DOES MALAYSIAN ECONOMY HAVE IMPACT ON THE FLUCTUATION OF OIL PRICE?

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Bachelor of Business Administration
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JUNE 2019

UNIVERSITI TEKNOLOGI MARA

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Final Year Project Paper submitted in fulfillment
of the requirements for the degree of
**Bachelor of Business Administration
(Finance)**

Faculty of Business and Management

JUNE 2019

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AUTHOR'S DECLARATION

I declare that the work in this final year project paper was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Undergraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The purpose of this study is to examine does the fluctuation of oil give impact to the Malaysian economy during the period of year 1998 to 2017. This study uses collection of data from secondary data. All data collected are comes from the World Data Bank and Trading Economic. The method of time series data that has been adopted in this research was carefully designed as to go well with the area of inquiry. The data ran by using Eviews and being analysed by ordinary least square method. The variable for dependent variable is real oil price and independent variables are GDP, government expenditure, inflation, real exchange rate and net export.

ACKNOWLEDGEMENT

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CHAPTER 1: INTRODUCTION

1.1   Background of Study

Crude oil is a natural resource regarded by most nations in the globe to be the primary energy resource. It includes many distinct classes of chemical components that in their uses, composition and characteristics may or may not be linked. Oil is also one of the important strategic energy for ensuring the growth of contemporary sector and economy and is also a significant resource that is scrambled in the globe by every interest group. The daily usage of oil explains the importance of it as the revenue segment of exporting countries and the cost segment of importing countries. The fluctuation of oil prices is always seen as the measuring instruments of the world economy, which would be the hot topic of each change to be concerned and debated usually in every country's political and economic circle.

The cost of crude oil has fluctuated throughout the globe in latest years. Due to fluctuating of oil price, several issues have emerged. A prevalent problem that arises is that individuals have to spend more on their daily use of oil than before. According to the Moradkhani, Rashid, Hassan, and Nassir (2010), increasing in energy price including oil price will make other prices to increase as oil prices plays an important role in determining other prices. Due to fluctuating of oil price, the cost of production also will be affected that will result to reduction in production.

According to the The Star Online (Thursday 15 November 2018), it indicated that the global petroleum price benchmark is now at a low level of seven months, having dropped by almost 24% since its peak of US$ 85.83 per barrel in October. Meanwhile, crude oil at US$ 55.47 per barrel was closed by the US West Texas Intermediate (WTI). Oil prices have slowed globally due to weakening demand and growing supply. US President Donald Trump's policy of wishing reduced oil prices to lower the inflationary impact on the US economy is making the fragile prices worse. Since the oil price issue has been discovered a long time ago and it seen be continuous problem, one organization has been established. OPEC (Organization of Petroleum Exporting

Coutries) is an organization that controlling price of oil. OPEC was formed in 1960 with five members which is Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. At the end of year 1971, there has other six nations that joined the group which are Qatar, Indonesia, Libya, United Arab Emirates, Algeria and Nigeria. Objective of this organization is to co-ordinate and unify petroleum policies among member countries to secure fair and stable prices for petroleum producers.

Malaysia is an oil and a developing country. To decrease the impacts of fluctuating world oil prices, the government of Malaysia has provided subsidies. Although Malaysia is an oil-producing nation, the Malaysian economy was under pressure from an oil price hike in 2008. Tumbling crude oil prices means the government is faced with growing difficulties in financing the 2019 budget. Oil and gas stocks also felt the oil price fluctuation. Kenanga Oil and gas research analyst Sean Lim, the present trend in oil prices means worrying opportunities for the O&G segment businesses. The oil price problem continues a subject for policymakers and economists to debate.

1.2   Problem Statement

Malaysia experienced dramatic fluctuations in the price of gasoline, diesel and liquefied oil gas (LPG). This has resulted in mixed responses among economists, businesses, and people in Malaysia. The constant price changes are worrying for everyone. The big issue is whether it affects the financial performance of Malaysia. Decreasing or rising oil prices will affect the oil-exporting countries ' economies. The falling oil price will expose the nation to the danger of reducing its export profits. Since 2014, the decrease in oil prices has negatively impacted the exporting countries ' economies, creating more burdens on economic earnings to cover the budget's costs. As we know, since September 2018, the oil price in Malaysia has been changing monthly, but now it is changing weekly. The oil price modifications have a significant effect on the profits associated with the federal government's oil, which will hit the budget deficit for the following year. Therefore, further inquiry into the effect of the Malaysian economy towards the oil price fluctuation causes our interest.

1.3   Research Objective

The objectives are formed based on the research questions above to steer which direction for our research is going to focus.

i)   To investigate the effect of gross domestic product on fluctuation of oil price.

ii)   To investigate the effect of government expenditure on fluctuation of oil price

iii) To investigate the effect of inflation rate on fluctuation of oil price.

iv)   To investigate the effect of real exchange rate on fluctuation of oil price.

v)   To investigate the effect of net export on fluctuation of oil price.

1.4   Research Question

There are several questions that will be come out in this study. This study come out some questions which based on the problem statement that needs to be answered in later chapter. The question has been developed based of the study on theoretical framework.

i)   What is the relationship between gross domestic product and oil price?

ii)   What is the relationship between government expenditure and oil price?

iii) What is the relationship between inflation rate and oil price?

iv)   What is the relationship between real exchange rate and oil price?

v)   What is the relationship between net export and oil price?

1.5   Significant of Study

This research is important in giving us a clearer knowledge and clear explanation of the effect of the oil price fluctuation on the Malaysian economy. Other sides may therefore obtain the benefit from this study project as follows:

1.5.1 Investor

Based on the movements of the crude price oil, it is easy for the investor to predict the movement of the of the stock price since it has high causality effect towards Malaysian stock market. This is because, owing to the beneficial connection between oil price and stock price, when the oil price decreases, stock price will also reduce. Investors can therefore observe oil price as a tool to help predict stock price motions for their hedging choices.

1.5.2 Petroleum Sector

This study might be can help the petroleum manager to forecast demand and supply in the future. Additional demand for natural gas should be developed either through new markets or by boosting consumption in current economies to rebalance and create a sustainable and robust natural gas sector in the Asia-Pacific region. Oil price fluctuations can affect crude petroleum demand and supply.

1.5.3 Government

This study provides important and useful information to the government. Since Malaysia is one of the exporter of the oil, this activities give revenue to the country. Government can know the relationship between the economic variable with the oil price. Therefore, government can understand the limitations and/or reinforce the macroeconomic variables and do some option to fix the issue from the measured consequence.

1.6   Scope of Study

The scope of the research is to investigate several effects that may be caused by fluctuating actual oil price to the Malaysian economy. The variable being studied is gross domestic product, government spending, inflation rate, actual exchange rate and net export. The information gathered are secondary data acquired from World Data Bank and Trading Economy. From 1988 to 2017, we gathered information on an annual basis for the 30 years.

1.7   Limitation of the study

Although the study has reached its goals, some constraints have been unavoidable. First, the selection of data collection method may be to mix extra data collection methods that might have enhanced analytical scope and depth. The information might be hard to locate because there is a border between the indicator to find the information. In addition, lack of understanding about the technique of research methodology that could

be used in this study and it is difficult to comprehend the researcher's technique did not recognize the technique.

1.8 Definition of Key Terms

1.8.1 Real Oil Price

Oil price relates to the spot price of one barrel of the crude oil benchmark. Usually the cost relies on the grade, place and content of the sulfur present in it. The value of oil can be determined by balancing demand and supply.

