fox (1984) indicated that collection of more adequate data is one solution to solve this problem. Biased regressor coefficients used by Regression technique is an approach for achieve the minimizing variance and stability between same coefficients.

Table 3.2: Indicator of VIF Value.

VIF Value	**Indications**
VIF=1	Not correlated
VIF >5	Highly correlated
1< VIF ≤ 5	Moderately correlated

Note. From Jamal, I. D. (2017). Multicollinearity and regression analysis. *Journal of Physics: Conference Series, 949*(1).

3.6.3 Heteroscedasticity

The variances of error terms are not constant which it is possible have greater deviation during values of some X variables or Y variables are large or small is known as heteroscedasticity (Williams, 2015). The model

misspecification outlier, the skewness of regressor and the error learning model are the factors caused heteroscedasticity problem in model.

There are informal way and formal way to detect heteroscedasticity problem. The visual inspection which is scatter plot used to plot error terms against time and plot error terms against independent variables. William stated that the detections for heteroscedasticity in formal way which is hypothesis testing include ARCH Test, White General Test, Goldfeld-Quandt Test, Park Test, Glejser Test and Breusch-Pagan-Godfrey Test. Normally, BP Godfrey test aims for cross-sectional data that regress the squared residuals on the original regressors by default while ARCH test is for time-series data that regress the squared residuals on lagged squared residuals and a constant.

H_0: There is no heteroscedasticity problem.

H_1: There is heteroscedasticity problem.

By using F statistics, p-value from the model must be smaller than significant level which is 0.01 to reject the H_0.

There is some treating of heteroscedasticity, which is Generalized Least Square (GLS), Weighted Least Square (WLS) and transform the variables. The deviation of error term for each observation will become constant. If there are no any changes in p-value for White and BPG test after remedies, scholars should check whether is there any omitted relevant variables.

3.6.4 Autocorrelation

Autocorrelation means there are a correlation between error term of period t and before period t, the past error terms. Autocorrelation is the regression residuals for individual observations are related to residuals for other observations.

There are few ways to find out autocorrelation problem which are residual correlogram, Durbin-Watson Test, Durbin's h Test and Breusch-Godfrey LM test. For the residual correlogram, it is to obtain the least squares residuals and check whether the sample correlations between the residual with its past values are significant different from zero. There is no autocorrelation when there is within the bound indicates. However, if it is out of bound, it needs to proceed with Durbin-Watson test.

H_0: There is no autocorrelation problem.

H_1: There is autocorrelation problem.

The F-statistics' p-value need to lower than 0.05 to reject the H_0 andit means it has autocorrelation problem within the model.

There have some ways to solve the autocorrelation problem which is and Newey-West estimator, Cochrane-Orcutt procedure and Generalized Least Squares (GLS) For Cochrane-Orcutt procedure is to solve pure autocorrelation problem while the Newey-West Standard Errors is for TOL only. If the problem is keep on, then will need to redesign the model. From LM test, whenever the F statistics and p-value is still not enough 0.01 as there is autocorrelation exists, it will need to consider whether there is omitted any relevant variables, included any irrelevant variables or transform data into functional form.

3.7 Conclusion

In chapter 3, scholars have study the methodologies by using Hausman Test, Fixed Effect Model and Random Effect Model. Then, they use Normality, Multicollinearity, Heteroscedasticity and Autocorrelation in the diagnostic checking. The collection of secondary data is from World Bank Data and Bloomberg.

Moreover, Hausman test, Fixed effect model and Random effect model are using regression equation which related to the econometric model. Hausman test is to do examination on the fixed and random effects model. Then, it is followed by fixed and random effect model is examined the relationship of dependent variable (mutual fund performance) and various independent variable.

In diagnostic checking, to eliminate the issues in the model, test of normality, multicollinearity, autocorrelation and heteroscedasticity are used. Normality test is to discover the error term is normal distributed or not. Multicollinearity problem takes place when there is insignificant t-ratios but high R-square. Next, there is no multicollinearity issue when only the correlation is less than 0.85 and variance inflation factor (VIF) equal to 1, otherwise multicollinearity problem arises. Heteroscedasticity issue arise whenever variances of error term did not constant while autocorrelation problem happen when the current error term is correlated to the past error term.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Chapter 4 discusses about empirical results which have done in previous chapter included with 10 selected mutual funds among the year 2009 to year 2018 with the annual data. The mutual funds that selected are:

Table 4.1: List of Selected Mutual Fund.

BSN Dana Al-Jadid	Apex Quantum Fund
RHB Equity Trust	AmanahSaham Bank Simpanan Nasional
MIDF Amanah Growth Fund	MIDF Amanah Dynamic Fund
RHB Global New Stars Fund	Pacific Focus18 Fund
MIDF Amanah Islamic Fund	BIMB Asbi Dana Al Munsif

The results will show how macroeconomic variables bring a significant effect on those10 selected mutual funds.

4.1 Descriptive Analysis

Table 4.2: Descriptive Data.

	ROI	IR	ER	INF	GDP	MS

Mean	1.9696	3.172658	1.284178	2.124307	4.73147	1.88998
Median	1.635	3.14518	3.4615	2.097478	5.192714	7.3
Maximum	44.84	11.78227	1.501006	3.871201	7.424847	2.660259
Minimum	-30.72	-2.113296	1.117925	0.5833084	-1.513529	1.098612
Std Dev	15.49127	3.60449	0.1389506	0.9831469	2.258434	0.460225

For overall mean value, Gross Domestic Product (GDP) has the highest mean of 4.73147 while the Exchange Rate (ER) has the lowest mean of 1.284178. However, the mean of Return on Investment (ROI), Interest Rate (IR), Inflation Rate (INF), and Money Supply (MS) are1.9696, 3.172658, 2.124307, and 1.88998 respectively. Next, the median of Money Supply got the largest value among the variables which is 7.3 while the median of Return on Investment is the lowest which is 1.635. The median of Interest Rate, Exchange Rate, Inflation Rate and Gross Domestic Product is 3.14518, 3.4615, 2.097478, and 5.192714 respectively. Furthermore, Return on Investment has the highest overall standard deviation of 15.49127 and the lowest overall standard deviation of 0.1389506 come from Exchange rate within all variables. The overall standard deviation of Interest Rate, Inflation Rate, Gross Domestic Product, and Money Supply is 3.60449, 0.9831469, 2.258434, and 0.4602258 respectively.

