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The Influence of Consumption, Rupiah Exchange Rate, and International CPO Prices on Indonesia's Palm Palm Oil Export Volume 2018-2022

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A B S T R A C T

The purpose of this study is to identify the impact of domestic consumption, rupiah exchange rate, and international crude palm oil (CPO) price on palm oil export volume in Indonesia. The method applied in this study is multiple linear regression and classical assumption using secondary data in the form of time series. The results showed that together, domestic consumption, rupiah exchange rate, and international CPO prices have a significant influence on the volume of palm oil exports in Indonesia.

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INTRODUCTION

Globalization which is increasingly widespread nowadays has attracted great attention in various fields, especially economics. Free trade is a form of globalization in the economic sector which is expected to encourage economic growth in the global market. However, many countries in the world experience challenges in free trade, especially related to issues of want and scarcity. As a result, countries are expected to increase the efficiency of commodity production compared to other countries, thereby gaining profits by producing commodities that have greater advantages. Indonesia, as an agricultural country with the majority of its population working in the agricultural sector, relies heavily on international trade in this sector as a major factor in long-term economic development and national economic recovery. Among the agricultural subsectors, plantations have great potential to increase the country's foreign exchange and attract labor. The government prioritizes the plantation subsector because it has strong export attraction to developed countries. One of the important plantations in Indonesia is palm oil, which has promising potential compared to other crops. Crude palm oil (CPO) is used as a raw material for the production of cooking oil and various food and non-food industries. Indonesia is one of the largest palm oil producers in the world, occupying the top position as the largest palm oil producer globally. It is projected that the area of oil palm plantations will increase significantly from 2018 to 2022, mainly due to increased coverage by oil palm companies, so that the total area of oil palm plantations reaches 14.33 million hectares. However, as the area increases, land productivity decreases due to aging of plants and low quality of palm oil seedlings. This decrease in land area also resulted in a decrease in palm oil (CPO) production by 1.36 percent or the equivalent of
45.121 million tons (Central Statistics Agency, 2022).

Since 2006, Indonesia has become the world's largest palm oil producer, dominating this industry. Most of the growth in CPO production is directed towards exports, while the remaining 20 to 25 percent is used for domestic consumption. Domestic consumption includes industries such as oleofood, oleochemicals, detergent/soap, and biodiesel (Indonesian Palm Oil Entrepreneurs Association, 2022). In international trade activities, especially exports, currency exchange rates determine the level of exports of a product. When the value of a currency weakens, prices goods export become more cheap, thereby increasing exports. Conversely, if the exchange rate weakens, the value of imports will increase because countries want to meet their needs (Taufiq & Natasah, 2019).

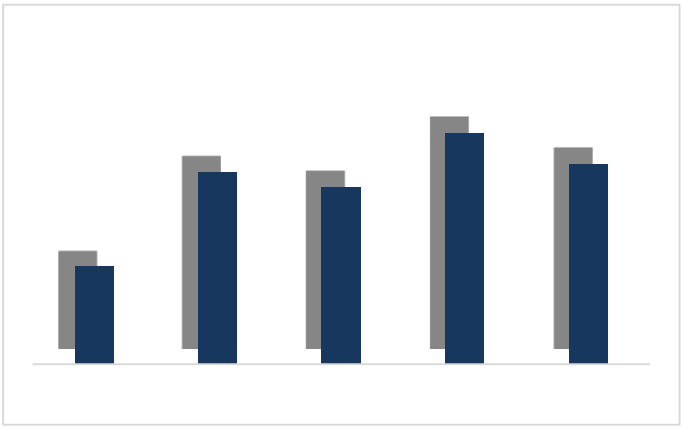


Figure 1. Rupiah Exchange Rate against the United States Dollar in 2018–2022

The data in Figure 1 shows that the rupiah exchange rate against the United States dollar has tended to increase in recent years. At the beginning of 2017, the average rupiah exchange rate was Rp.13,398, where the number increased towards the end of 2021 to 14,344, which indicates a strengthening of the rupiah exchange rate. In 2020 the rupiah exchange rate will be at Rp. 14,625, this is the highest value for the last few years. Not only can exchange rates influence exports, the price of the commodity in the international market can also influence exports. Changes in global CPO prices can also influence changes in export and import volumes. If global CPO prices increase, then palm oil exports will also increase (Nurmalita & Wibowo, 2019).