1.8.2 Gross Domestic Product (GDP)

Gross domestic product is the monetary value of all finished goods and services produced within the boarders of a country over a specific period of time. The gross national product is also important and known as the primary indicator used to understand the economic situation of countries.

1.8.3 Government Expenditure

Government expenditure relates to the acquisition of products and services, including government consumption and public investment, and transfer payments consisting of revenue transfers such as pension and social benefits.

1.8.4 Inflation Rate

Inflation is a quantitative measure of the rate at which the average price level of selected goods and services increases over a period in an economy.

1.8.5 Real Exchange Rate

The exchange rate can be defined as the exchange rate of one currency for another currency or for speculation or trading on the foreign exchange market.

It is also regarded as the value of one country's currency in comparison to another currency.

1.8.6 Net Export

Net exports can be described as the price of the complete exports of a country less the value of its complete imports.

1.9   Summary

Chapter 1 identified and listed all the issues and variables to define study goals. The dependent variable is the global real price of oil. The independent variables, meanwhile, are gross domestic product, government expenditure, inflation rate, real exchange rate, and net export. This research specifically concentrated on the important relationship between dependent and independent variables. The next section will further clarify the literature review from past research conducted by notable scientists globally.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Literature review will be highlighted in the second chapter of this study project document. Until a narrow view, the literature review linked to the studies will be clarified in a wide overall view. It will function as guidance in the development of a better theoretical framework for further explanation. It consists of the review on the main independent variable which is real oil price. The independent variables will be gross domestic product, government expenditure, inflation rate, real exchange rate and net export.

2.2 Literature Review on GDP and Oil Price

To determine a country's economy performance, gross domestic product is the best indicator. Oladosu, Leiby, Bowman, Uría-Martínez, and Johnson (2018) that study about 16 countries have the result positive relationship between GDP and oil price. Highest coefficients are Kuwait, Iraq, Qatar, Libya and Algeria.

According to Oladosu et al. (2018), there has positive relationship between GDP and oil price. This explains by their result which GDP elasticity is less negative for larger oil price shocks. This support by Fah and Shi (2017), analysed the impact of plunging of oil prices to the Malaysia and Indonesia economy from the year 2005 until 2014. This researcher using autoregressive distributed lag (ARDL), Granger Causality Test and VAR Model that also applied by Shaari, Pei, and Rahim (2013). Based on their research, they found that gross domestic product has positive relationship towards the fluctuation of oil price.

That result was support by Aimer (2016) that stated fluctuation of oil price will effect on gross domestic product in the short run in the Libya. This will cause a higher cash income and will affect GDP components. This researcher also recommends making policymakers to provide enabling policy that could lead to the diversification

of the nation's economy from oil export to non-oil export product. This paper using Augmented Dickey-Fuller (ADF) to test variables.

2.3 Literature Review on Government Expenditure and Oil Price

Government spending can be categorized into different sections such as social, education, health, army, and others. There has been a important connection between oil price fluctuation and government spending based on previous research. Adedokun (2018) who conducted studies in Nigeria indicated that there was a favorable connection between oil price and government expenditure.

The result was support by Fah and Shi (2017), there was a positive significant relationship between government expenditure and changes of the oil price for the Malaysia and Indonesia.

Sadeghi (2017) stated that unexpected increase in oil price leads to expansion in government expenditure and the larger is the government. In other words, capital expenditure will increases more than current expenditure in respond towards volatilities of oil price. This show there was a posotive relationship between government expenditure and oil price.

This was support by Tuzova and Qayum (2016) that made research in Iran. There was stated there was a positive relationship between oil price and government expenditure.

2.4 Literature Review on Inflation Rate and Oil Price

Basically, oil price fluctuation will impact the inflation rate of the country. Previous study by Bass (2019) in Russia, the result that using VEC framework and data was collected from 2010 until 2017 annual basis. Result that obtained by Bass (2019) was there was a significant relationship between inflation rate and oil price.

Based on Akhmad, Romadhoni, Karim, Tajibu, and Syukur (2019) previous

study in Indonesia, the result stated that there has positive relationship between inflation rate and changes of oil prices. this result support by previous researcher Fah and Shi (2017) previous study in Malaysia and Indonesia shows inflation rate is positively related to the fluctuation of oil price. Previous study (Álvarez, Sánchez-García, & Urtasun, 2017) in Spanish also obtained the same result which is positive relationship between oil price and inflation rate.

By using consumer price index (CPI) as the proxy to the inflation rate, (Zulkifli, 2016) also obtained the same result that show positive relationship between inflation rate and oil price.

2.5 Literature Review on Real Exchange Rate and Oil Price

Domestic or foreign currency fluctuations can strongly influence the economy of the country, such as trade terms, as measured by the use of actual exchange rates. According to Meo, Chowdhury, Shaikh, Ali, and Masood Sheikh (2018) researcher stated that, there was a positive relationship between the exchange rate and oil price. The researcher also stated, exchange rate is the big impact of the fluctuation of oil price. This is because, changes of the oil price will effect their tourism demand that also will effect their gross domestic product.

Gbatu, Wang, Wesseh Jr, and Tutdel (2017) researcher that make study in West Africa that using VAR model was obtained result there was a positive relationship between exchange rate and oil price.

However, there has different result from (Fah & Shi, 2017) in Malaysia were stated there was a negative relationship between real exchange rate and changes of oil price.

2.6 Literature Review on Net Export and Oil Price

Malaysia has been a net exporter of natural gas and crude oil among non-OPEC nations. Being a oil exporter, changes of oil prices actually helped to cushion part of the

slack. Sometimes, the leading index being stabilized , indicative of a modest growth pace into the next one or two quarters. Based on previous researcher Nusair (2019)that do the research about relationship between gross domestic product and net export towards oil price among the GCC countries (Gulf Cooperation Council). result from the research is there has positive relationship between net export and oil price. This will support the result from the previous researcher.

However, according to the Fah and Shi (2017) there was negative relationship between net export and oil price in Malaysia but positive relationship between that two variables in Indonesia.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This section will address in depth sample and information, study framework, measurement of factors and study hypothesis. Generally, this section will concentrate on the early phase information collection method of the information type until information is analysed. The information for this study were secondary sources collected from journals, publications, articles and websites.

The variables being explained in depth in the research methodology part will be dependent variable which is real oil price and the five independent variables which are gross domestic product, government expenditure, inflation rate, real exchange rate and net export. This chapter will help us to understand better the relationship studies that being conducted. Research methodology also will explain on how we will obtain required result.

3.2 Sample and Data

3.2.1 Population and Samples

This study's population consists of gross domestic product, government spending, real exchange rate, inflation rate, and net export representing Malaysian economy. The annual data base is used as a sampling of this research. The data are collected within a span of 30 years from 1998 to 2017.

3.2.2 Data Collection

All required variables data are collected form secondary data.

3.2.2.1 Journals

Journal is the main secondary sources that used in this study. Journals provide evidence and guide the literature review and ensure the research done is supported. Journal articles by previous researchers are structure of decent

information, comments, opinion and helpful discussions for researcher's guidance. Journals were retrieved from Google Scholars, Science Direct and many more.

3.2.2.2 Internet

Internet is another secondary source which used by us to provide outcome for this research study.