For maximum values, Return on Investment (ROI) has the highest maximum value, 44.84. Next, the maximum value of variables is Interest Rate (IR) which is 11.78227 following by Gross Domestic Product (GDP) which is 7.424847, Inflation Rate (INF) which is 3.871201, Money Supply (MS) which is 2.660259, while smallest maximum value is Exchange Rate (ER) which is 1.501006.

For minimum values, Exchange Rate (ER) scores the highest minimum value of 1.117925. Next, the minimum value of variables is Money Supply (MS) which is 1.098612 following by Inflation Rate (INF) which is 0.5833084, Gross Domestic Product (GDP) which is -1.513529, Interest Rate (IR) which is -2.113296, smallest maximum value is Return on Investment (ROI) which is -30.72.

4.2 Model Selection

4.2.1 Poolability F-test

Table 4.3: Poolability F-test.

Test	Probability (P-value)
Poolability F-Test	0.9757

H_0:Pooled OLS Model is preferable.

H_1:Fixed Effect Model is preferable.

Decision Rule: Reject H_0 if the p-value of Poolability F-Test is less than the significance level of 5%. Otherwise, do not reject H_0.

Decision Making: Do not rejectH_0 since the p-value (0.9757) is more than the significance level of 5%.

Conclusion: Pooled OLS Model is preferable at the significance level of 5%.

4.2.2 Breusch-Pagan Lagrange Multiplier Test

Table 4.4: Breusch-Pagan LM Test.

Test	Probability (P-value)
Breusch-Pagan LM Test	1.0000

H_0:Pooled OLS Model is preferable.

H_1:Random Effect Model is preferable.

Decision Rule: Reject H_0 if the p-value of Breusch-Pagan LM Test is less than the significance level of 5%. Otherwise, do not reject H_0.

Decision Making: Do not reject H_0 since the p-value (1.0000) is more than the significance level of 5%.

Conclusion: Pooled OLS Model is preferable in this study at the significance level of 5%.

4.3 Model

4.3.1 Pooled Ordinary Linear Square Model

Table 4.5: Pooled OLS Table.

Independent Variables	**Pooled OLS**			
	Coefficient	Standard Error	T-statistic	Probability
C	233.3237	26.23398	8.89	0.000
IR	-0.570518	0.7720536	-0.74	0.462
Log(ER)	-117.4889	12.7726	-9.20	0.000
INF	3.444527	1.366888	2.52	0.013
GDP	-5.868673	1.205306	-4.87	0.000
Log(MS)	-30.80308	3.998588	-7.70	0.000

Note. The asterisks indicate rejection of null hypothesis at 5% significance level.

$$ROI = 233.3237 - 0.570518\,IR - 117.4889\,Log(ER) + 3.444527\,INF - 5.868673\,GDP - 30.80308\,Log(MS) + \varepsilon_i$$

Where,

ROI = Return on Investment (%)

IR = Interest Rate (%)

ER = Exchange Rate (RM per US Dollar)

INF = Inflation (%)

GDP = Gross Domestic Product (%)

MS = Money Supply (RM Million)

4.3.2 Interpretation of Pooled OLS

I. Coefficient (β_0)

When all of the exogenous variable's value is equal to zero, on average, the return on investment (ROI) is equal to233.3237%.

II. Interest Rate (β_1)

When the interest rate increase by 1%, on average, the return on investment will decrease by 0.570518%, holding other variables constant.

III. Exchange Rate (β_2)

When the exchange rate increase by 1%, on average, the return on investment will decrease by 1.174889%, holding other variables constant.

IV. Inflation ($\boldsymbol{\beta_3}$)

When the inflation rate increase by 1%, on average, the return on investment will increase by 3.444527%, holding others variables constant.

V. Gross Domestic Product ($\boldsymbol{\beta_4}$)

When the gross domestic product increase by 1%, on average, the return on investment will decrease by 5.868673%, holding others variables constant.

VI. Money Supply ($\boldsymbol{\beta_5}$)

When the money supply increase by 1%, on average, the return on investment will decrease by -0.3080308%, holding others variables constant.

4.3.3 Hypothesis Testing of Pooled OLS

I. Interest Rate ($\boldsymbol{\beta_1}$)

H_0: There is no significant relationship between Interest Rate and Return on Investment.

H_1: There is a significant relationship between Interest Rate and Return on Investment.

P-value: 0.462

Decision Rule: Reject H_0 if the p-value is less than significance level or the test statistic value is greater than critical value. Other than that, do not reject H_0.

Decision Making: Do not reject H_0because the p-value (0.462) is more than significance level of 5%.

Conclusion: There is a sufficient evidence to conclude that there is no significance relationship between Interest Rate and Return on Investment at the significance level of 5%.

II. Exchange Rate ($\boldsymbol{\beta_2}$)

H_0:There is no significant relationship between Exchange Rate and Return on Investment.

H_1:There is a significant relationship between Exchange Rate and Return on Investment.

P-value: 0.000

Decision Rule: Reject H_0 if the p-value is less than significance level or the test statistic value is greater than critical value. Otherwise, do not reject H_0.

Decision Making: Reject H_0 since the p-value (0.000) is less than significance level of 5%.

Conclusion: There is a sufficient evidence to conclude there is a significance relationship between Exchange Rate and Return on Investment at the significance level of 5%.

III. Inflation ($\boldsymbol{\beta_3}$)

H_0:There is no significant relationship between Inflation Rate and Return on Investment.

H_1:There is a significant relationship between Inflation Rate and Return on Investment.

P-value: 0.013

Decision Rule: Reject H_0 if the p-value is less than significance level or the test statistic value is greater than critical value. Other than that, do not reject H_0.

