UNIVERSITI TEKNOLOGI MARA

THE RELATIONSHIP OF MALAYSIAN ECONOMICS VARIABLES AND CRUDE PALM OIL PRICE

ATIQAH BINTI ABUZA
2020986039

Final Year Project Paper submitted in fulfilment of the requirements for the degree of
Bachelor of Business Administration (Hons)
Investment Management

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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.

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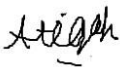
Name of student	:	Atiqah binti Abuza
Student I.D No	:	2020986039
Programme	:	Bachelor of Business and Administration (Hons) in Investment Management
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Signature of Student	:	_Atiqah_
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ABSTRACT

Crude palm oil (CPO) is a significant contributor to Malaysia's economy. Malaysia is currently the world's second largest producer and exporter of palm oil, trailing only Indonesia. However, there is uncertainty around the price of CPO, and the pattern indicates significant volatility over the last decade. The purpose of this study is to analyse the link and relationship of four economics variables on the Malaysian CPO price, specifically the exchange rate (EXC), inflation (INF), money supply (M3), and gross domestic product (GDP). The emphasis is on macroeconomic factors affecting CPO prices in Malaysia between 2010 and 2020. Secondary data from the World Bank is incorporated into the study. The data are analyzed using descriptive statistics, correlation, and normality test. The researcher may conclude from this research that there is a relationship between macroeconomic conditions and CPO prices in Malaysia.

Keywords: Crude palm oil price (CPO), Inflation (INF), Money supply (M3), Gross domestic product (GDP), Economics variable, Malaysia.

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LIST OF SYMBOLS

SYMBOLS	DEFINITIONS
CPO	CRUDE PALM OIL
GDPP	GROSS DOMESTIC PRODUCT PER CAPITA
EXC	EXCHANGE RATE
INF	INFLATION
M3	MONEY SUPPLY

LIST OF ABBREVIATION

ABBREVATIONS

MPOB	The Malaysian Palm Oil Board
BNM	The Central Bank of Malaysia
GNI	Gross National Income
MTEN	The National Economic Action Council
KPDNHEP	The agencies under the Ministry of Domestic Trade and Consumer Affairs

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

Oil palms are extremely productive and have made a substantial contribution to Malaysia's economy. By increasing community incomes, the growth of oil palm plantations benefited rural communities and raised issues of welfare, human rights, equity, and demographic change Mohd Hanafiah (2021). Among the projected benefits for the oil palm business are biodiversity and environmental management, sustainability certification, improved social corporate responsibility, and a review of employment policies.

In 2017, Malaysia ranked second in the world in terms of oil palm exports, with a total value of USD 9.7 billion. Malaysia ranked second in palm oil output in the same year, with 21 million metric tons produced. In 2016, the agriculture industry contributed RM89.5 million to the Malaysian GDPP, accounting for 8.1 percent of the total. The oil palm sector alone accounted for 43.1 percent of the GDPP by Department of Statistics, (2017).

The palm oil business is viewed as a crucial industry that contributes significantly to Malaysia's Gross National Income (GNI). The Malaysian Palm Oil Council (MPOC) was founded in 1990 to promote its goods and market expansion by improving the image of palm oil and promoting its acceptability through new technology, economic benefits, and environmental sustainability.

The Malaysian palm oil sector, according to Khalid et al, (2018), not only contributes to economic development but also improves the country's socioeconomic status. The contributions of Malaysia's palm oil sector, which is the fourth largest contributor to the country's GNI, demonstrate this. Because price is one of the factors that influences income, specifically GNI, it is critical to understand what causes pricing. In the palm oil sector, this is referred to as the CPO price.

As a result, the goal of this research is to find out how macroeconomic factors influence the CPO price in Malaysia. This paper examines the issue from the standpoint of macroeconomic variables in the hopes of better understanding the causes of CPO price and ultimately assisting the government in increasing GNI.

1.2 BACKGROUND OF THE STUDY

According Ministry of Economic Affairs Malaysia (2019), Malaysia and Indonesia, as the world's top two producers, account for 85 percent of global palm oil exports and around 5% of global Gross Domestic Product Per Capita (GDPP). Malaysia consumed 3.7 million metric tonnes of palm oil in 2019, amounting to RM38 billion in GDP, or 2.8 percent of the country's overall GDP. As a result, the importance of analysing the effects on Crude Palm Oil (CPO) prices is critical to our economy's growth.

Crude Palm Oil is one of the most commonly traded commodities in the world, according to studies. Palm oil is the second most consumed edible oil on the market, accounting for around 23% of worldwide fats and oils output. Recent research has been conducted on the effect of CPO prices on currency exchange rates. Currency exchange rates may be affected differently in oil-exporting and oil-importing countries

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An increase in the money supply suggests an increase in the demand for money circulation, and hence shows a productive economy. The purpose of this study is to establish a link between the money supply and the CPO price. Malaysia's money supply is classified as M1, M2, and M3. M1 refers to the private sector's money in circulation and demand deposits. M2, on the other hand, is a hybrid of M1 and quasi money, which includes short-term time deposits and other money market instruments. Meanwhile, M3 encompasses M2 as well as long-term deposits. We employ M3, or broad money, in this study to evaluate the relationship between the money supply and the CPO price in Malaysia.

In recent years, our economy has faced several challenges, including recession and rising inflation, which have harmed Asia's macroeconomic prospects. Inflation,

which analyses broad price changes in the economy, is typically linked to purchasing power in countries where oil is a major component of industry, such as transportation. Therefore an increase in oil prices may lead to an increase in product costs. So is the impact on the production cost if there is an uprising in the CPO price.

Producers of palm oil must manage their resources efficiently in order to produce enough for export or internal use, and the Malaysian government must consider all macroeconomic aspects affecting the palm oil business. We need to understand the relationship and influence of variables on the CPO, whether they are positive or negative, or have no effect on the palm oil business at all. As a result, this research requires a well-defined framework in order to reach an effective keyword on the issue.

1.3 PROBLEM STATEMENT

In this new era, Malaysia's palm oil production and exports are predicted to be lower in 2021 than they were in 2020. MPOB director-general Ahmad Parveez Ghulam Kadir said on Sept. 7 at the World Palm Virtual Expo and Conference 2021 that crude palm oil production is expected to be approximately 18 million metric ton this year, down from 2020. This is largely due to national boarder restrictions prompted by the pandemic, which have restricted the entry of foreign workers who work on oil palm fields. Malaysia is primarily reliant on Bangladeshi, Indian, and Indonesian workers (S&P Global, 2021).

This condition will have a negative impact on Malaysian economic, because palm oil is one of Malaysia's primary industries, and its main agricultural export globally. Palm oil is one of Malaysia's main industries, accounting for the majority of the country's agricultural industry. Changing weather patterns, greater awareness of the environmental impact of palm oil monoculture, and overreliance on foreign labor in the plantations have all posed problems to the Malaysian palm oil sector in recent years. The COVID-19 pandemic, which impacted the stockpile and pricing of this commodity this year, exacerbated these concern (Statista, 2021). This research to examine whether gross domestic product per capita (GDPP), inflation rate, exchange rate and money supply in Malaysia have a relationship with crude palm oil price.

Time-series data from 2010 to 2020. Previously, the industry was primarily focused on upstream activities such as cultivating palm trees for the production of fruit bunches in plantations, processing FFB in mills for CPO and palm kernel oil, producing refined palm oil (RPO) from CPO, and fractionating palm oil (both crude and refined) to obtain liquid olein and solid stearin fractions as well as oleo chemical products. When the Malaysian government established the Economic Transformation Program (ETP) in September 2010, this customary strategy was revised. The ETP is a multi-pronged endeavour that lays out a 10-year economic path for Malaysia to become a high-income country by 2020 Parveez (2021).

1.4 RESEARCH QUESTIONS

This study was conducted to examine the role of economic variables in the determination of crude palm oil price. Therefore gross domestic product per capita, inflation rates, exchange rates, and money supply has been chosen as the explanatory variables to explain the fluctuation of crude palm oil price. Thus, the research question for this study is the explanatory variables to explain the fluctuation of crude palm oil price. Thus, research questions for this study is

i) What is the relationship between economic variables and crude palm oil price in Malaysia?

Besides, there are four specific questions that have been built for the purpose of this study. The question are

Specific research question:

i) What is the relationship between Gross domestic products per capita (GDPP) and crude palm oil price in Malaysia?

ii) What is the relationship between Inflation rates (INF) and crude palm oil price in Malaysia?

iii) What is the relationship between Exchange rates (EXC) and crude palm oil price in Malaysia?

iv) What is the relationship between Money supply (M3) and crude palm oil price in Malaysia?

1.5 RESEARCH OBJECTIVES

The main objective of this study is to identify the significant of economic variables on crude palm oil price. Thus, this research tries to determine the relationship between economic variable and crude palm oil price in Malaysia. Whereas the specific objectives of this research study are to

i) To determine the relationship of Gross domestic product per capita (GDPP) towards crude palm oil price.

ii) To determine the relationship of Inflation rates (INF) towards crude palm oil price.

iii) To determine the relationship of Exchange rates (EXC) towards crude palm oil price.

iv) To determine the relationship of Money supply (M3) towards crude palm oil price

1.6 SIGNIFICANCE OF THE STUDY

There are a variety of economic factors that might influence variations in the price of crude palm oil in Malaysia, including supply and demand. It may be influenced by influences within or outside the organisation. However, determining the most important aspect that influences changes in the price of crude palm oil continues to be the most difficult task. The goal of this research is to identify the most important elements that influence the price of crude palm oil (CPO) in Malaysia.

1.7 SCOPE OF THE STUDY

The purpose of this research is to investigate the relationship between economic variables and the price of crude palm oil in Malaysia. The research makes use of secondary data gathered from sources such as the World Bank and DataStream. The study focuses on the macroeconomic factors that have an impact on the price of CPO in Malaysia between 2010 and 2020.

1.8 LIMITATIONS OF THE STUDY

1.8.1 Data reliability

The data for this study came from secondary sources. As a result, its dependability and correctness are solely dependent on the published information. Additionally, the data set for this investigation was confined to a period of 10 years. This is because certain types of knowledge are not accessible for extended periods of time.

