International Journal of Economics, Commerce, and Management
Volume. 1 No. 4 October 2024
e-ISSN: 3047-9754; and p-ISSN: 3047-9746 Page 60-81
DOI: https://doi.org/10.62951/ijecm.v1i4.190
Available online at: https://international.areai.or.id/index.php/IJECM

Determinants of Indonesian Palm Oil Export Volume

Ivan William Saragi[1], I Nyoman Mahaendra Yasa[2]
Faculty of Economics and Business, Udayana University, Bali, Indonesia[1,2]

Author's correspondence : williamsaragiivan@gmail.com

Abstract: Indonesia is the first palm oil producing country and palm oil exporter in the world. In recent years, the volume of Indonesian palm oil exports has decreased. The determinants of the volume of Indonesian palm oil exports are the United States dollar exchange rate, the area of Indonesian palm oil plantations, and the price of CPO. This research aims to analyze the influence of the United States dollar exchange rate, oil palm land area, and CPO prices in the short term and long term, simultaneously and partially on the volume of Indonesian palm oil exports. The type of data in this research is secondary data in the form of quantitative data obtained from the Indonesian Central Statistics Agency (BPS), Bank Indonesia and the World Bank. This research was conducted in Indonesia from 1994-2023, with a total of 30 observations. The data analysis technique used is the Error Correction Model (ECM). The results of the research show that the US dollar exchange rate and the area of Indonesian palm oil plantations in the short and long term have a significant effect, while the CPO price has an insignificant effect on the volume of Indonesian palm oil exports. The United States dollar exchange rate, the area of Indonesian palm oil plantations, and the price of CPO simultaneously influence the volume of Indonesian palm oil exports. The United States dollar exchange rate has a partially negative and significant effect on the volume of Indonesian palm oil exports. The area of Indonesian oil palm land has a partially positive and significant effect on the volume of Indonesian palm oil exports. CPO prices have a negative and partially insignificant effect on the volume of Indonesian palm oil exports.

Keywords: Exports, exchange rate, land area, price, ECM

1. INTRODUCTION

International trade is one aspect that is needed in a country. International trade can occur due to disparities in human resources, natural resources, such as geographical location and climate, as well as differences in the social and economic conditions of a country. The dissimilarities that exist in various countries give rise to differences in the costs required and the goods produced. Through international trade, every country in the world has the opportunity to exchange its resources with other countries. This aims to avoid excesses and shortages or imbalances in the distribution of resources in various countries throughout the world. A country's dependence on resources that cannot be met independently and the superiority of overproduction from other countries in a product maintains the continuation and development of international trade to this day. In principle, international trade arises because each country involved in the activity identifies the benefits or additional profits that can be obtained through the exchange of goods and services. Thus, when carrying out international trade, through export and import activities, it provides economic benefits and allows countries to complement each other's resources and expertise, so as to create positive interdependent relationships between these countries.

Received: July 09, 2024; Revised: July 23, 2024; Accepted: August 16, 2024; Online Avaliable: August 19, 2024;

Exports are transactions in which economic ownership of goods, which can be in the form of sales, barter, gifts or grants, is transferred from residents of a provincial area to economic actors abroad (non-residents) (Bali Provincial Central Statistics Agency, 2017). Exports occur when a country has excess production and then sells or markets this excess to other countries, which in turn can encourage economic growth. This is because exports can contribute directly to increasing a country's income. Indonesia is an agricultural country with a tropical climate, creating the potential for abundant natural wealth for development in the agricultural sector, including oil palm plantations. Palm oil is palm oil or Crude Palm Oil (CPO), which is rich in its uses and is in great demand throughout the world. Apart from being used as the main component in making cooking oil, CPO is also an essential component in the industry produced from palm oil fruit extract. CPO is often a basic ingredient in making edible oils, vegetable fats for products such as milk and ice cream. Not only that, CPO can also be used as raw material in biodiesel production.

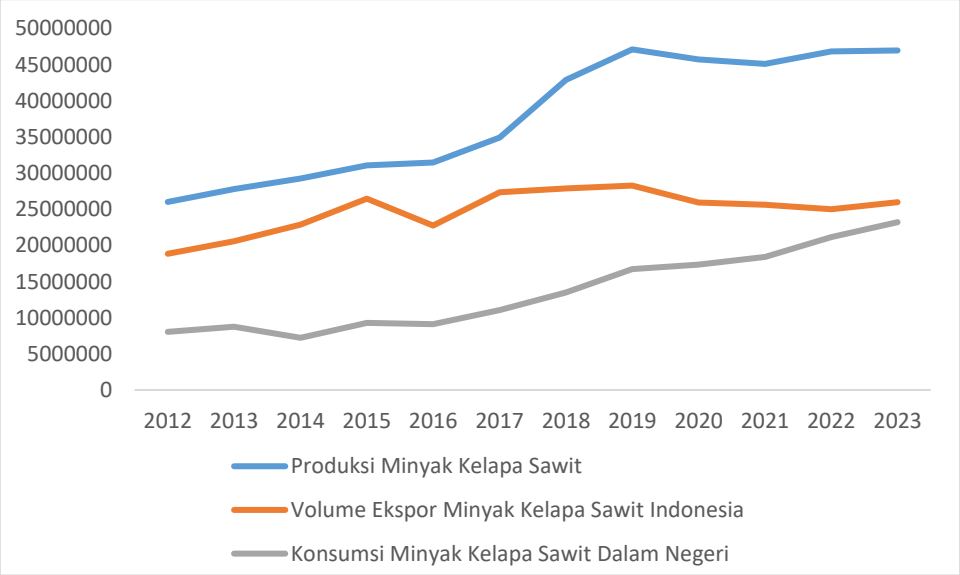

Figure 1. Palm Oil Production, Palm Oil Export Volume, and Domestic Palm Oil Consumption 2012 – 2023 (Tons)

Source: BPS Indonesia, Bank Indonesia, GAPKI (2024)