Variables	Proxy	Sources
Real Oil Price	Brent Crude Oil	World Data Bank
Gross domestic product	GDP Growth	Trading Economy
Government expenditure	Government Expenditure	Trading Economy
Inflation rate	Consumer Price Index	World Data Bank
Real exchange rate	MYR/USD ratio	World Data Bank
Net export	Net Export	World Data Bank

3.2.3 Variables

Research manipulates variables to test the hypothesis. The values vary for the same object or individual at distinct times, or the values may vary for distinct object or individual at the same moment.

3.2.3.1 Dependent Variable

The dependent variables represent how independent variables can affect the variable. The dependent variable is known to the investigator as a main concern variable as it provides a measure of the impact of independent variables. Real petroleum price is the assigned dependent variable in this research where it shows the result of the change brought about by modifications in dependent factors.

3.2.3.1.1 Real Oil Price

Oil Price refers to one barrel of spot price of crude oil. The value

relies on its content of grade, location and sulphur. We use Brent Crude Oil as the proxy for the oil value for this research. Brent Crude is the main oil trading classification and acts as the global benchmark rates for oil purchases. Brent crude oil grade can be defined as light because of its comparatively low.

3.2.3.2 Independent Variables

Independent variables are those that influence the dependent variable and define the variance's independent variables. Independent variables affect the dependent variable in both beneficial and negative ways. In this study, gross domestic product (GDP), government expenditure (GE), inflation rate (IR), real exchange rate (RER) and net export (NE) are chosen independent variables that were used to find the relationship between dependent and independent variables to draw findings for this research project.

3.2.3.2.1 Gross Domestic Product

The complete financial activity of the nation is evaluated by the gross domestic product (GDP). In other words, GDP represents the monetary value over a specified period of time of all goods and services activity within the geographic boundaries of a nation. GDP is a key indicator for measuring the country's financial performance.

3.2.3.2.2 Government Expenditure

Government expenditure relates to the government's operations of buying products and services. This includes government consumption, government investment and payments for transfers consisting of revenue transfers such as pensions and social benefits. In other words, government spending is when public

spends cash on providing products and services that are not supplied by the private sector but are essential to the welfare of the nation.

3.2.3.2.3 Inflation Rate

Inflation is a quantitative measure of the pace at which an economy raises over a period of time the average price level of a basket of chosen goods and services. As we understand, it will begin to affect the overall price of living for the common public and the country's corresponding monetary authority when prices rise. For this study we use Consumer Price Index (CPI) as the proxy to inflation rate.

3.2.3.2.4 Real Exchange Rate

Real exchange rate can be defined as the foreign price level ratio and the domestic price level, where the foreign price level is converted into domestic currency units through the current nominal exchange rate.

3.2.3.2.5 Net Export

Net exports are the value of a country's total exports less the value of its complete imports. It is used in an open economy to calculate a nation or gross domestic product's aggregate expenditures. Net changes in exports can affect the economy country.

3.3 Research Design

Research design is the plan that responds to study questions.

3.3.1 Purpose of Study

The aim of this study is to analyse the impact on the Malaysian economy of

fluctuating actual oil price. It focuses on gross national product (GDP), government expenditure (GE), inflation rate (IR), real exchange rate (RER) and net export (NE), in particular. Thus, this research is to find out whether a important connection exists in Malaysia between the actual oil price and the variable economy.

3.3.2 Study Setting

This research is based on secondary data gathered and made accessible to the consumer of the information. The information will be gathered by World Data Bank and Trading Economics in a straightforward phrase.

3.3.3 Unit of Analysis

Real oil price measured by the Brent Crude Oil is the dependent variable of this study. Independent variables are gross domestic product, government expenditure, inflation rate, real exchange rate and net export. The proportion of gross domestic product is evaluated annually while the rate of inflation is evaluated annually in terms of the consumer price index (CPI). In addition, the proportion of gross domestic product is measured by government expenditure. Real exchange rates are measured using efficient actual exchange rates, and net exports are measured using complete crude oil exports.

3.4 Hypothesis Statement

Hypothesis statements can be defined as logical statements of the association between two or more factors expressed in the form of a testable statement that has clear implications for testing the specified relationships. By testing the hypothesis, it is expected that a solution can be identified to correct the problem that has been identified.

3.4.1 Gross Domestic Product (GDP)

H_0: There is no significant relationship between GDP and real oil price.
H_A: There is a significant relationship between GDP and real oil price.

3.4.2 Government Expenditure

H_0: There is no significant relationship between government expenditure and real oil price.

H_A: There is a significant relationship between government expenditure and real oil price.

3.4.3 Inflation Rate

H_0: There is no significant relationship between inflation rate and real oil price.

H_A: There is a significant relationship between inflation rate and real oil price.

3.4.4 Real Exchange Rate

H_0: There is no significant relationship between real exchange rate and real oil price.

H_A: There is a significant relationship between real exchange rate and real oil price.

3.4.5 Net Export

H_0: There is no significant relationship between net export and real oil price.

H_A: There is a significant relationship between net export and real oil price.

3.5 Research Framework

To better comprehend the connection between autonomous variables with dependent factors, research framework is created.

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE |
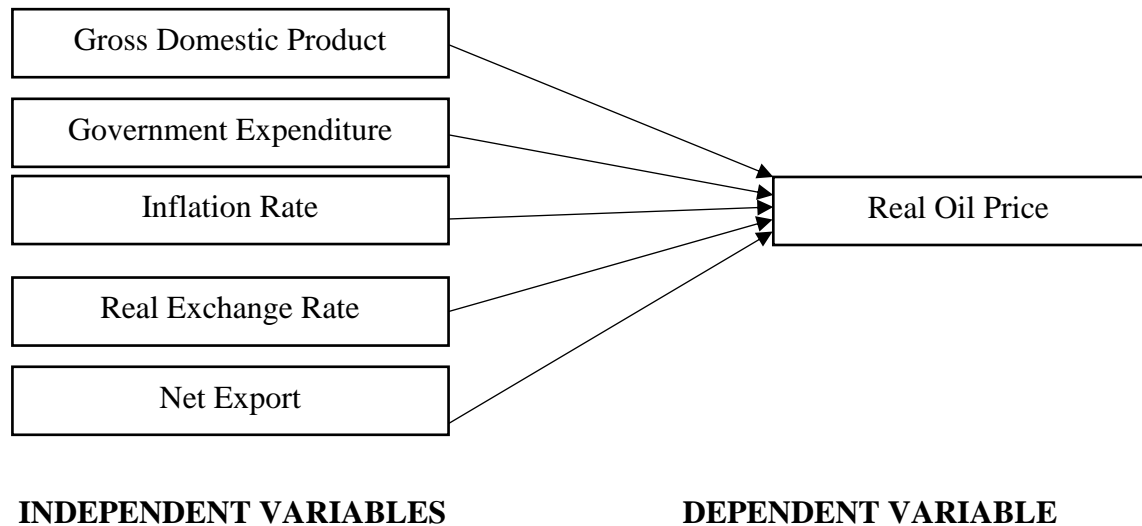
Diagram 3.1: Research Framework

3.6 Data Analysis Method

This research aims at identifying the impact of oil price fluctuation on Malaysia's economy. To meet the goal, this study used a method of analysing the time series. This research performs a descriptive analysis, analysis of correlation and analysis of regression. A tool detail as shown below:

3.6.1 Descriptive Analysis

Descriptive analysis is used in this research to define the fundamental information characteristics. Simple summaries of the sample and measures are provided by descriptive assessment. Descriptive analysis was also used in manageable form to present quantitative descriptions. All information from each variable will be defined as central tendency measurements that include mean and mean. A standard deviation may also be used to set a benchmark to estimate a process's general variation.

