THE ANALYSIS OF INFLUENCING FACTORS TOWARDS INDONESIA CRUDE PALM OIL EXPORT TO CHINA PERIOD 1989 - 2019

A THESIS

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TABLE OF CONTENTS

ABSTRACT ii
ACKNOWLEDGEMENTS iii
CHAPTER I 1
INTRODUCTION 1
1.1 RESEARCH BACKGROUND 1
1.1.1 The Status of Crude Palm Oil In Indonesia 1
1.1.2 The Development of Indonesia Crude Palm Oil Exports Trade 6
1.1.3 The Benefits Towards Exports of Indonesia's Crude Palm Oil 9
1.2 PROBLEM FORMULATIONS 9
1.3 RESEARCH OBJECTIVES 9
1.4 RESEARCH CONTRIBUTIONS 10
1.5 SYSTEMATIC REVIEW 10
CHAPTER II 12
LITERATURE REVIEW 12
2.1 BRIEF THEORETICAL REVIEW 12
2.2 INTERNATIONAL TRADE 13
2.3 THE FACTORS INFLUENCED THE EXPORT 14
2.4.1 Exchange Rate 14
2.4.2 Gross Domestic Product (GDP) 15
2.4.3 Production 16
2.4.4 Price 16
2.4.5 Domestic Consumption 17
CHAPTER III 18
THEORETICAL ANALYSIS AND HYPOTHESIS 18
3.1 THEORETICAL REVIEW & HYPOTHESIS DEVELOPMENT 18
3.1.1 Exchange Rates & Exports 18
3.1.2 Gross Domestic Product & Exports 19
3.1.3 Production & Exports 19
3.1.4 International Price & Exports 20
3.1.5 Consumption & Exports 21
3.2 CONCEPTUAL FRAMEWORK 21
CHAPTER IV 23
RESEARCH METHODOLOGY 23
4.1 TYPE AND RESOURCE OF DATA 23
4.2 RESEARCH DESIGN 23
4.3 VARIABLE AND MEASUREMENT 24
4.3.1 Dependent Variable 25
4.3.2 Independent Variable 25
4.3.3 Descriptive Statistical Analysis 25

4.4 DATA ANALYSIS METHOD 26
4.4.1 Classical Assumption Test 26
4.4.1.1 Normality Test (Kolmogorov-Smirnov Test) 27
4.4.1.2 Linearity Analysis 27
4.4.1.3 Multicollinearity Test 27
4.4.1.4 Autocorrelation Test 28
4.4.1.5 Heteroscedasticity Test (Glejser Test) 28
4.4.2 Hypothesis Test Using Multiple Linear Regression 28
4.4.2.1 t-Test 30
4.4.2.2 F-Test 30
4.4.2.3 Coefficient of Determination 31
CHAPTER V 32
RESULT AND DISCUSSION 32
5.1 RESULT 32
5.1.1 Classical Assumption Test 32
5.1.1.1 Normality Test (Kolmogorov-Smirnov Test) 32
5.1.1.2 Linearity Analysis 33
5.1.1.3 Multicollinearity Test 33
5.1.2.1 t-Test 37
5.1.2.2 F Test 37
5.1.2.3 Coefficient of Determination 38
5.2 DISCUSSION 38
5.2.1 The Influence of Exchange Rate of Rupiah Against US Dollar on Volume of Export Indonesia Crude Palm Oil 39
5.2.2 The Influence of Gross Domestic Product on Volume of Export Indonesia Crude Palm Oil 39
5.2.3 The Influence of Crude Palm Oil Production on Volume of Export Indonesia Crude Palm Oil 40
5.2.4 The Influence of International Price of Crude Palm Oil on Volume of Export Indonesia Crude Palm Oil 41
5.2.5 The Influence of Domestic Consumption on Volume of Export Indonesia Crude Palm Oil 41
CHAPTER VI 44
CONCLUSION 44
6.1 CONCLUSION 44
6.2 IMPLICATIONS 45
6.3 SUGGESTIONS 46

REFERENCES 47
APPENDIX 61
Appendix 1. Classical Assumption Test 61
Appendix 2. Multiple Linear Regression 63

LIST OF FIGURES

Figure 1.1 Indonesia Vegetable Oil Production Period 1989 - 2019 2
Figure 1.2 Indonesia Palm Plantation and Crude Palm Oil Production Period 2000 - 2021 3
Figure 1.3 Indonesia Crude Palm Oil Production and Consumption Period 1989 - 2021 4
Figure 1.4 The Top 5 Crude Palm Oil Producers In The World Period 1989 - 2019 5
Figure 1.5 The Export and Production of Indonesia Crude Palm Oil Period 1989 - 2019 6
Figure 1.6 The Indonesia Export Commodities Period 2020 7
Figure 1.7 The Import of Indonesia Crude Palm Oil In China Period 1989 - 2019 7
Figure 1.8 The Production and Domestic Consumption of Vegetable Oil In China Period 1989 - 2019 8
Figure 3.1 Conceptual Framework 22

LIST OF TABLES

Table 4.1 Variables, Names, Symbols, Unit of Measurement, and Definitions 24
Table 4.2 Descriptive Statistics Table Results 26
Table 5.1 Multicollinearity Test Results 34
Table 5.2 Breusch-Godfrey Serial Correlation LM Test Results 34
Table 5.3 White Test Results 35
Table 5.4 Multiple Linear Regression Results 36
Table 5.5 Table of The Hypothesis Analysis Results 42

CHAPTER I

INTRODUCTION

1.1 RESEARCH BACKGROUND

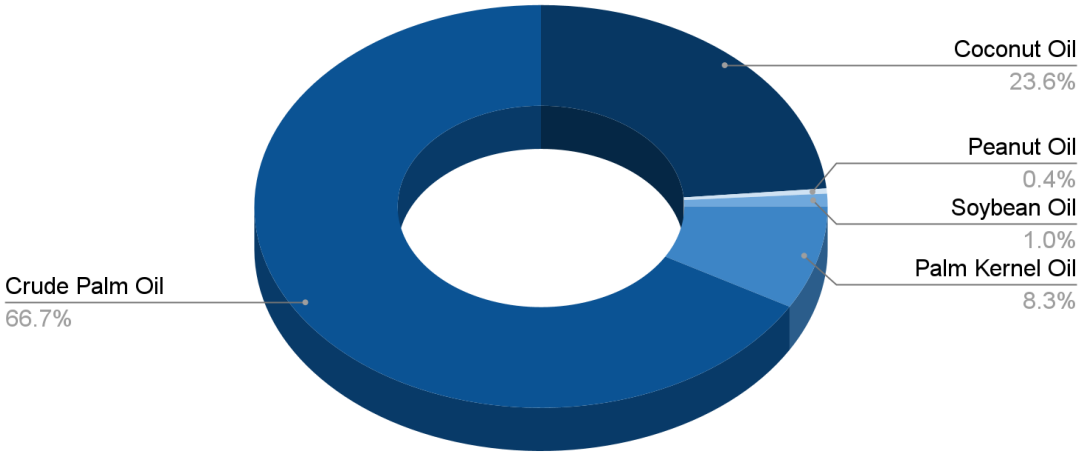
1.1.1 The Status of Crude Palm Oil In Indonesia

Every country in the world has different specializations in producing goods. The differences in geographical conditions, climate, technology, economic structure, labor, social, and politics can be the factors behind the difference in natural resources between countries. All countries utilize the opportunity to gain benefits through conducting international trade. To fulfill the demand of domestic consumption, every country tends to exchange goods with their specialized goods. International trade gives many benefits including being able to expand existing domestic markets in the international markets, encourage the smooth flow of domestic trade, and overcome the problem of excessed production by exporting to other countries. So the domestic market production can be optimal (Tan, 2011). In other words, exports reflect the country's economic growth.

Indonesia has been widely known as a country that has an abundance of natural resources. The abundance of natural resources produces a variety of agricultural commodities which can be an advantage for Indonesia to gain benefits from international trade. According to data from the Central Statistics Agency (BPS), the horticulture sector in Indonesia contributed IDR 192.9 trillion (approximately USD 13.1 billion) to the country's GDP in 2020, up from IDR 182.5 trillion (approximately USD 12.4 billion) in 2019. The number indicates a growth rate of GDP around 5.7%. Over the past 20 years, the development of the vegetable oil industry in Indonesia continues to increase. The growth can be seen from figure 1.2 in the amount of production and also the area of oil palm plantations. Palm oil is a strategic commodity for Indonesia. As one of the world's largest producers and exporters of palm oil, Indonesia plays a critical role in the global palm oil market. Palm oil is an essential ingredient in a wide range of products, including food, cosmetics, and biodiesel. Indonesia's palm oil industry has grown rapidly in recent years, driven by increasing demand from both domestic and international markets. Palm oil production provides significant benefits for Indonesia's economy. According to PASPI (2016) research states that the palm oil industry is a major contributor to the country's economic development, poverty alleviation, and improving the welfare of Indonesian farmers. On the other hand, the contribution of the palm oil industry can be seen from the growth in investment, economics, output and foreign exchange.

Indonesia produces many kinds of vegetable oil. The vegetable oil products include crude palm oil, coconut oil, palm kernel oil, soybean oil, and peanut oil. The figure 1.1 displays crude palm oil as the highest production among other vegetable oils which is about 66.7% followed by coconut oil about 23.5%. High number of production indicates that Indonesia crude palm oil has a large quantity to support both domestic consumption and international demand that continuously increases every year. The General Directorate of Horticulture (2021) stated that crude palm oil (CPO) is at the top rank among the nine primary horticulture commodities in terms of export. About 9.5% of volume export increased in 2021 or equivalent to USD 25.16 billion increase from USD 22.97 billion. According to Susila in BPS (2008), the CPO performs strategic contributions to Indonesia's economy through export, poverty reduction, and more job creation. Furthermore, the CPO is the primary substance of alternative energy to substitute fossil fuels or can be recognized as biodiesel energy.

Figure 1.1



Indonesia Vegetable Oil Production Period 1989 - 2019

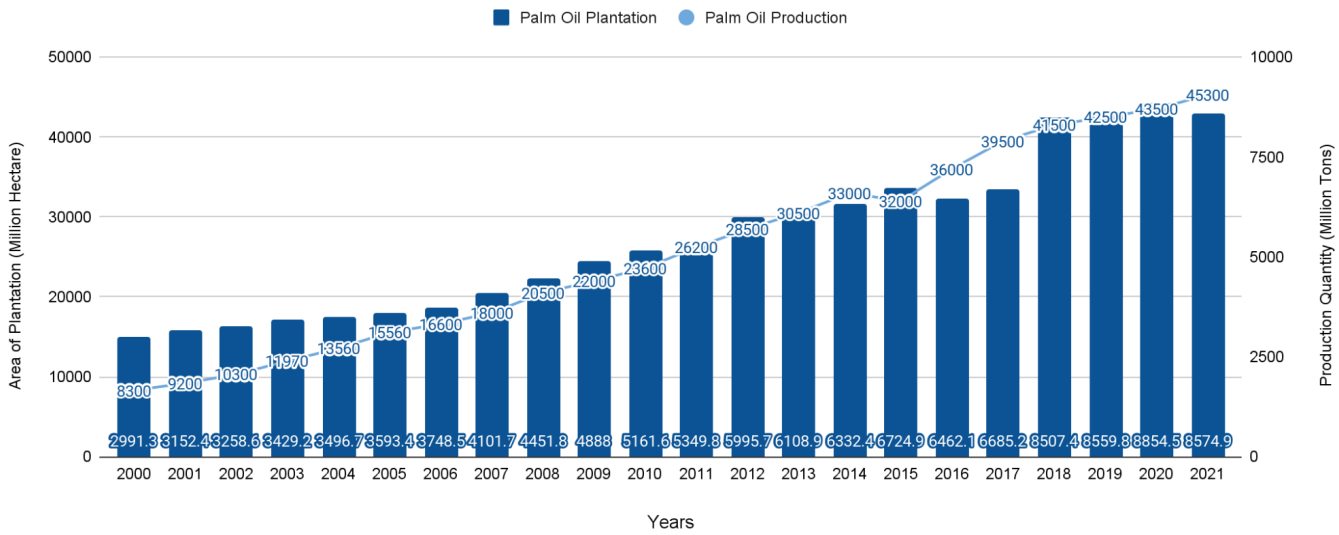
Source: United States Department of Agriculture Foreign Agricultural Service, 2019

Along with the development of the Indonesian palm oil industry, Indonesia has succeeded in becoming the world's main exporter of crude palm oil. Indonesia even has become one of the world's main producers of vegetable oil. The proportion of world crude palm oil consumption has managed to outperform the domination of soybean oil consumption for decades, which placed the first rank in world vegetable oils. The situation places Indonesia in an increasingly important position in the international market. The predominance of palm is unbeatable by other vegetable oils especially soybean oil, sunflower

oil, and rapeseed oil. In terms of productivity and the cheapest price, crude palm oil is still more favorable than other vegetable oils.

Year by year, Indonesia has expanded the area of palm plantations across the islands. The plantation area reached 8.5 million hectares in 2021 and continued to increase in the following years. Palm plantation has been widely planted outside Java islands such as Sumatera island, Sulawesi island, and Kalimantan island. Sumatra island is the largest palm oil producer and plantation area in Indonesia. According to the United States Department of Agriculture (USDA) report released in February 2023, Indonesia's total palm oil production in 2023 is estimated to reach 49 million metric tons, which increased about 3.3% compared to the previous year. In 2023, palm oil production in Riau reached 25 percent of Indonesia's total palm oil production, while North Sumatra was 17 percent, and West Kalimantan was 15 percent (USDA, 2023). The graph in figure 1.2 shows that the increase in plantation area was followed by the rise in the quantity of crude palm oil production. In 2018 the production increased significantly to 41500 million tons followed by an increase in palm plantation to 8507.4 million hectares. The increase of the palm plantation area, followed by the increase in the amount of palm oil production. Accompanying the increase in the amount of palm oil production, the amount of palm oil exports to other countries from Indonesia will also be increased.