Decision Making: Reject H_0 since the p-value (0.013) is not greater than significance level of 5%.

Conclusion: There is a sufficient evidence to conclude that there is a significance relationship between Inflation Rate and Return on Investment at the significance level of 5%.

IV. Gross Domestic Product (β_4)

H_0:There is no significant relationship between Gross Domestic Product and Return on Investment.

H_1:There is a significant relationship between Gross Domestic Product and Return on Investment.

P-value: 0.000

Decision Rule: Reject H_0 if the p-value is less than significance level or the test statistic value is greater than critical value. Otherwise, do not reject H_0.

Decision Making: Reject H_0 since the p-value (0.000) is less than significance level of 5%.

Conclusion: There is a sufficient evidence to conclude that there is a significance relationship between Gross Domestic Product and Return on Investment at the significance level of 5%.

V. Money Supply ($\boldsymbol{\beta_5}$)

H_0:There is no significant relationship between Money Supply and Return on Investment.

H_1:There is a significant relationship between Money Supply and Return on Investment.

P-value: 0.000

Decision Rule: Reject H_0 if the p-value is less than significance level or the test statistic value is greater than critical value. Otherwise, do not reject H_0.

Decision Making: Reject H_0 since the p-value (0.000) is less than significance level of 5%.

Conclusion: There is a sufficient evidence to conclude that there is a significance relationship between Money Supply and Return on Investment at the significance level of 5%.

4.4. Diagnostic Checking

4.4.1 Normality Test

Table 4.6: Results of Jarque-Bera Test.

Test	Probability (P-value)
Jarque-Bera Test	0.8237

H_0:The error term is normally distributed.

H_1:The error term is not normally distributed.

Decision Rule: Reject H_0 if the p-value is less than the significance level of 5%. Otherwise, do not reject H_0.

Decision Making: Do not reject H_0 since the p-value (0.8237) is more than the significance level of 5%.

Conclusion: There error term is normally distributed.

4.4.2 Multicollinearity

Table 4.7: Correlation Matrix for the Variables.

	IR	**ER**	**INF**	**GDP**	**MS**
IR	1.000				
ER	0.1001	1.0000			
INF	0.3263	-0.1256	1.0000		
GDP	0.8707	0.2544	0.0276	1.0000	
MS	0.2841	0.7892	-0.0101	0.4032	1.0000

Note. ROI = Return on Investment (%), IR = Interest Rate (%), ER = Exchange Rate (RM per US Dollar), INF = Inflation (%), GDP = Gross Domestic Product (%), MS = Money Supply (RM Million)

The two independent variables defined as a high pair-wise correlation when the correlation coefficient is higher than 0.8 or 80%. Based on result, IR and GDP has the highest pair-wise correlation coefficient of 0.8707 and considered as problem. However, the pair-wise correlation coefficient of others independent variables is less than 0.8 or 80%, so it can conclude that this model does not have serious multicollinearity problem.

4.4.2.1 Variance Inflation Factor (VIF)

Table 4.8: Results of Each Variable for VIF.

Variables	$\boldsymbol{VIF = \frac{1}{1 - R^2}}$
Interest Rate	6.98
Exchange Rate	2.84
Inflation Rate	1.63
Gross Domestic Product	6.68
Money Supply	3.05

Since all the result of independent variables that has shown at above is between the range of 1 to 10, it is consider there is no serious multicollinearity happened within this model.

4.4.3 Heteroscedasticity

Table 4.9: Results of Heteroscedasticity

Test	Probability (P-value)
Breusch-Pagan/ Cook-Weisberg Test	0.3332

H_0:There is no heteroscedasticity problem.

H_1:There is a heteroscedasticity problem.

Decision Rule: Reject H_0 if the p-value is less than the significance level of 5%. Otherwise, do not rejectH_0.

Decision Making: Do not reject H_0 since the p-value (0.3332) is more than the significance level of 5%.

Conclusion: There is no heteroscedasticity problem.

4.4.4 Autocorrelation

Table 4.10: Durbin Watson Test Statistic

No Autocorrelation	2
Positive Autocorrelation	0 < Test Statistic < 2
Negative Autocorrelation	2 < Test Statistic < 4

Table 4.11: Results of Autocorrelation.

Test	Test Statistic
Durbin-Watson d-statistic	1.873286

H_0:There is no autocorrelation problem.

H_1:There is an autocorrelation problem.

The Durbin Watson test statistic is 1.873286 which is at the range of 0 to 2. Hence, the result concludes that there is a positive autocorrelation problem in this model.

Table 4.12: Results of Newey West Test.

Test	P-Value
Newey West Test	0.0000

Since the p-value of Newey West Test, 0.0000, the result concludes that positive autocorrelation problem in this model can be solved.

4.5 Conclusion

Over the chapter 4, the scholars had used diagnostic checking to find out this model which may have some issue about multicollinearity, heteroscedasticity and autocorrelation. Then, scholars also had determined the best model that most suitable for this research among the Pooled OLS Model, Fixed effect model and Random Effect Model. Next, the chapter 5 will proceed to further discussion and recommendation of this research purpose.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter will be discussing the comprehensive conclusion of the research. A discussion of the major findings comprises a synopsis of the empirical test results from the previous chapter. Furthermore, the implications and limitations of the research will also be deliberated. There are some recommendations will be given to enhance the understanding of the relationship among the performance of the selected mutual fund and macroeconomics variables.

5.1 Discussions of Major Findings

Table 5.1: Results and Theoretical Summary.

Dependent Variable	**Independent Variables**	**Expected Sign**	**Results**	**Consistency**
ROI	IR	Negative	Negative	Philpot (1998)
		Insignificant	Insignificant	
ROI	ER	Negative	Negative	Ibrahim and Aziz (2003)
		Significant	Significant	
ROI	INF	Positive	Positive	No Previous Study
		Significant	Significant	
ROI	GDP	Negative	Negative	Ingrid (2015)

		Significant	Significant	
ROI	MS	Negative	Negative	No Previous Study
		Significant	Significant	

Table 5.1 summarizes the Pooled OLS model results which the scholars analyze from Chapter 4. According to the table, there are four significant independent variables and one insignificant independent variable towards the dependent variable which the dependent variable is the mutual fund performance (ROI) of the selected 10 mutual fund companies with a 5% significant level. The four significant independent variables are Exchange Rate (ER), Inflation Rate (INF), Gross Domestic Product (GDP) and Money Supply (MS) while Interest Rate (IR) is the insignificant independent variable.