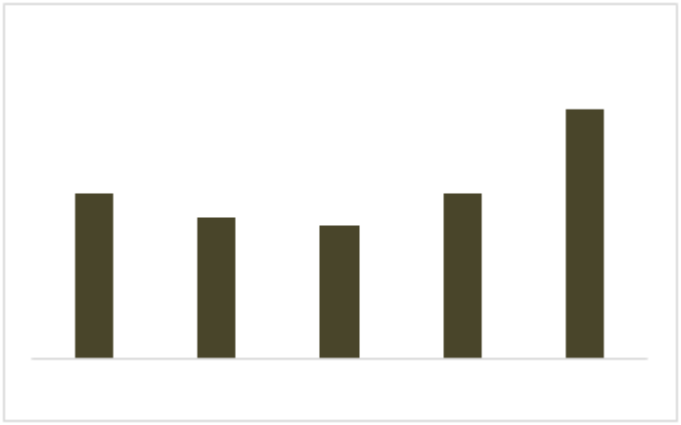


Figure 2. International CrudePalmOil (CPO) Prices 2018–2022

CPO prices tend to fluctuate from year to year. It can be seen in the table above that the average initial price of CPO tends to increase from year to year. However, the price of CPO experienced a drastic decline in 2019, from 703.45 USD in January to 535.02 USD in December. The highest CPO price occurred in December 2021 at 1,016.37 USD.

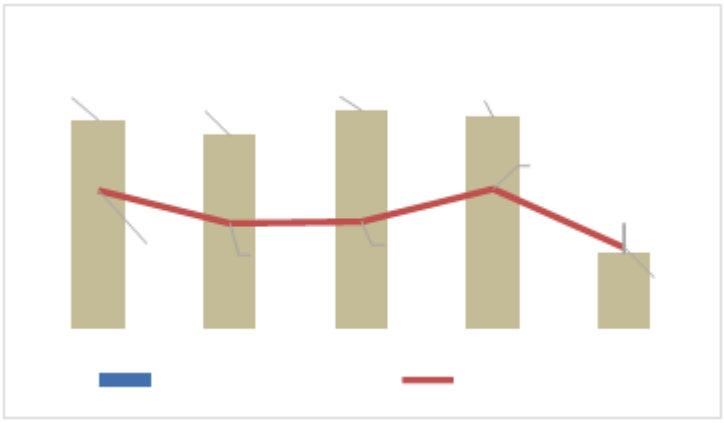


Figure 3. Volume and Value of Exports of Indonesian Palm Oil for the Period 2018-2022

Figure 3 shows that Indonesia's palm oil export volume fluctuated from 2018 to 2022. Palm oil exports do not have a fixed volume or value. The highest volume of palm oil recorded in 2020 was 7,401,796 tons and the highest export value was recorded in 2021 at 4,743,567 USD. Meanwhile, in 2022 the volume and value of Indonesian palm oil exports will experience a significant decline, namely by 2,543,057 tons and 2,737,923 USD. The decline in export volume is in line with the stagnation of domestic palm oil production. Apart from that, total domestic palm oil consumption has also increased so that meeting domestic palm oil needs has become a top priority.

Based on the previous explanation, the author wants to dig deeper into the volume of palm oil exports, which includes the total palm oil produced in Indonesia and will be exported through international trade. Indicators that are focused on in international trade include domestic consumption, the rupiah exchange rate, and international CPO prices. The main priority is to meet domestic palm oil needs before exporting to countries such as India, Pakistan, the United States, Malaysia, Bangladesh, China, Egypt, Russia, Spain, the Philippines, Myanmar and other countries. Therefore, this topic becomes interesting to research by considering domestic consumption, the rupiah exchange rate, and international CPO prices.

A study conducted by Nainggolan and colleagues (2021) shows that production variables have an insignificant negative influence on Indonesian tobacco exports, while the rupiah exchange rate has a significant positive influence on the volume of Indonesian tobacco exports, and international prices have a significant negative influence on the volume of Indonesian tobacco exports. The research results of Rosita et al. (2014) stated that CPO production, CPO consumption, and the rupiah exchange rate against the United States dollar influence Indonesian CPO exports, with production capacity having a positive and significant influence in the short and long term, while consumption and the rupiah exchange rate have a negative and significant influence in the short and long term. Mariati (2009) concluded that national production, world consumption and world prices jointly influence CPO exports in Indonesia, but only some of the national production and world price variables have a partially significant influence on CPO exports in Indonesia.