Figure 1.2

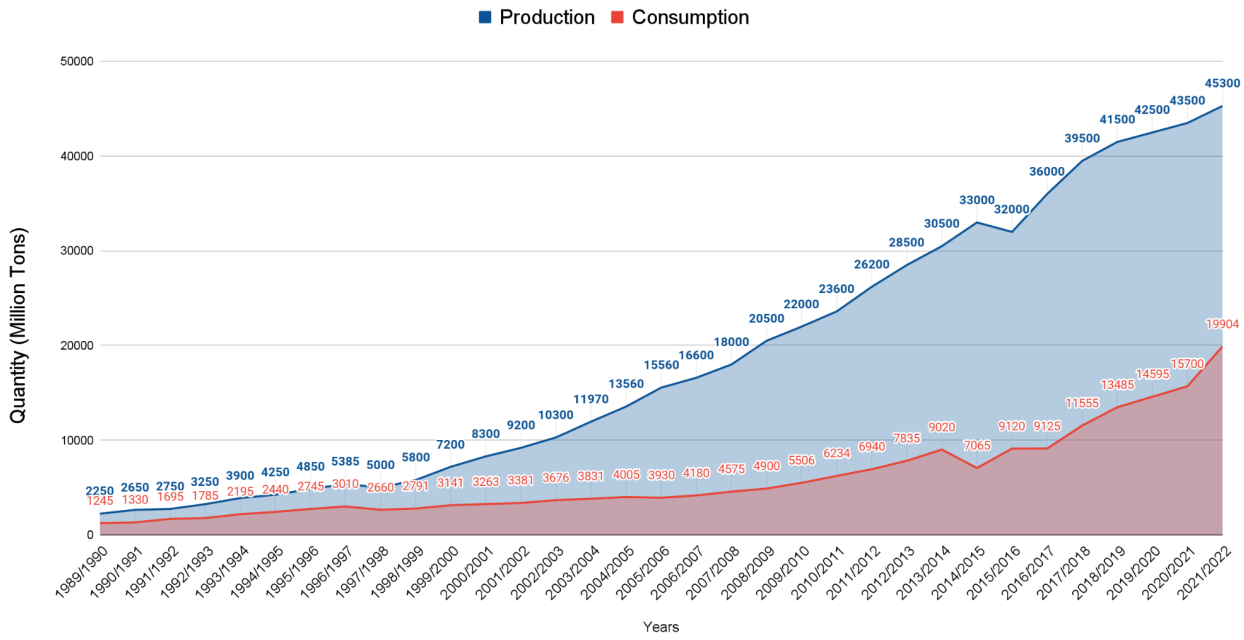


Indonesia Palm Plantation and Crude Palm Oil Production Period 2000 - 2021

Source: Badan Pusat Statistik, 2021

Different people have different tastes in each country and it will affect the country's consumption pattern of vegetable oil (Ervani, 2013). In addition, the role of vegetable oil price plays an important role in influencing the composition of various types of vegetable oil consumption in the world. In 2023, world consumption of crude palm oil reached 84.1 million tons, followed by soybean oil at 58.4 million tons, rapeseed oil at 30.6 million tons and sunflower oil at 19.3 million tons means that the consumption of soybean oil and palm oil has the highest number of consumption compared to other kind of vegetable oil (USDA, 2023).

Figure 1.3



Indonesia Crude Palm Oil Production and Consumption Period 1989 - 2021

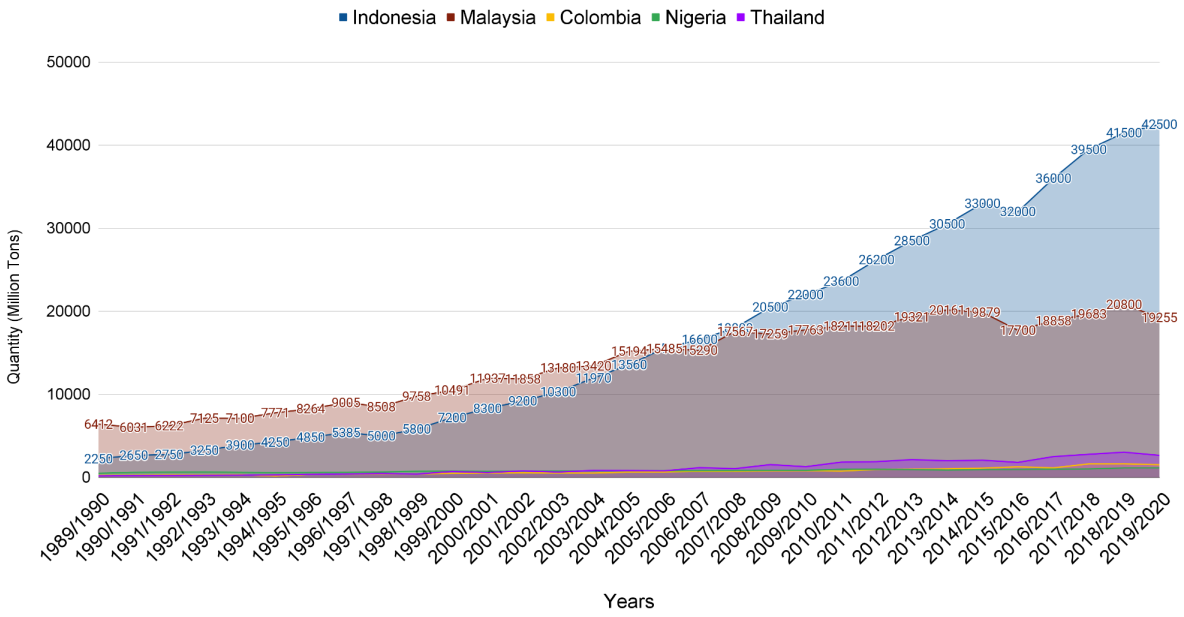
Source: United States Department of Agriculture Foreign Agricultural Service, 2021

The high amount of crude palm oil production in Indonesia makes the domestic consumption fulfilled, even exceeding more than two times the domestic demand (Directorate General of Plantation, 2021). The figure 1.3 indicates that Indonesia crude palm oil production was bigger than the domestic consumption itself. In 2021 the quantity CPO that was produced reached 43500 million tons, while the domestic consumption was 19904 million tons. Means that Indonesia can accomplish the domestic demand and the rest of the crude palm oil production will be exported to various countries such as China and India. The increase in domestic consumption will impact the increase of crude palm oil production. Since the imported country relies on Indonesia crude palm oil and their domestic supply continues to

increase every year, then Indonesia keeps increasing crude palm oil production to fulfill other country's domestic demand.

Palm oil industry is one of the leading industries in the agricultural sector of developing countries such as Indonesia, Malaysia and Thailand. Indonesia has become the biggest producer of crude palm oil in the world. The production of Indonesia crude palm oil has been stable and continues to increase afterwards. The figure 1.4 reveals the top 5 biggest crude palm oil producers in the world which include Indonesia, Malaysia, Colombia, Nigeria, and Thailand. Based on the 1.4 Indonesia and Malaysia were among the countries that produce the highest number of crude palm oil which is about 42500 million tons and 19255 million tons in 2019 that dominate the crude palm oil market compared to other countries.

Figure 1.4



The Top 5 Crude Palm Oil Producers In The World Period 1989 - 2019

Source: United States Department of Agriculture Foreign Agricultural Service, 2020

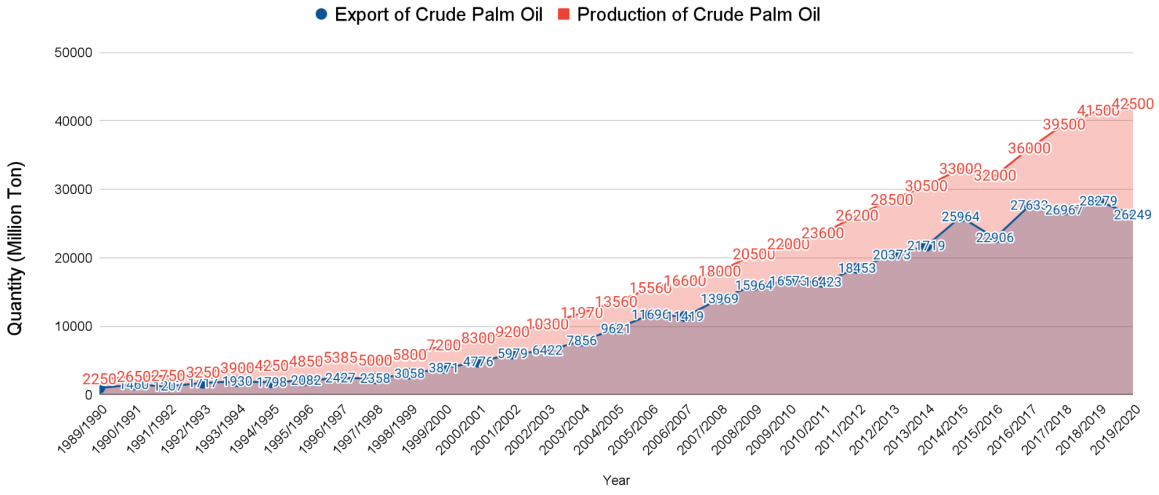
Indonesia and Malaysia continue to compete to produce crude palm oil. In the beginning of 1989, both Indonesia's and Malaysia's palm oil export share increased simultaneously. However in 2006, Malaysia's export declined, while Indonesia's export had been continuously growing until Indonesia declared the position as the main crude palm oil producer in the world, surpassing Malaysia's position. The CPO production of Indonesia reached 46.4 million tons in 2020 which was the highest production quantity of crude palm oil in the world (GAPKI, 2020).

1.1.2 The Development of Indonesia Crude Palm Oil Exports Trade

Crude Palm oil is the leading export commodities of Indonesia. Due to the fact that crude palm oil is the substance of biodiesel which is the alternative energy to substitute petroleum. The development of this alternative energy potentially affects the world crude palm oil demand. Indeed, the increase of international demand gives a big opportunity for Indonesia to export more quantities of crude palm oil to various countries.

The development of Indonesia's palm oil export volume in 1989 - 2019 fluctuated, but the total export of crude palm oil (CPO) over the past thirty one years has tended to continue to increase as illustrated on figure 1.5. In 2013 the volume export reached 2179 million tons while the production is 30500 means that the increase in export quantity followed by the increase in production quantity of crude palm oil. On the other hand, in 2016 the quantity exported continued to rise about 27663 million ton followed by the quantity of production about 36000 million tons. Indonesia, as a country with the biggest crude palm oil volume export globally, decreased the quantity of crude palm oil exports starting in 2019 when COVID-19 starts to spread across different countries. Since there was a change in policies in every country around the world and the lockdowns policies also caused several impacts on trade activities on all countries that impact the global economy. COVID-19 not only impacts the export quantity but also the quantity of production. The government policies require the people to work from home to reduce the impact of COVID-19 that can be one of the factors affecting the production quantity.

Figure 1.5

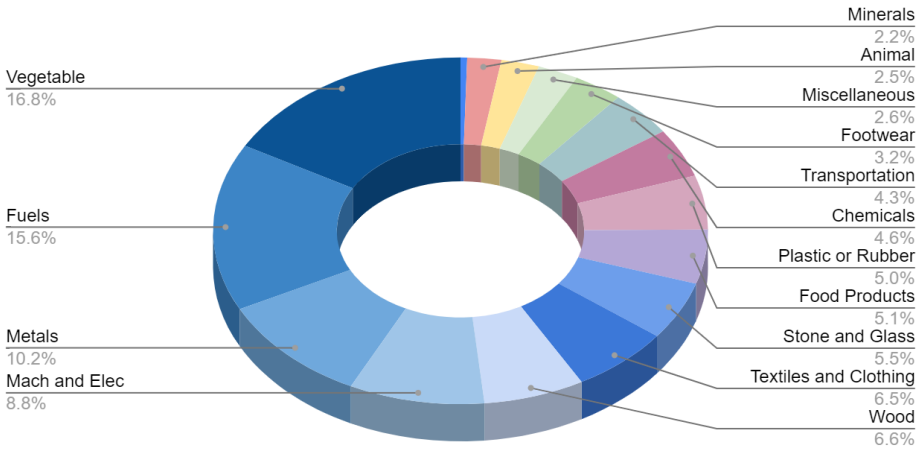


The Export and Production of Indonesia Crude Palm Oil Period 1989 - 2019

Source: United States Department of Agriculture Foreign Agricultural Service, 2019

As a country with abundance of natural resources, Indonesia continues to enlarge long term relationships among countries in order to increase the export quantity and gain more benefit from the trade activity. Crude palm oil being the main commodity export of Indonesia due the high production and productivity among producers of crude palm oil in Indonesia. Figure 1.6 shows that Indonesia's vegetable sector exports reached 16.8% followed by fuels 15.6% in 2020. Means that the vegetable sector leads the export commodity more than other commodities. The vegetable sector contains the vegetable oil commodity which includes crude palm oil products as the main commodity export.