According to the result conducted in Chapter 4, it can be conclude that Exchange Rate is significantly negative towards mutual fund performance. This result is justified by the study of Ibrahim and Aziz (2003), the researchers indicate that the activity of the exchange rate significantly affects the fluctuation in the stock market as Malaysia is strongly dependent on the international trade. A higher exchange rate always comes with a rising interest rate. Hence, it strengthens cost of borrowing. While the cost of borrowing increases, investors may reduce their investment. Therefore, the expansions in the exchange rate will shrinkage the ROI of the mutual fund.

Inflation Rate is positively significant towards the performance of mutual fund. To our best knowledge, there is no previous study persistent with the result conducted in Chapter 4. However, the study of Krishnamurthy (2018) had conducted a significant relationship bounded by inflation rate and ROI. The researcher states that high inflation illusion is come with underestimated stock price which then influence the ROI in the mutual fund. Besides that, greater inflation rate will affect high volatile in stock market. High volatility of mutual fund means that there is high

risk and uncertainty, hence, results in high return on investment. In conclusion, this study proves that increase in inflation rate will increase the ROI.

Furthermore, from the results which conduct in Chapter 4, GDP is negatively significant against the mutual fund performance (ROI). This conclusion is coherent with the study of Ingrid (2015). The study is regarding the factors affecting mutual fund performance in Kenya. When GDP increase, it will lead to booming in interest, therefore, investors will tend to switch their investment, which most likely on shares or bonds, instead of the mutual fund. Therefore, as demand decrease, the return on investment will also decrease. This can be concluded that GDP has a negatively significant outcome on mutual fund performance.

For the independent variable of Money Supply, the relationship of money supply and ROI are negatively significant. As far as we know, we did not found that there is previous study to support our study while there are study which conducted by Singh (2011) in Taiwan concluded that money supply is positively dependent to the ROI. Besides that, there are another study which conducted by Humpe and Macmillan (2009) stated that money supply is significant related to the ROI in US and Japan. In addition, rise in money supply may be a sign of bear market, this may cause the underlying component of mutual fund will drop in performance. Thus, this can be concluded that rise in money supply will lead to decline in ROI.

From Table 5.1, the only insignificant independent variable is Interest Rate, it is negatively insignificant towards the mutual fund performance (ROI). The result can be supported by Philpot's study which conducted in 1998, which stated that there is an inverse relationship between the performance of the mutual fund and interest rate. However, the research result in Chapter 4 clarifies that interest rate is meaningless towards the dependent variable which can conclude that the interest rate movement does not alter the changes in mutual fund performance.

5.2 Implication

5.2.1 Policy Implication

From our research, it shown that the variables of inflation rate and exchange rate possess a significant consequence towards the Malaysia's mutual fund performances, while interest rate is insignificant to mutual fund performances in Malaysia. Many of the investors and fund managers are curious on the impacts of macroeconomic variables towards the mutual fund performances. Thus, the analysis regarding the macroeconomic variables of the mutual fund performances has become an important and common topic among the researchers in the mutual funds industry.

The implication of this study offers the policy makers a thorough discussion of mutual fund performances in Malaysia in terms of how the macroeconomics variable brings effects toward the mutual fund performances. Moreover, it has unwittingly helps the policy makers to gain a stable market or growth in the industry of mutual funds. By knowing the key determinants of the mutual fund performances, the policy makers may create a useful policy that can strengthen the rule of law in mutual funds.

Since the outcome of the study shows that the mutual fund performance and inflation rate are positively related, therefore it shows that the increases in the inflation will increase the mutual fund performances. Hence, suitable monetary policy and fiscal policy are recommended to obtain a desire inflation rate. (Bai, 2014) Policy makers may control the inflation rate by reducing the money supply in the country.

Besides, the study has proven that the exchange rate possesses a significant effect against the mutual fund performances in Malaysia. A result of a adverse relationship among mutual fund performance and exchange rate has been obtained from the study. Based on the study by Lemantile (2017), policy makers should engage with suitable hedging strategies as it can minimize the negative event occur. This may also prevent losses or currency risk during the financial crisis. Furthermore, it is critical for policy makers to consider a guideline that will maintain the exchange rate which will affect the foreign investors and mutual fund performances negatively. Therefore, a useful policy is recommended by taking into account the exchange rate and the situation of the financial market. By doing so, the policy makers may achieve a stable mutual fund performance due to the exchange rate.

5.2.2 Implication to Investor

One of the significant variables that have been generally recognized that impacts financial status and capability in financial decision-making. Subsequently, recognizing factors that are significantly related to financial decisions is important and is one of the critical issues for an individual (Zaidi &Tahi, 2019). Risk adverse investors should diversify their holdings in various organizations to minimize the risks and maximize returns. Through this study, it helps the investors that prone to invest in a mutual fund to recognize the factors that manipulate the performance of the mutual fund. Investors could refer to this research to discover which factors will affect the mutual fund performance in Malaysia as a different country has a different cause. Hence, it enables investors to avoid taking wrong actions and prevent the risk of further losses.

5.2.3 Implication to Fund Manger

The results of our research identify the macroeconomic determinants that affect the performance of a particular investment fund which will help fund managers manage the risk profile of their investment portfolio more effectively. Thus, it would enable them to predict how the portfolio will behave one's factor increases or declines. The fund managers suggest using their reasonable business knowledge to carefully analyze investment factors before perform an investment decision. Furthermore, the fund manager ought to evaluate all the variables that affect the investment instead of considering only one variable (Jagongo & Mutswenje, 2014).