1.9 DEFINITION OF KEY TERMS

1.9.1 Crude Palm Oil Price (CPO)

Palm oil is primarily utilised in cooking in South East Asia due to its abundance. Apart from cooking and food production, Palm Oil and its derivatives, referred to as fractions of oil, are used to manufacture pre-packaged foods and personal care products such as cosmetics, cleaning agents, and hair care products, as well as soaps and other personal care items. Palm wax is used to make candles since it is derived from palm plants. It is used as a by-product to produce biofuel for automobiles, as well as for shipping and aircraft fuel.

Additionally, glycerine is created as a by-product of this procedure. Indonesia and Malaysia are the world's two largest palm oil producers and exporters. Indonesia and Malaysia generate the lion's share of crude palm oil in the globe, accounting for 85 percent of total production. Palm oil prices are influenced by severe weather conditions that adversely affect palm production.

1.9.2 Exchange Rate (EXC)

The exchange rate is the price of one currency in terms of another currency. Its position might be either fixed or floating. Fixed currency rates are set by individual countries' central banks, whereas floating exchange rates are decided by market demand and supply mechanisms.

According to Vogler et al.(2019), the exchange rate between two countries defines the price of one country's currency in relation to another. They can be expressed

as an average rate throughout a certain period of time or as the rate at the end of the specified period of time.

1.9.3 Inflation (INF)

Inflation is the rate of increase in prices over a specified time period. Typically, inflation is characterised in general terms, such as the total increase in prices or the cost of living in a country.

Additionally, inflation is viewed as a critical factor in determining possible economic conditions; it is also a primary objective of every nation, according to Musarat et al. (2021). According to Ecb, (2010), the shift in inflation rates complicates the computation and tracking of monetary policy assessments in real time, and any ambiguity that occurs is a sign of policy decisions' absurdity

1.9.4 Money Supply (M3)

The money supply is the total amount of currency and other liquid assets in an economy on the date of measurement. The money supply consists largely of cash and deposits that can be utilised in the same way as cash.

1.9.5 Gross Domestic Product per Capita (GDPP)

Gross domestic product Per Capita (GDPP) is the sum of the monetary or market values of all finished products and services produced within the borders of a country during a specified time period. It serves as a comprehensive barometer of a country's economic health because it is a wide measure of total domestic production.

1.10 SUMMARY

The first chapter discusses the effect of selected variables on the Malaysian Crude Palm Oil price, including the Exchange Rate (EXC), Inflation (INF), Money Supply (M3), and Gross Domestic Product Per Capita (GDPP). The research works presented here summarise the research context and the significance of the relationship between economic variables and crude palm oil price in Malaysia. It then discusses the problem statement, research questions, and research objectives. The study's scope and limitations are discussed. The significance of this study is explained in this chapter. The goal of this research is to determine the most influential factors affecting the price of Crude Palm Oil (CPO) in Malaysia modified by the variables chosen.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Discussion and studies on the relationship of economic variable and crude palm oil price in Malaysia. Different study indicate that different factor contribute to the changes in price of Crude Palm Oil (CPO).

As CPO is a globally competitive vegetable oil in terms of demand and supply, its price is decided by its versatility in use. MPOB has several strategies in place to ensure the palm oil industry's long-term viability, including expanding and increasing the use of palm oil products, seeking new uses for these palm oil products, improving production efficiency and product quality, optimising land use in oil palm plantation areas, and promoting the use, ability, and market for palm oil products.

Malaysia produced 20 million tonnes of CPO in 2017, with exports reaching RM78 billion, up from RM67 billion in 2016. For the seventh time since 2014, India is Malaysia's top palm oil export destination, with total exports of 2.51 million tonnes in 2018, accounting for 15.2 percent of overall palm oil exports. This is followed by 11.6 percent for the European Union, 11.3 percent for China, and 7% for Pakistan. India's palm oil imports from Malaysia increased to 52 percent in the first half of 2019 from 30 percent in 2018, according to MPOB, after New Delhi slashed its import duty to 45 percent. By the end of 2019, the demand for palm oils in Malaysia is predicted to continue to rise.

As a result, the consumer in the palm oil sector and the literature benefit from this study in the following ways. To begin with, recognising the factors that influence palm oil price volatility helps stakeholders, particularly smallholders, devise different methods for generating income rather than depending on a single crop. Second only to the Malaysian palm oil authority, Malaysia Palm Oil Berhad (MPOB) will be more attentive to and aware of the internal and external elements that influence palm oil price movement when developing plans to improve Malaysia's palm oil competitiveness and stimulate economic growth.

2.2 LITERATURE REVIEW ON CRUDE PALM OIL (CPO)

According to a study conducted by Zabid & Abidin, (2015) on the world's oil and fats market, palm oil is one of the most important agricultural commodities, with Malaysia and Indonesia rising to the top of the list of nations that are major producers of the commodity. Yet, the price of palm oil continues to fluctuate throughout the course of time. As a result, investors and government organisations that deal with the risks and uncertainties connected with CPO price forecasts must be aware of the accuracy of the forecasting process (Arasim, 2015).

In accordance with data, the world's demand for palm oil has been increasing in recent years Bentivoglio,Finco & Bucci et al (2018). Palm oil is a desirable product because of its versatility in usage, as well as its reasonable market price. According to Rahman (2013) ,palm oil is currently the second most significant vegetable oil in the world oils and fats market, accounting for 14.35 per cent of global production of seventeen major oils and fats and accounting for 14.35 per cent of world production of seventeen major oils and fats.

The price of Malaysia CPO has been volatile all over the time. This happens because the CPO market needs a longer time to adjust in the market if any shocks happened Haron & Salami, (2015).

According to CIMB Securities, the price of palm oil is significantly lower than the price of soybean oil, therefore if the price of crude palm oil rises over time, consumers will transfer to other, lower-cost vegetable oils to compensate. In the near term, soybean oil has proven to be a more viable substitute for palm oil, and it has played a key role in determining the price of crude palm oil (CPO). This study also discovered that, in the long run, soybean, sunflower, and rapeseed oil will all have an impact on the price of crude palm oil (CPO). Based on their findings in 2016, Azlan et al. (2022), predicted that increasing palm oil production will have a negative impact on the price of soybean oil, overall exports, and production in the short run.

According to Zaidon & Karim, (2019), Malaysia palm oil stock and output should be controlled in accordance with changes in export prices in order to fulfil

demand at the time of CPO, as the study indicated that Malaysia palm oil prices have a negative impact on export demand.

2.3 LITERATURE REVIEW ON GROSS DOMESTIC PRODUCT PER CAPITA (GDPP)

If Crude Palm Oil (CPO) prices were reduced, Malaysia's GDPP would only be slightly affected, according to The Malaysia Reserve (2021), because other sectors would more than make up for the shortfall produced by lower CPO prices.

According to Hasrini et al. (2017) who used Autoregressive Distributed Lag (ARDL) models to find the factors that influence the demand for palm oil in India from 1980 to 2015, there is a substantial negative association between CPO and GDPP. The negative link between GDP and demand for palm oil demonstrates that Indians regard palm oil as a second-rate product.

Zaidon & Karim, (2019) found that growth in the domestic product per capita (GDPP) has an impact on CPO export. Besides, Murshidi & Aralas, (2017) discovered that the price of CPO palm oil has influenced GDPP growth in both the short and long term. According to Anzuini, J. Lombardi, and Pagona (2013), the rise in commodity prices is due to a rise in short-term inflation expectations following monetary expansion.

The study also discovered that global GDPP has a big impact on palm oil exports. Palm oil production has varied and expanded to include value-added goods as technology has advanced Nambiappan, (2018).

The researches range from regional to national in scope and are either agricultural or economic in nature. From 2001 to 2013, one of the recent studies cited in this paper indicates that changes in the price of crude palm oil (CPO) in the international market will affect Indonesian palm oil commodity exports and GDP for 15 months, will increase inflation for one year, will increase the money supply for six months, and will have a negative effect on the real exchange rate for ten months Mark et al., (2018).

2.4 LITERATURE REVIEW ON EXCHANGE RATE (EXC)

The exchange rate is the price at which one currency is swapped for another. It is the value of one currency in relation to another. The exchange rate is a macroeconomic factor that determines crude palm oil. The currency rate is an independent variable in this research of CPO in Malaysia.

Crude palm oil (CPO) is a significant contributor to Malaysia's economy. It is the fourth greatest contributor to gross national income (GNI), accounting for RM52.7 billion or 8% of GNI in 2011 and projected to reach RM178 billion by 2020 Aziz & Applanaidu, (2017)

There are insufficient studies on the exchange rate effect of crude palm oil prices. While recent investigations by Debarun Chakraborty, (2016) demonstrated that palm oil prices had a considerable impact on the Rupiah and Ringgit, the authors provided no theoretical basis for the relationship between these two variables. Additionally, the simplicity of the modelling frameworks used in both research shows that the results may be skewed by omitted variables.

Increases in the price of palm oil will result in currency depreciation in palm oil-dependent countries, given the degradation of current accounts required to settle high import expenditures for palm oil, ceteris paribus. Thus, a negative link between palm oil prices and the exchange rates of significant palm oil exporters is hypothesised. To test this hypothesis, construct a predictive model of the exchange rate in which palm oil price acts as a predictor and in which some salient characteristics of both the predictand and predictor series, such as endogeneity, conditional heteroscedasticity, and persistence effects, are taken into account during the estimation process (Lean & Smyth, 2015).

Additionally, Aziz & Applanaidu, (2017) used the Dynamic Ordinary Least Squares (DOLS) method to analyse the impact of palm oil prices on currency rates in Malaysia and Indonesia using monthly time series data from 1983 to 2015. They discovered a positive link between CPO and exchange rate, indicating that CPO is a substantial predictor of the exchange rate. Additionally, Aprina, (2014) discovered a

favourable correlation between CPO and exchange rate and stated that the depreciation of the P rupiah will result in a decrease in the price of CPO produced in Indonesia, hence increasing the incentive for producers to export their CPO.

2.5 LITERATURE REVIEW ON INFLATION (INF)

In general, an increase in the price of oil will result in an increase in the price of goods and services. Many people were immediately impacted by the increase in the price of gasoline and diesel.

Sihem, (2021) investigated the relationship between the differential change rate of crude oil prices and inflation in India for the period 2001 to 2015 using regression, collinearity, and intercorrelation, as well as an antagonistic relationship between crude oil price and inflation. They found a link between the differential change rate of crude oil prices and inflation in India for the period 2001 to 2015. There is a clear indication that if inflation grows, the price of crude oil decreases and vice versa, and that this is true in both directions.