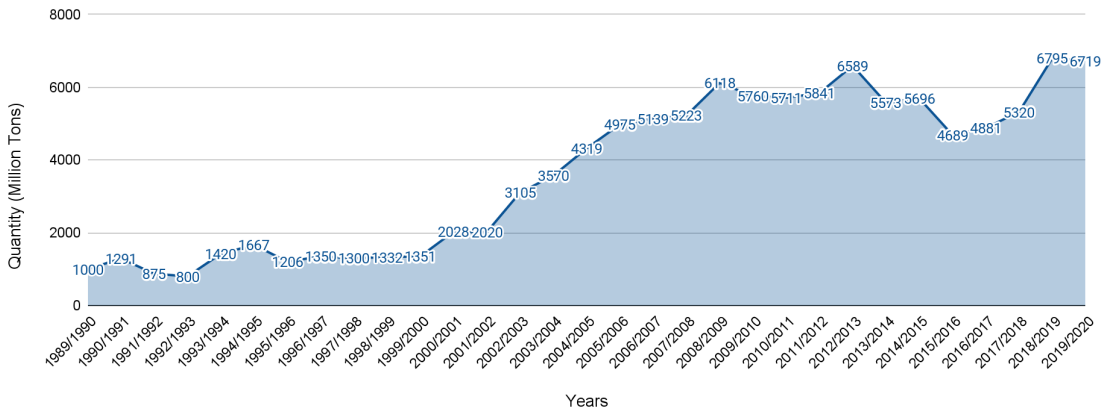
Figure 1.6



The Indonesia Export Commodities Period 2020

Source: The World Integrated Trade Solution, 2020

Figure 1.7

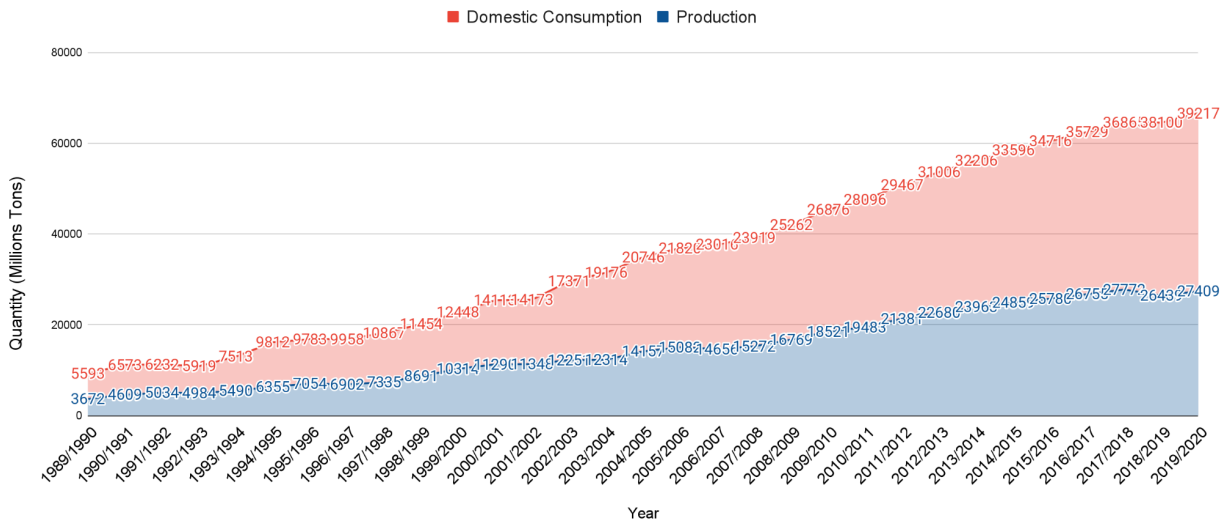


The Import of Indonesia Crude Palm Oil In China Period 1989 - 2019

Source: United States Department of Agriculture Foreign Agricultural Service, 2019

China is one of the world's main producers of soybean oil, with production of 15.58 million tons or 29% of total world production, followed by the USA, with production of 10.22 million tons or 19% (Directorate General of Plantation, 2021). Even though China is the world's main producer of soybean oil and rapeseed, China is still a net importer country because the domestic consumption far exceeds from the domestic production. Therefore, China needs to import from other countries to fulfill the domestic demand. As the main export partner of Indonesia, China imports a high amount of crude palm oil from Indonesia. In figure 1.7 it illustrates that the import quantity of crude palm oil from Indonesia fluctuates but keeps increasing every year and reached the highest import quantity in 2018. Indonesia's CPO exports to China have the largest share proportion due to the big amount of crude palm oil that is being exported to China.

Figure 1.8



The Production and Domestic Consumption of Vegetable Oil In China Period 1989 - 2019

Source: United States Department of Agriculture Foreign Agricultural Service, 2019

China tries to produce vegetable oil in their country in order to reduce the amount of imports from other countries but in figure 1.8 it indicates that there is a huge gap between the amount of vegetable oil production and domestic consumption. In 2019 it shows a big gap between production and domestic consumption in China which is about 27409 million tons and 39217 million tons. The gap means that the consumption of vegetable oil in China increases significantly while China cannot satisfy the demand. The figure 1.8 also illustrates that the import quantity continues to rise year by year. So both figures support China increasing the crude palm oil import quantity in order to fulfill the domestic demand.

1.1.3 The Benefits Towards Exports of Indonesia's Crude Palm Oil

Crude palm oil is one of the sub-sector commodities that plays an important role in Indonesia's economy because CPO is the top non-oil and gas export commodities that can generate foreign exchange (Baek, 2007). The increased demand of crude palm oil (CPO) is influenced by the needs of raw material for bio-energy alternative fuels or biofuels (Prajitno and Saputra , 2012). The high production of crude palm oil has been one of the triggers for Indonesia to boost the export volume that impacts the growth in export value. As a leading export commodity, crude palm oil not only supports economic development but also can provide more jobs, rise in economic growth, as the source of foreign exchange and decrease poverty (Mariati, 2009). The crude palm oil export also makes a significant contribution to generating foreign exchange, enlarging potential market share, and helping Indonesia trade balance to be surplus (BPS, 2008).

1.2 PROBLEM FORMULATIONS

Based on the explanation in the introduction, there are many factors influencing the development of the palm oil industry in Indonesia. As a result, this study will analyze the influencing factors of Indonesia crude palm oil export to China. The formulation of the problem are:

1. What are the factors that significantly influence the export volume of Indonesia crude palm oil to China?
2. What is the impact of these factors on Indonesia's export of crude palm oil to China?
3. How do these factors affect the export volume of crude palm oil from Indonesia to China?
4. How can Indonesia enhance the export of crude palm oil to China?

1.3 RESEARCH OBJECTIVES

Based on the problem formulation, this study aims to:

1. To analyze whether Exchange Rate, Price, Production of Indonesia Crude Palm Oil, GDP, and Consumption have a significant influence on the Export Volume of Indonesia crude palm oil to China
2. To identify the reason and direction of influence the Exchange Rate, Price, Production, GDP, and Consumption on the Export Volume of Indonesia crude palm oil to China

1.4 RESEARCH CONTRIBUTIONS

This research provides three major contributions. First, the research can study the influence of exchange rate, price, production, GDP, and consumption on crude palm oil export. Second, the research can provide empirical study about the influencing factors of Indonesia crude palm oil export to China in the last 30 years. Third, this study is expected to be a reference material and be able to give several contributions for:

1. Governments

   The results of this study are expected to be a consideration for the government in making decisions and determining palm oil export policies. This research intended to provide additional information and relevant data on the last 30 years.

2. Researchers

   The output of this study is expected to provide more insight and a good understanding of international trade. This research is also expected to provide further information to the researchers and can be used as a reference for researchers in this study area

1.5 SYSTEMATIC REVIEW

The systematic writing in this study is divided into six chapters and each chapters consist of:

CHAPTER I INTRODUCTION

This chapter describes the general explanation of the study as the outline of the conceptual base that include research background, problem formulation, objectives of the research, contribution of the research, and systematic writing of the research.

CHAPTER II LITERATURE REVIEW

This chapter consists of specific theories used as the foundation of the research variable of this study.

CHAPTER III THEORITICAL ANALYSIS & HYPOTHESIS

This chapter contains the explanation of theoretical analysis from prior research, hypothesis development, and the conceptual framework of this study.

CHAPTER IV RESEARCH METHODOLOGY

This chapter explains the research method which carries out type of research, the source of the data, design of the research, descriptive statistics, the variables used on the study and measurement include the Exchange Rate, Price, Production, GDP, and Consumption followed by method of data analysis that consist of classical assumption test and multiple linear regression analysis.

CHAPTER V ANALYSIS AND DISCUSSION

This chapter explains the result of the research analysis with the overview of the research object, the result of classical assumption test and multiple regression, followed by discussion and conclusion of the tested hypothesis.

CHAPTER VI CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The final chapter of this study contains the conclusions of the research, the implication of the study, and the suggestions for future studies.

CHAPTER II

LITERATURE REVIEW

2.1 BRIEF THEORETICAL REVIEW

According to the law of comparative advantage, each country should specialize in producing goods and export the excess goods to the other country in exchange for the other goods (Husted & Melvin, 2012). In the Ricardian theory as stated by David Ricardo, countries will export goods that their labor produces relatively efficient and import goods that their labor produces relatively inefficient or in other words a country's production pattern is determined by comparative advantage (Evenett, 2017). Comparative advantage occurs when a country can produce a good at a lower opportunity cost than another country (Tambunan, 2000). According to Junaidi (2005), even though a country did not have an absolute advantage in any goods, every country still gained benefits from international trade if countries specialized in producing goods in which they had the greatest absolute advantage. Based on Adam Smith's theory, trade between two nations is based on absolute advantage and he believed that different countries had unique advantages in producing certain goods (Chris & Donald, 2016). When a country is more efficient or has an absolute advantage over another country in producing one commodity but less efficient or has an absolute disadvantage over other countries in producing other commodities, then both countries can gain benefit by specializing in the production of an absolute advantage commodity (Meiners et al., 2000). Based on the Heckscher–Ohlin theory shows that comparative advantage is influenced by the interaction between nation's resources (the relative abundance of factors of production) and the technology of production which influences the relative intensity that different factors of production are used in the production of different goods (Goeltom, 1998). The theory of Heckscher–Ohlin underlines the interplay between the proportions of different production factors available in various countries and the proportions of production in different goods (Simamora, 2000).

According to Mankiw (2006), the law of demand determines that the quantity demanded of goods declines when the price of the goods rises. Demand defines the rate at which customers are willing to purchase a product (Obado et al., 2009). The economic theory defines demand based on two factors including taste (the desire for a good that determines willingness to buy the good at a specific price) and ability to buy (the customers will buy the goods at a specific price which the customers possess sufficient wealth or income). The market price influences both factors because when the market price of a product is high, the demand will decrease. Meanwhile, if the price is low, demand will increase because consumers will be able to purchase the product. The price of each commodity depends on the extent to which

consumers demand it (Lindert, 1994). According to Linder (1993) when the price increases, there will be more commodities that will be available to the buyers and the suppliers will be able to maintain the profit despite the higher costs of production that may result from the short-term expansion of their capacity. The concept of a general classical economic equilibrium is based on the balance of supply and demand that plays an important role in theoretical economics and it appears when the demand curve matches the supply curve at the point where an upward-sloping supply curve and a downward-sloping demand curve intersect (Krugman, 2018). In reality, the concept will be difficult to implement because the prices of goods and services frequently change due to fluctuations in demand and supply (Pracoyo, 2006).

2.2 INTERNATIONAL TRADE

According to Sukirno (2010) trade is defined as a process of exchanging based on the desire of both parties. International trade arises when two or more parties conduct trade to gain benefits that can be obtained from the trade (Boediono, 1999). International trade is also defined as trade between countries, including exports and imports activities. According to Sukirno (2010). export demand is the number of goods or services requested to be exported to different countries. Export refers to the trade activity in various countries using the payment system, quality, quantity and other terms of trade that the exporter and importer have agreed (Reynalto, 2019). In general, export is the act of selling goods or commodities to other countries (Nopirin, 1996). According to Krugman (2018), exports are goods and services sold to foreign countries in exchange for other goods. Mankiw (2010) mentioned that export divided into three types including direct exports (exports that are sold directly to end-users in another country, for example a company may sell the products directly to consumers or businesses in a foreign market), indirect exports (exports that are sold through intermediaries such as agents, distributors, or wholesalers, for example a company may sell the products to an intermediary in a foreign market then sells the products to end-users), and re-exports (exports of goods that were imported into a country and then re-exported to another country without undergoing any significant transformation, such as a company may import goods from one country and then export them to another country without processing or manufacturing them). According to Sukirno (2010), the benefits of export activities are:

a. Expanding the country's products market. For example, batik clothes are one of the Indonesian products that have started to be recognized by people from various countries. If the demand of batik clothes increases, the income of batik suppliers will also increase. The higher income allows batik production activities to grow and expand their market.
b. Increase the country's foreign exchange. Trade between countries allows exporters to sell goods to overseas communities. Thus, exports can boost the country's wealth.

c. Expanding job opportunities. Export activities will provide more job opportunities. The wider country's products market, the higher domestic production activities. The higher production activities, the more workers are needed.

International trade is divided into goods and services. According to Tambunan (2000), each party gains mutual benefits from the differences (of goods and services) in each country. According to Nopirin (2010), international trade often arises due to the differences in the price of goods in various countries, the differences in tastes, and the difference in income. According to Krugman et al., (2018), differences between countries are the only reason for the countries to conduct international trade. The reasons why trade between countries may occur as followed:

a. Beneficial trade can occur between countries if the countries differ in their technological abilities to produce goods and services. Technology refers to the techniques used to turn resources (labor, capital, land) into outputs (goods and services). The basis for trade in the Ricardian model of comparative advantage is differences in technology.
b. Beneficial trade can occur between countries if the country differs in their resource endowments. Resource endowments refer to the skills and abilities of a country’s workforce, the natural resources available within the borders (minerals, farmland, etc.), and the sophistication of the capital stock (machinery, infrastructure, communications systems). The basis for trade in the Heckscher-Ohlin model is differences in resource endowments.
c. Beneficial trade can occur between countries if demands or preferences differ between countries. Individuals in different countries may have different preferences or demands for various products. For example, the Chinese are likely to demand more rice than Americans, even if consumers face the same price. Variety of demand can be based on differences in tastes between consumers.

2.3 THE FACTORS INFLUENCED THE EXPORT

2.3.1 Exchange Rate

Based on Mankiw (2014), the exchange rate is defined as the price of foreign currency in domestic currency. Exchange rate is important when conducting the exchange or trade (Kanza, 2018). Exchange rate can be used as a tool to increase competitiveness (encourage exports) (Goeltom, 1998). The exchange rate determines the currency's value compared to other currencies because the high value of foreign exchange makes the value of domestic currency relatively cheap or decreased (Nopirin, 1996). When currency decreases in value compared to other currencies, it is called depreciation, meanwhile when the currency increases in value compared to other currencies, it is called appreciation (Tambunan, 2000).