3.6.2 Correlation analysis

Correlation analysis also known as Pearson correlation is a statistical assessment technique used to analyse the power of a association between two continuous numerically measured variables. We use this research to determine whether there are viable links between variables and to reduce the uncertainty predictive range. The range of values for the correlation coefficient is -1.0 to 1.0. A -1.0 correlation shows a perfect adverse correlation, while a 0.1 correlation shows a perfect correlation. The information will refer to the test's p-value. The assumptions are as follows:

H_0: p =0 (positive correlation)

H_1: p ≠0 (negative correlation)

3.6.3 Regression analysis

Regression analysis is a statistical process for estimating the relationships among variables. Through the regression analysis, we can comprehend the changes in the dependent variable that result from the changes in the independent variables and vice versa. This analysis will be used to explain the findings that obtained from the test of the assumptions and model estimations that used in this study. We can interpret the regression on the basis of T-test, R-squared and F-test. Some of the variables will be converted into logarithms in some research that can reduce information variation. The regression outcome equation is shown as follows:

$BCO_t = \beta 0 + \beta 1\ GDP_t + \beta 2\ GE_t + \beta 3\ CPI_t + \beta 4\ RER_t + \beta 5\ NE_t + €$

Where,

B0 = Constant number of equations

B = Coefficient beta value

BCO = Brent Crude Oil

GDP = Gross Domestic Product (%)

GE = Government Expenditure (%)

CPI = Consumer Price Index (%)

RER = Real Exchange Rate

NE = Net Export

Ɛ = Error term

3.6.3.1 P-Value

P-value is also known as Probability value and usually use in concluding the probability value of both t-statistic and F-statistics of a regression. P-value will determine the confidence level which if the confidence level of the test is 95%, thus the level of significance or α-value will be 5% (α=0.05). The hypotheses are:

H0: p-value is more than alpha (p-value > α)

H1: p-value is less than alpha (p-value < α)

3.6.3.2 T-test

T-test uses to test hypotheses about coefficients of individual regression slope to assess their important connection between each independent variable and dependent variable. By looking at t-statistics, it is useful to find out whether the population means are different. By using this t-test analysis, the alternative hypotheses are evaluated against the null hypotheses between dependent and independent variable.

3.6.3.3 F-Test

F-test is used to assess the model's estimated regression general meaning or general fitness. This test offers an indication as to whether any of the independent variables are helpful to explain the dependent variable variance. F-test is basically comparable to t-test, but the distinction is that the variance is measured. This research expects to dismiss the F-test's null hypothesis.

3.6.4 Goodness to Fit

3.6.4.1 R-Squared

R-squared is used to measure the quantity changes that can be explained by the independent variable in the dependent variable and also to assess how close the data fixed with regression. R-squared equals 1 usually means that the regression fits perfectly with the information. In other words, it indicates a powerful correlation between dependent and independent variables if R-squared shows the value of 1. If R-squared is equal to 0, this indicates the independent variables are not explained by the variation changes in the independent variable.

3.6.4.2 Adjusted R-Squared

Adjusted R-Squared can be defined as a mean in the regression model from the percentage of dependent variable. Comparing the regression lead with the same dependent variable and different amount of independent variables is used.

3.6.4.3 Correlation coefficient of r

R's correlation coefficient is used to measure the relationship strength between a dependent variable and an independent variable. It is portrayed by the letter "r" in the lower case. Perfect positive correlation indicates a ideal adverse correlation for + 1, while-1 implies perfect adverse correlation and 0 suggests that two variables are completely uncorrelated.

3.6.5 Test on Assumption

3.6.5.1 Normality Test

Normality test use to determine whether error term is normally distributed. To conclude, we concentrated on the p-value in this experiment. If the p-value exceeds the significance level of 5%, this shows that the null hypothesis is failed to rejected by this research and we can conclude that the error term is normally distributed.The hypothesis for this normality test is as follows:

H_O: The residuals are normally distributed.

H_A: The residuals are not normally distributed.

This study expecting to reject the null hypothesis as by rejecting H_0, it is assume that the regression is strong.

3.6.5.2 Autocorrelation Test

Autocorrelation test or also known as serial correlation use to be described as a condition in which the residuals are interrelated and can be affirmed by F-statistics probability. If the p-value of F-statistics is significantly higher than 5%, this implies that we failed to reject the null hypothesis (H_0), which implies that the residual is not correlated, or the error is serially independent.

H_O: The residuals are normally distributed.

H_A: The residuals are not normally distributed.

CHAPTER 4: FINDINGS AND ANALYSIS

4.1 Introduction

This chapter performed and analysed the empirical outcome of all the regression and tests listed in chapter 3. The aim is to achieve the stated objective of finding out the relationship between the dependent variable and independent variables. To interpret the analysis and results, we use Eviews8 as statistical tools. At the end of this chapter, a summary of the findings and results obtained will be presented.

4.2 Descriptive Analysis

Table 4.1: Table of Descriptive Analysis

	ROP	GDP	GE	CPI	RER	NE
Mean	45.81383	6.114667	12.42583	84.76143	3.299333	13.33263
Median	28.56200	6.075000	12.58050	83.48900	3.300000	13.78043
Maximum	111.9660	10.00000	14.23400	119.6050	4.300000	22.25819
Minimum	12.71700	-7.360000	9.769000	53.81100	2.510000	6.172354
Std. Dev.	33.05918	3.700453	1.168709	19.22984	0.558112	4.598917
Skewness	0.856565	-1.864383	-0.486818	0.075825	-0.025196	0.171144
Kurtosis	2.338688	7.358887	2.448764	1.930742	1.627492	2.107458
Jarque-Bera	4.215186	41.12949	1.564785	1.457887	2.357896	1.142240
Probability	0.121530	0.000000	0.457310	0.482419	0.307602	0.564892
Sum	1374.415	183.4400	372.7750	2542.843	98.98000	399.9789
Sum Sq. Dev.	31694.38	397.1071	39.61057	10723.81	9.033187	613.3511
Observations	30	30	30	30	30	30

**Notes: The dependent variable is Real Oil Price (ROP) in Nominal US Dollar, while the independent variables are Gross Domestic Product (GDP) in percent, Government Expenditure in percent, Consumer Price Index (CPI) in index, Real Exchange Rate (RER) in USD/RM and Net Export in percent.

The first finding of this research is descriptive statistic which used to describe the basic features of the data in this study. Table 4.1 shows the central tendency and dispersion for real oil price, gross domestic product, government expenditure, real exchange rate, inflation rate and net export. Time series data from year 1988 to 2017 with total 30 observations.

As presented in table above, during the period 1988 to 2017, the mean value of real oil price is on average 45.81383. It means that the on average yearly oil price is around 45.81383. Median for the oil price is 28.56200 which mean the exact score at the middle of the probability is 28.56200. Throughout the 30 years, the maximum of the oil price is 111.9660 on the year 2012. There are some significant variables that affected the price of crude oil for the year 2012, according to the U.S. Energy Information Administration (21 August 2012). First, shifts in expectations of worldwide economic growth. Strong U.S. work information lowering interest rates for several European nations. This has led to enhanced economic growth expectations and greater prices of crude oil for 2012. The second factor is interruptions in the supply of oil.