Using the Ordinary Least Square (OLS) approach, Socha, (2017) investigated the key factors of crude oil prices in India using once-a-month time-series data from April 1994 to December 2015 collected from the Indian Oil Corporation. They discovered that the relationship between inflation and crude oil prices is positive, and they came to the conclusion that one of the predictors of crude oil prices, inflation, was determined to be important.

Ahmed, (2018) used an Auto-Regressive Distributed Lag (ARDL) technique to analyse the association between crude oil price variations and inflation behaviour in Oman from 1990 to 2017. The data was collected between 1990 and 2017. Specifically, he discovered that there is a long-run relationship between these variables and that fluctuations in the price of crude oil have a direct impact on the inflation rate in Oman.

Besides, according to Anzuini et J. Lombardi, and Pagano (2013) the rise in commodity prices is due to a rise in short-term inflation expectations following monetary expansion.

According to Zahrah Lubis, R. A., Ruslan, D., & Zainal, A., (2018), the global CPO price has an effect on the expansion of money supply, as well as the budget deficit. When the money supply increases, the interest rate decreases, and inflationary forces

such as global inflation and economic development affect the appreciation of the Rupiah's real exchange rate.

2.6 LITERATURE REVIEW ON MONEY SUPPLY (M3)

The increase in global demand for Crude Palm Oil (CPO) and its processed products has a negative impact on the economies of the nations that produce CPO, namely Indonesia and Malaysia.

Cheng, Shi, Yu, and Zhang., (2019) used structural vector autoregressive models (SVAR) to study how the Chinese macroeconomic responds to uncertainty shocks in international crude oil markets. They discovered a negative association between crude oil prices and money supply, as well as the fact that quarter-lagged oil prices and uncertainty have major negative effects on money supply. When the first and second-moment swings in oil prices fall, the negative sign indicates that the Chinese government raises the money supply. In other words, in response to a decrease in the fluctuation of oil prices, it conducts an expansionary monetary policy.

A study conducted by Rahman (2013) found that their relationship with the macro-economy and the stock markets encourages researchers to concentrate their attention on crude oil price and money supply. This relationship is critical for financial hedgers, portfolio managers, asset allocators, and financial analysts to understand and use effectively. It is also important for the formulation of monetary policy in the United States.

Mahdi, (2012) did the analysis to see whether there is a long-run link between the concerned variables in Oman during the period 1990 to 2016 using Autoregressive Distributed Lag (ARDL). He discovered a positive relationship between money supply and crude oil prices in his findings.

According to Aisyah & Renggani, (2021) export is a transaction of products and services from Indonesia to other nations that results in payment by foreign customers. Money might enter to Indonesia in the form of foreign currency through export transactions. When exporters (sellers from Indonesia) get payment from a foreign country, they convert the foreign currency into Rupiah so that it can be utilised as capital to buy raw materials and cover other operational costs in order to manufacture new items. The price of CPO over the world has an impact on the expansion of money supply, as well as budget deficits. When the supply of money increases, the interest rate

decreases, causing inflation, such as global inflation and economic growth, to effect the appreciation of the Rupiah's real exchange rate.

2.7 THEROTICAL/ RESEARCH FRAMEWORK
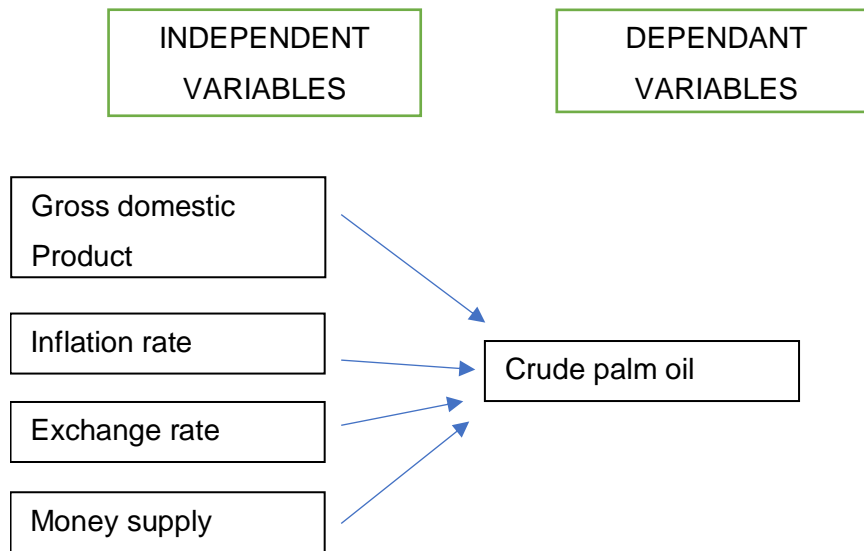
Figure 1. Theoretical Framework for the study
Aziz & Applanaidu, (2017)

2.8 SUMMARY

In conclusion, based on all of the previous literature reviews, what can be concluded here is that this chapter is attempting to gather or review all of the available literature from all of the previous research findings based on the topic, the dependent, and the regulating of variable chosen for research purposes? All of the foundation and support are used to finish the evaluation on this chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter will detail the procedures used to perform the research. It is where it discovers and creates new information in order to address the unresolved question. Additionally, it outlines how the researcher resolves all issues and establishes a good and credible rationale that is relevant to the research objective and goals. Additionally, this study will determine the link between the independent and dependent variables. This study will not only describe the processes that will be utilised, but also why the methods will be employed in order to have a sound research approach.

3.2 SAMPLING

In this study, the secondary data approach was applied. This is because secondary data is available from other sources and has already been used in earlier studies.

3.2.1 Target population

The price of crude palm oil in Malaysia is the subject of this study. The dependent variable, CPO price, and the independent variables, Exchange rate, Inflation, Money Supply, and Gross Domestic Product per capita, are all shown to be related in this study.

3.2.2 Sampling size

The research study on the crude palm oil price oil in Malaysia is observed over 30years period from 1990 until 2020 (Malaysia prices of crude palm oil 2021). The data for 10 years from 2010 until 2020 is taken for measure each the variables in this study.

3.3 DATA COLLECTION

This research paper's data is based on secondary data gathered from a variety of sources. Secondary data is information gathered from other sources such as the World Bank and DataStream. The use of secondary data is justified since it provides a

reference point for the data acquired. There are a number of conditions that must be met while reviewing secondary data. The data must be available, and the data must meet the standards in terms of relevancy. The data's accuracy and sufficiency must be examined.

3.4 VARIBLES

3.4.1 Dependent variable

The dependent variable in this study is the price of crude palm oil in Malaysia. From 2010 to 2020, data will be extracted.

3.4.2 Independent variables

Gross domestic product per capita (GDPP), exchange rate (EXC), inflation (INF) and money supply (M3) the independent variables for this research. All variables were to find the connection and the relationship between independent and dependent variables to obtain the ending decision of this research.

3.5 RESEARCH DESIGN

Research Design generates data that helps lessen ambiguity. This section will cover the research's objective, the investigation's style, the scope of the researcher's intervention, the study's environment, the component of analysis, and the study's timeline. The main objective of this research is to establish a link between the relationship and the impacts of four macroeconomic variables, namely the exchange rate (EXC), inflation (INF), money supply (M3) and gross domestic product per capita (GDPP) on the Malaysian CPO price.

3.5.1 Purpose of the study

In conducting study, researchers employ a range of studies, including causal studies, exploratory studies, and descriptive studies. In this study, a causal inquiry was used to determine the relationship between the dependent and independent variables. The goal of this research to see the relationship between, dependent variable, CPO price, and the independent variables, Exchange rate, Inflation, Money Supply, and Gross Domestic Product Per Capita (GDPP).

3.5.2 Types of investigation

There are three ways that can be used to perform this research: correlational, clarification, and casual. The causal investigation method will be employed to perform the research in this study. According to the causal relationship, one variable can impact movement in another idea and variable. As a result, the movement of the available elements might influence the crude palm oil price in Malaysia.

3.5.3 Researcher interference

The magnitude of the researcher's interference with the referred to as intervention by researchers. The study's outcome is influenced by a number of factors that have been investigated. There are three forms of research interference: minimal, moderate, and excessive interference. The observation of prior findings was limited to no intervention in this study because the topic was dependent on previous results.

3.5.4 Unit of Analysis

The organization's unit of analysis is utilized by researchers to collect data. Individuals, dyads, groups, organizations, and countries are all examples of analytical units. This study's element of analysis was chosen to be the country. This is due to the fact that the study was based on the price of crude palm oil in Malaysia. All available data was gathered from Malaysian sources.

3.5.5 Study settings

Contrived and non- contrived study environments are the two types of study settings. This study relied on secondary data for its findings. As a result, this study is conducted in a non-contrived setting in which the research can be conducted under normal working conditions.

3.5.6 Time horizon

The temporal range in the study is divided into cross sectional and longitudinal studies. A cross-sectional study is one in which data is collected only once, maybe over multiple days, weeks, or months, in order to achieve the research's goal. Longitudinal

studies, on the other hand, are studies that are carried out over a longer period of time in order to attain a specific goal. Longitudinal studies will be used in this study. The study was conducted over a ten-year period, beginning in 2010 and ending in 2020.

3.6 HYPOTHESIS STATEMENT

        The main research objective of this study is to study the relationship and the impacts of four macroeconomic variables, namely the exchange rate (EXC), inflation (INF), money supply (M3) and gross domestic product per capita (GDPP) on the Malaysian CPO price. The hypothesis statement in this study will state the effect of economic variables such as Gross Domestic Product (GDP), Exchange Rate (ER), Inflation (INF) and Money Supply (M3) on the Malaysian CPO price as the dependent variable. This study will be able to finalize whether macroeconomic variables have an impact on the Malaysian CPO price or not.

a) Gross Domestic Product (GDPP)

H_0: Gross Domestic Product Per Capita does no affect Malaysian CPO price.

H_A: Gross Domestic Product does have affect Malaysian CPO price.

b) Exchange Rate (EXC)

H_0: Exchange Rate does no affect Malaysian CPO price.

H_A: Exchange Rate does have affect Malaysian CPO price.

c) Inflation (INF)

H_0: Inflation does no affect Malaysian CPO price.