Sukirno (2004) stated that the exchange rate is crucial when conducting economic transactions with other countries because the transaction process uses two different types of currencies. The exchange rate can be interpreted as the price of a domestic currency against another country's currency (Haryadi, 2007). The exchange rate can be divided into real and nominal exchange rates (Mankiw, 2006). The nominal exchange rate is the value used when exchanging a country's currency with another country's currency. In comparison, the real exchange rate measures the price of goods and services in the domestic country that can be exchanged in terms of foreign goods and services in a foreign country. The real exchange rate measures an economy's international competitiveness (Nopirin, 1996). The real exchange rate will impact price distortions and resource misallocation of tradable and non-tradable goods. According to Haryadi (2007), there is undervaluation and overvaluation in the real exchange rate. An overvalued real exchange rate will decrease the profit, which can reduce investment that affects the negative implications on export and trade balance. Sukirno (2004) stated that the exchange rate becomes crucial because the exchange rate can be used as an instrument to measure the economic situation of a country. The stable currency value indicates the stable economic conditions of a country (Salvatore, 1997).

2.3.2 Gross Domestic Product (GDP)

According to Krugman (2004), Gross Domestic Product is a measure of the total value of all final goods and services produced within a country's borders over a specified period (usually a year or a quarter). As mentioned by Trenggonowati (2010), GDP is often used as a key indicator of a country's economic performance, as it reflects the size and growth rate of the economy. In addition, a country's level of imports can also reflect the level of the economic activity because if a country is experiencing strong economic growth, the businesses and consumers are likely to demand more goods and services, some of which may need to be imported from other countries. A higher GDP may lead to an increase in consumer and business spending, which can increase the demand for goods and services, including exports (Yuniarti, 2007). The increase in demand for exports can benefit the country's exporters, who may be able to sell more of their products or services because a strong GDP can create opportunities for exporters by increasing demand for goods and services, improving access to resources, and opening up new markets (Mankiw, 2014). As stated by Yuniarti (2007), a country's GDP can affect the currency exchange rates because when a country's GDP is strong, it may lead to an appreciation of the currency, making the exports more expensive for foreign buyers that can reduce demand for the country's exports and making it harder for the exporters to sell their products.

2.3.3 Production

According to Surbakti (2020), production is the process of transforming inputs raw materials, labor, and capital into finished goods or services that can be sold in the market which involves a series of activities that carried out in a systematic manner to create value-added products or services. Production refers to the process of creating goods and services that are valuable and can be sold in the market (Feenstra, 2018). Krismadayanti (2020) believes that production is a crucial factor that drives Indonesia's export of CPO to China due to the impact on supply and demand dynamics, trade policies, transportation costs, and the overall economic relationship between the two countries. Salvatore (1997) said that the goal of production is to create the maximum amount of output using the minimum amount of resources which is known as efficiency. Efficiency can be achieved when resources are allocated in the most optimal way to produce the maximum amount of goods and services that are achieved through the use of technology, innovation, and the specialization of labor (Delle Chiaie et al., 2017). As said by Sukirno (2006), trade benefits a country in either of two ways. First, trade as an indirect method of production. Instead of producing a good for itself, a country can produce another good and trade it for the desired good. The simple model shows that whenever a good is imported, the indirect production requires less labor than direct production. Second, trade enlarges a country's consumption possibilities, which implies gains from trade. The distribution of the gains from trade depends on the relative prices of the goods countries produce. The ultimate goal of production is to create value for customers by transforming inputs into finished products or services that meet their needs and expectations (Zuhroh & Kaluge, 2007).

2.3.4 Price

According to Kusuma & Firdaus (2015), price is the amount of money, goods, or services that a buyer pays to a seller in exchange for a good or service. Price represents the value placed on a product or service by both the buyer and the seller in a market transaction. Greene (2012) said that the price of a product or service is determined by a variety of factors, such as production costs, competition, supply and demand, and consumer preferences. In a free market economy, prices are typically set by the forces of supply and demand, with prices rising as demand increases and falling as supply increases (Rahman, 2021). Ginting (2021) stated that price is determined by the interaction of supply and demand in a market. When the supply of a good or service exceeds demand, the price typically falls as sellers try to entice buyers with lower prices and when demand exceeds supply, the price typically rises as buyers compete for a limited number of goods or services (Singagerda et al., 2013). Telaumbanua (2013) mentioned that a fair price is treating consumers with the respect they deserve and it has two separate meanings, including acceptable and just. Acceptable implies that a fair price is satisfactory, while just price is a judgment that the price has been justified which is free of favoritism or bias consistent with rules, logic or ethics. In

addition, Shiozawa (2017) stated that consumers may change their purchasing behavior based on the price of a product. In case if a product becomes too expensive, consumers may choose to switch to a cheaper product. While if a product is priced too low, it may be perceived as low quality and consumers may choose to purchase a more expensive product. Price is a complex concept that is influenced by a variety of factors (Cashin et al., 2004).

2.3.5 Domestic Consumption

According to Pugel (2016), consumption is a term used to describe the act of using goods and services to satisfy human wants and needs. Consumption is driven by a number of factors such as preferences, income levels, prices, availability of credit, and social and cultural factors (Haryati & Hidayat, 2015). French (2017) mentioned that tastes and preferences are important determinants of consumption because people tend to consume goods and services that the consumer enjoys and reflect the values and interests. In addition, expectations about the future, such as changes in income or prices can also influence consumption patterns (Moloi & Marwala, 2020). Consumers make choices about what to buy based on a variety of factors, including the perceived quality and utility of the goods or services, the price, and the availability of substitutes (Krugman, 2004). Consumption is a fundamental component of the economy and accounts for a significant portion of the Gross Domestic Product (GDP) of a country (Amiruddin et al. 2005). Consumption is an essential component of economic growth because when individuals consume goods and services, it creates demand for those goods and services which drives economic growth (Feenstra, 2018).

CHAPTER III

THEORETICAL ANALYSIS AND HYPOTHESIS

3.1 THEORETICAL REVIEW & HYPOTHESIS DEVELOPMENT

In order to provide a comprehensive understanding related to the factors that influence Indonesia in exporting Crude Palm Oil (CPO) to China, this study uses in-depth explanation from the previous research studies that have been conducted. To analyze the influencing factor of Indonesia export CPO to China, the researcher uses the study by Nurussalam (2018) as the first base of the study. In order to develop new conceptual framework, the researcher decided to combine the study by Nurussalam (2018) with Wikatama (2022) and Ridwannulloh (2018) to increase credibility and provide a solid foundation for the new framework since those studies were examined the factor that influence Indonesia in exporting CPO to China. The base studies from prior research were conducted below 5 years before this study to provide relevant situations and increase the reliability and validity of the study.

3.1.1 Exchange Rates & Exports

Sitepu and Butarbutar (2019) collected data during the period from 2000 to 2019 to analyze the impact of exchange rates on Indonesia's palm oil exports to China using multiple regression analysis. The study found that the exchange rate between the Indonesian rupiah and the US dollar had a partially significant impact on crude palm oil exports. Gerber (2011) stated that the exchange rate has a significant impact on exports because it affects the price competitiveness of a country's goods and services in international markets. When a country's currency depreciates or weakens in value relative to other currencies, the exports become cheaper for foreign buyers that make buyers more attractive and competitive (Kusuma & Firdaus, 2015). Based on the study by Hanny (2018), the exchange rate can affect the competitiveness of Indonesian CPO in the Chinese market. A stronger Indonesian rupiah (IDR) relative to the US dollar (USD) can make Indonesian CPO more expensive for Chinese buyers, thereby reducing demand and exports. In addition the exchange rate can affect the profitability of exporting firms because when a country's currency depreciates, the revenues generated from exports will be worth more in domestic currency that increases the profitability of the exporting country (Budiman et al., 2017). A weaker exchange rate can increase demand for exports and improve profitability, while a stronger exchange rate can decrease demand for exports and reduce profitability (Zuhroh & Kaluge, 2007). Therefore, this study proposes hypothesis of the influence of exchange rate towards Indonesia CPO export to China as shown:

H1 : A higher Exchange Rate Rupiah Against US Dollar leads to an increase in the Volume of Indonesia Crude Palm Oil Exports to China.

3.1.2 Gross Domestic Product & Exports

Irawan (2018) stated that a country's GDP represents the domestic demand for goods and services because if the domestic demand is high, it may lead to higher production and more exports to meet the demand. Additionally, a strong GDP can also indicate that the country has a higher level of disposable income which can lead to an increase in demand for imported goods and services because a higher GDP can indicate higher purchasing power of consumers both domestically and internationally (Lipsey, 1995). As a result, a country with a higher GDP may be able to export more goods and services. A country's GDP can also affect the currency exchange rate which in turn can impact the exports because a strong currency can make exports more expensive, while a weak currency can make them more affordable that potentially increases demand for exports (Pracoyo, 2006). GDP also has an impact on exports because it reflects the overall economic health and strength of a country (Radifan, 2015). Putri (2019) examined the factors that determine Indonesia's palm oil exports to China using multiple regression analysis. The study used annual data from 2000 to 2017 and found that the GDP of the importing country had a significant positive effect on Indonesia's palm oil exports to China. The study by Eka (2020) also found that the GDP of the importing country influenced Indonesia's palm oil exports to China. In addition, the study by Fadillah (2020) indicates that GDP is one of the significant factors that influence Indonesia's export of crude palm oil to China. Thus, the proposed hypothesis as follows:

H2 : A higher GDP growth rate in China leads to an increase in the Volume Export of Crude Palm Oil from Indonesia to China.

3.1.3 Production & Exports

The report notes from the International Trade Center (2018) that Indonesia's CPO production has grown significantly over the past decade, with exports to China accounting for a significant share of total CPO exports. Production has a direct impact on exports because exports involve producing and selling goods and services to customers outside of the country's borders (Dominick, 1997). Sembiring (2017) stated that when a country has higher production levels, it can increase the ability to produce more goods and services for export which can lead to an increase in exports. If a country has high production capacity, it can meet the demand for the products in the international market and increase the exports (Mejaya et al., 2013). Higher production levels can also lead to economies of scale which can lower the cost of production and make a country's exports more competitive in the global market (Surbakti, 2020). Arini

(2020) conducted a study on the factors that influence Indonesia's palm oil exports to China using data from 2010 to 2019 and found that the production of palm oil in Indonesia had a significant positive effect on Indonesia's palm oil exports to China. Hidayati et., al (2016) declared that production is an important factor that can impact Indonesia's export of CPO to China. Azizah (2015) mentioned that production levels of CPO determine the availability of the product for export. Therefore if Indonesia's production of CPO is low, it may not have enough supply to meet China's demand and lead to a decrease in exports. Napitupulu, et al. (2015) examined the impact of production factors on Indonesia's CPO exports to China and indicates that production factors, such as the availability of raw materials, the size of the plantation, and the age of the trees, significantly influenced Indonesia's CPO exports to China. Febriana (2019) also found that GDP in China has a positive impact on Indonesian CPO exports to China which indicates that as China's economy grows and the demand for CPO also increases. Thus, this can be confirmed by following hypotheses:

H3: A higher Production level of Crude Palm Oil lead to an increase in the Volume Export of Indonesia Crude Palm Oil to China.

3.1.4 International Price & Exports

The price of a product is a critical factor in determining the competitiveness in the international market (Rahman, 2009). Surbakti (2020) stated that the international price of a product can have a significant impact on a country's exports, since it affects the competitiveness of a country's products in the global market. Nurussalam (2018) stated that price is a crucial factor that can influence Indonesia's export of CPO to China due to the impact on market supply and demand. When the price of a country's exports is high, it may lead to a decrease in demand because consumers may look for cheaper alternatives. International price is also affected by exchange rates, which is the value of one country's currency relative to another. When a country's currency is weaker than the currency of the importing country, the price will decrease, which makes the price more affordable to foreign buyers that can result in increased demand for exports (Sitorus, 2009). On the other hand, a high price of a goods may influence sellers to sell more goods to maximize the profit (Zou et al., 2017). Eka (2020) collected quarterly data from 2012 to 2018 and found that the price of palm oil had a significant positive effect on Indonesia's palm oil exports to China. When the prices increase, exporters potentially earn greater revenues which lead to bigger profits. Based on a study by the United States Department of Agriculture (2019), found that price is one of the critical factors affecting Indonesia's export of CPO to China. The study analyzed data from 2000 to 2016 and found that changes in CPO prices in the global market have a significant impact on Indonesia's export volumes to China. The study by Putri (2019) found that the price of palm oil also influenced Indonesia's

palm oil exports to China. In addition, the study by Setiawan (2020) indicates that the price of palm oil influenced Indonesia's palm oil exports to China. Therefore, this study proposes hypotheses as shown:

H4: A higher International Price of Crude Palm Oil lead to an increase in the Volume Export of Crude Palm Oil From Indonesia to China.