Based on Figure 1, it can be seen that in 2012 Indonesia's palm oil production was 26,015,519 tons, increasing continuously until 2019 was 47,120,247 tons, and in 2020 and 2021 Indonesia's palm oil production experienced a decline, but after In 2021, Indonesian palm oil production will increase until 2023. And the lowest Indonesian palm oil production occurred in 2012 and the largest Indonesian palm oil production occurred in 2023, amounting to 50,069,000 tons. Indonesian palm oil consumption only fluctuated from 2012 to 2017, and after

that Indonesian palm oil consumption increased until 2023. The smallest consumption occurred in 2012 at 7,164,681 tonnes and the highest consumption of Indonesian palm oil occurred in in 2023 amounting to 20,998,128 tons. In terms of palm oil export volume, it can be described that Indonesia's palm oil export volume is fluctuating. In 2012, the smallest palm oil export volume was 18,845,020 tons and the highest export occurred in 2019, amounting to 28,279,350 tons. However, after 2019, Indonesian palm oil exports experienced a decline, where in 2022 they could only export 24,989,929 tons, although in 2023 there was another increase of 25,988,000 tons from the previous year, but this increase was still lower than in 2019.

In research regarding the export volume of palm oil, various studies have been carried out taking into account the different variables or factors that influence the export volume. Research by Alam, et al (2021) analyzes the influence of production, international prices and exchange rates on the volume of Indonesian palm oil exports. Hutapea, et al (2023) also examined the influence of exchange rates, land area and palm oil prices on the volume of palm oil exports in North Sumatra. In addition, research by Nawangsih, et al (2023) examines the volume of Indonesian CPO exports to India, China and Europe (the Netherlands and Italy), with influencing factors including Indonesian palm oil production, international soybean oil prices, sunflower oil prices international, and exchange rates. Bayu (2018) examined Indonesian palm oil exports with a focus on the influence of exchange rates and inflation. Meanwhile, Hati, et al (2021) researched Indonesian crude palm oil (CPO) exports by considering factors such as exchange rates, international CPO prices, CPO production and inflation. The problem formulation in this research was obtained from the background explained as follows.

1) Do the United States dollar exchange rate, Indonesian palm oil plantation area, and CPO prices in the short and long term have an effect on the volume of Indonesian palm oil exports?
2) Do the United States dollar exchange rate, the area of Indonesian palm oil plantations, and the price of CPO simultaneously influence the volume of Indonesian palm oil exports?
3) What is the influence of the United States dollar exchange rate, the area of Indonesian palm oil plantations, and the partial price of CPO on the volume of Indonesian palm oil exports?

2. LITERATURE REVIEW

International Trade Theory

International trade can be explained as a business activity involving parties from various countries. Examples of these business transactions include exporting products from one country to another, investing in building factories abroad, purchasing raw materials from abroad, producing product components abroad which are then assembled domestically, and borrowing funds from banks in a country. to support business operations in other countries. Basically, countries do not directly carry out trade or business with other countries. Trade or business actors are individuals or entities in one country who transact with individuals or entities from other countries. These actors can be citizens, companies, government institutions, or non-profit organizations (Diphayana, 2018:2).

There are several theories that explain international trade, including the Mercantilism Theory. Mercantilists believed that the only way for a country to achieve wealth and power was to maximize exports and minimize imports. Profits from excess exports were expected to generate an influx of precious metals, especially gold and silver, which were directly linked to the nation's wealth and power. Therefore, it is deemed necessary for the government to use all efforts to encourage exports while reducing and limiting imports, especially luxury goods.

Next, there is the Absolute Advantage Theory introduced by Adam Smith. According to Adam Smith, a country will export goods that can be produced at a lower absolute cost compared to other countries. This absolute advantage refers to a country's ability to produce goods or services using fewer resources compared to other countries.

Apart from that, there is also the Heckscher-Ohlin (HO) Theory. This theory states that in international trade, each country is unique based on its production factors, even though all countries have similar production functions. Based on this assumption, countries tend to export goods that utilize the country's abundant and cheap resources, while importing goods that require scarce resources and have high production costs in the country. In HO theory, comparative advantage can be interpreted as the existence of differences in domestic supply situations between countries.

Export Concept

Exports are international trade activities carried out by a country to another country or various countries, where goods and services from within the country are offered abroad. According to Todaro and Smith (2015: 260), exports aim to expand domestic demand through international trade. One part of the economy that contributes to the development of international markets is exports. By expanding certain industries, exports can encourage the growth of other sectors, which ultimately has a positive impact on the broader economic sector. The purpose of exports is to increase national income, create jobs, increase production efficiency, expand markets, and make profits.

Exchange Rate Concept

The exchange rate of a country's currency compared to another country's currency is known as the exchange rate or foreign exchange rate. According to Yoopi (2007:8), the price of a country's currency compared to another country's currency is determined by supply and demand factors for the two currencies. The interaction between supply and demand for the two currencies causes this exchange rate equilibrium. Yoopi (2007:11) also explains that there are two main models for stating exchange rates, namely the European Model (Indirect quote) and the American Model (Direct quote). In the European Model, which is often used in global foreign exchange trading, the exchange rate is expressed as the number of units of foreign money required to purchase one unit of domestic currency. In contrast, in the American Model, which is applied in Indonesia, the exchange rate is defined as the price of foreign currency in domestic currency, or how many rupiah it takes to buy one unit of foreign currency. This exchange rate balance reflects the results of the interaction between supply and demand for the two currencies.

Land Area concept

Land is an area used for agricultural or plantation activities. Land can be defined as a plot of land of a certain size that can be planted with various types of plants and used for agricultural activities, which is generally measured in hectares. Land use really depends on the conditions and environment where the land is located (Daniel, 2004:66). Land area is the total area of land used for planting or agricultural activities. This land area plays an important role in determining the yield or amount of production that will be obtained by farmers from all areas used for these activities.