Demand from other nations like Syria, Sudan, and Yemen that use about 1 million barrels of oil a day off the world market, which also led that year's oil price to rise. In the meantime, the minimum oil price for 1998 is 12,71700. Since November 1997, oil prices have dropped as a result of the Asian crisis from 1997 to 1998. This oil price fluctuation continues until 1999.

Next, the mean value for the gross domestic product is 6.114667. It means that the average gross domestic product is around 6.114667. Median for the gross domestic product is 6.0750 which mean the exact score at the middle of the probability is 6.0750. From the 30 observations from year 1988 to 2017, the maximum of gross domestic product is 10.00 which on the year 1996. Because of the high educational rates and low labor costs that make Malaysia a foreign direct investment magnet. Government is undertaking a number of major infrastructure projects, such as Petronas Towers and Cyberjaya high-tech town. Malaysia's economy enjoys an average annual GDP growth rate of over 8% during this moment. Meanwhile, the gross domestic product's minimum value is-7,3600 compared to 1998. The Malaysian economy is again hurting the Asian financial crisis. As the other currency collapses, the Malaysian Ringgit's value drops significantly. In order to stabilize GDP, Malaysia imposes tight controls on all economic industries.

For the government expenditure, the mean value is 12.42583 which means the average of the government expenditure is 12.42853. Median for the government expenditure is 12.5805. It means the exact score at the middle of the probability is 12.5805. Throughout the 30 years, the maximum value for the government expenditure is 14.234 on the year 1988. In the Malaysian economy, central planning has been a significant factor, as government spending has often been used to boost the economy. First Malayan Five Year Plan, implemented since 1955, has been used by the government. These plans were used by the government to intervene in the economy to attain objectives such as wealth redistribution and investment in infrastructure projects, for example. Meanwhile the minimum value of the government expenditure is 9.7690 on the year 1998. In May 1997, there has financial crisis when the Thai baht under severe pressure due to the speculative attack. The ringgit was also not spread due to this

financial crisis and came under severe selling pressure. This give impact to the government expenditure when the country income does not stabilize with government expenses.

For the inflation rate, the mean value is 84.76143 which means the average of the inflation rate is 84.76143. Median for the inflation rate is 83.84900 which means the exact score at the middle of probability is 83.84900. The maximum value for the inflation rate is 119.6050 on the year 2017. According to the The Star (Wednesday, 24th January 2018) Malaysia's inflation rate has increase by 3.5% in December 2017. This is due to higher fuel prices due to transport expenses. But analysts expect the effect to decrease and the rate of inflation to decrease for 2018. Transport, food and non-alcoholic beverages are the major group that contributes to increasing the inflation rate. Meanwhile the minimum value for the inflation rate is 53.811 on the year 1988. With a growth pace of 1.1%, financial output fell into the biggest crisis in 1985. Because of the narrow liquidity situation and mild demand rises under circumstances of enhanced use of plant and manpower ability, prices rose in 1985 with a slower pace of 1% per year up to 1987.

The mean of the yearly data from the year 1988 until 2017 for real exchange rate is 3.29933 which indicate the average of the real exchange rate is 3.29933. Median for real exchange rate is 3.3000 which means the exact score at the middle of probability is 3.3000. The maximum value for the real exchange rate is 4.3000 on the year 2017. In year 2017, Ringgit was strengthened by 10.1%, which means USD/RM exchange rate stable on that year. Added by Central Bank, since December 2016 net export proceeds forex conversion recorded amounted to a surplus compared to a deficit between January and November 2016. Meanwhile the minimum value for the real exchange rate is 2.5100 on the year 1995.

For the net export, the mean value is 13.33263 which indicate the average of the net export is 13.33263. Median for net export is 13.78043 which indicate the exact score at the middle of probability is 13.78043. Maximum value for the net export is 22.25819 for the year 2013. According to The Star (Wednesday, March 5, 2014), Petroliam

Nasional Bhd (Petronas) had one of its "best years ever" in 2013 when it published an 8.4% increase in net profit to RM54.11bil a year earlier from RM49.92bil, citing better output of oil and gas from South Sudan, Iraq, Malaysia and Canada.For the year 2013, Malaysia Refined Petroleum Product export is 500 thousand barrels of oil per day which is higher compare to the others year. Meanwhile minimum value for the net export is 6.172354 on the year 1998. As we known, there has financial crisis in year 1997/98, when Thai baht on attack then starting to attack many Sounth-East Asian countries. Due to this financial crisis, the currency will affect the demand of the crude oil that will result the low export of crude oil.

We used skewness and kurtosis to measure the forms in this research. The outcome of skewing from table 4.1 above is 0.856565 for the actual oil price as dependent variable and it shows that the actual oil price is positively skewed. Beside that, independent variables which are consumer price index and net export are 0.045825 and 0.171144 respectively. This value shows the distribution being strongly skewed and the frequency has a longer tail to the correct distribution. However, the value shows -1.864383, -0.486818 and -0.025196 respectively for the gross domestic product, government spending and real exchange rate. This value indicates the negative skewed distribution. This value indicates the negative skewed distribution. The frequency of the gross domestic product, government spending and the actual exchange rate have a longer tail to the left of the distribution.

The outcome of true oil price kurtosis is 2.338688 showing as platykutric as the value is reduced than 3 and the curve is more flat topped. In addition, 7.358887 shows the leptocutric meaning higher peak and the value is more than 3 for the independent variables being the gross domestic product. Meanwhile, for government expenditure, consumer price index, actual exchange rate and net export are 2.448464, 1.930742, 1.627492 and 2.107485 respectively and indicates as playkutric because the value is lower than 3 and the curves are more flat-toped.

The gross domestic product information capable of rejecting null hypothesis from the table above since Jarqua Bera's p-value (probability) is 0.000000. Meanwhile,

the null theory was not rejected for government expenditure, consumer price index, real exchange rate and net export, as Jarqua Bera's p-value is more than the important 5%. It can therefore be concluded that, except for gross domestic product, the independent variable is normally distributed.

4.3 Correlation Test

Table 4.2: Result of Correlation Test

Correlation t-Statistic Probability	ROP	GDP	GE	CPI	RER	NE
ROP	1.000000					

GDP	-0.193146	1.000000				
	-1.041646	-----				
	0.3065	-----				
GE	0.218727	0.313263	1.000000			
	1.186117	1.745491	-----			
	0.2455	0.0919	-----			
CPI	0.757780	-0.409519	-0.032194	1.000000		
	6.145186	-2.375277	-0.170443	-----		
	0.0000	0.0246	0.8659	-----		
RER	0.173113	-0.595536	-0.358503	0.646912	1.000000	
	0.930069	-3.922780	-2.032093	4.488974	-----	
	0.3603	0.0005	0.0517	0.0001	-----	
NE	0.763336	0.056072	0.629183	0.434486	-0.073680	1.000000
	6.252607	0.297174	4.283423	2.552610	-0.390939	-----
	0.0000	0.7685	0.0002	0.0164	0.6988	-----

**Notes: The dependent variable is Real Oil Price (ROP) in Nominal US Dollar, while the independent variables are Gross Domestic Product (GDP) in percent, Government Expenditure in percent, Consumer Price Index (CPI) in index, Real Exchange Rate (RER) in USD/RM and Net Export in percent.