3.1.5 Consumption & Exports

Consumption can have a significant impact on a country's exports (Triyono, 2008). Wikatama (2022) found that higher levels of consumption can lead to higher levels of imports, which can lead to higher levels of exports because imports of raw materials and intermediate goods can help domestic producers to increase their competitiveness and meet the demands of foreign markets. Goeltom (1998) stated that higher levels of domestic consumption can lead to an increase in demand for goods and services, which can create an opportunity for producers to increase exports to meet this demand in foreign markets. When domestic consumption increases, producers can take advantage of their comparative advantage in producing certain goods and services that lead to increased exports and greater competitiveness in the global market (Delle et al., 2017). In addition, higher domestic consumption can lead to a stronger currency, making exports cheaper for foreign buyers, which can increase demand for exports (Kahn, 1984). Research by Fenny (2019) examined the factors that determine Indonesia's palm oil exports to China. The study used annual data from 2007 to 2017 and indicates that consumption in China had a significant positive effect on Indonesia's palm oil exports to China. The other study by Zhang (2017) found that consumption in China has a significant positive impact on Indonesia's CPO exports to China in the long run. Specifically, an increase in domestic consumption in China led to an increase in CPO exports from Indonesia to China. In addition, the study by Hidayat & Rosadi (2018) found that consumption of palm oil were significant determinants of Indonesian palm oil exports to China. Thus, hypotheses can be formed into:

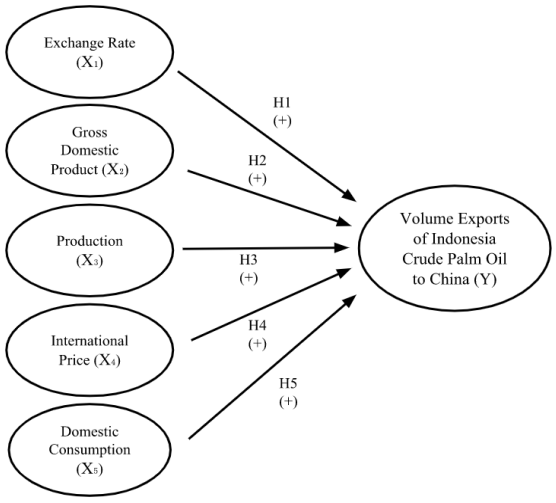
H5: A higher Domestic Consumption of Crude Palm Oil in China lead to an increase in the Volume Export of Crude Palm Oil Indonesia to China.

3.2 CONCEPTUAL FRAMEWORK

Crude Palm Oil (CPO) is one of the main agricultural commodities exported by Indonesia. In fact, Indonesia is the largest producer and exporter of palm oil in the world, accounting for over 50% of the global supply of palm oil (Nurussalam, 2018). Palm oil is an important commodity for the Indonesian economy, contributing significantly to the country's foreign exchange rate. According to data from the

Indonesian Palm Oil Association (GAPKI) in 2020, Indonesia exported 27.8 million tons of palm oil and palm oil products, which generated a revenue of around USD 17.8 billion. China is one of the largest importers of Indonesian palm oil, accounting for about 16% of Indonesia's total palm oil exports in 2020. The demand for palm oil in China has been increasing rapidly in recent years, driven by the country's growing population, increasing disposable income, and expanding food processing industry. The palm oil trade between Indonesia and China has been mutually beneficial. Indonesia benefits from China's high demand for palm oil, which supports the country's palm oil industry and generates significant foreign exchange earnings. Meanwhile, China benefits from the reliable and affordable supply of palm oil from Indonesia, which helps to ensure the stability of the domestic palm oil market. The demand for palm oil in China is expected to continue to grow in the coming years. However, the factors that drive this demand may change over time, such as shifts in consumer preferences, changes in regulations, and evolving trade policies. This study developed the conceptual framework of the prior study by Nurussalam (2018) in analyzing the influencing factor of Indonesia CPO export to China by adding production and consumption variables to the conceptual framework. In order to support the variables, this study also used studies by Wikatama (2022), and Ridwannulloh (2018) that found that variables (exchange rate, GDP, production, price, and consumption) have significant influence on the CPO export from Indonesia to China. While there have been previous researches conducted on the factors influencing Indonesia's export of CPO to China, developing the conceptual framework can enhance the current understanding and provide a more complete picture of the factor of CPO export from Indonesia to China. The conceptual framework of this study develop as follows:

Figure 3.1



Conceptual Framework

Source: Hypothesis used in the study (2023)

CHAPTER IV

RESEARCH METHODOLOGY

4.1 TYPE AND RESOURCE OF DATA

The study's reliance on secondary data ensured that the researchers had access to a comprehensive and diverse set of information. The International Monetary Fund (IMF), Bank Indonesia, Badan Pusat Statistik/Central Statistics Agency (BPS), The Observatory of Economic Complexity, and the United States Department of Agriculture were among the sources of the data in this research. The data analyzed in this study includes the exchange rate (Rupiah against the US Dollar), the gross domestic product (GDP), the production of crude palm oil, the international price of crude palm oil, and the domestic consumption of China. The analysis method that is used in this research is a quantitative method with multiple regression analysis tools taken from data during 1989 - 2019 to identify the variables that influence the volume of crude palm oil exported from Indonesia to China. The use of annual data ensured that the trends and patterns identified in the study were accurate and reliable.

4.2 RESEARCH DESIGN

This study is using a hypothesis testing technique. The analysis was carried out using multiple linear regression. According to Bergstrand (1985), through hypothesis testing this study can explain the causal connection between the independent and dependent variables. Hypothesis provides a tentative explanation or prediction of the relationship between variables or the possible outcome of a research study (Made et al., 2018). In order to understand the relationship between the independent variables and the dependent variable, this study uses a quantitative method. The quantitative approach generates actual data in the form of measurable numbers. The hypothesis test of this study analyzes the relationship between the volume of crude palm oil export from Indonesia to China with the exchange rate (Rupiah against the US Dollar), the gross domestic product (GDP), the production of crude palm oil, the price of crude palm oil, and the domestic consumption of China. The hypothesis of the study also analyzes whether the exchange rate (Rupiah against the US Dollar), the gross domestic product (GDP), the production of crude palm oil, the price of crude palm oil, and the domestic consumption of China have significant influence on the export volume of crude palm oil from Indonesia to China. In addition, to prevent any biases in the regression model estimation, the data were modified. A good model should fulfill the BLUE (Best Linear Unbiased Estimator) criteria which can be achieved by passing the classical assumptions test. All the

independent variables are transformed into natural logarithmic (ln) form to minimize the violations in the classical assumption.

4.3 VARIABLE AND MEASUREMENT

There are two variables that are used in this study, including independent variable which is predicted in a statistical model and dependent variable that is hypothesized to have an effect on the explained variable. The table 4.1 below represents the name, symbol, unit of measurement, and definition of the variables used in the study.

Table 4.1

Variable		Name	Symbol	Unit of Measurement	Definition
Dependent Variable	The Volume Quantity Crude Palm Oil Export	Net Exports Crude Palm Oil	y	Million Tons	The total amount of crude palm oil that exported from a country or region during a specific period
Independent Variable	Exchange Rate (Rupiah against the US Dollar)	Exchange Rate	X_1	IDR/USD	The currency's value relative to another currency
	Gross Domestic Product of China	Gross Domestic Product (GDP)	X_2	Thousands Dollar	The total value of all goods and services produced in a country over a given period including Consumption, Investment, Government Spending and Net Export
	Quantity Production of Crude Palm Oil	Production	X_3	Million Tons	The number of output that manufactured by the producers
	International Price of Crude Palm Oil	International Price	X_4	US$/Ton	The price of goods or services in international markets
	Domestic Consumption of Crude Palm Oil	Domestic Consumption	X_5	Million Tons	The total amount of goods consumed within a country

Variables, Names, Symbols, Unit of Measurement, and Definitions

Source: Data used in the study (2023)

4.3.1 Dependent Variable

Dependent variable is a variable that is observed and measured in a research or study to determine the effect of an independent variable (Sally, 2016). Kakkar and Yan (2014) mentioned that dependent variables are affected by the independent variable which means that any changes in the dependent variable are thought to be caused by the independent variable. The dependent variable in this study is the export of Indonesia's crude palm oil, which examines the volume of crude palm oil that exported from Indonesia to China. Export volume refers to the quantity of goods or services that a country sells to customers in another country (Arifin, 2002). Nurussalam (2019) stated that the export volume is an important indicator of international trade activity because it can reflect the competitiveness, market demand, and economic growth of a country.

4.3.2 Independent Variable

According to Krugman (2004), an independent variable is a variable that is manipulated or changed by the experimenter in order to observe the effect it has on a dependent variable. Independent variable is thought to be the cause of changes in the dependent variable (Rosadi, 2012). One of the independent variables in this study is exchange rate (Rupiah against the US Dollar). Surbakti (2020) mentioned that the exchange rate is recognized as the value of one currency expressed in terms of another currency. The second independent variable is gross domestic product (GDP). According to Sembiring (2017), gross domestic product is the total monetary value of all the goods and services produced within a country's borders in a specific period that measure a country's economic performance. The third independent variable is production of crude palm oil. French (2017) stated that production refers to the process of creating goods or services using resources such as labor, capital, and materials. Another independent variable is the price of crude palm oil. Price is the monetary value that assigned to a good or service, which represents the amount that a buyer is willing to pay (Gujarati, 2010). Finally, the last independent variable is domestic consumption of China which Susetyo (2017) stated that consumption refers to the use of goods and services by individuals, businesses, and governments.

4.3.3 Descriptive Statistical Analysis

Descriptive statistics is examined to show the summary of the variables in the study through the mean and standard deviation value. The mean value illustrates the average value of a variable. While the standard deviation value shows the spread or variability of the data points around the mean.

Table 4.2

	Mean	Std. Deviation	N
Export Volume of CPO (y)	0.1881	0.1751	31
Exchange Rate IDR - USD (X1)	8.1723	4.2091	31
Gross Domestic Product of China (X2)	20.3140	27.7433	31
Production of CPO (X3)	16.9863	13.0362	31
International Price of CPO (X4)	60.9776	24.0403	31
Domestic Consumption of China (X5)	3.5982	2.1477	31

Descriptive Statistics Table Results

Source: Data processed by SPSS ver. 20 (2023)

Based on the descriptive statistics of CPO Export Volume on table 4.2 it can be seen that the variables in this study include exchange rate, GDP, production, international price, domestic consumption, and the export volume of CPO which 31 samples were used in this study. The descriptive statistics results show that first, the mean value of Export Volume of CPO is 0.1881, which means that the volume of quantity exported is 0.1881 on average. Secondly, the mean value of Exchange Rate is 8.1723, which means that on average the exchange rate is 8.1723 Rupiah. Third, the GDP's mean value is 20.3140, which indicates that the GDP is 20.3140 thousand dollars on average. Fourth, the mean value of Production is 16.9863, which means that on average the quantity production of CPO is 16.9863 million tons. Fifth, the mean value of International Price is 60.9776, which means that the international price of CPO is 60.9776 US Dollar per ton on average. Finally, the mean of Domestic Consumption is 3.5982 means that on average the domestic consumption is 3.5982 million tons. In addition, the results show the standard deviation of Export Volume of CPO is 0.1751, Exchange Rate is 4.2091, GDP is 27.7433, Production is 13.0362, International Price is 24.0403, and Domestic Consumption is 2.1477.

4.4 DATA ANALYSIS METHOD

4.4.1 Classical Assumption Test

Before analyzing multiple regression, prerequisite analysis using classic assumptions is required to ensure that the data are normal to be used in the research (Wooldridge, 2015). There are many assumptions and restrictions that should be considered when conducting multiple linear regression and it can be checked by selecting the appropriate parameters when running the statistics in. As noted by Amalia

et al. (2021), the classical assumption test is required when conducting multiple linear regression. Thus, this study will conduct the classical assumption test including the Jarque Bera test that will be used to determine whether the residuals in a regression model are normally distributed, Ramsey RESET test as the linearity test used to determine whether there is a linear relationship between the dependent variable with independent variable, Multicollinearity test that will be used to detect if there is a high correlation between dependent variables, the Breusch-Godfrey Serial Correlation LM test as Autocorrelation test that will be used to check for the presence of correlation among the residuals in a regression model and the White test that will be used to assess heteroscedasticity (unequal variance of the residuals in a regression model) in this study.

4.4.1.1 Normality Test (Kolmogorov-Smirnov Test)

The purpose of conducting a normality test is to determine if variables have a normal distribution, as stated by Cronk (2018). The normal distribution, also known as the Gaussian distribution. The Gaussian distribution is a continuous probability distribution that is commonly used in statistical analysis due to the numerous mathematical properties and the ability to model many real-world phenomena (Nopirin, 1994). Ainiyah et al. (2016) explain that normal distribution means that the data represents the population accurately because the data is evenly spread out. This study utilizes the Jarque Bera test on the Eviews software to determine the distribution of the data. The Jarque Bera test determines whether the sample's skewness and kurtosis align with a normal distribution by measuring the goodness of fit. In addition, if the Jarque-Bera value and p-value are greater than 0.05 or has a confidence level of 95%, the data will be considered normally distributed.

4.4.1.2 Linearity Analysis

Linearity analysis is a statistical technique that aims to examine the relationship between two or more variables (Field, 2000). In particular, linearity analysis examines whether the relationship between the variables is linear or non-linear (Akemokwe, 2015). According to Lipsey (1995), the relationship between outcome scores and the predictor must be linear, the model may be inappropriate and the results may be unreliable if the relationship is not linear. The linearity can be examined by the Ramsey RESET (Regression Equation Specification Error Test) test which is when the p-value of F-statistics is bigger than 0.05, it can be concluded that the linear model is better than the non-linear model. To conclude, when the p-value is bigger than 0.05, then linearity assumption is accepted.

4.4.1.3 Multicollinearity Test

According to Sugiyono (2014), the purpose of multicollinearity testing is to examine whether there is high or perfect correlation among independent variables in a regression model. Multicollinearity occurs when the predictors variables are highly correlated that can lead to unreliable and unstable coefficient estimates, which makes it difficult to interpret the results of the analysis (Field, 2000). Multicollinearity tests can be analyzed through the VIF value for each variable. The VIF measures how much the variance of the estimated regression coefficient is increased due to the correlation with other dependent variables (Menard, 1995). Hence, it can be realized that there is a high degree of multicollinearity if the VIF is greater than 10. To avoid multicollinearity, it needs the VIF value not higher than 10. When the VIF value is above 10, it indicates a problem in the data.