Study from Mejaya dkk. (2016) shows that production, international prices, and exchange rates have a significant influence together on the volume of tea exports in Indonesia, but partially, production variables and international prices do not have a significant influence on the volume of Indonesian tea exports, while the exchange rate has a negative and significant influence. Kannan's research (2013) shows that production, Indian rubber stock, and domestic prices have a negative influence on export quantity, while world market prices and world population have a positive influence. Kuwornudkk. (2009) found that the domestic crude price of Ghanaian palm oil, the international real price of Ghanaian palm oil, the international real price of Malaysian palm oil, the real exchange rate in Ghana, and quantity demand lagging behind one year significantly influenced the quantity demand for Ghanaian palm oil. The differences between previous studies and this research, especially in terms of research models, are the focus. Many previous studies only considered the variables of the rupiah exchange rate and CPO prices in analyzing palm oil export volumes. However, in this research, the additional variable considered is domestic consumption. In addition, there are differences in the methods and years of research conducted.

The aim of this research is to explore the influence of domestic consumption, the rupiah exchange rate, and international CPO prices on the volume of palm oil exports in Indonesia, as well as to understand the policies implemented by the government to increase the volume of palm oil exports in Indonesia.

LITERATURE REVIEW

This research still has delays, so further research is needed on the topic The Influence of Consumption, Rupiah Exchange Rate, And International CPO Prices on Indonesia's Palm Palm Oil Export Volume 2018-2022 in order to improve this research and increase insight for readers.

METHODOLOGY

Researchers use research with a quantitative approach. The aim of applying this method is to understand the relationship between the specified variables. The quantitative method in this research was prepared by testing several data that were obtained to then obtain the results of the relationship and influence between the variables in it. The independent variables that will be used include the amount of production (X1), domestic consumption (X2), exchange rate (X3) and international crude palm oil price (X4) and the dependent variable, namely export volume (Y). The data source used was obtained secondaryly in the form of a Time Series for 31 years, with a research period from 1991 to 2021. The analysis technique used was the classic assumption test and multiple linear regression.

The multiple linear regression equation is:

$$Y=\alpha+\beta 1 .X 1 +\beta 2 .X 2 +\beta 3 .X 3 +\varepsilon \quad (1)$$

Information:

Y	=	Export volume is measured in tons
X 1	=	Domestic Consumption is measured in metrictons
X 2	=	Rupiah Exchange Rate against USD
X 3	=	CPO prices are measured in US dollars per metric ton

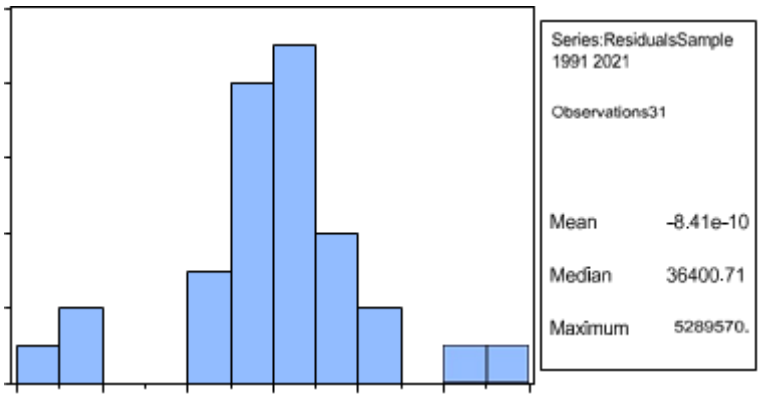
A = Constant
B = Coefficient
E = Standard error

RESULT AND DISCUSSION

Classic assumption test

1. Normality test

Figure 4. Normality Test Results



Based on the normality test estimation results in Figure 4, it shows that the results are normally distributed because the Jarque-Bera value is 2.645782 with a probability value of 0.266364 where this value is greater than 0.05 (α> 0.05).

2. Multicollinearity Test

Table 1. VIF Results

Variabel	CoefficientVariance	UncenteredVIF	CenteredVIF
KD_X1	2.64E+10	8.940299	3.143003
NTR_X2	31971.21	16.13695	2.703804
HARGACPO_X3	5064486.	12.47664	1.437094
C	2.31E+12	12.31586	NA

Based on the examination of the Variance Inflation Factor (VIF) value above, the variables domestic consumption, rupiah exchange rate and CPO price each variable have a VIF value <10, so it can be concluded that there is no multicollinearity in these variables.