H_A: Inflation does have affect Malaysian CPO price.

d) Money Supply (M3)

H_0: Money Supply does no affect Malaysian CPO price.

H_A: Money Supply does have affect Malaysian CPO price.

3.7 RESEARCH METHODOLOGY

This research is based on secondary data obtained from the World Bank and Data Stream. The purpose of this research is to study at the relationship between the dependent variable, CPO price, and the independent variables, Exchange rate (EXC), Inflation (INF), Money Supply (M3), and Gross Domestic Product (GDP). All four elements have the potential to influence the price of CPO in Malaysia. Time-series data from 2010 to 2020.

3.7.1 Descriptive Analysis

The descriptive review technique provides a high-level overview of the mathematical evidence that was employed in this research work, as well as specifics on the evidence. There is a list of the different samples obtained from the data set's collection in the comprehensive statistics portion of the report. Arithmetic expressions such as mean, median, maximum, and minimum. The statistics of minimum, skewness, and even Kurtosis are the most frequently employed for measurements. To summarise, a descriptive statistic is a statistic that summarises another statistic based on another statistic. Results are gathered in one place

3.7.2 Correlation Analysis

The objective of correlation is to identify whether or not the dependent and independent variables have a linear relationship. It's a method for determining how strong two variables' correlations are. The t-p-value statistic's shows whether or not the null hypothesis should be rejected. The null hypothesis can be rejected if the p value is less than 5% of significance. It implies that the two variables are inextricably linked.

H_0: There is does no correlation

H_A: There is does have correlation

3.7.3 Regression Analysis

$$CPO = \beta_0 + \beta_1 EXC_{it} + \beta_2 INF_{it} + \beta_3 M3_{it} + \beta_4 GDPP_{it} + e$$

Where,

$\beta_1\beta_2\beta_3\beta_4$ = Coefficient of each independent variable

EXC = Exchange rate

INF = Inflation

M3 = Money supply

GDPP = Gross domestic product per capita

i = Malaysia countries

t = Year 2010 until 2020

e = Error term

3.7.4 T-test

The t-test is a statistical test for comparing the means of two groups. It is sometimes used in hypothesis testing to see whether a method or procedure has an impact on the population of interest, or whether two groups differ from one another. The t-test is easy to use because it accounts for differences in the units of measurement of the variables and in the standard deviations of the estimated coefficients. Furthermore, each time the stochastic error term is normally distributed and when the variance of that distribution must be estimated, this is when t-test plays a crucial role to be tested.

Critical t-value is used when a decision whether a null hypothesis should be rejected or not after the t-value is calculated. The critical t-value, tc, is selected from a t-table depending on whether the test is one-sided or two-sided. The decision rule can identify by:

For one-sided hypothesis:

H0: $k \leq 0$
HA: $k > 0$

Reject null hypothesis, H0 if: tk > tc

Do not reject null hypothesis, H0 if otherwise.

The significance level for this study is measured at 5%. If the result of the p-value is less than 5% ($p < 5\%$), then the difference between both observations is statistically significant, and the null hypothesis is rejected.

3.7.5 F-Test

The F-test is known as a formal hypothesis test that is used to deal with null hypotheses with multiple hypotheses or single hypotheses about a group of coefficients. For instance, "joint" and "compound" null hypotheses are appropriate whenever the underlying economic theories become specific values. Firstly, we need to translate the null hypothesis into a constraint that will be added to the equation. Then, we need to estimate the constraint equation with OLS and compare the fit constraint equation with the unconstraint equation.

H_0: $B1 = B2 =. .. = B_k = 0$

H_A: H_0 is not true

Reject null hypothesis, H_0 if: $f_k > f_c$

Do not reject null hypothesis, H_0 if otherwise.

3.7.6 Coefficient of Determination

Coefficient of Determination is also known as R-squared where it refers to the ratio of the explained sum of squares to the total sum of squares. The higher the R-squared, the closer the estimated regression equation that fits the sample data. The measure is known as "goodness of fit". The perfect fit of R-squared is when it is equal to 1. For instance, if the R-squares is equal to 0.5, it is approximately that half of the observed variation can be explained by the model's input.

3.7.7 Adjusted R-Squared

Adjusted R-squared measures the percentage of the variation of Y around its mean that is explained by the regression equation. An increase in R-squared indicates the marginal benefit of adding variables that exceeds the cost and vice versa. Same as R-squared where the highest possible for the adjusted is 1.00 while the lowest can be negative.

3.7.8 Descriptive Analysis

The descriptive review technique offers a high-level overview and detail about the mathematical evidence used in this research article. The detailed statistics section contains a list of the different samples taken from the data set's collection. Mean, Median, Maximum, Minimum, Skewness, and even Kurtosis are the most often used statistics for measurements. To summarize, a descriptive statistic summarizes a statistic based on a collection of results.

3.7.9 Normality Test

The normality test determines whether or not data is distributed normally. According to Jarque Bera, a key figure in statistical applications, assessing the sample of kurtosis and skewness is essential when using the normalcy test. The test result must be analysed at the 5% significant level to determine whether the data is regularly distributed.

H_0: Normally distributed data

H_A: Not normally distributed data

3.8 SUMMARY

This chapter illustrates why the research design is critical for the researcher when conducting research. Additionally, it is critical because the research design will be used in this study or research to ensure its authenticity. The goal of this study is to examine the link between the dependent variable, crude palm oil prices in Malaysia, and the independent variables, which include the exchange rate (EXC), inflation (INF), money supply (M3), and gross domestic product (GDP). From 2010 to 2020, these two variables are observed and used in this study. The World Bank provided the data for this study. The test results will be utilized to generate knowledge necessary to respond to the hypothesis statement.

CHAPTER 4

DATA ANALYSIS

4.1 INTRODUCTION

This chapter will explain and solve the hypotheses supported by the empirical results of all the experiments that were evaluated after conducting multiple studies on the collected data. These tests were performed using the EViews software to determine the effect of the independent variable towards the dependent variable. The methods used in this research are descriptive analysis, test on assumptions, correlation analysis and regression analysis.

4.2 DESCRIPTIVE ANALYSIS

Table 4.1: Descriptive Analysis

	CPO (R.M/TAN)	EXCHANGE RATES (RM)	GDP PER CAPITA (RM BILLION)	INF (INDEX)	M3 (INDEX)
MEAN	2545.909	3.684453	1.328182	1.834905	6.385452
MEDIAN	2609.000	3.905500	1.330000	2.090567	6.304048
MAXIMUM	3219.000	4.300441	1.520000	3.871201	14.62794
MINIMUM	2119.000	3.060003	1.060000	-1.138702	2.674720
STD.DEV	330.7708	0.515667	0.128749	1.380439	3.475362

Notes: The dependent variable is the Crude Palm Oil Price (CPO). The independent variables are the Exchange Rate (EXC), Growth Domestic Product per Capita (GDP), Inflation (INF), and Money Supply (M3).

Table 4.1 above shows the descriptive statistics of the research variables that include the average or mean, median, maximum, minimum, and standard deviation for the Exchange Rate (EXC), Growth Domestic Product per Capita (GDP), Inflation (INF), and Money Supply (M3).

The CPO price measured in Malaysian Ringgit per metric ton (R.M. /ton). The exchange rate measured by R.M. per USD, and the inflation rate is measured by the consumer price index (CPI) with the based 2010 = 100, and the money supply measured by broad money (M3). Meanwhile, the GDP measured by GDP per capita (constant, 2010 USD).

The mean value for the Crude palm oil (CPO) price for over 10 years is RM 2545.909 per metric ton. For the standard deviation, it is shown that the dispersion of the CPO price from its mean is RM 330.7708 per metric ton. This shown that the CPO price has a low standard deviation because the data points are near from the mean and there is a lower deviation within the data set, thus the low spread out the data, the lower the standard deviation. Next, the median of CPO price is RM 2609.00 per metric ton which indicates that half the observations are above the value of RM 2609.00 per metric ton and the half observations are below the value of RM 2609.00 per metric ton. The maximum amount of CPO price is RM 3219.00 per metric ton which shows that it is the highest CPO price issued by the Malaysia metric ton which shows that it is the highest CPO price issued by the Malaysia in 2011 and it indicates that the RM 3219.00 per metric ton amount is the last number listed of the highest price for over 10 years from 2010 until 2020. In addition, the minimum amount CPO price is RM 2119.00 per metric ton which show that it is the lowest CPO price in Malaysia and it is also indicates that the RM 2119.00 per metric ton amount is the first amount listed in the range because it is lowest value of CPO price for over 10 year in Malaysia from 2010 until 2020.

The mean value for the average exchange rate of R.M. to USD (RM/USD) is RM 3.684453. For the standard deviation, it is shown that the dispersion of the exchange rate from its mean is RM 0.515667. This shown that the exchange rate has a low standard deviation because the data points are near from the mean and there is a lower deviation within the data set, thus the low spread out the data, the lower the standard deviation. Next, the median of the exchange rate is RM 3.905500 which indicates that the half the observations are above the value of RM 3.905500 and half the observations are below the value of RM 3.905500. The maximum amount of the exchange rate is RM 4.300441 in 2017 and it indicates that the last number listed of the highest value for over 10 years from 2010 until 2020. In addition, the minimum exchange rate is RM 3.060003 in 2011, which indicates the first number listed in the range because it is the lowest value of exchange rate obtained for over 10 years from 2010 until 2020.

The mean value for the number of GDP per capita (GDP) is RM 1.328182 billion which is shows the average number of GDP per capita. For the standard deviation, it is show that the dispersion of the GDP per capita from its means is RM 0.128749 billion.

This shows that GDP per capita has a low standard deviation because the data points are near from the mean and there is a lower deviation within the data set, thus the less spread out the data, the lower the standard deviation. Next, the median of GDP per capita is RM 1.330000 billion which indicate that half the observations are above the value of RM 1.330000 billion and half the observations are below the value of RM 1.330000 billion. The maximum amount of GDP is RM 1.520000 billion in 2019 and it indicates that the last number listed of the highest value for over 10 years from 2010 until 2020. In addition, the minimum amount of GDP per capita is RM 1.060000 billion in 2010, which indicates the first number listed in the range because it is the lowest value of exchange rate obtained for over 10 years from 2010 until 2020.