Price Concept

Price is the value of a product which is the basis for determining offers to attract consumers. Price has two different meanings. Specifically, price refers to the amount of money a buyer must pay to obtain a product or service. However, in general, price includes all contributions from customers, both in the form of money and other elements, to obtain the benefits of the product or service (Kotler and Armstrong, 2017: 245).

Conceptual Framework

Boediono (2001:115) stated that a weakening exchange rate can increase exports. When a country's exchange rate weakens, the price of exported goods becomes more affordable for international buyers. This is caused by the comparison between the country's currency and the currencies of other countries which is represented by the exchange rate. If the exchange rate weakens, the value of that country's currency will decrease relative to other countries' currencies, making products purchased with that currency cheaper for foreign buyers. Exchange rates indicate the relative price between two currencies, which affects purchasing power, especially in international trade with different currencies. When the exchange rate weakens, the price of export products will decrease, while the price of imported products from trading partner countries will increase (Pratiwi et al, 2018). Currently, the Rupiah exchange rate is still very dependent on the United States Dollar exchange rate, due to the low value of the Rupiah and the high exchange rate of the United States Dollar. Research by Andriana, et al (2021) shows that the exchange rate has a positive influence on PT's CPO export volume. Letawa. Another research by Adiyasa, et al (2019) found that the United States Dollar exchange rate had a significantly positive effect on Balinese coffee exports in 2003-2017. Meanwhile, research by Wardani & Sudirman (2014) shows that the United States Dollar exchange rate also influenced the volume of Indonesian tea exports in the 2000-2012 period.

Land area can provide a comparative advantage in international trade. Countries with larger land areas tend to have the ability to produce agricultural products and natural resources more efficiently than countries with limited land areas. This can provide a comparative advantage for the country in terms of exports of these products. Research by Dewi & Utama (2022) shows that land area influences Indonesian coffee exports during 2001-2020. Segarani & Dewi (2015) found that land area had a significant effect on Indonesian clove exports in the 1993-2012 period. Research by DJ & Wirawan (2015) states that land area has a positive and significant influence on the volume of Indonesian ginger exports in 1993-2012. Meanwhile,

research by Zuhri et al (2016) shows that land area has a significant influence on the volume of clove exports in Central Java.

According to Soekartawi (2005:128), if commodity prices in the international market are higher than prices in the domestic market, this can increase the volume of exports of these commodities. World price refers to the price of goods on the international market. If global prices are higher than domestic prices, the country is likely to become an exporter, because producers will be more interested in offering their products in international markets that offer higher profits. Conversely, if global prices are lower than domestic prices, the country may become an importer because consumers will look for cheaper prices from other countries. This is in line with the law of supply, where if the price increases, the quantity of goods offered will also increase, and conversely if the price falls, the quantity of goods supplied will decrease. Based on research by Sulistiawati (2023), CPO prices have a positive and significant influence on the volume of Indonesian palm oil exports. Another research by Ardika & Indrajaya (2019) explains that international CPO prices have a positive and significant influence on the volume of palm oil exports in Indonesia. Research by Akbar & Dahlan (2023) also shows that CPO prices have a positive and significant influence on the volume of Indonesian CPO exports.

Research Hypothesis

Based on the theoretical basis and results of previous research, the hypothesis in this research is:

- The United States dollar exchange rate, palm oil plantation area, and CPO prices in the short and long term have a significant influence on the volume of Indonesian palm oil exports.
- The United States dollar exchange rate, palm oil plantation area, and CPO prices simultaneously influence the volume of Indonesian palm oil exports.
- The United States dollar exchange rate, palm oil plantation area, and CPO prices partially have a positive effect on the volume of Indonesian palm oil exports.

3. RESEARCH METHODS

Location and time of research

The location of this research is in Indonesia. Indonesia is a palm oil producing country and the first palm oil exporting country in the world. In recent years, the volume of Indonesian palm oil exports has tended to decline. The time used in this research is the period from 1994-2023

Data type and source

This research uses two types of data, namely quantitative data and qualitative data. Quantitative data refers to data in the form of numbers. Quantitative data refers to data in the form of numbers. In this research, quantitative data includes the United States Dollar exchange rate, Palm Oil land area, and CPO prices related to Indonesian palm oil exports in 1994-2023. Qualitative data is data that is not in the form of numbers and cannot be measured using arithmetic units. This data is in the form of explanations, descriptions, words, sentences and images which are important for interpreting research results.

Data collection methods and data sources

The data collection method used in this research is non-participant observation method taken from various references, namely collecting data by reading, copying and processing documents, as well as existing written notes. In this method, the researcher acts as an independent observer, not directly involved. Data is collected through recording, observation, and literature studies which include articles, scientific works such as journals, scientific articles, documents from related agencies, and literature books. The data source used in this research is secondary data. Secondary data is data obtained or collected from various existing sources (researchers as second hand) (Siyoto, 2015:68). In this research secondary data was obtained through BPS, the Directorate General of Plantations, the Indonesian Ministry of Trade, and the World Bank.

Data analysis techniques

- **Descriptive Statistical Analysis**
- Descriptive Statistical Analysis is a statistical technique used to analyze data by describing or illustrating the data that has been collected, without aiming to draw general conclusions or make generalizations (Sugiyono, 2018:206). Descriptive

research is carried out to determine the value of independent variables, either one or more (independent) variables without linking them to other variables. In this research, descriptive analysis is used as a first step to understand the general picture of data that has been collected from several trusted secondary sources.

- Error Correction Model (ECM)

  The tests used in the Error Correction Model (ECM) model are as follows. 1) Stationarity Test Stationarity test is important in carrying out time series regression analysis to find out whether the data is stationary or not stationary. 2) Cointegration Test To carry out a cointegration test, the variable being tested must first pass the unit root test. The cointegration test aims to detect the stability of the long-term relationship between two or more variables, or between the independent variable and the dependent variable. 3) Ordinary Least Square (OLS) Test. The analytical method used in this research to observe the long-term relationship between the dependent variable and the independent variable is a multiple regression model using the Ordinary Least Square (OLS) method. Ordinary Least Squares (OLS) is the most commonly used parameter estimation method in linear regression analysis. Linear regression analysis was carried out to determine the direction and how much influence the independent variable has on the dependent variable (Ghozali, 2016: 97).