3. Heteroscedasticity Test

Table 2. Results of the Breusch Pagan Godfrey Test

HeteroskedasticityTest:Breusch-Pagan-Godfrey			
F-statistics	2.320608	Prob.F(4,26)	0.0977
Obs*R-squared	6.354682	Prob.Chi-Square(4)	0.0956
ScaleexplainedSS	7.897904	Prob.Chi-Square(4)	0.0482

Based on the results of the heteroscedasticity test above, it shows a Prob.Chi-Square value of 0.0956 which is greater than 0.05 (α > 0.05). Therefore it can be decided to accept H 0. In this way, the assumption of heteroscedasticity is acceptable or there is no heteroscedasticity.

4. Autocorrelation Test

Figure 5. Parameters Calculation Results of the Durbin-Watson Test

From the results of the Durbin-Watson test above, a statistical value of Durbin- Watsonstat is obtained of 1.456435, where the value is d_L < d< d_U , so the Durbin-Watson test does not provide accurate results (inconclusive).

Multiple linear regression

Multiple linear regression analysis is used to examine the association between two or more variables, according to (Noer, 2011). Determining if there is a positive or negative relationship between the independent and dependent variables as well as predicting whether the independent variable will rise or decrease in value are the goals of this analysis. Regression model equation produced by Eviews9 software calculations is as follows:

Table 3. Multiple Linear Regression Results

Variables	Coefficient	Std. Error	t-Statistics	Prob.
KD_X1	-142350.2	162340.6	-0.876861	0.3883
NTR_X2	428.3604	178.8049	2.395685	0.0238
HARGACPO_X	6997,672	2250.441	3.109466	0.0044
C	-3007721.	1518702.	-1.980455	0.0579

Based on table 3, The regression equation model in this research is written as follows: **Y=-3007721.– 142350.2X 1 +428.3604X 2 +6997.672X 3**

From these equations it can be interpreted as follows:
The result of the constant value a in the data regression analysis is - 3007721, which means that if the independent variable (domestic consumption, rupiah exchange rate and CPO price) does not increase (constant) or remains constant and does not change every 1 percent, then the dependent variable, namely export volume, will experience a decrease of 3007721. The domestic consumption coefficient value shows a value of -142350.2, if domestic consumption is increased by 1 percent, it will result in a decrease in export volume of 142350.2. The coefficient result of the rupiah exchange rate in the regression equation is 428.3604, meaning that the volume of palm oil exports will increase by 428.3604 for every additional 1 percent of the rupiah exchange rate. The CPO price variable coefficient shows a value of 6997.672, meaning that the export volume of palm oil will increase by 6997.672 for every additional 1 percent of the CPO price.

Hypothesis testing

1. Partial Test(Test)

The t test is used to analyze the influence of each independent variable individually or partially on the dependent variable. Following are the results of the t test:

Table 4. Test Results

Variables	Coefficient	t-Statistics	Prob.
KD_X1	-142350.2	-0.876861	0.3883
NTR_X2	428.3604	2.395685	0.0238
PRICEPO_X3	6997.672	3.109466	0.0044
C	-3007721.	-1.980455	0.0579

From the results of multiple linear regression, the calculated t value for each variable is obtained at a significance level of 5% and df = n – 3 = 31 – 3 = 28, thus producing a t table value of 2.04841. Based on the calculation results above, it can be explained that:

a. Variable Domestic Consumption (X 1)

Resultstcount-0.876861>t-table-2.04841. Then produces a sig value. 0.3883 is greater than the determined significant value of 0.05. Therefore, it was decided to reject H0 and accept H1, resulting in the conclusion that partially domestic consumption has an insignificant effect on the volume of palm oil exports in Indonesia.

b. Variable Rupiah Exchange Rate (X 2)

The result is tcount2.395685>t-table2.04841. Then it produces a value of sig.0.0238 which is smaller than the significant value that has been determined, namely 0.05. Therefore, it was decided to reject H0 and accept H1 so that it can be partially concluded that the rupiah exchange rate has a significant influence on the volume of palm oil exports in Indonesia.

c. Variable CPO Price(X 3)

Obtained t-count 3.109466 < from t-table 2.04841. Then produce a sig value. 0.0044 Where this value is smaller than the determined significant value of 0.05 so that the influence of the CPO price is significant. Therefore, it was decided to reject H0 and accept H1 so it was concluded that partially the CPO price had a significant influence on the export volume of palm oil.