The mean value for money supply (M3) is 6.385452 which shows the average number of money supply. For the standard deviation, it is shown that the dispersion of the money supply from its mean is 3.475362. This shows that money supply has a low standard deviation because the data points are near from the mean and there is a lower deviation within the data set, thus the less spread out the data, the lower the standard deviation. Next, the median of money supply is 6.304048 which indicates that half the observations are above the value of 6.304048 and half the observations are below the value of 6.304048. The maximum money supply is 14.62794 in 2011 and it indicates that the last number listed of the highest value for over 10 years from 2010 until 2020. In addition, the minimum amount of money supply is 2.674720 in 2019, which indicates the first number listed in the range because it is the lowest value of inflation rate obtained for over 10 years from 2010 until 2020.

4.3 CORRELATION ANALYSIS

Table 4.2: Correlation Analysis

Number of observation :11 Correlation T-statistic Probability	Crude Palm Oil Price (RM)	Exchange Rate (RM)	GDP Per Capita (RM)	Inflation (Index)	Money supply (Index)
Crude Palm Oil Price	1.0000 -------- --------				
Exchange Rate	-0.3608 -1.1605 0.2757	1.0000 -------- --------			
GDP Per Capita	-0.5379 -1.9145 0.0878	0.4245 1.4065 0.1931	1.0000 -------- --------		
Inflation	0.3534 1.1336 0.2862	-0.3230 -1.0240 0.3325	-0.3233 -1.0251 0.3320	1.0000 -------- --------	
Money Supply	0.6649 2.6708 0.0256**	-0.7293 -3.1983 0.0109	-0.2524 -0.7827 0.4539	0.2679 0.8343 0.4257	1.0000 -------- --------

Notes: The dependent variable is Crude Palm Oil Price (CPO). The independent variables are the Growth Domestic Product per Capita (GDPP), Exchange Rate (EXC), Inflation (INF), and Money Supply (M3).

** Probability value that are significant

To analyse the correlation, a correlation value near -1 indicates a strong negative relationship between the variables, whereas a correlation value around +1 indicates a strong positive relationship. As the correlation value is 0, there is no relationship between the variables. The level of significance is set at 5%, or 0.05

First, crude palm oil and exchange rate. The exchange rate is shown to have a weak downhill linear relationship or a negative relationship with the crude palm oil as the correlation value is -0.3608. The probability value of exchange rate is higher than 0.05 level of significance which is 0.2757 where it indicates exchange rate negatively insignificant relationship with crude palm oil price. The result means that when the Malaysian currency appreciates against the U.S. dollar, the price of CPO decreases, but when the Ringgit depreciates, it will because the CPO price to rise Isa et al., (2020).

Second, GDP per capita and crude palm oil price. The GDP per capita is shown to have a weak downhill linear relationship or a negative relationship with the crude palm oil price as the correlation value is -0.5379. The probability of GDP per capita is higher than 0.05 level of significance which is 0.0878 where it indicates the GDP per capita has negatively insignificant relationship with crude palm oil price. , the GDP indicates similar correlation where the higher GDP will contribute towards the rising price of CPO. Higher GDP means the economic activities of the country is prospering. The result explains that more products are produced mainly in this case, palm oil-based products. It is translated into higher demand for CPO and rise in its price Isa et al., (2020)

Next, the inflation and crude palm oil price. The inflation is shown a positive relationship with crude palm oil price as the correlation value is 0.3534. The probability value of inflation is higher than 0.05 level of significance which is 0.2862 where it indicates the inflation has a positively insignificant relationship with crude palm oil price. Inflation will affect the level price of goods and services generally, which means the higher inflation, the higher price of goods and services or vice versa. As the main commodity in Malaysia, CPO price will also be affected or increasing due to rising inflation Isa et al., (2020)

Finally, the money supply and crude palm oil price. The money supply also shown a positive relationship with crude palm oil price as the correlation value is 0.6649. The probability value of money supply is smaller than 0.05 level of significance which is 0.0256 where it indicates the money supply has a statistically positively significant relationship with crude palm oil price. The money supply shows the positive correlation, where more money circulated in the economy means more demand for

products in the market. So is the demand for CPO consequently, the CPO price will rise accordingly Isa et al., (2020) .Rahman et al., (2013) stated that the concentration of the study on crude oil price and money supply is encouraged by their association with the macroeconomic and the stock markets. Understanding of this link is of pronounced significance for financial hedgers, portfolio managers, asset allocators and financial analysts. It is also significant for the formulation of the U.S. monetary policy.

In conclusion, exchange rate, GDP per capita and inflation has a positively insignificant relationship with crude palm oil price as the probability value is higher that the level of significant. While money supply has a positively and significant relation according to the probability value smaller than 0.05. Furthermore, only money supply has a positive relationship with crude palm oil price, the other variable has a negative relationship.

4.4 MULTIPLE REGRESSION ANALYSIS

Table 4.3 *Result of Multiple Regression Analysis*

Variables	Coefficient	Std. Error	t-Statistic	Prob
C	2335.807	1093.206	2.136657	0.0765
EXC	358.4411	218.4519	1.648024	0.1519
GDP_BILLION	-1295.115	631.1207	-2.052088	0.0860
INF	30.39074	56.14475	0.541293	0.6078
M3	86.73256	30.24230	2.867992	0.0285
R-squared	0.720351			
Adjusted R-squared	0.533918			
F-statistic	3.863864			
Prob(F-Statistic)	0.069131			

Notes: The dependent variable is the Crude Palm Oil (CPO). The independent variables are the Exchange Rate (EXC), Growth Domestic Product per Capita (GDP), Inflation (INF), and Money Supply (M3).

Multiple Regression Model

$CPO = \beta_0 + \beta_1 EXC_{it} - \beta_2 GDPP_{it} + \beta_3 INF_{it} + \beta_4 M3_{it} + e$

$CPO = 2335.807 + 358.4411\ EXC_{it} - 1295.115\ GDPP_{it} + 30.39074\ INF_{it} + 86.73256\ M3_{it} + e$

CPO = Crude Palm Oil Price

$\beta_1 \beta_2 \beta_3 \beta_4$ = Coefficient of each independent variable

EXC = Exchange rate

INF = Inflation

M3 = Money supply

GDPP = Gross domestic product per capita

i = Malaysia countries

t = Year 2010 until 2020

e = Error term

4.3.1 T-TEST

H_0: BEXC ≤ 0

H_A: BEXC > 0

H_0: BGDP ≤ 0

H_A: BGDP > 0

H_0: BINF ≤ 0

H_A: BINF > 0

H_0: BM3 ≤ 0

H_A: BM3 > 0

The result of T-test as shown in Table 4.3 above, the p-value must be less than 5% significance level in order for the null hypothesis, H0 to be rejected. A significance level of 0.05 indicates the probability of rejecting the null hypothesis when it is true. The p-value for the exchange rate is 0.1519, which is more than 0.05 significance level. This shows that this study fails to reject the null hypothesis. Thus, it indicates that the exchange rate has insignificant effect on crude palm oil price. Raji et al., (2018) found an insignificant relationship between exchange rate and crude oil price in his study to investigate the influence of oil price fluctuations on the nominal exchange rate of U.S. dollar in Libya from January 2000 to December 2015 using Vector Error Correction Estimates (VECM). Alekhina & Yoshino, (2018) found that for oil exporting countries such as Malaysia and Indonesia where oil exports contribute significantly to their economies, studies have generally found a negative relationship between crude oil price and exchange rates, example an increase in oil prices leads to an appreciation of the domestic currency. Isa et al (2020) found that p-value prove that exchange rate are not significant variables towards CPO price in Malaysia. Despite the negatively insignificance, the exchange rate might influence the CPO price negatively. Hence, the impacts of both macroeconomic variables on the CPO price must be as well taken heed by the relevant parties in making any forecasts or decisions.

Besides, the p-value for the GDP per capita 0.0860, which is more than 0.05 significance level. This shows that this study fails to reject the null hypothesis. Thus, it

indicates that the GDP per capita has an insignificant effect on crude palm oil price. Isa et al (2020) found that GDP are significant macroeconomic variables that influence the CPO price in Malaysia. GDP affect the CPO price negatively, where the GDP poses the most significant impact. Aziz & Applanaidu, (2017) studied to appraise and investigate the relationship between biodiesel demand and the Malaysian palm oil market and also found a negative relationship between GDP and CPO.

Next, the p-value for the inflation rate is 0.6078, which is more than 0.05 significance level. This shows that this study fails to reject the null hypothesis. Thus, it indicates that the inflation rate has an insignificant effect on crude palm oil price. Economic growth does not show any significant influence to inflation with positive value. This is due to the fact that when the economy is growing, investors will come in flocks to invest their capital in the respective country. When investors invest their capital, there will be employment which can increase the income of people. When people's income increases, the need for consumption will also increase. When demand goes up, the prices of goods will consequently go up, causing an inflation. When the inflation rate is high, the wealth will be allocated for physical capitals. Furthermore, some developmental theories suggest that inflation can be used as a mean to mobilize sources as accumulation of capital. This is supported by research conducted by Aprina (2014).

Lastly, the p-value of money supply is less than 0.05 significant level which is 0.0285. This indicates that this study is suggesting to reject H0. The result shows that inflation has a positive significant effect with crude palm oil price. Thus, it can be assumes that as money supply, so crude palm oil price will increase as well. The increase of domestic price against CPO will improve the needs of money. Meanwhile, the research result conducted by Lubis et al., (2018) reveals that the change of world market's price of CPO gives positive influence to the supply of money. This means that the increase of world CPO price increases the supply of money.

According to these results, this study conclude that the money supply is the only variable that is positively significant towards crude palm oil price, while the other two variable which is GDP, inflation and exchange rate are not an insignificant.

4.3.2 F-STATISTIC

H0: $BGDP = BER = BINF = BM3 = 0$

H1: $BGDP \neq BER \neq BINF \neq BM3 \neq 0$

Based on table 4.3, the F-statistic value is 3.863864 and the p-value of the F-statistic is 0.069131. In order for the null hypothesis to be rejected, the p-value of F-statistic must be less than the level of significance which is 0.05. Therefore, this study has shown that the null hypothesis fail to be rejected because the value has a significance level of more than 0.05.