5.3 Limitations

After going through the whole research, we find out that there are some limitations and barriers faced by us. The first is on the process of data collection. Since our research is about the mutual fund performing and most of the mutual fund are created when a different year, so the researcher was having a limitation as not include all the mutual fund in this study because some of the mutual fund data are not sufficient. In addition, there are also various kinds of mutual funds in the market, such as open-end funds, closed-end fund and exchange-traded funds (ETF). Hence, to have consistent and efficient results, we decide to choose the top 10 underperforming mutual funds from the open-end fund.

Besides, we also meet a problem when running the test and diagnostic checking. While we are using the panel data in our research, we got some problems when

running those data with e-views. The E-view could not run some tests successfully and we need to change the structure of the data in order to attain the results.

Moreover, all of the previous studies and the researches for the literature review are for the other country's condition but this research is mainly focus the mutual fund market in Malaysia so the significant relationship bound by the independent macroeconomics variables and dependent variables of other research might not apply in this research.

Then, another constraint of this study is the research only concentrates on the mutual fund market in Malaysia so the conclusion we get might cannot as a reference for other countries since every mutual fund in each country are quite different and the other macroeconomic variables we include in this research are also depending on each countries situation.

5.4 Recommendation

In order to enhance and improve the model further, future researchers are advised to include any other new variable or significant to substitute the irrelevant variables. From the study of Ghoul and Karoui (2017), the researchers have conducted a study that explores the relationship of corporate social responsibility and performance of the mutual fund. This study implies innovation in the field of research in mutual fund performance, so those future researchers may do more study on it.

Furthermore, apart from the macroeconomics variables we use in this study, future researchers may also study other variables which are significant towards mutual fund performance, such as unemployment rate, trade cycle, economic growth, the

balance of payment and etc. This will gain much more contribution in the study of mutual fund performance.

On the other hand, future researchers may expand the capacity of research by including extra mutual fund companies and a longer time duration. This is due to most researchers will face the problem of sample size while conducting research. Therefore, larger sample size is recommended for future research.

Lastly, the future researcher may use a more perplexed econometric model to capture more possibility of impact from independent variables on dependent variables. In addition, future researchers are recommended to implement more advanced test statistics to precisely determine the short run and long run relationship.

5.5 Conclusion

This research study the relationship between variables in macroeconomics and the selected mutual fund performance in Malaysia. The 10 underperforming mutual fund companies in Malaysia were being adopted in this research from the year 2009 until 2018. The result of mutual fund performance is determined through the Return on Investment (ROI). A significant relationship is shown in the exchange rate, inflation rate, gross domestic product and money supply towards the mutual fund performance. However, interest rate shows an insignificant relationship on mutual fund performance, which means that it does not support the alternative hypothesis related to this relationship. Through this research, few limitations are determined and recommendations have been provided for future study.

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APPENDICES

Appendix 1: Raw data of dependent and independent variables for 10 underperforming mutual funds companies in Malaysia from 2009 to 2018.

Mutual Fund	Year	ROI	IR	ER	INF	GDP	MS
BSN Dana Al-Jadid	2009	20.9800	11.7823	3.4265	0.5833	-1.5135	9.2000
BSN Dana Al-Jadid	2010	5.0900	-2.1133	3.0835	1.6229	7.4248	6.8000
BSN Dana Al-Jadid	2011	-3.0000	-0.4719	3.1682	3.1745	5.2939	14.3000
BSN Dana Al-Jadid	2012	12.4900	3.7484	3.0585	1.6636	5.4735	9.0000
BSN Dana Al-Jadid	2013	3.3800	4.4303	3.2755	2.1050	4.6937	7.3000
BSN Dana Al-Jadid	2014	-11.7200	2.0684	3.4965	3.1430	6.0067	7.3000
BSN Dana Al-Jadid	2015	-8.8900	4.9703	4.2925	2.1044	5.0915	3.0000
BSN Dana Al-Jadid	2016	-10.4900	2.5419	4.4862	2.0906	4.2234	3.2000
BSN Dana Al-Jadid	2017	-1.2700	0.7614	4.0465	3.8712	5.8970	4.9000
BSN Dana Al-Jadid	2018	-22.5900	4.0087	4.1335	0.8847	4.7236	8.0000
Apex Quantum Fund	2009	22.4300	11.7823	3.4265	0.5833	-1.5135	9.2000
Apex Quantum Fund	2010	5.6400	-2.1133	3.0835	1.6229	7.4248	6.8000
Apex Quantum Fund	2011	-2.4500	-0.4719	3.1682	3.1745	5.2939	14.3000
Apex Quantum Fund	2012	-0.7900	3.7484	3.0585	1.6636	5.4735	9.0000
Apex Quantum Fund	2013	3.4700	4.4303	3.2755	2.1050	4.6937	7.3000
Apex Quantum Fund	2014	-20.0800	2.0684	3.4965	3.1430	6.0067	7.3000
Apex Quantum Fund	2015	-7.0700	4.9703	4.2925	2.1044	5.0915	3.0000
Apex Quantum Fund	2016	-9.2000	2.5419	4.4862	2.0906	4.2234	3.2000
Apex Quantum Fund	2017	15.1500	0.7614	4.0465	3.8712	5.8970	4.9000
Apex Quantum Fund	2018	-13.5200	4.0087	4.1335	0.8847	4.7236	8.0000
RHB Equity Trust	2009	35.0200	11.7823	3.4265	0.5833	-1.5135	9.2000
RHB Equity Trust	2010	19.6000	-2.1133	3.0835	1.6229	7.4248	6.8000
RHB Equity Trust	2011	-0.9200	-0.4719	3.1682	3.1745	5.2939	14.3000
RHB Equity Trust	2012	20.1000	3.7484	3.0585	1.6636	5.4735	9.0000
RHB Equity Trust	2013	19.6900	4.4303	3.2755	2.1050	4.6937	7.3000
RHB Equity Trust	2014	-1.0800	2.0684	3.4965	3.1430	6.0067	7.3000
RHB Equity Trust	2015	-2.4600	4.9703	4.2925	2.1044	5.0915	3.0000
RHB Equity Trust	2016	-15.8100	2.5419	4.4862	2.0906	4.2234	3.2000
RHB Equity Trust	2017	1.8100	0.7614	4.0465	3.8712	5.8970	4.9000