To measure the strength of the linear connection between two variables, we used correlation test. The relationship can be either in perfect positive (+), perfect submission (0) or in perfect negative (-), since the correlation can bring any value from -1 to + 1.

Based on the table 4.2, the p-value of gross domestic product and real oil price is 0.3065, government expenditure and real oil price is 0.2455, consumer price index and real oil price is 0.0000, real exchange rate and real oil price is 0.3063 and net export and real oil price is 0.0000. Consumer price index and net export able to reject the null hypothesis with 5% of significance level. Meanwhile, gross domestic product, government expenditure and real exchange rate failed to reject null hypothesis with 5% of significant level. This means this pair has negative correlation, while the other two pairs have positive correlation between the variables

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4.4 Regression Analysis

Table 4.3: Ordinary Least Square (OLS) Regression

Sample (adjusted): 1989 2017
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.572365	6.425458	-0.400340	0.6926
GDP	-0.488509	0.679967	-0.718430	0.4797
D(GE)	-3.851354	2.825038	-1.363293	0.1860
D(CPI)	3.631851	1.629838	2.228351	0.0359
D(RER)	-26.91485	10.15571	-2.650217	0.0143
D(NE)	3.664624	0.808534	4.532431	0.0001

R-squared	0.774557	Mean dependent var		1.359379
Adjusted R-squared	0.725548	S.D. dependent var		15.12422
S.E. of regression	7.923304	Akaike info criterion		7.159485
Sum squared resid	1443.911	Schwarz criterion		7.442374
Log likelihood	-97.81253	Hannan-Quinn criter.		7.248082
F-statistic	15.80427	Durbin-Watson stat		1.355458
Prob(F-statistic)	0.000001			

**Notes: The dependent variable is Real Oil Price (ROP) in Nominal US Dollar, while the independent variables are Gross Domestic Product (GDP) in percent, Government Expenditure in percent, Consumer Price Index (CPI) in index, Real Exchange Rate (RER) in USD/RM and Net Export in percent.*

$$Y = -2.572365 - 0.488509_{GDP} - 3.851354_{GE} - 26.91485_{RER} + 3.631851_{CPI} + 3.664624_{NE}$$

From the above the ordinary least squares (OLS) regression, we concludes it into the term of p-value in related to it t-test and f-test. Government expenditure, real exchange rate, consumer price index and net export has positive and significant relationship with real oil price. Meanwhile, gross domestic product has negative and insignificant relationship with real oil price.

4.4.1 T-test (Hypothesis analysis)

The hypothesis for gross domestic product is:

H_0: There is no significant relationship between GDP and real oil price.

H_A: There is a significant relationship between GDP and real oil price.

Gross domestic product has no significant relationship with real oil price. From

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the p-value that is been stated in the table above show 0.4797, it can be conclude that we failed to reject the null hypothesis at 5% significant level because the p-value is more than 5%. Therefore, 1% increase in gross domestic product, the real oil price will decrease by 0.488509%.

The hypothesis for government expenditure is:

H_0: There is no significant relationship between government expenditure and real oil price.

H_A: There is a significant relationship between government expenditure and real oil price.

Government expenditure have significant relationship with real oil price. From the p-value that is been stated in the table above show 0.1860, it can be conclude that we failed to reject the null hypothesis at 5% significant level because the p-value less than 5%. Therefore, 1% increase in government expenditure, the real oil price will decrease by 3.851354%.

The hypothesis for real exchange rate is:

H_0: There is no significant relationship between real exchange rate and real oil price.

H_A: There is a significant relationship between real exchange rate and real oil price.

Real exchange rate have significant relationship with real oil price. From the p-value that is been stated in the table above shows 0.0143, it can be conclude that we able to reject the null hypothesis at 5% significant level because the p-value less than 5%. Therefore, 1% increase in real exchange rate, the real oil price will decrease by 26.91485%.

The hypothesis for consumer price index is:

H_0: There is no significant relationship between consumer price index and real oil price.

H_A: There is a significant relationship between consumer price index and real oil price.

Consumer price index are representing the inflation rate. Consumer price index have significant relationship with real oil price. From the p-value that is been stated in the table above shows 0.0359, which it can be conclude that we able to reject the null hypothesis at 5% significant level because the p-value is less than 5%. Therefore, 1% increase in consumer price index, the real oil price will increase by 3.631851%.

The hypothesis for net export is:

H_0: There is no significant relationship between net export and real oil price.

H_A: There is a significant relationship between net export and real oil price.

Net export have significant relationship with real oil price. From the p-value that is been stated in the table above shows 0.0001, which it can be conclude that we able to reject the null hypothesis at 5% significant level because the p-value is less than 5%. Therefore, 1% increase in net export, the real oil price will increase by 3.664624%.

4.4.2 F-test

This observation is used to the relationship between dependent variable which is real oil price and independent variable which is gross domestic product, government expenditure, consumer price index, real exchange rate and net export be shown thru the hypothesis below:

$$H_0: \beta GDP = \beta GE = \beta CPI = \beta RER = \beta NE = 0$$
$$H_A: \beta GDP \neq \beta GE \neq \beta CPI \neq \beta RT \neq \beta RER \neq \beta NE \neq 0$$

The F-statistics value is 15.80427. The f-test p-value is 0.000001. This outcome

indicates that the f-statistic p-value is a significant level of less than 5%. Thus, indicates that the null hypothesis can be rejected at a significant level of 5% and the outcome that the dependent variable has at least four independence variable effects.

4.4.3 Coefficient of determination (R-Squared)

The value of R-squared is 0.774557, this indicated that 77.46% of real oil price can be explained by the independent variables which are gross domestic product, government expenditure, real exchange rate, consumer price index and net export. Meanwhile another 22.54% are explained by other variable not included in this research.

4.4.4 Adjusted R-squared

Adjusted R-squared is 0.725548, this indicated that 72.55% of real oil price can be explained by the independent variable which are gross domestic product, government expenditure, consumer price index, real exchange rate and net export. The balance of 27.45% variation is determined by other factors.

4.5 Test on Assumption

4.5.1 Normality Test

Series: Residuals	
Sample 1989 2017	
Observations 29	
Mean	5.51e-16
Median	0.132818
Maximum	16.34132
Minimum	-13.98619
Std. Dev.	7.181104
Skewness	-0.068596
Kurtosis	2.843930
Jarque-Bera	0.052175
Probability	0.974250
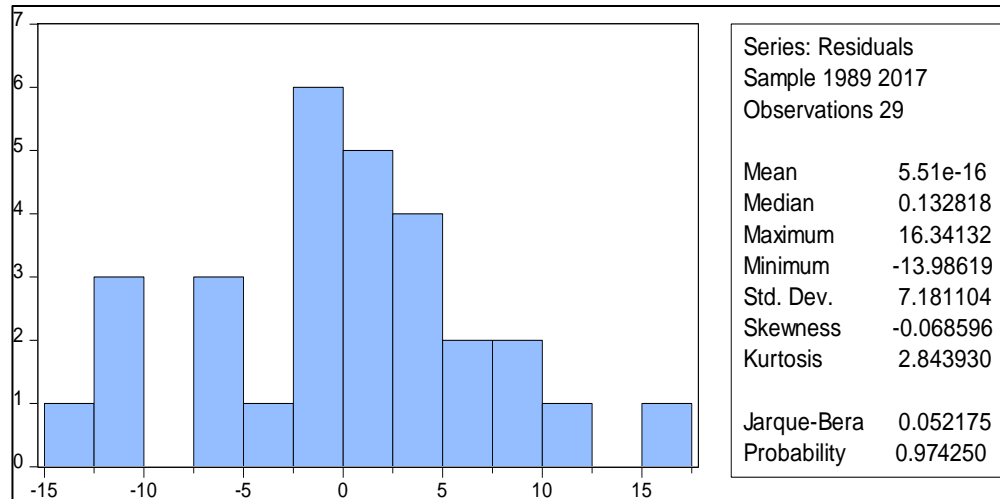
Diagram 4.1: Normality Test

H_O: The residuals are normally distributed.