4.4.1.4 Autocorrelation Test

An autocorrelation test is used to measure the correlation between independent variables (Lipsey, 1995). Dominic (1997) stated that autocorrelation is a common problem that can occur in time series analysis when there is a correlation between the observations at different time points that can lead to biased parameter estimates and reduced efficiency of the estimation procedures. Autocorrelation tests typically examine the degree of correlation between the error terms by calculating the Durbin-Watson statistic. The Durbin-Watson statistic is a measure of the extent to which the residuals are correlated with each other (Akemokwe, 2015). If the Durbin-Watson statistic is close to 2, it indicates that there is no autocorrelation present in the model. While if the Durbin-Watson statistic is less than 2, it indicates positive autocorrelation, which means that the residuals are positively correlated with each other. Meanwhile if the Durbin-Watson statistic is greater than 2, it indicates negative autocorrelation, which means that the residuals are negatively correlated with each other. On the other hand, autocorrelation tests can be examined through the Breusch-Godfrey Serial Correlation LM test. In Breusch-Godfrey Serial Correlation LM test, when the Prob. Chi-Square(2) values more than 0.05 it can be concluded that there is no autocorrelation in the data.

4.4.1.5 Heteroscedasticity Test (Glejser Test)

A heteroscedasticity test is a test to detect variations of error variants from each observation (Myers, 1990). Heteroscedasticity is a common problem that can occur in regression analysis when the variance of the errors is not constant across the range of the independent variables which can lead to biased standard errors, incorrect hypothesis tests, and inaccurate predictions (Widarjono, 2013). If there is no heteroscedasticity, the absolute values of the residuals should not be related to the independent variables. To address this issue, researchers use heteroscedasticity tests such as the White test, to identify

the presence and severity of heteroscedasticity in the data. The White test examines the significance of the Probability Chi-Square from the Obs*R-squared value (Sugiyono, 2014). There is no heteroscedasticity in the data if the Probability Chi-Square value is more than 0.05.

4.4.2 Hypothesis Test Using Multiple Linear Regression

This research was conducted to examine the factors that affect the volume export of Indonesia crude palm oil to China. Multiple regression analysis was used in this study to analyze the data in order to investigate the ability of independent variables (X) to exert an influence or impact on the dependent variable (y). Multiple linear regression analysis was used to determine whether each independent variable, which are Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic Consumption (X_5) respectively influences the dependent variable, which is Volume of Export Indonesia Crude Palm Oil (y). To explain dependent variable (y) in terms of independent variables (X), writing down an equation relating y to x is needed. y is the predicted y value for each independent variable (X) and α is the y-intercept. When all independent variables (X_1, X_2, X_3, X_4, and X_5) are 0, the y-intercept α is the value of y. Each coefficient β is the amount of change in y when independent variables (X_1, X_2, X_3, X_4, and X_5) are changed by one unit and holding all other independent variables fixed. In the analysis of multiple linear regression, hypotheses and feasibility were tested. Hypothesis testing was assessed to test the effect of independent variables on the dependent variable simultaneously (F test) and partially (t-test). The coefficients will illustrate how influential each independent variable was in predicting the dependent variable. Multiple linear regression analysis is an analysis method that aims to describe the dependency of the dependent variable in estimating or projecting the additional mean value based on the fixed value of the independent variable (Gujarati, 1988). The criteria for testing simultaneous parameters (F test) was if the value of significance exceeds 0.05, then all independent variables in one equation together (simultaneously) do not significantly influence the dependent variable. If the value of significance is lower than 0.05 then all independent variables in one equation simultaneously have a significant influence on the dependent variable. The criteria for testing parameters partially (t-test) is when the value of significance is below 0.05, then the independent variable partially gives significant influences on the dependent variable. Meanwhile, if the value of significance exceeds 0.05, then the independent variables partially do not affect the dependent variable. Testing the feasibility of multiple regression models was based on the coefficient of determination (R^2). The value of R^2 is used to measure the level of ability of the model to explain the variation of independent variables. The Coefficient of Determination is a computation used to measure the goodness of the regression line, which is to provide the proportion or percentage of the total variance of the dependent variable y as described by the independent variable X. The higher the value of R^2, the greater the difference in the dependent variable

that the independent variables can describe. The higher the R^2 value, the more reliable the regression line is when explaining the observed values. Conversely, the smaller the R^2, the smaller the difference in the dependent variable, which independent variables can explain. The regression model used in this study has the following structure:

$$y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

In order to prevent any biases in regression model estimation, the model needs to be modified. The variables Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic Consumption (X_5) are transformed into natural logarithmic (ln) form using log-log model. In this study, the logarithmic model is utilized to determine how the relative change in the independent variable affects the dependent variable's absolute change. The expected percent change in the dependent variable when the independent variable is increased by one percentage point can be interpreted using the coefficient value from the log-log model. Hence, the equation in this study is formed as follows:

$$ln(y) = a + \beta_1 lnX_1 + \beta_2 lnX_2 + \beta_3 lnX_3 + \beta_4 lnX_4 + \beta_5 lnX_5 + \varepsilon$$

4.4.2.1 t-Test

The t-test is used to assess the significance of individual dependent variables in the regression model (Hakim, 2014). The aim of the t-test test is to determine whether the estimated regression coefficient for each dependent variable is significantly different from zero. The t-test statistic is calculated by dividing the estimated regression coefficient by the standard error. If the t-test statistic is greater than the critical value (usually determined by the significance level), then the null hypothesis is rejected and concludes that the corresponding dependent variable is significant. Means that there is evidence to suggest that the dependent variable has a significant linear relationship with the independent variable. On the other hand, if the t-test statistic is not significant, the null hypothesis is accepted and concludes that the corresponding dependent variable is not significant. This suggests that there is no evidence to suggest that the dependent variable has a significant linear relationship with the independent variable.

4.4.2.2 F-Test

The F test is used to determine the overall significance of the regression model. The purpose of this test is to assess whether the regression model significantly explains the variation in the independent variable relative to a null model, which assumes no relationship between the dependent variables and the independent variable (Widarjono, 2013). By using F-table statistics, the probability was obtained. If the

F-test statistic is greater than 1 and the associated p-value is less than the predetermined significance level, then the null hypothesis is rejected and concludes that the regression model is significant. Means that at least one of the dependent variables has a significant linear relationship with the independent variable and the model is better at explaining the variation in the independent variable than the null model. However, if the F-test statistic is not significant, the null hypothesis is accepted and concludes that the regression model does not significantly explain the variation in the independent variable.

4.4.2.3 Coefficient of Determination

Coefficient of Determination is a computation used to measure the goodness of the regression line, which is to provide the proportion or percentage of the total variance of the dependent variable y as described by the independent variable X (Wooldridge, 2012a). R-squared ranges from 0 to 1 or 0% to 100% and indicates the percentage of variation in the dependent variable that can be explained by the dependent variables. The higher the value of R^2, the greater the difference in the dependent variable that the independent variables can describe. Conversely, the smaller the R^2, the smaller the difference in the dependent variable, which independent variables can explain.

CHAPTER V

RESULT AND DISCUSSION

5.1 RESULT

In the following chapter, the data analysis result will be described in more detail to explain the factor affecting crude palm oil export from Indonesia to China. The secondary data from International Monetary Fund (IMF), Bank Indonesia, and Badan Pusat Statistik/Central Statistics Agency (BPS) were used in the study using multiple linear regression analysis. There are several steps of testing in the study to analyze the relationship between Exchange Rate (Rupiah against the US Dollar), Gross Domestic Product, Production, International Price, and Domestic Consumption on Volume CPO Export from Indonesia to China including classical assumption test and multiple regression test. The data used in the study start from 1989-2019, which means 31 years in total that become the data sample of the study.

5.1.1 Classical Assumption Test

In order to ensure the statistical analysis and models used in data analysis are appropriate and reliable, this study carried out the classical assumption test. Wooldridge (2015) stated that analyzing classic assumptions is required before multiple regression analysis to ensure that the data are normal to be used in the research. This study uses the Jarque-Bera test as the normality test, Ramsey RESET test as the linearity test to analyze the linearity between the independent and dependent variables, Multicollinearity test that will be used to detect if there is a high correlation between dependent variables, the Breusch-Godfrey Serial Correlation LM test as Autocorrelation test to identify the presence and severity of autocorrelation and lastly the White test to detect the heteroscedasticity in the data.

5.1.1.1 Normality Test (Kolmogorov-Smirnov Test)

According to Cronk (2018), the objective of a normality test is to analyze whether the data for the variables follows a normal distribution pattern. If the residuals are not normally distributed, then the model may not be valid, and the results may be biased or misleading. The data can be identified as normally distributed if the sigma value is over 0.05 with a confidence level of 95% by performing the Jarque-Bera test. According to the output of the Jarque-Bera test using Eviews, the Jarque-Bera value of the data is 0.123567 and the p-value is 0.940086, which means that the data is normally distributed, since the value exceeds 0.05 in the confidence level of 95%.

5.1.1.2 Linearity Analysis

Linearity analysis aims to identify whether the relationship between the variables is linear or non-linear (Akemokwe, 2015). According to Lipsey (1995), examining a linear correlation between the predictor and outcome scores is crucial to ensure an appropriate model and reliable results. The linearity tests in this study using Ramsey Reset test. The linearity can be examined through the p-value of F-statistics. The result can indicate there is a linear relationship between dependent variable and independent variable if the p-value is exceeded 0.05. From the result it can be concluded that the p-value is 0.7331 which is bigger than 0.05. The result indicate that there is a linear relationship between the Exchange Rate of Rupiah Against the US Dollar (X_1), Gross Domestic Product of China (X_2), Production of Crude Palm Oil (X_3), International Price of Crude Palm Oil (X_4), and Domestic Consumption of China (X_5) and Volume CPO Export From Indonesia to China (y).

5.1.1.3 Multicollinearity Test

Sugiyono (2011) stated that the Multicollinearity test aims to identify the multicollinearity in the data. According to Field (2000), the presence of high correlation between dependent variables can result in multicollinearity, which may cause unstable and unreliable coefficient estimates. The value of VIF for each variable can be utilized to examine multicollinearity tests. When the VIF-value is lower than 10.00, it can be concluded that there is no multicollinearity in the data. Based on the table 5.1 it illustrates that the collinearity statistics VIF less than 10 means that there is no multicollinear occurs. The VIF of the X_1 is 1.172 indicate that there is no multicollinear in variable between Exchange Rate and Indonesia CPO export volume to China. X_2 also shows no multicollinear in the data, since the VIF is 1.113 that indicates that there is no multicollinear between variable gross domestic product and the volume export of CPO from Indonesia to China. Besides, there is no multicollinearity between variable production and the Indonesia CPO export volume to China considering the VIF is 1.574. Additionally, the variable international price and volume exported from Indonesia to China also indicates there is no multicollinearity because the VIF is 1.392 which means variable X_4 VIF smaller than 10. Lastly, the variable domestic consumption of China and volume export Indonesia CPO to China also shows no multicollinearity due the fact that the VIF is 1.381. All in all, the results indicate that there is no presence of multicollinearity within the data.

Table 5.1

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	395.9617	2432.901	NA
LN_X1	0.341251	162.3314	1.172759
LN_X2	0.290715	116.3238	1.113714
LN_X3	0.299773	159.2123	1.574154
LN_X4	1.961686	1426.422	1.392842
LN_X5	0.429628	170.4819	1.381149

Multicollinearity Test Results

Source: Data processed by Eviews ver. 12 (2023)

5.1.1.4 Autocorrelation Test

According to Lipsey (1995), an autocorrelation test is utilized to assess the level of correlation that exists between independent variables. The autocorrelation test can be done through the Breusch-Godfrey Serial Correlation LM test that can test whether there is a linear relationship between the residuals of the model and their lagged values. When the value of Probability of Chi-Square(2) of Obs*R-squared more than 0.05 it can be concluded that there is no autocorrelation in data. According to the result in table 5.2, it shows that Prob. Chi-Square(2) value is 0.5187 more than 0.05. So the results indicate that there is no autocorrelation in the data.

Table 5.2

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.491978	Prob. F(2,20)	0.6186
Obs*R-squared	1.312945	Prob. Chi-Square(2)	0.5187

Breusch-Godfrey Serial Correlation LM Test Results

Source: Data processed by Eviews ver. 12 (2023)

5.1.1.5 Heteroscedasticity Test (Glejser Test)

Widarjono (2013) notes that heteroscedasticity is a situation in which the error variances in regression analysis are not uniformly distributed across the independent variables that can give biased standard errors, incorrect hypothesis tests, and inaccurate predictions. To test whether the heteroscedasticity exists in the data, the study carried out the White test using Eviews. It can be determined no heteroscedasticity in the data if the significance value is more than 0.05 and the constant-value is below 0.05. The table 5.3 shows the result of heteroscedasticity test using White test results. As presented in table 5.3, the value of Prob. Chi-Square of Obs*R-squared is 0.7123 which exceeds 0.05 means that there is no heteroscedasticity in the data.

Table 5.3

Heteroskedasticity Test: White			
F-statistic	0.471483	Prob. F(2,7)	0.9113
Obs*R-squared	16.07035	Prob. Chi-Square(20)	0.7123
Scaled explained SS	11.13276	Prob. Chi-Square(20)	0.9427

White Test Results

Source: Data processed by Eviews ver. 12 (2023)

5.1.2 Multiple Linear Regression Test

The purpose of the multiple regression test is to know the degree of capability possessed by each independent variable including Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic Consumption (X_5) to affect the dependent variable which is the Volume of Export Indonesia Crude Palm Oil (y). Multiple linear regression is the method that is used in the study which conducts two types of test including t-test and F test. The t-test and F-test are statistical tools commonly used in multiple regression analysis to evaluate the significance of dependent variables. In addition, to determine the percentage of influence given by the independent variable to the dependent variable the percentage can be seen from R square. Based on table 5.4, the result of the regression test shows the significant-value that can explain which independent variable that gives significant impacts to the dependent variable. Further explanations will be explained in the following chapters.