  4) Error Correction Model (ECM) Test The ECM model is used to find the short-term balance regression equation and to determine the consistency of a model. In addition, the ECM model aims to overcome data problems related to spurious and non-stationary time series. The ECM regression model applied in this research is as follows.

  $\mathrm{LnDY} = \beta_0 + \beta_1 \mathrm{LnDX_1}t + \beta_2 \mathrm{LnDX_2}t + \beta_3 \mathrm{LnDX_3}t + \beta_1 \mathrm{ECT} + u_t$.....(2)

  Information :

DY	= volume of Indonesian palm oil exports
DX1	= United States dollar exchange rate
DX2	= Area of Oil Palm Land
DX3	= CPO price
ECT	= residual equation
β_0	= Constant
D	=Difference
Ln	= Natural logarithm
u_t	= residual value (previous period)

- Classical Assumption Test

  The classical assumption tests are the normality test, multicollinearity test, and heteroscedasticity test which are explained as follows. The normality test is a test to find out whether in regression the dependent variable and independent variables are normally distributed or not. The multicollinearity test explains that there is no multicollinearity between the independent variables in the regression model, which is one of the assumptions of the classical regression model. Multicollinearity means that there is a close relationship between several independent variables in the regression model. The heteroscedasticity test is used to test whether in a model there is an inequality of variance from residual observations to other observations. Heteroscedasticity occurs due to the absence of the same standard deviation of the dependent variable for each independent variable. If the research has symptoms of heteroscedasticity, it will provide deviant predictions.

5. RESULTS AND DISCUSSION

Table 1. Descriptive Statistical Analysis

Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
United States Dollar Exchange Rate	2,180	15,219	10,015	3,737,113
Oil palm area	1,804,149	16,833,985	8,477,820	4,409,075
CPO Price	287	1,276	706,533	257,382
Palm Oil Export Volume	1,265,024	28,279,350	14629985	9,707,247

Based on the table, it shows that the United States Dollar Exchange Rate (X1) has a minimum value of 2,180 and a maximum value of 15,219 rupiah, a mean of 10,015 rupiah, and a standard deviation of 3,737.113 rupiah. The area of oil palm land (X2) has a minimum value of 1,804,149 hectares and a maximum value of 16,833,985 hectares, a mean value of 8,477,820 hectares, and a standard deviation value of 4,409,075 hectares. The price of CPO (X3) has a minimum value of 287 and a maximum value of 1276, a mean value of 706,533 USD and a standard deviation value of 257,382 USD. The export volume of palm oil (Y) has a minimum value of 1265024 and a maximum value of 28,279,350 tons, a mean value of 14,629,985 tons and a standard deviation value of 9,707,247 tons.

Table 2. Data Stationarity Test

	levels	1st difference	2nd difference
Prob. ln_Dollar Exchange Rate (x1)	0.1007	0.0146	0.0000
Prob. ln_Land area (x2)	0.0183	0.0105	0.0000
Prob. ln_CPO Price (x3)	0.4306	0.0002	00005
Prob. ln_export volume (Y)	0.0473	0.9105	0.0001

Based on the table, it is found that in the level test, not all variables are known to be stationary, where the probability value of the dollar exchange rate and export volume variables is below 0.05. In the first difference test, not all variables are stationary, where the probability values of the variables dollar exchange rate, land area and CPO price are below 0.05. In the second difference test, all variables were found to be stationary with a probability of all variables below 0.05.

Table 3. Data cointegration test

Variable	Probability	F-Statistics	Prob(F-Statistic)	Information
ECT	0.0386	4.728911	0.038592	There is Cointegration

In the table it can be seen that the probability value of the ECT variable is below 0.05. This provides information that the ECT variable is stationary at the level and implicitly states that the variables of the United States dollar exchange rate, oil palm area, CPO price, and palm oil export volume are cointegrated or have a long-term relationship and testing can be continued to the equation estimation stage. short term (ECM Model).

Table 4. Ordinary Least Square Test (OLS)

Variable	Coefficient	Std. Error	t-statistic	Prob.
Dollar Exchange Rate (X1)	-0.606919	0.218127	-2.782412	0.0099
Land area (X2)	2.106878	0.224521	9.383872	0.0000
CPO Price (X3)	-0.197799	0.175791	-1.125196	0.2708

Based on the regression results in the long-term equation model table, it can be seen that the United States dollar exchange rate (X1) has a negative and significant effect with a probability of 0.0099 < 0.05 on the volume of Indonesian palm oil exports. The oil palm land area variable (X2) has a positive and significant effect at a probability value of 0.0000 < 0.05 on the volume

of Indonesian palm oil exports. The price variable (X3) of CPO has a negative and insignificant effect with a probability of 0.2708 > 0.005 on the volume of Indonesian palm oil exports.

Table 5. Error Correction Model (ECM) Test

Variable	coefficient	Probability
C	0.045615	0.3943
D(Dollar Exchange Rate(X1))	-0.853114	0.0001
D(Land area(X2))	1.508426	0.0245
D(CPO Price(X3))	-0.178690	0.2344
ECT(-1)	-0.366214	0.0251
R2	0.602806	
Adjusted R2	0.536608	
F-Statistics	9.105986	
Prob. (F-statistic)	0.000127	

In the table, the prob value is known. (F-statistic) of 0.000127 which is smaller than 0.05 (α) and the ECT value (-1) which indicates speed adjustment which is negative and significant indicates that this ECM model is valid and has a significant effect in the short term and long term. The adjusted R2 value of 0.536608 or 53.6 percent indicates that around 46.4 percent of the variation in the Indonesian palm oil export volume variable is influenced by independent variables outside the model. The results of the short-term estimation equation show that the US dollar exchange rate variable (X1) has a negative and significant effect with a probability of 0.0001 < 0.05 on the volume of Indonesian palm oil exports. The oil palm land area variable (X2) has a positive and significant effect at a probability value of 0.0245 < 0.05 on the volume of Indonesian palm oil exports. The price variable (X3) of CPO has a negative and insignificant effect with a probability of 0.2344 > 0.005 on the volume of Indonesian palm oil exports. The ECT coefficient value is -0.366214 and the probability value is 0.0251 <0.05. A coefficient with a negative sign means that the regression model has a short-term relationship.