4.3.3 R-SQUARED & ADJUSTED R-SQUARED

According to the table 4.4 above, the amount of R-Squared shows is 0.720351 which indicates that 72.03% the amount of the crude palm oil (CPO) is being explained Growth Domestic Product per Capita (GDP), Exchange Rate (ER), Inflation (INF), and Money Supply (M3). Another 27.97% of the amount crude palm oil price (CPO) is explained by the independent variables that are not included in the regression model.

4.3.4 NORMALITY TEST

Table 4.4 Normality test

Jarque-Bera	1.027611
Probability	0.598215

H_o: Error term is normally distributed
H_A: Error term is not normally distributed

The purpose of the normality test is to identify the distribution of the error term. If the probability value of Jarque – Bera has a significance amount of more than 5 percent and vice versa, the data is normally distributed.

In the table 4.5 above, it shows that the Jarque – Bera's value is 1.027611 and 0.598215 is the relative probability value. When the probability value is more than 5

percent significance level, null hypothesis is failed to be rejected. It concludes that the data is normally distributed.

To conclude, the data in this research were normally distributed. It is because it shows a positive probability and the distribution channel is flat compared to normal.

4.5 SUMMARY

This study investigates the relationship of economic variable and crude palm oil price in Malaysia for the period 2010 to 2020. Overall, the findings indicate that the crude palm oil price is driven by a confluence of numerous variables. Economic variables such as money supply have a positive significant impact to the crude palm oil price. In contrast, the gross domestic product per capita, exchange rate and inflation have shown a negative significant effect towards the crude palm oil price. The outcome from this test can help to explain relationship of crude palm oil price and gross domestic product per capita, exchange rate, inflation and money supply in Malaysia.

Table 4.5: Summary of the result

Variables	Correlation	Results
Gross Domestic Product per Capita (GDPP)	H_0: GDPP does no correlation affect Malaysian CPO price.	Negatively Insignificant relationship
Inflation (INF)	H_0: INF does no correlation affect Malaysian CPO price.	Positively Insignificant relationship
Exchange Rate (EXC)	H_0: EXC does no correlation affect Malaysian CPO price.	Negatively Insignificant relationship
Money Supply (M3)	H_A: M3 does have correlation affect Malaysian CPO price	Positively Significant relationship

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter will focus on summarizing the analysis based on the results of data obtained from the research study, as well as making a few recommendations on the results' outcome. The act of making recommendations serves as a roadmap for future research in order to improve results and assure more exact and accurate findings.

5.2 FINDING OF DISCUSSION

To recap, the purpose of this study is to analyse the link and relationship of four economics variables on the Malaysian CPO price, specifically the exchange rate (EXC), inflation (INF), money supply (M3), and gross domestic product (GDP). The emphasis is on macroeconomic factors affecting CPO prices in Malaysia between 2010 and 2020 .As a consequence, various tests were carried out using EViews software to acquire the study's findings.

Various economic variables, such as the money supply, have a positive and statistically significant effect on the price of crude palm oil. The gross domestic product per capita, the exchange rate, and inflation, on the other hand, have all demonstrated a statistically significant negative relationship with the price of crude palm oil. The results of this test may be used to explain the relationship between crude palm oil prices and the gross domestic product per capita, the currency rate, inflation, and the money supply in Malaysia, among other variables.

5.2.1 Money Supply (M3)

This study conclude that the money supply is the only variable that is positively significant towards crude palm oil price showing a value of 0.0285 which is less than the significance level of 0.05. While the other variable are insignificant according to each variable is higher than the significance level of 0.05. The probability value of money supply is less than the 0.05 level of significance, which is 0.0256, indicating that

money supply has a statistically positively significant association with crude palm oil price. The money supply has a positive relation, with more money circulated in the economy averaging more demand for goods on the market. Likewise, the demand for CPO is increasing. As a result, the CPO price will increase proportionately .Isa et al.,(2020)

According to Rahman et al., (2013) the relationship of crude oil price and money supply with the macroeconomic and stock markets encourages the concentration of research on these two variables. This relationship is critical for financial hedgers, portfolio managers, asset allocators, and financial analysts to understand and use effectively. It also has implications for the formation of monetary policy in the United States.

The increase in the domestic price relative to the CPO will reduce the demand for money. Meanwhile, according to the findings of the research conducted by Lubis et al., (2018), a change in the price of CPO on the world market has a beneficial impact on the supply of money in the economy. This means that as the price of world CPO rises, the amount of money available to spend grows as well.

5.2.2 Gross Domestic Product per capita (GDPP)

Followed by the result of the GDPP, according to Isa et al., (2020) GDP per capita and the price of crude palm oil The correlation score of -0.5379 indicates that the GDP per capita has a weakly downhill linear relationship or a negative association with the crude palm oil price. GDP per capita has a negative and insignificant relationship with crude palm oil price, with a probability of 0.0878, indicating that GDP per capita has a negative and insignificant relationship with crude palm oil price. GDP shows a similar correlation, with higher GDP contributing to rising CPO prices. A higher GDP indicates that the country's economic operations are thriving. The developed information so more products are produced, primarily palm oil-based products in this case. It leads to increases demand for CPO and a price increase.

Overall, the GDP per capita p-value is 0.0860, which is greater than the 0.05 significance limit. As a result, the null hypothesis is not rejected in this investigation.

Thus, GDP per capita has a strongly negative impact on the price of crude palm oil. According to Isa et al., (2020), it was discovered that GDP and other macroeconomic variables have a considerable impact on the CPO price in Malaysia. The GDP has a negative impact on the CPO price, with the GDP having the greatest impact.

5.2.3 Inflation Rate (INF)

Inflation and the price of crude palm oil the inflation rate has a positive association with the price of crude palm oil, with a correlation coefficient of 0.3534. The probability value of inflation is greater than the 0.05 level of significance, which is 0.2862, indicating that inflation has a negative insignificant association with the price of crude palm oil. Inflation will affect the level price of products and services in general, which means that the greater the inflation rate, the higher the price of goods and services, and vice versa. As the primary commodity in Malaysia, CPO prices will be affected or rise as a result of rising inflation. Isa et al., (2020)

The inflation rate's p-value is 0.6078, which is greater than the 0.05 significance level. This demonstrates that the null hypothesis is not rejected in this investigation. As a result, the inflation rate has a negative but negligible effect on the price of crude palm oil. Economic growth has no discernible impact on inflation with a positive number. This is due to the fact that while the economy is developing, investors will flock to the relevant country to invest their wealth. When investors put their money into something, it creates jobs, which raises people's income. When people's incomes rise, so does their need for consuming. When demand rises, so will the prices of goods, resulting in inflation. When the rate of inflation is strong, wealth is allocated to physical capitals. Furthermore, certain developmental theories propose that inflation can be utilised to mobilise resources such as capital accumulation. Aprina, (2014).

5.2.4 Exchange Rate (EXC)

The correlation value of -0.3608 indicates that the currency rate has a weak downhill linear association or a negative relationship with crude palm oil. The probability value of the exchange rate is greater than the 0.05 level of significance, which is 0.2757, indicating that the exchange rate has negatively insignificant relationship with the price of crude palm oil. As a result, when the Malaysian currency improves against the US dollar, the price of CPO falls, but when the Ringgit falls, the price of CPO rises. Isa et al., (2020)

The exchange rate has a p-value of 0.1519, which is greater than the 0.05 significance level. This demonstrates that the null hypothesis is not rejected in this investigation. As a result, it appears that the exchange rate has a relatively negatively insignificant impact on the price of crude palm oil.

According to Alekhina & Yoshino,(2018) Studies have generally found a negative relationship between crude oil price and exchange rates for oil exporting countries such as Malaysia and Indonesia, where oil exports contribute significantly to their economies. For example, an increase in oil prices leads to an appreciation of the domestic currency.

Last but not least, it is possible that the exchange rate will have a detrimental impact on the CPO price notwithstanding its statistical insignificance. As a result, while developing forecasts or making choices about the CPO price, it is important for all parties involved to consider the impact of these macroeconomic variables as well.

5.3 CONCLUSIONS

In conclusion, the results suggest that the crude palm oil price is influenced by a variety of factors economic variables such as the money supply have a positive and considerable impact on the crude palm oil. In contrast, gross domestic product per capita, exchange rate, and inflation have all had a significant negative impact on the crude palm oil price. The results of this test can help to understand the relationship between the crude palm oil price and the Malaysian gross domestic product per capita, exchange rate, and inflation**.**

5.4 SUMMARY OF THE RESULTS

Table 5.1: Summary result of Research Objective

Research Questions	Results	Supporting Articles	
What is the relationship between Gross domestic products per capita (GDPP) and crude palm oil price in Malaysia?	Gross domestic product per capita (GDPP) shows a negative relationship towards crude palm oil price. Decrease in GDPP by 53.79% will decrease in the crude palm oil price by 1%. Therefore, it shows the negatively insignificant relationship.	Higher GDP means the economic activities of the country is prospering. The result explains that more products are produced mainly in this case, palm oil-based products. It is translated into higher demand for CPO and rise in its price	Isa et al., (2020)
		Investigate the relationship between biodiesel demand and the Malaysian palm oil market and also found a negative relationship between GDP and CPO.	Aziz & Applan aidu, (2017)
What is the relationship between Inflation Rate (INF) and crude palm oil price in Malaysia?	Inflation (INF) shows a positive relationship towards crude palm oil price. Increase in INF by 35.34% will increase in the crude palm oil price by 1%. Therefore, it shows the positively insignificant relationship.	Inflation will affect the level price of goods and services generally, which means the higher inflation, the higher price of goods and services or vice versa. As the main commodity in Malaysia, CPO price will also be affected or increasing due to rising inflation.	Isa et al., (2020)
		Economic growth does not show any significant influence to inflation with positive value. This is due to the fact that when the economy is growing, investors will come in flocks to invest their capital in the respective country. When investors invest their capital, there will be employment which can increase the income of people. When people's income increases, the need for consumption will also increase. When demand goes up, the prices of goods will consequently go up, causing an inflation. When the inflation rate is high, the wealth will be allocated for physical capitals. Furthermore, some developmental theories suggest that inflation can be used as a mean to mobilize sources as accumulation of capital.	Aprina (2014).