Table 5.4

Variable	Coefficient	Std. Error	*t-statistic*	Prob.
C	-58.73050	19.89879	-2.951462	0.0074
LN_X1	2.436778	0.584167	4.171373	0.0004
LN_X2	1.410307	0.539180	2.615652	0.0158
LN_X3	1.541527	0.547515	2.815497	0.0101
LN_X4	5.702736	1.400602	4.071632	0.0005
LN_X5	-3.889442	0.655461	-5.933907	0.0000
R-squared = 0.685348		Prob(F-statistic) = 0.000058		
Adjusted R-squared 0.613836		F-statistic 9.583711		

Multiple Linear Regression Results

Source: Data processed by Eviews ver. 12 (2023)

On the other hand, the number of coefficients in the table 5.4 can be drawn as a log-log model. In order to study the effect of Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic Consumption (X_5) to the Indonesia Crude Palm Oil Export Volume (y), the model can be written as follows:

$$\boldsymbol{ln(y) = -58.73050 + 2.436778lnX_1 + 1.410307lnX_2 + 1.541527lnX_3 + 5.702736lnX_4 - 3.889442lnX_5 + \varepsilon}$$

Based on the regression equation, ln(y) is called a dependent variable which is defined as the Export Volume of CPO and will be interpreted in tons. For instance, the volume export of CPO is predicted to decrease 58.73050% when all independent variables are 0. Besides, if the X_1 (Exchange Rate) increase with one percent, then the volume export of CPO is predicted to increases about 2.436778% holding the X_2, X_3, X_4, and X_5 are held fixed. In addition, if X_1, X_3, X_4, and X_5 are held constant and X_2 (Gross Domestic Product) increases about one percent, then volume export of CPO is predicted to change by 1.410307%. Furthermore, when X_3 (Production) increases by one percent, then volume export of CPO is predicted to increase about 5.702736% holding X_1, X_2, X_4, and X_5 are constant. Additionally, when X_4 (International Price) increases by one, then volume export of CPO is predicted to increase by 3.889442% held X_1, X_2, X_3, and X_5 are fixed. Conversely, when X_5 (Domestic Consumption) increases by one percent then it can be predicted that volume export of CPO will be decrease about 3.889442% holding other

factors (X_1, X_2, X_3, and X_4) are fixed. All in all, it can be concluded that all the coefficients are significant on the level of 5% or 1%.

5.1.2.1 t-Test

As stated by Widarjono (2013), t-test is being conducted in order to test the statistical significance of individual regression coefficients. The t-test determines the null hypothesis that all regression coefficients in the model are equal to zero where the significance is below 0.05 or the t-value more than t-table value. When the significance value is below 0.05 it indicates that independent variables (X) are partially affected by the dependent variable. The t-test results using Eviews can be seen from table 5.4 in the aim to know which independent variable that partially impacts the dependent variable. Based on the result it can be seen that the t-statistic value of variable X_1 is 0.0004, X_2 is 0.0158, X_3 is 0.0101, X_4 is 0.0005, and X_5 is 0.0000 which all of the t-statistics value of independent variables are less than 0.05, means that Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic Consumption (X_5) are partially affect the Volume of Export Indonesia Crude Palm Oil. In addition, the t-test also can use the t-statistics value. When the t-value is bigger than t-table it indicates that the independent variable partially influences the dependent variable. The table value can be calculated by $\alpha/2$; n-k-1 where α is 0.05, n is the total sample in the study, and k is the total independent variable then matches the value to the distribution t-table value. Based on the t-table test, the value of t-table is 2.060 which comes from 0.025;25 that can be interpreted through the table of t-table value. Meanwhile the result of reveals that the t-value of X_1 is 4.171, X_2 is 2.615, X_3 is 2.815, and X_4 is 4.071 which are exceeded 2.060 means that Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), and International Price (X_4) partially give positive impact to the Volume of Export Indonesia Crude Palm Oil (y). While the t-value of Domestic Consumption of China (X_5) is -5.933 means that the X_5 partially give negative impact to the CPO export volume (y).

5.1.2.2 F Test

According to Widarjono (2013), F test is being carried out to examine the overall significance of a regression model by testing the null hypothesis that all of the regression coefficients in the model are equal to zero. When the significance of the independent variable is significant is below 0.05 or when the F-value exceeds the F table value it indicates that the independent variable does not have a significant relationship with the dependent variable. Based on the F test result in table 5.4 it shows that the Prob(F-statistic) is 0.000 where the value is below 0.05. The Prob(F-statistic) indicate that the Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic

Consumption (X_5) are simultaneously affect the Volume of Export Indonesia Crude Palm Oil (y). On the other hand, the F test also can be examined through the F-value where the F-value exceeds the F table which indicates that the independent variables are simultaneously affected by the dependent variable. To calculate the F table, it is required to measure k;n-k where k is the total of independent variables and n is the total sample of the data. The F table calculation result is 5;26 or equal to 2.60, while the F-value from the table 5.11 shows the value is 9.58. So it can be concluded that the F-value exceeds the F table, which means that the variables independent simultaneously impact the dependent variable.

5.1.2.3 Coefficient of Determination

As mentioned by Sugiyono (2007), coefficient of determination is used to measure the proportion of variability in the dependent variable that can be explained by the dependent variables in the model. R-squared value can be interpreted as the percentage of variation in the dependent variable that can be explained by the dependent variables in the model. To determine the percentage of impact that independent variable has on the dependent variable is by examining the R-squared value which represents the proportion of the variation in the dependent variable that can be explained by the independent variable. According to the table 5.4 it shows that the R square value is 0.685 means that the independent variables simultaneously influence on dependent variable about 68.5% which indicate that about 68.5% of Volume of Export Indonesia Crude Palm Oil is influenced by Exchange Rate (X_1), Gross Domestic Product (X_2), Production (X_3), International Price (X_4), and Domestic Consumption (X_5) with the Volume of Export Indonesia Crude Palm Oil (y). While the remaining 31.5% of Indonesia crude palm oil export volume variable is influenced by other variables that are not included in this research.

5.2 DISCUSSION

In the discussion section, the following explanation will address the research question or hypothesis, summarize the key findings, and offer interpretations and explanations for the findings which come from the multiple regression test in the previous section. The discussion section will explain whether Exchange Rate of Rupiah Against the US Dollar (X_1), Gross Domestic Product of China (X_2), Production of Crude Palm Oil (X_3), International Price of Crude Palm Oil (X_4), and Domestic Consumption of China (X_5) influence the Volume of Export Indonesia Crude Palm Oil (y).

5.2.1 The Influence of Exchange Rate of Rupiah Against US Dollar on Volume of Export Indonesia Crude Palm Oil

Based on the data in table 5.4 it can be seen that the exchange rate of Rupiah against US Dollar has a significant impact on export volume of crude palm oil. The coefficient number from the equation of regression shows the positive value, which is 2.436778. Means there is a significant positive relationship between exchange rate and volume export CPO from Indonesia to China. Based on the coefficient number, it can be concluded that a 1% increase in the exchange rate is predicted to increase the export volume of CPO about 2.44%. According to the Law of One Price theory, in a perfectly competitive market the goods should have the same price across different countries when measured in the same currency. Therefore, any changes in the exchange rate of a currency will impact the supply and demand of goods and services. Any changes in exchange rates can impact the demand for exports and subsequently the supply of goods and services in the domestic market. The result of the study is also in line with the study by Cheung and Wong (2000) that found a positive relationship between exchange rate and quantity export. When the exchange rate depreciates, the supply exports will be increased due to lower prices in foreign currencies. On the other hand, the increased price of goods may lead the exporter to export more to gain more advantage. When the exchange rate of a currency increases means that the value relative to other currency appreciates and the price of exports from that country becomes more expensive for foreign buyers but the exporters have more chances to get bigger profit. In addition, Indonesia can enhance the export of CPO to China by taking advantage of favorable exchange rates. Indonesian exporters can offer competitive prices to Chinese buyers, to make Indonesian palm oil more attractive than that of other competitors. Looking from the coefficient, it can be concluded that the hypothesis H1 is acceptable.

5.2.2 The Influence of Gross Domestic Product on Volume of Export Indonesia Crude Palm Oil

As shown in table 5.4 it can be seen that the coefficient is 1.410307 which means that gross domestic product has a significant impact on the volume CPO export from Indonesia to China. Besides, the positive coefficient from the equation of regression indicates there is a positive relationship between gross domestic product and volume export of Indonesia CPO to China. The coefficient illustrates that an increase in the GDP by 1% is associated with an increase of export volume of crude palm oil by 1.41%. When GDP increases, it signals that the total value of goods and services produced in the economy has increased. The increase in GDP can be influenced by many factors such as an increase in consumer spending, investment, or government spending. When the demand for goods and services increases, firms may increase their production to meet the demand, which increases the aggregate supply of goods and services in the economy which can lead to lower prices. Aggregate supply refers to the total amount of

goods and services that all firms in an economy are willing and able to produce at a given price level. Besides, when the demand for goods and services decreases, firms may decrease the production, which decreases the aggregate supply of goods and services in the economy that can lead to higher prices and decreased availability of goods and services. In addition, Indonesia has a significant opportunity to enhance the export of crude palm oil to China by leveraging China's Gross Domestic Product (GDP). With a large and growing GDP, China has become a major player in the global economy, making it a crucial market for Indonesian palm oil. To increase exports of crude palm oil to China, Indonesia can focus on high-demand markets, such as the food processing industry, and develop partnerships with Chinese companies to strengthen trade relations. Moreover, Indonesian exporters can differentiate themselves by promoting high-quality and sustainable palm oil production practices to meet the rising demand from Chinese consumers. By leveraging the advantage of China's GDP, Indonesia can increase the export of crude palm oil to China, creating new opportunities for growth and development in the palm oil industry, and boosting the overall Indonesian economy. Based on the coefficient result, it can be concluded that hypothesis H2 is accepted.

5.2.3 The Influence of Crude Palm Oil Production on Volume of Export Indonesia Crude Palm Oil

The result shown in table 5.4 shows that the production of crude palm oil has significant influence on the volume of export CPO from Indonesia to China. Moreover, the positive coefficient in the equation of regression illustrates that there is a positive relationship between production and export volume of crude palm oil from Indonesia to China. From table 5.4 it can be shown that the number of coefficients is 1.541527, which means that every 1% increase in production increases the volume of CPO export about 1.54%. The positive result matched with the concept of economies of scale. As production increases, the cost of producing each unit of output will decrease (due to factors such as bulk purchasing of inputs), more efficient production processes, and spreading fixed costs over a larger output. When businesses produce more goods and services, the company can take advantage of economies of scale and reduce the unit costs which can lead to lower prices for consumers that can increase demand for goods and services. The positive relationship was also studied by Tumwebaze and Matovu (2018) which found that when the production increases, the supply in the market will also increase which lead to higher quantity export. In addition, Indonesia can enhance the export of CPO to China by increasing CPO production. By improving agricultural practices, investing in research and development, and providing support for smallholder farmers, Indonesia can increase the CPO production which can then be exported to China. Indonesia can increase the production levels through measures such as planting new palm oil trees, improving cultivation techniques, and utilizing new technology to improve efficiency. Higher production levels can

lead to economies of scale and reduce the overall cost of producing CPO. This can lead to lower prices for Indonesian CPO and make the price more competitive in the Chinese market. From the result of the coefficient it can be said that the hypothesis H3 is accepted.

5.2.4 The Influence of International Price of Crude Palm Oil on Volume of Export Indonesia Crude Palm Oil

The data analysis results in table 5.4 shows the number of coefficients is 5.702736 that indicates a significant positive relationship between the volume of Indonesia crude palm oil exported and the international price of crude palm oil. From the coefficient it can be interpreted that an increase in international price by 1% predicted to increase the volume of CPO export by 5.70%. With the positive impact, it can be stated that if the international price of crude palm oil increases, the amount of crude palm oil exported from Indonesia will also increase. Following the findings of the coefficient, the hypothesis that stated the significant relationship between the international price of crude palm oil and the volume of crude palm oil exported from Indonesia is acceptable. The positive value of the regression supports Krugman and Maurice's theory. According to Krugman and Maurice's (2005) there is a positive relationship between commodity prices and quantity export. Higher market prices encourage suppliers to offer more commodities and vice versa. Therefore, if prices rise, more goods and services will be available and sellers tend to export more goods to gain higher profit. The positive results of the regression are also in line with Lipsey's (1995) study, which claims that there is a positive correlation between price and quantity supplied for a particular resource. Means that the higher the price of a commodity, the greater the quantity offered by sellers. Hence, when prices rise, then market players will automatically increase sales which lead to the higher volume of export in order to gain more advantage. Additionally, Indonesia can enhance the CPO export to China by closely monitoring the international price of CPO and adjusting the export price accordingly. When the international price of CPO is low, Indonesia can offer competitive prices to China which will help to increase the market share. In addition, the positive result of the coefficient indicated that the hypothesis H4 can be accepted.

5.2.5 The Influence of Domestic Consumption on Volume of Export Indonesia Crude Palm Oil

Based on the result in table 5.4 it can be seen that the number of coefficients is -3.889442, which means that domestic consumption has a significant impact on the volume export of CPO. The negative coefficient indicates a negative relationship between the domestic consumption and the volume of Indonesia CPO export to China, which means that the increase in domestic consumption leads to a

decrease in the volume of export Indonesia CPO. Hence, from the coefficient number it can be concluded that every 1% increase in domestic consumption is predicted to decrease the volume of CPO export about 3.89%. Many factors can influence the negative relations between domestic consumption and quantity Export. Higher domestic consumption in exporter countries can be one of the factors. Since the exporter needs to fulfill their domestic demand that leads to decrease in the quantity exported. On the other hand, high levels of consumption can create supply shortages, as firms struggle to keep up with demand. Additionally, when consumers buy more goods and services, this signals to producers that there is a higher demand for their products. In response, producers increase their output to meet this demand and take advantage of the potential profits. According to the study by Setiawan (2021), there was a negative relationship between domestic consumption and quantity export. As the demand increases due to higher domestic consumption, the supply in the market needs to be increased to meet the demand. Technological limitations can be the other factors that lead to a negative relationship between domestic consumption and export volume. When the technology is limited, the firms may not have the necessary technological capabilities to meet the demand for their goods and services. Additionally, technological limitations can reduce the productivity of workers, which can ultimately reduce the overall supply of goods and services. When the supply decreases it can affect the available goods to sell. In order to balance the domestic consumption of importer countries that continue to increase, the exporter should have enough goods to be exported to the importer country. Thus, Indonesia can enhance the technology capabilities to maximize the output. So, Indonesia can boost the volume export of crude palm oil to China. From the coefficient result, it can be concluded that H5 is rejected.