RHB Equity Trust	2018	-30.7200	4.0087	4.1335	0.8847	4.7236	8.0000
Amanah Saham Bank Simp Nasio	2009	44.8400	11.7823	3.4265	0.5833	-1.5135	9.2000
Amanah Saham Bank Simp Nasio	2010	15.4400	-2.1133	3.0835	1.6229	7.4248	6.8000
Amanah Saham Bank Simp Nasio	2011	0.0000	-0.4719	3.1682	3.1745	5.2939	14.3000
Amanah Saham Bank Simp Nasio	2012	3.4200	3.7484	3.0585	1.6636	5.4735	9.0000
Amanah Saham Bank Simp Nasio	2013	15.8900	4.4303	3.2755	2.1050	4.6937	7.3000
Amanah Saham Bank Simp Nasio	2014	-10.3400	2.0684	3.4965	3.1430	6.0067	7.3000
Amanah Saham Bank Simp Nasio	2015	-0.1600	4.9703	4.2925	2.1044	5.0915	3.0000
Amanah Saham Bank Simp Nasio	2016	-8.0500	2.5419	4.4862	2.0906	4.2234	3.2000
Amanah Saham Bank Simp Nasio	2017	-3.6100	0.7614	4.0465	3.8712	5.8970	4.9000
Amanah Saham Bank Simp Nasio	2018	-21.5700	4.0087	4.1335	0.8847	4.7236	8.0000
MIDF AMANAH GROWTH FUND	2009	23.4300	11.7823	3.4265	0.5833	-1.5135	9.2000
MIDF AMANAH GROWTH FUND	2010	18.1000	-2.1133	3.0835	1.6229	7.4248	6.8000
MIDF AMANAH GROWTH FUND	2011	-14.7600	-0.4719	3.1682	3.1745	5.2939	14.3000
MIDF AMANAH GROWTH FUND	2012	-15.3300	3.7484	3.0585	1.6636	5.4735	9.0000
MIDF AMANAH GROWTH FUND	2013	9.2400	4.4303	3.2755	2.1050	4.6937	7.3000
MIDF AMANAH GROWTH FUND	2014	-6.2200	2.0684	3.4965	3.1430	6.0067	7.3000
MIDF AMANAH GROWTH FUND	2015	15.0200	4.9703	4.2925	2.1044	5.0915	3.0000
MIDF AMANAH GROWTH FUND	2016	-5.7000	2.5419	4.4862	2.0906	4.2234	3.2000
MIDF AMANAH GROWTH FUND	2017	21.1600	0.7614	4.0465	3.8712	5.8970	4.9000
MIDF AMANAH GROWTH FUND	2018	-24.8900	4.0087	4.1335	0.8847	4.7236	8.0000
MIDF AMANAH DYNAMIC FUND	2009	27.3300	11.7823	3.4265	0.5833	-1.5135	9.2000
MIDF AMANAH DYNAMIC FUND	2010	16.7000	-2.1133	3.0835	1.6229	7.4248	6.8000
MIDF AMANAH DYNAMIC FUND	2011	-15.2000	-0.4719	3.1682	3.1745	5.2939	14.3000
MIDF AMANAH DYNAMIC FUND	2012	-15.6900	3.7484	3.0585	1.6636	5.4735	9.0000
MIDF AMANAH DYNAMIC FUND	2013	10.9400	4.4303	3.2755	2.1050	4.6937	7.3000
MIDF AMANAH DYNAMIC FUND	2014	7.4200	2.0684	3.4965	3.1430	6.0067	7.3000
MIDF AMANAH DYNAMIC FUND	2015	16.9100	4.9703	4.2925	2.1044	5.0915	3.0000
MIDF AMANAH DYNAMIC FUND	2016	-8.1100	2.5419	4.4862	2.0906	4.2234	3.2000
MIDF AMANAH DYNAMIC FUND	2017	8.6800	0.7614	4.0465	3.8712	5.8970	4.9000
MIDF AMANAH DYNAMIC FUND	2018	-26.4400	4.0087	4.1335	0.8847	4.7236	8.0000
RHB GLOBAL NEW STARS FUND	2009	36.6900	11.7823	3.4265	0.5833	-1.5135	9.2000
RHB GLOBAL NEW STARS FUND	2010	1.5000	-2.1133	3.0835	1.6229	7.4248	6.8000