What is the relationship between Exchange Rate (EXC) and crude palm oil price in Malaysia?	Exchange rate (EXC) shows a negatively relationship towards crude palm oil price. Decrease in EXC by 36.08 % will decrease in the crude palm oil price by 1%. Therefore, it shows the negatively insignificant relationship.	When the Malaysian currency appreciates against the U.S. dollar, the price of CPO decreases, but when the Ringgit depreciates, it will because the CPO price to rise.	Isa et al., (2020)
		For oil exporting countries such as Malaysia and Indonesia where oil exports contribute significantly to their economies, studies have generally found a negative relationship between crude oil price and exchange rates, example an increase in oil prices leads to an appreciation of the domestic currency	Alekhina & Yoshino, (2018)
What is the relationship between Money Supply (M3) and crude palm oil price in Malaysia?	Money supply (M3) shows a positive relationship towards crude palm oil price. Increase in M3 by 66.49% will increase in the crude palm oil price by 1%. Therefore, it shows the positively significant relationship.	Where more money circulated in the economy means more demand for products in the market. So is the demand for CPO consequently, the CPO price will rise accordingly	Isa et al., (2020)
		The concentration of the study on crude oil price and money supply is encouraged by their association with the macroeconomic and the stock markets. Understanding of this link is of pronounced significance for financial hedgers, portfolio managers, asset allocators and financial analysts. It is also significant for the formulation of the U.S. monetary policy	Rahman et al., (2013)
		Reveals that the change of world market's price of CPO gives positive influence to the supply of money. This means that the increase of world CPO price increases the supply of money.	Lubis et al., (2018)

5.5 RECOMMEDATIONS

5.5.1 Do Study On Other Countries

To learn more about other countries, for example Indonesia and Thailand in crude palm oil price there is a great demand for expertise in this field. As such, increased and continuous efforts in educating and training more human resources through the establishment of more educational and training centres can be a key factor in the understanding and development of market instruments such as other countries in this research.

5.5.2 Urge the Government Agencies or Policymakers to Be More Proactive

Urge the government agencies or policymakers to be more proactive in tackling the fluctuation of CPO price. The Central Bank of Malaysia (BNM) must ensure effective and sustainable policies on Malaysian currency exchange and money supply in the economy. The National Economic Action Council (MTEN) must continuously endeavour with strategic and affirmative actions to stimulate economic activities of the country and ultimately boosting the GDP growth. The agencies under the Ministry of Domestic Trade and Consumer Affairs (KPDNHEP) must be strict in law enforcement to curb any profiteering activities in order to avoid inflation from rising. This is due to the fact that strong crude palm oil is a vital commodity for Malaysia, since it contributes significantly to the country's earnings. As a result, governments must devise new methods in order to keep the crude palm oil business afloat. Likewise, during the shocks, smallholders must plan new crops such as corn and sugar cane to earn greater cash from their harvest. Finally, because of the importance of CPO price fluctuation and development to Malaysia's economic growth, more research is required.

5.5.3 The Malaysian Palm Oil Board (MPOB) Should Be More Aggressive In Promoting

The Malaysian Palm Oil Board (MPOB) Nambiappan et al., (2018) should be more aggressive in promoting and developing the palm oil industry in Malaysia by having strategic alliances with the related industries to come up with more palm oil based-products introduced into the market. Conclusively, it is utmost necessary for the CPO price to remain stable in any economic circumstances so that it will not severely affect our economy and national income. The government might also need to look into

the related agricultural policy to enhance further the production and quality of CPO using the latest technology. This is because Malaysia is the world's fifth largest producer of oils and fats in 2021, accounting for 7.5% of total global production. (The edge market, 2022)

5.6 SUMMARY

In summary, this chapter gives all the explanation on the findings that have been obtained from the analysis of this study. Furthermore, recommendations are also given to give an idea to readers on how they can conduct future studies more efficiently. The chapter also acknowledges some limitations that have occurred during the study which will shed light on readers' eye on what to avoid and what to do when conducting a research.

REFERENCES

Ahmed, A. E. A. (2018). Relationship between Crude Oil Price Fluctuations and Inflation in Oman. *GCNU Journal*, *1990*(November), 1–4. https://www.researchgate.net/profile/Abubaker_Ahmed6/publication/329222266_Relationship_between_Crude_Oil_Price_Fluctuations_and_Inflation_in_Oman_1990-2017/links/5bfdacd292851c78dfafa6d6/Relationship-between-Crude-Oil-Price-Fluctuations-and-Inflation-in-

Aisyah, S., & Renggani, T. D. (2021). Determinants of Indonesia Non-Oil and Gas Exports To Non-Traditional Market. *Business and Accounting Research (IJEBAR) Peer Reviewed-International Journal*, *5*(3), 1136–1142. https://jurnal.stie-aas.ac.id/index.php/IJEBAR

Alekhina, V., & Yoshino, N. (2018). *AN ENERGY EXPORTING ECONOMY Asian Development Bank Institute*. *828*.

Anzuini, A., Lombardi, M. J., & Pagano, P. (n.d.). *zzzAnzuini et al. (2012)-The impact of monetary policy shocks on commodity prices*. 119–144.

Aprina, H. (2014). the Impact of Crude Palm Oil Price on Rupiah'S Rate. *Buletin Ekonomi Moneter Dan Perbankan*, *16*(4), 295–314. https://doi.org/10.21098/bemp.v16i4.448

Arasim, D. H. (2015). *Author ' s Details : 4*(12), 4–14.

Aziz, M. I. A., & Applanaidu, S. D. (2017). Effects of palm oil price on exchange rate: A case study of Malaysia and Indonesia. *Institutions and Economies*, *9*(4), 71–87.

Azlan, M., Zaidi, S., & Karim, Z. A. (2022). *External and Internal Shocks and the Movement of Palm Oil Price : SVAR Evidence from Malaysia as*.

Bentivoglio, D., Finco, A., & Bucci, G. (2018). Factors affecting the indonesian palm oil market in food and fuel industry: Evidence from a time series analysis. *International Journal of Energy Economics and Policy*, *8*(5), 49–57.

Cheng, D., Shi, X., Yu, J., & Zhang, D. (2019). How does the Chinese economy react to uncertainty in international crude oil prices? *International Review of Economics & Finance*, *64*. https://doi.org/10.1016/j.iref.2019.05.008

Chuangchid, K., Wiboonpongse, A., Sriboonchitta, S., & Chaiboonsri, C. (2012). Factors Affecting Palm Oil Price Based on Extremes Value Approach. International Journal of Marketing Studies, 4(6), 54-65

Daily Palm Oil Price. (n.d.). Malaysian Palm Oil Council. https://mpoc.org.my/daily-palm-oil-price/

Department of Statistics. (2017). Selected agricultural indicators, Malaysia, 2017. https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=72&bul_id=MDNYUitINmRKcENRY2FvMmR5 T WdGdz09&menu_id=Z0VTZGU1UHBUT1VJMFlpaXRRR0xpdz09.

Accessed April 8, 2020

Ecb. (2010). Approaches To Monetary Policy Revisited - Lessons From the Crisis. In *Sixth ECB Central Banking Conference* (Issue NOvember).

Haron, R., & Salami, M. A. (2015). Malaysian Crude Palm Oil Market Volatility : *International Journal of Economics and Management*, *9*, 103–120.

Hasrini, R. F., Zakaria, F. R., Adawiyah, D. R., & Suparto, I. H. (2017). Antidiabetic and immunomodulatory potential of purple soymilk enriched with Crude Palm Oil microcapsule in type- 2 diabetes mellitus respondents. *Malaysian Journal of Nutrition*, *23*(3), 461–471.

Isa, M. A. M., Baharim, A. T., Mohamed, S., Noh, M. K. A., Nasrul, F., Ibrahim, W. M. F. W., & Hassan, S. S. (2020). Crude Palm Oil Price Fluctuation in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, *10*(5), 879–892. https://doi.org/10.6007/ijarbss/v10-i5/7319

Khalid, N., Hamidi, H. N. A., Thinagar, S., & Marwan, N. F. (2018). Crude palm oil price forecasting in Malaysia: An econometric approach. *Jurnal Ekonomi Malaysia*, *52*(3), 263–278. https://doi.org/10.17576/JEM-2018-5203-19

Lean, H. H., & Smyth, R. (2015). Testing for weak-form efficiency of crude palm oil spot and future markets: new evidence from a GARCH unit root test with multiple structural breaks. *Applied Economics*, *47*(16), 1710–1721. https://doi.org/10.1080/00036846.2014.1002905

Lubis, R. A. Z., Ruslan, D., & Zainal, A. (2018). the Influence of World Cpo Price on Real Exchange Rate of Rupiah Through the Changes of Money Supply, Interest Rate and Inflation. *Journal of Community Research and Service*, *2*(1), 111. https://doi.org/10.24114/jcrs.v2i1.9436

Mahdi, A. E.-S. A. A. (2012). *the Impact of Crude Oil Price Changes on Money Supply (M2) in Oman (1990-2016)*. *5*(June), 259–278. http://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=1072&context=jolti

Malaysian Palm Oil Board. (2017). Malaysian oil palm industry performance 2016 and prospects for 2017. http://www.mpob.gov.my/images/stories/pdf/2017/2017_Dr.KushairiPALMEROS2017.pdfA ccessed on April 8, 2020

Mark, B., Steve, J., Will, S., Richard, S., & Sam, R. (3Keel L. (2018). Study on the environmental impact of palm oil consumption and on existing sustainability standards. In *LMC International Ltd.* http://ec.europa.eu/environment/forests/pdf/palm_oil_study_kh0218208enn_new.pdf

Ministry of Economic Affairs Malaysia. (2019). Demographic Statistics First Quarter 2019 by Department of Statistics Malaysia. *STATS Malaysia*, *2*(May), 1–139. https://www.dosm.gov.my/

Mohd Hanafiah, K., Abd Mutalib, A. H., Miard, P., Goh, C. S., Mohd Sah, S. A., & Ruppert, N. (2021). Impact of Malaysian palm oil on sustainable development goals: co-benefits and trade-offs across mitigation strategies. *Sustainability Science*, *October*. https://doi.org/10.1007/s11625-021-01052-4

Murshidi, M. H., & Aralas, S. (2017). The Impact of Price Shocks of Crude Oil, Palm Oil and Rubber Towards Gross Domestic Product Growth of Malaysia. *Proceedings of International Conference on Economics*, *2017*(Ice), 421–437. https://www.ums.edu.my/fpep/files/Haziq.pdf

Musarat, M. A., Alaloul, W. S., & Liew, M. S. (2021). Impact of inflation rate on construction projects budget: A review. *Ain Shams Engineering Journal*, *12*(1), 407–414. https://doi.org/10.1016/j.asej.2020.04.009

Nambiappan, B., Ismail, A., Hashim, N., Ismail, N., Shahari, D. N., Idris, N. A. N., Omar, N., Salleh, K. M., Hassan, N. A. M., & Kushairi, A. (2018). Malaysia: 100 years of resilient palm oil economic performance. *Journal of Oil Palm Research*, *30*(1), 13–25. https://doi.org/10.21894/jopr.2018.0014

Norlin, K., Hakimah, N. A. H., Sharmila, T., & Nur, F. M. (2018). Crude Palm Oil Price Forecasting in Malaysia: An Econometric Approach. Jurnal Ekonomi Malaysia, 52(3), 247–259

POINTERS: Malaysian Palm Oil Supply and Demand Updates for 2021. (n.d.). Www.pointers.org.my. Retrieved January 10, 2022, from https://www.pointers.org.my/v3/report.php?id=355

Punati, N., & Raju, R. (2017). Determinants of Crude Oil Prices in India. SSRG International Journal of Economics and Management Studies, 4(10), 1–9.