Table 5.5

Hypothesis	Conclusion
H1 : A higher Exchange Rate Rupiah Against US Dollar leads to an increase in the Volume of Indonesia Crude Palm Oil Exports to China	H1 is accepted
H2 : A higher GDP growth rate in China leads to an increase in the Volume Export of Crude Palm Oil from Indonesia to China	H2 is accepted
H3: A higher Production level of Crude Palm Oil lead to an increase in the Volume Export of Indonesia Crude Palm Oil to China	H3 is accepted

H4: A higher International Price of Crude Palm Oil lead to an increase in the Volume Export of Crude Palm Oil From Indonesia to China.	H4 is accepted
H5: A higher Domestic Consumption of Crude Palm Oil in China lead to a increase in the Volume Export of Crude Palm Oil Indonesia to China	H5 is rejected

Table of The Hypothesis Analysis Results

Source: Findings processed by Eviews ver. 12 (2023)

CHAPTER VI

CONCLUSION

6.1 CONCLUSION

The objective of this study is to examine whether Exchange Rate Of Rupiah Against the US Dollar, Gross Domestic Product of China, Production Of Crude Palm Oil, International Price of Crude Palm Oil, and Domestic Consumption of Crude Palm Oil have significant influence towards the Volume of Export Indonesia Crude Palm Oil. Besides, the aim of this study is to determine the influence's direction and cause of Exchange Rate Of Rupiah Against the US Dollar, Gross Domestic Product of China, Production Of Crude Palm Oil, International Price of Crude Palm Oil, and Domestic Consumption of Crude Palm Oil have significant influence towards the Volume of Export Indonesia Crude Palm Oil. The study used the data in the period of 1989-2019. Multiple linear regression was the technique utilized in the study that operated through Statistical Product and Service Solutions (SPSS) and Eviews to analyze the correlation between the volume of crude palm oil exported from Indonesia to China. The conclusion validates the findings of various studies that became the foundation of this study along with the hypothesis. According on the result of the study, the following conclusions can be made:

1. The Exchange Rate of Rupiah Against the US Dollar partially has a significant positive effect on the Volume Export of crude palm oil Indonesia. The stronger Indonesia Rupiah against US Dollar lead the producer to maximize the benefit by increasing the volume export of crude palm oil. Hence, every increase in Exchange Rate leads to increase in Export volume of CPO.
2. The Gross Domestic Product of China partially has a significant positive effect on the Volume Export of crude palm oil Indonesia. The higher GDP of China illustrates the higher China's market potential which leads the producer to increase the volume export of crude palm oil to gain higher profit. Therefore, every increase in GDP leads to an increase in Export volume of CPO.
3. The Production of Crude Palm Oil partially has a significant positive effect on the Volume Export of crude palm oil Indonesia. The bigger quantity of crude palm oil production leads the producers to increase the volume export in order to obtain higher revenue. Thus, every increase in Production leads to an increase in Export volume of CPO.
4. The International Price of Crude Palm Oil partially has a significant positive effect on the Volume Export of crude palm oil Indonesia. The higher price of crude palm oil lead the producer to earn more profit through increasing the volume export of crude palm oil. Therefore, every increase in International Price leads to increase in Export volume of CPO.

5. The Domestic Consumption of Crude Palm Oil partially has a significant negative effect on the Volume Export of crude palm oil Indonesia. The higher domestic consumption of China in consuming oil lead the producer to increase the volume exports of crude palm oil but the procedure needs to have sufficient stock in order to fulfill the domestic consumption of the importer country. Thus, every increase in Domestic Consumption leads to decrease in Export volume of CPO.
6. The Exchange Rate of Rupiah Against the US Dollar, Gross Domestic Product of China, Production of Crude Palm Oil, International Price of Crude Palm Oil, and Domestic Consumption of Crude Palm Oil simultaneously have a significant positive effect on the Volume Export of crude palm oil Indonesia.
7. Indonesia can enhance the crude palm oil export to China by strengthening the Indonesia Rupiah currency against US Dollar, understanding the demand of palm oil in China, increasing the quantity production of crude palm oil, offering competitive prices, and using more advanced technology.

6.2 IMPLICATIONS

Based on the conclusion of the study, there are several implications that are expected to enhance the efficiency of the crude palm oil sector export in Indonesia in exporting the commodity to other countries especially China as one of the main importer of crude palm oil from Indonesia including:

1. Consistency and high quality of crude palm oil should be maintained to boost exports to China.
2. The government should encourage the production of crude palm oil as it is a dominant export commodity that can be processed into various products to increase productivity and contribute to the country's economic development.
3. The government should ensure that the Rupiah exchange rate remains stable, as fluctuation in the exchange rate can weaken the value of the currency and disrupt international trade activities.
4. To maximize the potential of the opportunities, it is critical for Indonesian producers to maintain the competitiveness and responsiveness to changing market demands.
5. The researcher believes that these study's findings on the variables that impact the export volume of Indonesia crude palm oil can be used as a reference for future studies that explore other variables.

6.3 SUGGESTIONS

In order to improve, develop, and complete this study, the following suggestions for future research can be formed:

1. Future research can examine the influence factor before and after COVID-19 pandemic situation and find the different impact that can influence the factors with a bigger sample size.
2. Future studies may offer a more comprehensive and in-depth analysis of the factors affecting Indonesia's exports of CPO to China.
3. It is recommended for further research to cover a wider range of time periods to have a better view on the volume CPO export from Indonesia to China.

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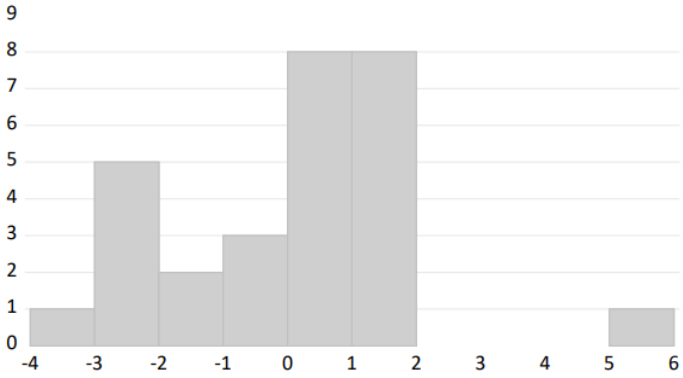
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APPENDIX

Appendix 1. Classical Assumption Test

1. Normality Test (Jarque-Bera Test)



Series: Residuals	
Sample 1989 2019	
Observations 28	
Mean	1.81e-14
Median	0.421041
Maximum	5.082966
Minimum	-3.954135
Std. Dev.	1.926961
Skewness	0.107517
Kurtosis	3.244285
Jarque-Bera	0.123567
Probability	0.940086

2. Linearity Analysis (Ramsey RESET Test)

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: LN_Y C LN_X1 LN_X2 LN_X3 LN_X4 LN_X5

	Value	df	Probability
t-statistic	0.345569	21	0.7331
F-statistic	0.119418	(1, 21)	0.7331
Likelihood ratio	0.158773	1	0.6903

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.566888	1	0.566888
Restricted SSR	100.2558	22	4.557081
Unrestricted SSR	99.68890	21	4.747090

LR test summary:

	Value
Restricted LogL	-57.58756
Unrestricted LogL	-57.50818

Unrestricted Test Equation:
Dependent Variable: LN_Y
Method: Least Squares
Date: 05/13/23 Time: 03:00
Sample: 1989 2019
Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-115.1026	164.3876	-0.700190	0.4915
LN_X1	4.355981	5.585659	0.779851	0.4442
LN_X2	2.552835	3.351706	0.761652	0.4547
LN_X3	2.814069	3.724611	0.755534	0.4583
LN_X4	10.64013	14.35907	0.741005	0.4669
LN_X5	-7.226770	9.680628	-0.746519	0.4636
FITTED^2	-0.022487	0.065071	-0.345569	0.7331

R-squared	0.687127	Mean dependent var	19.09789
Adjusted R-squared	0.597735	S.D. dependent var	3.435245
S.E. of regression	2.178782	Akaike info criterion	4.607727
Sum squared resid	99.68890	Schwarz criterion	4.940778
Log likelihood	-57.50818	Hannan-Quinn criter.	4.709544
F-statistic	7.686661	Durbin-Watson stat	1.366946
Prob(F-statistic)	0.000185		

3. Multicollinearity Test

Variance Inflation Factors
Date: 05/13/23 Time: 02:41
Sample: 1989 2019
Included observations: 28

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	395.9617	2432.901	NA
LN_X1	0.341251	162.3314	1.172759
LN_X2	0.290715	116.3238	1.113714
LN_X3	0.299773	159.2123	1.574154
LN_X4	1.961686	1426.422	1.392842
LN_X5	0.429628	170.4819	1.381149

4. Autocorrelation Test (Breusch-Godfrey Serial Correlation LM Test)

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.491978	Prob. F(2,20)	0.6186
Obs*R-squared	1.312945	Prob. Chi-Square(2)	0.5187

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/13/23 Time: 02:59
Sample: 1989 2019
Included observations: 28
Presample and interior missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.646276	22.75203	0.292118	0.7732
LN_X1	-0.331107	0.715912	-0.462497	0.6487
LN_X2	-0.269002	0.622343	-0.432240	0.6702
LN_X3	-0.045928	0.599904	-0.076559	0.9397
LN_X4	-0.429723	1.565527	-0.274491	0.7865
LN_X5	0.445180	0.847074	0.525550	0.6050
RESID(-1)	0.354950	0.328915	1.079155	0.2934
RESID(-2)	0.053749	0.263767	0.203776	0.8406

R-squared	0.046891	Mean dependent var	1.81E-14
Adjusted R-squared	-0.286697	S.D. dependent var	1.926961
S.E. of regression	2.185803	Akaike info criterion	4.636800
Sum squared resid	95.55471	Schwarz criterion	5.017430
Log likelihood	-56.91520	Hannan-Quinn criter.	4.753162
F-statistic	0.140565	Durbin-Watson stat	1.605944
Prob(F-statistic)	0.993506		

5. Heteroscedasticity Test (White Test)

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.471483	Prob. F(20,7)	0.9113
Obs*R-squared	16.07035	Prob. Chi-Square(20)	0.7123
Scaled explained SS	11.13276	Prob. Chi-Square(20)	0.9427

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/13/23 Time: 02:58
Sample: 1989 2019
Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1183.075	4426.233	-0.267287	0.7970
LN_X1^2	2.584142	5.523061	0.467882	0.6541
LN_X1*LN_X2	-0.918919	7.259904	-0.126575	0.9028
LN_X1*LN_X3	-0.350108	5.588549	-0.062647	0.9518
LN_X1*LN_X4	-0.784265	14.69350	-0.053375	0.9589
LN_X1*LN_X5	1.042090	5.857837	0.177897	0.8638
LN_X1	-41.16472	207.7365	-0.198158	0.8486
LN_X2^2	-0.737218	4.568627	-0.161365	0.8764
LN_X2*LN_X3	-4.515944	6.618501	-0.682321	0.5170
LN_X2*LN_X4	-10.20179	20.64165	-0.494234	0.6363
LN_X2*LN_X5	6.646199	7.322818	0.907601	0.3943
LN_X2	117.1901	307.0191	0.381703	0.7140
LN_X3^2	-2.966762	4.680087	-0.633912	0.5463
LN_X3*LN_X4	2.440374	15.07058	0.161930	0.8759
LN_X3*LN_X5	3.706280	7.468193	0.496275	0.6349
LN_X3	36.06398	233.0150	0.154771	0.8814
LN_X4^2	-7.002896	27.80808	-0.251830	0.8084
LN_X4*LN_X5	5.001635	20.68851	0.241759	0.8159
LN_X4	171.8178	696.9710	0.246521	0.8124
LN_X5^2	-7.316910	13.77785	-0.531063	0.6118
LN_X5	-31.62477	322.9915	-0.097912	0.9247

R-squared	0.573941	Mean dependent var	3.580564
Adjusted R-squared	-0.643370	S.D. dependent var	5.462451
S.E. of regression	7.002533	Akaike info criterion	6.844127
Sum squared resid	343.2483	Schwarz criterion	7.843280
Log likelihood	-74.81777	Hannan-Quinn criter.	7.149578
F-statistic	0.471483	Durbin-Watson stat	2.373128
Prob(F-statistic)	0.911332		

Appendix 2. Multiple Linear Regression

Dependent Variable: LN_Y
Method: Least Squares
Date: 05/12/23 Time: 20:20
Sample: 1989 2019
Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-58.73050	19.89879	-2.951462	0.0074
LN_X1	2.436778	0.584167	4.171373	0.0004
LN_X2	1.410307	0.539180	2.615652	0.0158
LN_X3	1.541527	0.547515	2.815497	0.0101
LN_X4	5.702736	1.400602	4.071632	0.0005
LN_X5	-3.889442	0.655461	-5.933907	0.0000

R-squared	0.685348	Mean dependent var	19.09789
Adjusted R-squared	0.613836	S.D. dependent var	3.435245
S.E. of regression	2.134732	Akaike info criterion	4.541969
Sum squared resid	100.2558	Schwarz criterion	4.827441
Log likelihood	-57.58756	Hannan-Quinn criter.	4.629241
F-statistic	9.583711	Durbin-Watson stat	1.348839
Prob(F-statistic)	0.000058		