H_A: The residuals are not normally distributed.

Jarqua-Bera is used for normality testing to determine whether or not the error term is normally distributed. The outcome of the p-value of the Jarqua-Bera test is 0.974250 with a meaning level of 5%, so we fail to reject the null hypothesis. As this study expects the null hypothesis to be rejected and the outcome becomes as anticipated, it can be concluded that the regression is strong.

4.5.2 Heteroskedasticity Test

Heteroskedasticity Test: White			
Null hypothesis: Homoskedasticity			
F-statistic	1.228113	Prob. F(20,8)	0.4013
Obs*R-squared	21.87519	Prob. Chi-Square(20)	0.3473
Scaled explained SS	12.68603	Prob. Chi-Square(20)	0.8904

Table 4.4: Heteroskedasticity Test

H_O: There is no heteroskedasticity

H_A: There is a heteroskedasticity

For this research purpose, the value that needs to be considered in this White test will be the Prob. Chi-square of the Obs*R-Squared. The p-value for White test is 0.3473. By setting up the level of significance into 5%, it value show higher than level of significance 0.05. From the result, that concludes we fail to reject the null hypothesis the null hypothesis is fail to reject because of the error term shown constant. Moreover, the result above shows this study is homoscedasticity.

4.5.3 Multicollinearity

```
Variance Inflation Factors
Date: 05/10/19   Time: 11:47
Sample: 1988 2017
Included observations: 29
```

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	41.28651	19.07188	NA
GDP	0.462354	10.45789	2.813138
D(GE)	7.980837	2.011899	1.993024
D(CPI)	2.656371	7.565952	1.249827
D(NE)	0.653727	1.504505	1.504272
D(RER)	103.1385	3.480297	3.320404

Table 4.5: Result of Multicollinearity

H_O: There is no multicollinearity

H_A: There is a multicollinearity

We also use variance inflation factors (VIF) in this research to assess whether or not the variables are multicollinear. If the value of VIF is lower than the level of significant 5, there is no multicollinearity. It indicates, on the basis of the above table, that the value of VIF for gross national product, government expenditure, consumer price index, net export and real exchange rate exceeds the important amount of 5%. So we concludes that in this study, all independent variables have multicollinearity.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1 Introduction

This part will explain the general perspective of the completed research based on the outcomes of all Chapter 4 tests. This part will then also focus on concluding the analysis based on the information summary obtained from the research study and at the same time produce some recommendations on the outcomes. The recommendation will represent as a guideline for researchers to enhance the outcome and provide more accurate results.

5.2 Conclusion

Table 5.1: Finding of Results

VARIABLE	COEFFICIENT	PROBABILITY	RESULT
Gross Domestic Product	-0.488509	0.4797	Insignificant
Government Expenditure	-3.851354	0.1860	Insignificant
Consumer Price Index	3.631851	0.0359	Significant
Real Exchange Rate	-26.91485	0.0143	Significant
Net Export	3.664624	0.0001	Significant

Empirical findings from this study gave useful ideas for answering this research paper's issue statement and hypothesis statement. By using the significance level of 5%, it can be deduced that the gross domestic product and government expenditure has an insignificant connection with the actual oil price. Meanwhile, there is a substantial connection between the variables and the actual oil price for the other 3 variable, which are consumer price index, actual exchange rate and net export.

First debate is about the result of the gross national product's adverse connection with the actual oil price. The result was that the null hypothesis was not rejected, which implies there is no important connection between the dependent and independent variable. The resulting adverse coefficient shows the adverse relationship between gross national product and actual exchange rate. This result contra from the previous researcher (Oladosu et al., 2018) and (Fah & Shi, 2017) where both obtain positive relationship between gross domestic product and real oil price.

Second, government expenditure has a adverse connection to the real price of oil. We fail to reject the null hypothesis with a significance level of 5%. Government expenditure coefficient shows adverse coefficient resulting in this research ultimately acquiring a adverse connection between dependent and independent variable. This result contra from the previous relationship which is Fah and Shi (2017), Sadeghi (2017) and Adedokun (2018).

Third, the p-value of the consumer price index shows a significant level of confidence

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of less than 5%, indicating a favorable connection with the dependent variable, which is the real price of oil. The consumer price index coefficient shows a favorable coefficient, which ultimately results in a favorable relationship between dependent and independent variable. Our result supported by the previous researcher Akhmad et al. (2019), Bass (2019) and Fah and Shi (2017) which also get positive relationship between consumer price index and real oil price.

Forth, the real exchange rate has a positive relationship with real oil price. We able to reject the null hypothesis by using 5% significant level confidence. Real exchange rate coefficient shows adverse coefficient, which implies the connection between dependent variable and independent variable is negative. our result supported by the previous researcher Meo et al. (2018) and Gbatu et al. (2017).

Finally, the outcome shows a favorable connection with the actual oil price for net export. We can reject the null hypothesis with a significance level of 5%. The net export coefficient shows a favorable coefficient which ultimately implies that the dependent and independent variable has a favorable connection. This supported by the previous researcher which is Nusair (2019) that also obtained the same result.

5.3 Recommendation

5.3.1 Additional Independent Variable

Gross domestic product, government expenditure, real exchange rate, inflation rate and net export are independent of this research. Since there are only five (5) independent variables chosen, the study may have little distinction or only a small proportion of dependent variable described. Thus, the dependent variable could be described more obviously by adding other independent variables and at the same moment widening the reader and our knowledge.

5.3.2 Extend more time period

For 30 years, this study has only covered variable. For future studies, conducting a comparable study is better, but more time needs to be extended. This is because the future outcome will be measured if distinct length will have a major effect on the outcome.

5.3.3 Research Sample of Other Countries

For other nations, the future research may do this similar research to determine the connection between dependent and independent variables on those nations. Various nations have distinct implications on oil price fluctuations. Future study can also be carried out in a single study by comparing two (2) nations. By making a comparison, the outcome may be more useful and useful in choosing investment action for potential investors.