Parveez, G. K. A., Tarmizi, A. H. A., Sundram, S., Loh, S. K., Ong-Abdullah, M., Palam, K. D. P., Salleh, K. M., Ishak, S. M., & Idris, Z. (2021). Oil palm economic performance in Malaysia and R&D progress in 2020. *Journal of Oil Palm Research*, *33*(2), 181–214. https://doi.org/10.21894/jopr.2021.0026

Rahman, A. K. A., Balu, N., Faizah, & Shariff, M. (2013). Opiejv13N1-Ayat. *Oil Palm Industry Economic Journal*, *13*(1), 1–13.

Raji, J. O., Idowu Abdulkadir, R., & Badru, B. O. (2018). Dynamic relationship between Nigeria-US exchange rate and crude oil price. *African Journal of Economic and Management Studies*, *9*(2), 213–230. https://doi.org/10.1108/AJEMS-06-2017-0124

Sihem, T. (2021). *The Relationship between Oil Price Shocks , Inflation Rate and Economic Growth (Econometric Study the Case of Algeria over the Period 1971-2016) □) 2016 − 197111*(02).

Socha, R. (2017). Determinants of crude oil prices. *Polityka Energetyczna*, *20*(1), 49–66. https://doi.org/10.14445/23939125/IJEMS-V4I10P101

Soundarapandiyan, K., & Ganesh, M. (2017). An Analytical View of Crude Oil Prices and Its Impact on Indian Economy. IOSR Journal of Business and Management, 23–28

Tang, K. H. D. (2018). Climate change in Malaysia: Trends, contributors, impacts, migration and adaptations. Science of the Total Environment, 650(2), 1858–1871

Tang, K. H. D., & Al Qahtani, H. M. S. (2019). Sustainability of oil palm plantations in Malaysia. Environmental Development and Sustainability. https://doi.org/10.1007/s10668019-00458-6

Vogler, S., Schneider, P., & Zimmermann, N. (2019). Evolution of Average European Medicine Prices: Implications for the Methodology of External Price Referencing. *PharmacoEconomics - Open*, *3*(3), 303–309. https://doi.org/10.1007/s41669-019-0120-9

World Bank. (2021). *World Bank Open Data | Data*. Worldbank.org. https://data.worldbank.org/

Zabid, M. F. M., & Abidin, N. Z. (2015). Palm oil industry: A review of the literature on the modelling approaches and potential solution. *AIP Conference Proceedings*, *1691*(December 2015). https://doi.org/10.1063/1.4937023

Zaidon, N. A., & Karim, Z. A. (2019). *THE MOVEMENT OF PALM OIL PRICE : Crude Palm Oil Price (MYR / ton)*. *2019*(Ice), 1–11.

APPENDICES

1. DESCRIPTIVE ANALYSIS

Date: 01/11/22 Time: 10:18 Sample: 2010 2020					
	CPO	ER	GDP	INF	M3
Mean	2545.909	3.684453	1.328182	1.834905	6.385452
Median	2609.000	3.905500	1.330000	2.090567	6.304048
Maximum	3219.000	4.300441	1.520000	3.871201	14.62794
Minimum	2119.000	3.060003	1.060000	-1.138702	2.674720
Std. Dev.	330.7708	0.515667	0.128749	1.380439	3.475262
Skewness	0.458941	-0.116700	-0.420653	-0.623345	1.088875
Kurtosis	2.575906	1.179387	2.963680	3.157851	3.884496
Jarque-Bera	0.468582	1.544174	0.325012	0.723778	2.532259
Probability	0.791131	0.462048	0.850011	0.696360	0.281921
Sum	28005.00	40.52898	14.61000	20.18395	70.23997
Sum Sq. Dev.	1094093.	2.659129	0.165764	19.05612	120.7745
Observations	11	11	11	11	11

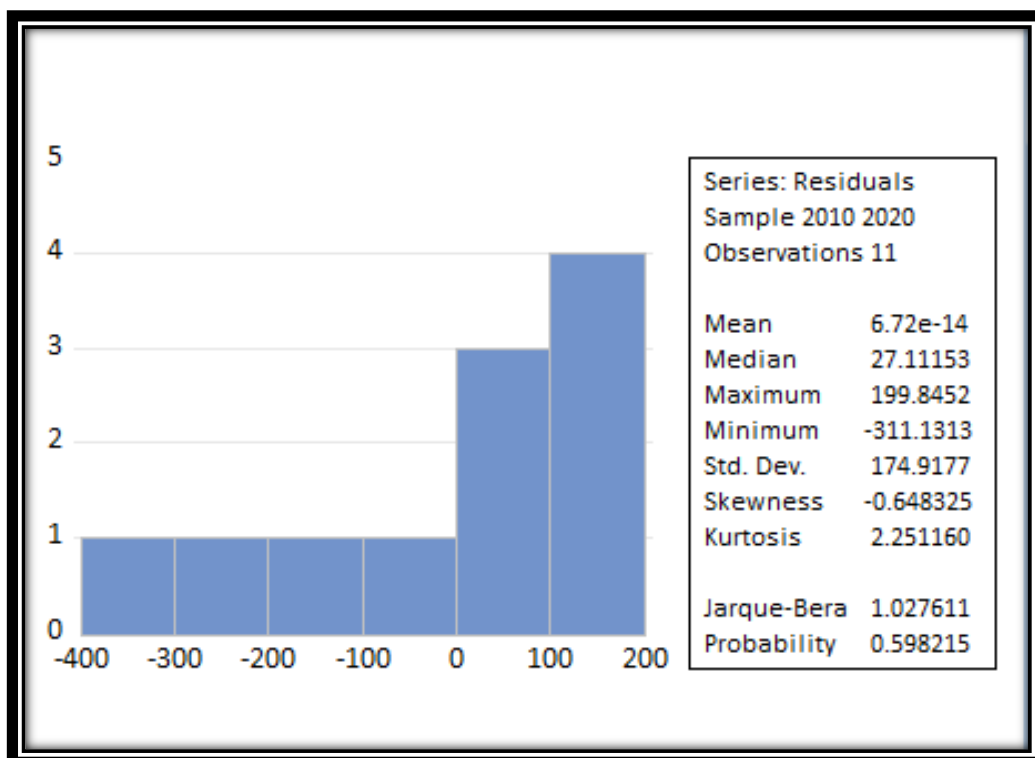## 2. COVARIANCE ANALYSIS

Covariance Analysis: Ordinary Date: 01/11/22 Time: 10:30 Sample: 2010 2020 Included observations: 11					
Correlation t-Statistic Probability	CPO	ER	GDP	INF	M3
CPO	1.000000 ----- -----				
ER	-0.360804 -1.160586 0.2757	1.000000 ----- -----			
GDP	-0.537968 -1.914558 0.0878	0.424513 1.406571 0.1931	1.000000 ----- -----		
INF	0.353484 1.133640 0.2862	-0.323047 -1.024048 0.3325	-0.323363 -1.025168 0.3320	1.000000 ----- -----	
M3	0.664948 2.670867 0.0256	-0.729357 -3.198310 0.0109	-0.252469 -0.782764 0.4539	0.267938 0.834319 0.4257	1.000000 ----- -----

3. REGRESSION ANALYSIS

Dependent Variable: CPO
Method: Least Squares
Date: 01/11/22   Time: 10:07
Sample: 2010 2020
Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2335.807	1093.206	2.136657	0.0765
ER	358.4411	218.4519	1.640824	0.1519
GDP	-1295.115	631.1207	-2.052088	0.0860
INF	30.39074	56.14475	0.541293	0.6078
M3	86.73256	30.24230	2.867922	0.0285

R-squared	0.720351	Mean dependent var		2545.909
Adjusted R-squared	0.533918	S.D. dependent var		330.7708
S.E. of regression	225.8178	Akaike info criterion		13.98029
Sum squared resid	305962.2	Schwarz criterion		14.16115
Log likelihood	-71.89159	Hannan-Quinn criter.		13.86628
F-statistic	3.863864	Durbin-Watson stat		2.447756
Prob(F-statistic)	0.069131			

4. NORMALITY TEST

Series: Residuals
Sample 2010 2020
Observations 11

Mean	6.72e-14
Median	27.11153
Maximum	199.8452
Minimum	-311.1313
Std. Dev.	174.9177
Skewness	-0.648325
Kurtosis	2.251160
Jarque-Bera	1.027611
Probability	0.598215

5. RAW DATA

YEAR	CPO (RM)	GDPP (RM BILLION)	INF	ER	M3
2010	2701	1.06	1.622852	3.221087	7.347736
2011	3219	1.24	3.174471	3.060003	14.62794
2012	2764	1.31	1.663571	3.088801	8.84602
2013	2371	1.34	2.105012	3.150909	7.397401
2014	2383	1.41	3.142991	3.27286	6.304048
2015	2153	1.26	2.10439	3.9055	3.043535
2016	2653	1.25	2.090567	4.148301	2.801134
2017	2798	1.33	3.871201	4.300441	4.644639
2018	2235	1.49	0.884709	4.03513	7.688024
2019	2119	1.52	0.662892	4.14247	2.67472
2020	2609	1.4	-1.1387	4.203482	4.864779