Classical Assumption Test

- **Normality Test**

The normality test used in this research is the Jarque-Bera test technique with the following results.

Table 6. Normality Test Results

Jarque-Bera	Probability	Information
0.008483	0.995767	Normal

Source: Processed Data, 2024

Based on Table shows that the probability is 0.995767 (>0.005), so it can be concluded that the data used in the ECM model is normally distributed.

- **Multicollinearity Test**

Multicollinearity test means that there is a close relationship between several independent variables in the regression model

Table 7. Multicollinearity Test Results

Variable	Centered VIF
D(ln_Dollar exchange rate(X1))	1.926817
D(ln_Land area(X2))	1.938083
D(ln_CPO price(X3))	1.152740
ECT(-1)	1.032307

Source: processed data, 2024

Based on the table, it can be seen that all the centered VIF values of the independent variables are smaller than 10, so it can be concluded that there is no multicollinearity or it could also be said that there is no relationship between the independent variables in the regression model.

- **Heteroscedasticity Test**

The heteroscedasticity test is used to test whether in a model there is an inequality of variance from residual observations to other observations. In this research, to determine the presence of heteroscedasticity, the Breusch-Pagan-Godfrey test was carried out as follows.

Table 8. Heteroscedasticity Test

Heteroscdasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.215441	Prob. F	0.9273
Obs*R-square	1.005205	Prob. Chi-Square(4)	0.9090
Scaled explained SS	0.671756	Prob. Chi-Square(4)	0.9548

Source: processed data, 2024

Based on the heteroscedasticity test results table, the Obs*R-square result is 1.005205 (>0.05) with a probability of 0.9090. So it can be concluded that this ECM model does not contain heteroscedasticity.

Table 9. Simultaneous Test (F Test)

	Fcount	**Ftable**
Short-term	9.105986	3,354
Long-term	158.6404	3,354

Based on the analysis results, it is known that the F table is 3.354 and the calculated F is 9.105986. It can be concluded that F-count > F-table or (9.105986 > 3.354) and H0 is rejected and H1 is accepted. This means that simultaneously the variables of the US dollar exchange rate, area of oil palm land, and CPO price have a significant effect on the volume of Indonesian palm oil exports in the short term. Based on the analysis results, it is known that the F table is 3.354 and the calculated F is 158.6404. It can be concluded that F-count > F-table or (158.6404 > 3.354) and H0 is rejected and H1 is accepted. This means that simultaneously the variables of the US dollar exchange rate, oil palm land area, and CPO price have a significant effect on the volume of Indonesian palm oil exports in the long term.

Table 10. Partial Test (t Test)

Variable	**Short-term**		**Long-term**	
	Coefficient	**Probability**	**Coefficient**	**Probability**
US Dollar Exchange Rate (X1)	-0.853114	0.0001	-0.606919	0.0099
Land Area (X2)	1.508426	0.0245	2.106878	0.0000
CPO Price (X3)	-0.178690	0.2344	-0.197799	0.2708

1. The influence of the United States Dollar Exchange Rate (X1) on the volume of Indonesian palm oil exports

Based on the results of the regression analysis, it was found that the regression coefficient for the US dollar exchange rate variable was -0.853114 with a probability of 0.0001. The significance value is lower than the significance level (0.0001 < 0.05) and H0 is accepted and H1 is rejected. This means that in the short term, the United States dollar exchange rate has a negative and significant influence on the volume of Indonesian palm oil exports. Based on the results of the regression analysis, it was found that the regression coefficient for the US

dollar exchange rate variable was --0.606919 with a probability of 0.0099. The significance value is lower than the significance level (0.0099 < 0.05) and H0 is accepted and H1 is rejected. This means that in the long term, the United States dollar exchange rate has a negative and significant influence on the volume of Indonesian palm oil exports.

2. The influence of the area of Indonesian palm oil plantations on the volume of Indonesian palm oil exports

Based on the results of the regression analysis, it was found that the regression coefficient for the oil palm land area variable was 2.106878 with a probability of 0.0245. The significance value is lower than the significance level (0.0245 < 0.05) and H0 is rejected and H1 is accepted. This means that in the short term, the area of oil palm land has a positive and significant influence on the volume of Indonesian palm oil exports. Based on the results of the regression analysis, it was found that the regression coefficient for the oil palm land area variable was 1.508426 with a probability of 0.0000. The significance value is lower than the significance level (0.0000 < 0.05) and H0 is rejected and H1 is accepted. This means that in the long term, the area of oil palm land has a positive and significant influence on the volume of Indonesian palm oil exports.

3. The influence of CPO prices on the volume of Indonesian palm oil exports

Based on the results of the regression analysis, it was found that the regression coefficient for the CPO price variable was -0.178690 with a significance value of 0.2344. The significance value is lower than the significance level (0.2344 > 0.05). This means that in the short term, CPO prices have a negative and insignificant influence on the volume of Indonesian palm oil exports. Based on the results of the regression analysis, it was found that the regression coefficient for the CPO price variable was -0.197799 with a significance value of 0.2708. The significance value is lower than the significance level (0.2708 > 0.05). This means that in the long term, CPO prices have a negative and insignificant influence on the volume of Indonesian palm oil exports.