RHB GLOBAL NEW STARS FUND	2011	-22.3200	-0.4719	3.1682	3.1745	5.2939	14.3000
RHB GLOBAL NEW STARS FUND	2012	19.7600	3.7484	3.0585	1.6636	5.4735	9.0000
RHB GLOBAL NEW STARS FUND	2013	-3.3400	4.4303	3.2755	2.1050	4.6937	7.3000
RHB GLOBAL NEW STARS FUND	2014	-9.2800	2.0684	3.4965	3.1430	6.0067	7.3000
RHB GLOBAL NEW STARS FUND	2015	6.3800	4.9703	4.2925	2.1044	5.0915	3.0000
RHB GLOBAL NEW STARS FUND	2016	1.7700	2.5419	4.4862	2.0906	4.2234	3.2000
RHB GLOBAL NEW STARS FUND	2017	10.3800	0.7614	4.0465	3.8712	5.8970	4.9000
RHB GLOBAL NEW STARS FUND	2018	-22.6000	4.0087	4.1335	0.8847	4.7236	8.0000
PACIFIC FOCUS18 FUND	2009	39.1900	11.7823	3.4265	0.5833	-1.5135	9.2000
PACIFIC FOCUS18 FUND	2010	8.4600	-2.1133	3.0835	1.6229	7.4248	6.8000
PACIFIC FOCUS18 FUND	2011	-15.2600	-0.4719	3.1682	3.1745	5.2939	14.3000
PACIFIC FOCUS18 FUND	2012	6.5100	3.7484	3.0585	1.6636	5.4735	9.0000
PACIFIC FOCUS18 FUND	2013	9.5400	4.4303	3.2755	2.1050	4.6937	7.3000
PACIFIC FOCUS18 FUND	2014	-4.1500	2.0684	3.4965	3.1430	6.0067	7.3000
PACIFIC FOCUS18 FUND	2015	4.2600	4.9703	4.2925	2.1044	5.0915	3.0000
PACIFIC FOCUS18 FUND	2016	-5.9200	2.5419	4.4862	2.0906	4.2234	3.2000
PACIFIC FOCUS18 FUND	2017	3.0400	0.7614	4.0465	3.8712	5.8970	4.9000
PACIFIC FOCUS18 FUND	2018	-14.5400	4.0087	4.1335	0.8847	4.7236	8.0000
MIDF AMANAH ISLAMIC FUND	2009	17.9400	11.7823	3.4265	0.5833	-1.5135	9.2000
MIDF AMANAH ISLAMIC FUND	2010	14.0700	-2.1133	3.0835	1.6229	7.4248	6.8000
MIDF AMANAH ISLAMIC FUND	2011	-13.2300	-0.4719	3.1682	3.1745	5.2939	14.3000
MIDF AMANAH ISLAMIC FUND	2012	-16.3600	3.7484	3.0585	1.6636	5.4735	9.0000
MIDF AMANAH ISLAMIC FUND	2013	12.9200	4.4303	3.2755	2.1050	4.6937	7.3000
MIDF AMANAH ISLAMIC FUND	2014	-1.6300	2.0684	3.4965	3.1430	6.0067	7.3000
MIDF AMANAH ISLAMIC FUND	2015	19.7300	4.9703	4.2925	2.1044	5.0915	3.0000
MIDF AMANAH ISLAMIC FUND	2016	-8.9000	2.5419	4.4862	2.0906	4.2234	3.2000
MIDF AMANAH ISLAMIC FUND	2017	22.0200	0.7614	4.0465	3.8712	5.8970	4.9000
MIDF AMANAH ISLAMIC FUND	2018	-18.7800	4.0087	4.1335	0.8847	4.7236	8.0000
BIMB ASBI DANA AL MUNSIF	2009	11.2100	11.7823	3.4265	0.5833	-1.5135	9.2000
BIMB ASBI DANA AL MUNSIF	2010	4.7000	-2.1133	3.0835	1.6229	7.4248	6.8000
BIMB ASBI DANA AL MUNSIF	2011	6.6000	-0.4719	3.1682	3.1745	5.2939	14.3000
BIMB ASBI DANA AL MUNSIF	2012	6.2000	3.7484	3.0585	1.6636	5.4735	9.0000
BIMB ASBI DANA AL MUNSIF	2013	7.3100	4.4303	3.2755	2.1050	4.6937	7.3000
BIMB ASBI DANA AL MUNSIF	2014	-1.7100	2.0684	3.4965	3.1430	6.0067	7.3000
BIMB ASBI DANA AL MUNSIF	2015	-7.8500	4.9703	4.2925	2.1044	5.0915	3.0000
BIMB ASBI DANA AL MUNSIF	2016	-4.6900	2.5419	4.4862	2.0906	4.2234	3.2000

BIMB ASBI DANA AL MUNSIF	2017	17.1700	0.7614	4.0465	3.8712	5.8970	4.9000
BIMB ASBI DANA AL MUNSIF	2018	-21.0700	4.0087	4.1335	0.8847	4.7236	8.0000

Appendix 2: Fixed Effect Model

```
Fixed-effects (within) regression               Number of obs      =       100
Group variable: MFnum                           Number of groups   =        10

R-sq:  within  = 0.5731                         Obs per group: min =        10
       between =      .                                       avg =      10.0
       overall = 0.5657                                       max =        10

                                                F(5,85)            =     22.82
corr(u_i, Xb)  = 0.0000                         Prob > F           =    0.0000
```

ROI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
IR	-.570518	.7996932	-0.71	0.478	-2.160522	1.019486
ERlog	-117.4889	13.22986	-8.88	0.000	-143.7934	-91.18437
INF	3.444527	1.415822	2.43	0.017	.6294931	6.259561
GDP	-5.868673	1.248456	-4.70	0.000	-8.350938	-3.386409
MSlog	-30.80308	4.141738	-7.44	0.000	-39.03796	-22.56819
_cons	233.3237	27.17316	8.59	0.000	179.2962	287.3512
sigma_u	1.8496682					
sigma_e	10.852261					
rho	.02822999	(fraction of variance due to u_i)				

F test that all u_i=0: F(9, 85) = 0.29 Prob > F = 0.9757

Appendix 3: Random Effect Model

```
Random-effects GLS regression                   Number of obs      =       100
Group variable: MFnum                           Number of groups   =        10

R-sq:  within  = 0.0000                         Obs per group: min =        10
       between = 0.0000                                       avg =      10.0
       overall = 0.5657                                       max =        10

                                                Wald chi2(5)       =    122.43
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

ROI	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
IR	-.570518	.7720536	-0.74	0.460	-2.083715	.9426793
ERlog	-117.4889	12.7726	-9.20	0.000	-142.5227	-92.45504
INF	3.444527	1.366888	2.52	0.012	.7654765	6.123577
GDP	-5.868673	1.205306	-4.87	0.000	-8.231029	-3.506317
MSlog	-30.80308	3.998588	-7.70	0.000	-38.64017	-22.96599
_cons	233.3237	26.23398	8.89	0.000	181.906	284.7413
sigma_u	0					
sigma_e	10.852261					
rho	0	(fraction of variance due to u_i)				

Appendix 4: Descriptive Analysis