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APPENDICES

APPENDIX 1

Table of Real Oil Price and Macroeconomic Factor

Year	Rop	GDP	Ge	Rer	Cpi	Ne
1988	14.971	9.94	14.234	2.62	53.811	15.79473
1989	18.217	9.06	14.062	2.71	55.325	16.24966
1990	23.683	9.01	13.794	2.7	56.773	18.30192
1991	20.067	9.55	13.694	2.75	59.247	15.47082
1992	19.313	8.89	13.01	2.55	62.072	12.90547
1993	17.021	9.89	12.631	2.57	64.267	10.29405
1994	15.83	9.21	12.265	2.62	66.661	7.371131
1995	17.066	9.83	12.373	2.51	68.961	6.996171
1996	20.65	10	11.105	2.52	71.367	8.06758
1997	19.09	7.32	10.767	2.82	73.267	8.141853
1998	12.717	-7.36	9.769	3.92	77.128	6.172354
1999	17.808	6.14	10.987	3.8	79.245	6.806334
2000	28.273	8.86	10.165	3.8	80.461	9.623071
2001	24.422	0.52	12.039	3.8	81.601	9.725341
2002	24.969	5.39	12.958	3.8	83.077	8.395752
2003	28.851	5.79	12.968	3.8	83.901	10.08648
2004	38.301	6.78	12.58	3.8	85.175	11.5766
2005	54.434	5.33	11.474	3.79	87.697	13.42123
2006	65.391	5.58	11.168	3.67	90.863	13.77756
2007	72.696	6.3	11.567	3.44	92.705	14.41232
2008	97.636	4.83	11.505	3.33	97.749	18.39658
2009	61.862	-1.51	13.048	3.52	98.319	14.81186
2010	79.636	7.42	12.581	3.22	100	15.85688
2011	110.94	5.29	13.271	3.06	103.174	17.75143
2012	111.966	5.47	13.842	3.09	104.891	20.43616
2013	108.856	4.69	13.715	3.15	107.099	22.25819
2014	98.938	6.01	13.329	3.27	110.465	22.01119
2015	52.37	5.09	13.139	3.91	112.79	16.09361
2016	44.048	4.22	12.576	4.14	115.147	13.78329
2017	54.393	5.9	12.159	4.3	119.605	14.98926

APPENDIX 2

Table of Descriptive Analysis

	ROP	GDP	GE	CPI	RER	NE
Mean	45.81383	6.114667	12.42583	84.76143	3.299333	13.33263
Median	28.56200	6.075000	12.58050	83.48900	3.300000	13.78043
Maximum	111.9660	10.00000	14.23400	119.6050	4.300000	22.25819
Minimum	12.71700	-7.360000	9.769000	53.81100	2.510000	6.172354
Std. Dev.	33.05918	3.700453	1.168709	19.22984	0.558112	4.598917
Skewness	0.856565	-1.864383	-0.486818	0.075825	-0.025196	0.171144
Kurtosis	2.338688	7.358887	2.448764	1.930742	1.627492	2.107458
Jarque-Bera	4.215186	41.12949	1.564785	1.457887	2.357896	1.142240
Probability	0.121530	0.000000	0.457310	0.482419	0.307602	0.564892
Sum	1374.415	183.4400	372.7750	2542.843	98.98000	399.9789
Sum Sq. Dev.	31694.38	397.1071	39.61057	10723.81	9.033187	613.3511
Observations	30	30	30	30	30	30

APPENDIX 3

Table of Correlation Analysis

Correlation t-Statistic Probability	ROP	GDP	GE	CPI	RER	NE
ROP	1.000000					

GDP	-0.193146	1.000000				
	-1.041646	---				
	0.3065	---				
GE	0.218727	0.313263	1.000000			
	1.186117	1.745491	---			
	0.2455	0.0919	---			
CPI	0.757780	-0.409519	-0.032194	1.000000		
	6.145186	-2.375277	-0.170443	-----		
	0.0000	0.0246	0.8659	-----		
RER	0.173113	-0.595536	-0.358503	0.646912	1.000000	
	0.930069	-3.922780	-2.032093	4.488974	---	
	0.3603	0.0005	0.0517	0.0001	---	
NE	0.763336	0.056072	0.629183	0.434486	-0.073680	1.000000
	6.252607	0.297174	4.283423	2.552610	-0.390939	-----
	0.0000	0.7685	0.0002	0.0164	0.6988	-----

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APPENDIX 4

Table of Regression Analysis

Sample (adjusted): 1989 2017
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.572365	6.425458	-0.400340	0.6926
GDP	-0.488509	0.679967	-0.718430	0.4797
D(GE)	-3.851354	2.825038	-1.363293	0.1860
D(CPI)	3.631851	1.629838	2.228351	0.0359
D(RER)	-26.91485	10.15571	-2.650217	0.0143
D(NE)	3.664624	0.808534	4.532431	0.0001

R-squared	0.774557	Mean dependent var	1.359379
Adjusted R-squared	0.725548	S.D. dependent var	15.12422
S.E. of regression	7.923304	Akaike info criterion	7.159485
Sum squared resid	1443.911	Schwarz criterion	7.442374
Log likelihood	-97.81253	Hannan-Quinn criter.	7.248082
F-statistic	15.80427	Durbin-Watson stat	1.355458
Prob(F-statistic)	0.000001		

APPENDIX 5

Table of Multicollinearity

Variance Inflation Factors
Date: 05/10/19   Time: 11:47
Sample: 1988 2017
Included observations: 29

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	41.28651	19.07188	NA
GDP	0.462354	10.45789	2.813138
D(GE)	7.980837	2.011899	1.993024
D(CPI)	2.656371	7.565952	1.249827
D(NE)	0.653727	1.504505	1.504272
D(RER)	103.1385	3.480297	3.320404

APPENDIX 6

Table of Heteroscedasticity Test

Heteroskedasticity Test: White			
Null hypothesis: Homoskedasticity			

F-statistic	1.228113	Prob. F(20,8)	0.4013
Obs*R-squared	21.87519	Prob. Chi-Square(20)	0.3473
Scaled explained SS	12.68603	Prob. Chi-Square(20)	0.8904

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/10/19   Time: 11:46
Sample: 1989 2017
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-534.8113	382.8492	-1.396924	0.2000
GDP^2	-8.714464	5.517872	-1.579316	0.1529
GDP*D(GE)	-59.21292	27.12854	-2.182680	0.0606
GDP*D(CPI)	-2.869358	16.37629	-0.175214	0.8653
GDP*D(NE)	-8.680823	5.917606	-1.466948	0.1806
GDP*D(RER)	-240.6784	125.9766	-1.910501	0.0925
GDP	108.0525	87.34457	1.237083	0.2511
D(GE)^2	-86.86432	55.03209	-1.578430	0.1531
D(GE)*D(CPI)	106.5300	72.24392	1.474588	0.1786
D(GE)*D(NE)	-34.59618	24.49891	-1.412152	0.1956
D(GE)*D(RER)	57.03285	407.5649	0.139936	0.8922
D(GE)	211.4259	256.4646	0.824386	0.4336
D(CPI)^2	-37.17052	20.62025	-1.802622	0.1091
D(CPI)*D(NE)	4.618019	15.28479	0.302132	0.7703
D(CPI)*D(RER)	-35.68821	197.7440	-0.180477	0.8613
D(CPI)	259.2550	166.0450	1.561354	0.1571
D(NE)^2	-6.176835	6.671090	-0.925911	0.3816
D(NE)*D(RER)	-99.80778	93.74879	-1.064630	0.3181
D(NE)	49.61243	55.22071	0.898439	0.3952
D(RER)^2	-953.9302	646.1992	-1.476217	0.1781
D(RER)	1911.372	1139.481	1.677406	0.1320

R-squared	0.754317	Mean dependent var	49.79003
Adjusted R-squared	0.140109	S.D. dependent var	68.80732
S.E. of regression	63.80524	Akaike info criterion	11.30997
Sum squared resid	32568.87	Schwarz criterion	12.30008
Log likelihood	-142.9946	Hannan-Quinn criter.	11.62006
F-statistic	1.228113	Durbin-Watson stat	2.420934
Prob(F-statistic)	0.401266		