Discussion

The influence of the United States dollar exchange rate on the volume of Indonesian palm oil exports

Based on the results of the analysis, the United States dollar exchange rate has a negative and significant effect in the long and short term on the volume of palm oil exports. The coefficient value in the long term is -0.606919 and in the short term is -0.853114. This

means that the United States dollar exchange rate has a negative influence on the volume of Indonesian palm oil exports. These results are not in accordance with the research hypothesis which has a positive effect. In theory, if the foreign currency exchange rate rises against the domestic currency, this can increase exports. Conversely, if the foreign currency exchange rate falls against the domestic currency. According to Sukirno (2004:319), if the United States dollar exchange rate increases, exports will also increase. This result means that according to Mankiw's theory, the weakening of the exchange rate (depreciation) or an increase in the value of the domestic currency will cause a decline in Indonesian exports. The influence of the United States dollar exchange rate which has a negative effect on the volume of Indonesian palm oil exports will have an impact on the price value which is used as a benchmark for carrying out transactions. These results are in accordance with research by Hamzah & Sasonto (2020) which states that the US dollar exchange rate has a negative effect on the volume of CPO exports. Apart from that, research by Paramartha & Setyari (2020) explains that the US dollar exchange rate has a negative effect on Indonesian palm oil exports. In research by Nurmalita & Wibowo (2019), the US dollar exchange rate variable has a negative and insignificant effect on the volume of Indonesian palm oil exports to India. In Gowinda & Ayuningsasi (2019) stated that the US dollar exchange rate variable has a negative effect on Indonesia's crude oil exports. Apart from that, research by Wiharani & Sukadana (2021) suggests that the US dollar exchange rate has a negative and insignificant effect on the volume of Indonesian shrimp exports to the United States from 1990 to 2019. There are other causes or factors that make the US dollar exchange rate have no influence on the volume of Indonesian palm oil exports, such as restrictions on palm oil exports by the European Union after the Renewable Energy Directive (RED) II Policy Agreement for 2018 – 2022. The RED II policy is the European Union's renewable energy platform which reached a political agreement on June 14 2018. This policy aims to optimize the use of biofuel-based renewable energy and limit the use of biofuels that cause deforestation during the period 2021 to 2030 (Lorensia et al, 2022). The Netherlands, Spain and Italy are the largest export destination countries for palm oil for the European Union. In recent years the volume of imports of palm oil from the Netherlands, Spain and Italy from Indonesia has decreased,The cause of the decline that occurred cannot be separated from the Black Campaign carried out by European Union countries against palm oil originating from Indonesia. Apart from that, another factor is the increasing use of domestic palm oil. The cause of the increase in domestic consumption of palm oil is due to its use in the biofuel industry for B30 and B35 fuels. There is an increase in the use of palm oil because biofuel is an alternative

renewable energy source that is environmentally friendly and sustainable, and dependence on petroleum and other fossil fuels can be minimized.

The influence of Indonesia's oil palm land area on the volume of palm oil exports

Based on the results of the analysis, it shows that the area of Indonesian oil palm land has a positive and significant effect in the long and short term on the volume of Indonesian palm oil exports. The coefficient value in the long term is 2.106878 and in the short term is 1.508426. This means that the area of Indonesian oil palm land has a positive influence on the volume of Indonesian palm oil exports. These results are in accordance with the research hypothesis which states that it has a positive effect on Indonesia's export volume. This explains that the larger the area of oil palm land, the greater the amount of production produced, so that the number of offers abroad will increase. The area of oil palm land can have an impact on Indonesia's comparative advantage in conducting international trade. Countries that have large land areas tend to have the ability to produce agricultural products and natural resources more efficiently than countries that have limited land areas. This situation can provide a comparative advantage for Indonesia in terms of exports of Indonesian palm oil. These results are in accordance with research by Hutapea et al (2023) which states that land area has a positive and significant effect on the volume of palm oil exports from North Sumatra. Apart from that, DJ & Wirawan's (2015) research states that land area partially has a positive and significant effect on the volume of Indonesian ginger exports. In research by Dewi & Utama (2022) it is stated that land area has a partial effect on Indonesian coffee exports during 2001-2020. Segarani & Dewi (2015) explained that land area had a significant influence on Indonesian clove exports for the 1993-2012 period. Research by DJ & Wirawan (2015) states that land area partially has a positive and significant effect on the volume of Indonesian ginger exports in 1993-2012. In research (Zuhri et al, 2016) it is explained that partially it has a significant effect on the volume of clove exports in Central Java. In research, Irawan (2018) explained that the variable area of oil palm land had a positive effect on Indonesian palm oil exports from 1995 to 2015. In Indonesia, plantations are dominated by oil palm plantations compared to other plantations. Indonesian oil palm land is spread across 26 provinces in Indonesia, because the land is suitable for planting oil palm and can grow for quite a long period of time compared to other types of plants. The existence of large areas of oil palm land will cause the amount of palm oil production to increase, so that domestic needs will be met and the rest will be sold to other countries that need or export palm oil.The influence of the area of oil palm land is an important factor in driving the influence of Indonesian palm oil exports.

The influence of CPO prices on the volume of Indonesian palm oil exports

Based on the analysis results, it shows that the CPO price has a negative and insignificant effect in the long and short term. The coefficient value in the long term is -0.197799 and in the short term is -0.178690. This means that the price of CPO has a negative effect on the volume of Indonesian palm oil exports. These results are not in accordance with the research hypothesis which states that CPO prices have a positive effect on the volume of Indonesian palm oil exports. In Soekartawi (2005:128) If commodity prices in the international market are higher than in the domestic market, this can increase the volume of commodity exports. World price refers to the price of a good on the international market. If global prices exceed domestic prices, then the country will tend to act as an exporter. Manufacturers will be interested in offering their products on international markets which promise higher profits. On the other hand, if global prices are below domestic prices, the country will likely act as an importer because consumers will look for cheaper prices from other countries. This is not in accordance with the law of supply where if the price increases then the goods offered will also increase and vice versa if the price falls then the quantity of goods offered will also decrease. This result explains that the price offered has a negative relationship with the quantity demanded, which means that the higher the price of a commodity, the lower the quantity demanded. In other research results, Mejaya (2016) stated that international prices have a negative and insignificant effect on the volume of tea exports. In research, Santosa et al (2021) explained that the CPO price variable had a negative effect on the volume of Indonesian palm oil exports to the European Union. In research, Aprilia et al (2023) said that the CPO price variable had a negative influence on the volume of Indonesian exports to India. Huda's research (2017) explains that in the short and long term international CPO prices have a negative and significant influence on Indonesian CPO exports. In the research of Mejaya et al. (2016) international prices have a negative and partial effect on the volume of Indonesian tea exports. Simanjuntak et al. (2017) which explains that the International Seaweed Price variable has a negative and partially insignificant influence on Indonesian Seaweed Export Volume. Apart from that, in the research of Alam et al. (2021) explains that the international price variable for palm oil does not have a significant influence on the volume of Indonesian palm oil exports. Other research also explains that Dewi & Indrajaya (2020) found that the international price variable partially had an insignificant negative influence on Indonesian paper exports.Price is the amount of money that must be paid to obtain a product or service, or the value spent by the importer to gain profits from owning or utilizing the product or service. The factor that causes the price of CPO to have a negative influence on the volume of palm oil exports is because