```
5 . xtsum MFnum Year ROI IR ERlog INF GDP MSlog
```

Variable		Mean	Std. Dev.	Min	Max	Observations	
MFnum	overall	5.5	2.886751	1	10	N =	100
	between		3.02765	1	10	n =	10
	within		0	5.5	5.5	T =	10
Year	overall	2013.5	2.886751	2009	2018	N =	100
	between		0	2013.5	2013.5	n =	10
	within		2.886751	2009	2018	T =	10
ROI	overall	1.9696	15.49127	-30.72	44.84	N =	100
	between		1.849668	-1.602	4.523	n =	10
	within		15.39056	-33.2734	43.2236	T =	10
IR	overall	3.172658	3.60449	-2.113296	11.78227	N =	100
	between		0	3.172658	3.172658	n =	10
	within		3.60449	-2.113296	11.78227	T =	10
ERlog	overall	1.284178	.1389506	1.117925	1.501006	N =	100
	between		0	1.284178	1.284178	n =	10
	within		.1389506	1.117925	1.501006	T =	10
INF	overall	2.124307	.9831469	.5833084	3.871201	N =	100
	between		0	2.124307	2.124307	n =	10
	within		.9831469	.5833084	3.871201	T =	10
GDP	overall	4.73147	2.258434	-1.513529	7.424847	N =	100
	between		0	4.73147	4.73147	n =	10
	within		2.258434	-1.513529	7.424847	T =	10
MSlog	overall	1.88998	.4602258	1.098612	2.660259	N =	100
	between		0	1.88998	1.88998	n =	10
	within		.4602258	1.098612	2.660259	T =	10

```
9 . tabstat ROI IR ER INF GDP MS,stats(median)
```

stats	ROI	IR	ER	INF	GDP	MS
p50	1.635	3.14518	3.4615	2.097478	5.192714	7.3

Appendix 5: Result of Pooled OLS Model

```
6 . reg ROI IR ERlog INF GDP MSlog
```

Source	SS	df	MS
Model	13439.4686	5	2687.89372
Residual	10318.4976	94	109.771251
Total	23757.9662	99	239.979456

Number of obs	100
F(5, 94)	24.49
Prob > F	0.0000
R-squared	0.5657
Adj R-squared	0.5426
Root MSE	10.477

ROI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
IR	-.570518	.7720536	-0.74	0.462	-2.103449	.9624126
ERlog	-117.4889	12.7726	-9.20	0.000	-142.8492	-92.12858
INF	3.444527	1.366888	2.52	0.013	.7305396	6.158514
GDP	-5.868673	1.205306	-4.87	0.000	-8.261836	-3.47551
MSlog	-30.80308	3.998588	-7.70	0.000	-38.74237	-22.86379
_cons	233.3237	26.23398	8.89	0.000	181.2355	285.4119

Appendix 6: Result of Poolability F-Test

Fixed-effects (within) regression Number of obs = 100
Group variable: **MFnum** Number of groups = 10

R-sq: within = 0.5731 Obs per group: min = 10
between = . avg = 10.0
overall = 0.5657 max = 10

F(5,85) = 22.82
corr(u_i, Xb) = 0.0000 Prob > F = 0.0000

ROI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
IR	-.570518	.7996932	-0.71	0.478	-2.160522	1.019486
ERlog	-117.4889	13.22986	-8.88	0.000	-143.7934	-91.18437
INF	3.444527	1.415822	2.43	0.017	.6294931	6.259561
GDP	-5.868673	1.248456	-4.70	0.000	-8.350938	-3.386409
MSlog	-30.80308	4.141738	-7.44	0.000	-39.03796	-22.56819
_cons	233.3237	27.17316	8.59	0.000	179.2962	287.3512
sigma_u	1.8496682					
sigma_e	10.852261					
rho	.02822999	(fraction of variance due to u_i)				

F test that all u_i=0: F(9, 85) = 0.29 Prob > F = 0.9757

Appendix 7: Result of Breusch-Pagan Lagrange Multiplier Test

Breusch and Pagan Lagrangian multiplier test for random effects

ROI[MFnum,t] = Xb + u[MFnum] + e[MFnum,t]

Estimated results:

	Var	sd = sqrt(Var)
ROI	239.9795	15.49127
e	117.7716	10.85226
u	0	0

Test: Var(u) = 0
chibar2(01) = 0.00
Prob > chibar2 = 1.0000

Appendix 8: Result of Hausman Test

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
IR	-.570518	-.570518	-1.68e-13	.2084283
ERlog	-117.4889	-117.4889	4.53e-12	3.44817
INF	3.444527	3.444527	-2.06e-13	.3690133
GDP	-5.868673	-5.868673	-1.70e-13	.3253917
MSlog	-30.80308	-30.80308	8.70e-13	1.079483

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.00
Prob>chi2 = 1.0000

Appendix 9: Result of Multicollinearity Test

Variable	VIF	1/VIF
IR	6.98	0.143176
GDP	6.68	0.149639
MSlog	3.05	0.327415
ERlog	2.84	0.352025
INF	1.63	0.613975
Mean VIF	4.24	

Appendix 10: Result of Heteroscedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ROI

chi2(1) = 0.94
Prob > chi2 = 0.3332

Appendix 11: Result of Autocorrelation Test

10 . dwstat

Durbin-Watson d-statistic(6, 100) = 1.873286

Appendix 12: Result of Newey West Test

```
. newey ROI IR ERlog INF GDP MSlog, lag(3) force

Regression with Newey-West standard errors          Number of obs   =       100
maximum lag: 3                                      F(  5,     94)   =     50.31
                                                    Prob > F        =    0.0000
```

ROI	Coef.	Newey-West Std. Err.	t	P>|t|	[95% Conf.	Interval]
IR	-.570518	.7039235	-0.81	0.420	-1.968175	.8271387
ERlog	-117.4889	9.519731	-12.34	0.000	-136.3905	-98.58723
INF	3.444527	1.276761	2.70	0.008	.9094888	5.979565
GDP	-5.868673	1.0801	-5.43	0.000	-8.013237	-3.724109
MSlog	-30.80308	3.334981	-9.24	0.000	-37.42476	-24.18139
_cons	233.3237	22.16852	10.52	0.000	189.3076	277.3398