Indonesia's export system often uses a Memorandum of Understanding (MoU) or cooperation contract, so price changes do not have much of an impact. This contract is signed between the producer company (palm oil exporter) and the consumer company (palm oil importer) and also the trading price set in the contract is based on the producer's currency value against the United States dollar. This means that the price of CPO has no influence on the volume of palm oil exports. Apart from that, Indonesia is the first producing country of palm oil in the world. However, the world CPO price is controlled by the Malaysian state. The reason why world CPO pricing is under Malaysia's control is because the country has long been recognized as the world's largest producer of palm oil and CPO. Malaysia determines world prices for palm oil and CPO commodities, including for Indonesia, through the Malaysia Derivatives Exchange (BMD). BMD itself has a history of trading CPO since 1980. The role and existence of BMD has caused world CPO prices to be set using the Malaysian ringgit currency. Apart from that, the prices of palm oil and CPO commodities are also determined by the United States dollar.The role and existence of BMD causes world CPO prices to be determined using the Malaysian ringgit currency. Apart from that, the prices of palm oil and CPO commodities are also determined by the United States dollar.The role and existence of BMD causes world CPO prices to be determined using the Malaysian ringgit currency. Apart from that, the prices of palm oil and CPO commodities are also determined by the United States dollar.

6. CONCLUSION

Based on the results of the research data analysis carried out, the conclusions obtained are presented and also at the same time to answer the proposed research problem formulation which is as follows.

1) The United States dollar exchange rate and the area of Indonesian palm oil plantations in the short and long term have a significant effect, while the price of CPO in the short and long term has no significant effect on the volume of Indonesian palm oil exports.
2) The United States dollar exchange rate, the area of Indonesian palm oil plantations, and the price of CPO simultaneously have a significant influence on the volume of Indonesian palm oil exports.
3) The United States dollar exchange rate partially has a negative and significant effect, the area of Indonesian oil palm land partially has a positive and significant effect, while the CPO price partially has a negative and insignificant effect on the volume of Indonesian palm oil exports.

BIBLIOGRAPHY

Yoopi, A. (2004). Understanding Foreign Exchange Rates. Jakarta: FE-UI.

Wiharani, I. G. A. D., & Sukadana, I. W. (2019). The influence of GDP, export prices, dollar exchange rates on the volume of Indonesian shrimp exports to the United States in 1990-2019. Unud EP E-Journal, 10(2), 28-35.

Wardani, N. W. G., & Sudirman, W. (2014). The influence of price, production, land area and the United States dollar exchange rate on Indonesian tea export volume and competitiveness for the 2000-2012 period. E-Journal of Development Economics, 4(1), 1-11.

Todaro, M. P., & Smith, S. C. (2015). Economic Development (12th ed.). United States: The George Washington University.

Suratiyah, K. (2015). Agricultural Science (Revised ed.). Self-Help Group Spreader.

Sulistiawati, P. (2023). Analysis of the influence of domestic consumption, rupiah exchange rate, and international CPO prices on palm oil export volume in Indonesia. JIE Journal of Economics, 7(04), 570–582.

Sukirno, S. (2004). Macroeconomic Theory: Introductory (2nd ed.). Jakarta: Raja Grafindo Persada.

Sugiyono. (2018). Quantitative, Qualitative and R&D Research Methods. CV. Alphabet.

Sugiyanto, C. (2009). Applied Econometrics. Yogyakarta: BPFE-YOGYAKARTA.

Soemarso, S. R. (1990). The Role of Cost Price in Determining Selling Price. Jakarta: Rineka Cipta.

Siyoto, S., & Sodik, M. A. (2015). Basic Research Methodology. Media Publishing Literacy.

Simanjuntak, P. T. H., Arifin, Z., & Mawardi, M. K. (2017). The influence of production, international prices and rupiah exchange rates on Indonesian seaweed export volumes. Journal of Business Administration, 50(1), 1-20.

Silitonga, R. B., Ishak, Z., & Mukhlis, M. (2017). The influence of exports, imports and inflation on the rupiah exchange rate in Indonesia. Journal of Development Economics, 15(1), 53-59.

Sidik, R. M. (2018). Indonesian CPO rejected by the European Union, why. Indonesia for Global Justice, 1.

Siboro, S. F. H. B., & Widanta, A. A. B. P. (2023). Analysis of competitiveness and determinant factors that influence Indonesian shrimp exports. Udayana University Economics and Business E-Journal, 12(08), 2337-3067.

Santosa, R., Haryadi, H., & Artis, D. (2022). Analysis of factors influencing Indonesian palm oil exports to the European Union. E-Journal of Industrial and Monetary Trade, 10(1), 63-70.

Rosita, R., Haryadi, H., & Amril, A. (2014). Determinants of Indonesian CPO exports. Journal of Regional Financing and Development Perspectives, 1(4), 183-183.

Rinaldy, E., Ikhlas, D., & Utama, A. (2021). International Trade: Concepts and Applications. Literary Earth.

Radifan, F. (2014). Factors influencing Indonesian crude palm oil exports in international trade. Economics Development Analysis Journal, 3(2), 259-267.

Pratiwi, D. S., Busairi, A., & Junaidi, A. (2018). The influence of exports and the rupiah exchange rate as well as the inflation rate on Indonesia's foreign exchange reserves. Mulawarman Journal of Economic Sciences (JIEM), 3(4), 13-25.

Oktarina, S. D., Nurkhoiry, R., Amalia, R., Pradiko, I., & Rahutomo, S. (2022). The impact of Covid-19 uncertainty, climate, and other complexities on the palm oil industry. WARTA Palm Oil Research Center, 27(2), 70-77.

Nurmalita, V., & Bowo, P. (2019). Analysis of factors affecting Indonesian palm oil exports to India. Economic Education Analysis Journal, 8(2), 605-619.

Nopirin. (1996). Monetary Economics (Book 2, 1st ed.). Yogyakarta: BPFE.

Nawangsih, W. S., Manumono, D., & Ambarsari, A. (2023). Factors affecting Indonesia's CPO export volume to India, China and Europe (Netherland and Italy). Agrotechnology, Agribusiness, Forestry, and Technology: Instiper Student Journal (AGROFORETECH), 1(2), 1033-1042.

Mona, M., Kekenusa, J., & Prang, J. (2015). Using multiple linear regression to analyze coconut farmers' income: Case study: Coconut farmers in Beo village, Beo sub-district, Talaud district. d'CARTESIAN: Journal of Mathematics and Applications, 4(2), 196–203.

Mejaya, A., Fanani, D., & Mawardi, M. (2016). The influence of production, international prices and exchange rates on export volume: Study on global Indonesian tea exports for the 2010-2013 period. Journal of Business Administration, 35(2), 20-29.

Marhaeni, A. A. I. N., & Yuliarmi, N. N. (2019). Research Methods Volume 1. CV. Primary Literature.

Manurung, E. (2014). Factors affecting rice imports in Indonesia 1991-2011 (Error Correction Model approach). Journal of Economic Sciences, 1-7.

Lorensia, N. N. P., Kusuma, R. P., & Elistania, E. (2022). The Indonesian government's efforts in facing palm oil export restrictions by the European Union after the Renewable Energy Directive (RED) II policy agreement for 2018 - 2022. Balcony, 6(2), 119–131.

Jazuli, N. A., & Kamu, A. (2019). Factors affecting the export demand of Malaysian palm oil. AGROLAND: The Agricultural Sciences, 6, 89-99.

Iskandar, A. (2015). The impact of changes in world crude palm oil (CPO) prices on the export value of palm oil commodities and the Indonesian economy: Vector autoregression analysis approach. STAN Arta Info Journal, 1(13), 1-20.

Irawan, H. (2018). Analysis of factors affecting Indonesian palm oil exports (1995-2015). Journal of Development Economics.

Hutapea, M., Nainggolan, P., Panjaitan, P. D., & Damanik, D. (2023). Analysis of determination of North Sumatra palm oil export volume. Ecogen Journal, 6(2), 213-221.

Huda, E. N., & Widodo, A. (2017). Determinants and stability of Indonesian crude palm oil exports. Journal of Economics and Business, 20(1), 45-66.

Hati, A. G. P., Saraswati, B. D., & Wahyudi, Y. (2021). Analysis of factors affecting Indonesian crude palm oil exports: Vector error correction model approach. Journal of Economics and Business, 24(2), 127-140.

Gowinda, A. A. B., & Ayuningsasi, A. A. K. (2019). The influence of the US dollar exchange rate, production, and world crude oil prices on Indonesian crude oil exports. Unud EP E-Journal, 10(6), 2253-2282.

Gilarso, T. (2004). Introduction to Macroeconomics. Yogyakarta: Kanisius.

Ghozali, I. (2006). Application of Multivariate Analysis with the SPSS Program (4th ed.). Semarang: Diponegoro University Publishing Agency.

Feriyanto, A. (2015). International Trade: Complete Export Import Procedures. Kebumen: Mediatera.

Gujarati, D. N. (2003). Basic Econometrics (4th ed.). New York: McGraw-Hill.

Diphayana, W. (2018). International Trade. Deepublish.

Dewi, M. F. A., & Indrajaya, I. G. B. (2020). The influence of production amounts, international prices and exchange rates on Indonesian paper exports. EP E-Journal, 9(8), 36-50.

Budi, D. N. (2018). Analysis of the factors influencing Indonesian CPO exports to the European Union. Journal of Agribusiness, 2(4), 21-30.

Azizah, A. N., & Kuntoro, T. A. (2016). Factors affecting Indonesian palm oil exports (2005-2015): An econometric approach. Journal of Economics and Business, 2(3), 19-30.

Asmara, A., & Aris, F. (2021). Microeconomics: Introduction and Applications (2nd ed.). Surabaya: PT. Gramedia Pustaka Utama.

Armida, S. A., & Baskoro, G. (2019). Analysis of the influence of production, prices and exchange rates on Indonesian coal exports. Journal of Mining and Energy Economics, 5(1), 33-42.

Anggraeni, D., & Widodo, P. (2018). The influence of production, international prices, and the exchange rate on Indonesian textile exports. Jurnal Ekonomi Pembangunan, 19(1), 70-88.

Ali, A. (2014). The influence of the rupiah exchange rate, world oil prices and Indonesian CPO production on the export value of Indonesian CPO. Jurnal Ekonomi dan Bisnis Indonesia, 12(3), 123-133.

Amalia, M. (2021). Analysis of factors affecting Indonesian palm oil export volumes to the European Union. Journal of Business and Management, 22(3), 20-30.

Ahmad, F. (2015). The Influence of World Oil Prices and International Palm Oil Prices on the Volume of Indonesian Palm Oil Exports. Jurnal Ekonomi dan Pembangunan Indonesia, 15(2), 115-125.