2. Test Simultaneous (Test F)

The F test is used to show whether the independent variables in research together have an influence on the dependent variable. Following are the results of the F test:

Table 5. Test Results F

F-Statistics	Prob(F-Statistic)
9.518152	0.000185

Based on the results of multiple linear regression, a calculated F value of 9.518 was obtained, while Ftable was 3.34 with a significance level of 5%, so it can be seen that F-count>F-table or 9.518>3.34. These results show that H0 is rejected and H1 is accepted. Thus it can be concluded that the dependent variable Palm Oil Export Volume is influenced jointly and significantly by independent variables, namely domestic consumption, rupiah exchange rate and CPO price.

3. Coefficient of Determination (R 2)

Table 4. Results Coefficient of Determination

R-squared	AdjustedR-squared
0.513990	0.459989

Based on the tests carried out, the resulting R 2 was 0.4599, which means that 45.99% of the palm oil export volume variable (Y) was influenced by independent variables, namely domestic consumption (X 1), rupiah exchange rate (X 2) and CPO price (X 3). Meanwhile, the remaining 54.01% was influenced by other variables outside the research.

The Influence of Domestic Consumption on the Export Volume of Palm Oil in Indonesia

Based on the results of statistical analysis, it was found that the domestic consumption coefficient was -142350.2 with a significance level of 0.3883, which was much greater than the significance value that had been set at 0.05. The t test results show that the t-count is -0.876861 < of the t-table -2.04841. Therefore, it can be concluded that domestic consumption has an insignificant negative influence on the volume of Indonesian palm oil exports.

This finding is consistent with research conducted by Mariati (2009), which found that world consumption did not have a significant impact on Indonesian CPO exports. Other research by Rosita et al. (2014) also shows that domestic consumption in the short and long term does not have a significant effect on Indonesia's export volume. This indicates that consumption trends are related to income, where if income increases, consumption will increase, but this increase is not as big as the increase in income.

The Influence of the Rupiah Exchange Rate on the Export Volume of Palm Oil in Indonesia

The rupiah exchange rate coefficient is 428.3604 with a significance level of 0.0238, which is less than the significance threshold set at 0.05, according to the findings of the statistical analysis that was done. The t-count is 2.395685 > from the t-table 2.04841, according to the t test results. Thus, it can be said that the amount of Indonesian palm oil exported is positively and significantly impacted by the rupiah exchange rate.

The statistical analysis's findings indicate that, at a significance level of 0.0044, the CPO price coefficient has a positive value of 6997.672, which is less than the predefined significance level of 0.05. The t-count is 3.109466 > from the t-table 2.04841, according to the t test results. Thus, it can be said that the amount of Indonesian palm oil exports is significantly and favorably impacted by the CPO price variable.

The Influence of Crude Palm Oil (CPO) Prices on Palm Oil Export Volumes in Indonesia.

The statistical analysis's findings indicate that, at a significance level of 0.0044, the CPO price coefficient has a positive value of 6997.672, which is less than the predefined significance level of 0.05. The t-count is 3.109466 > from the t-table 2.04841, according to the t test results. Thus, it can be said that the amount of Indonesian palm oil exports is significantly and favorably impacted by the CPO price variable.

The amount of palm oil exported from Indonesia is significantly and favorably impacted by the Rupiah Exchange Rate variable. Because foreign consumers have more purchasing power and can import more commodities, producers tend to export more goods when the rupiah exchange rate rises. The amount of palm oil exported from Indonesia is likewise positively and significantly impacted by the CPO price variable. This demonstrates that producers would typically boost exports in order to improve earnings when the price of CPO rises on the global market. It also shows how price and quantity supplied have a positive relationship, with vendors offering more of a good when its price is higher. A commodity's price and quantity supplied typically have a positive connection in which sellers give a larger amount of the good for a higher price. Soekartawi (2005), who claims that an increase in the number of exports of these goods can occur if global commodity prices surpass domestic market prices, also supports this finding.

CONCLUSIONS AND RECOMMENDATIONS

This research attempts to ascertain who the amount of production, domestic consumption, rupiah exchange value, and the price of international crude palm oil (CPO) effect on the export volume of palm oil in Indonesia, based on the previously explained research objectives. The hypothesis test results demonstrate that the export volume of palm oil is highly impacted by the independent variables of domestic consumption, the exchange rate of the rupiah, and the price of CPO. The Domestic Consumption variable partially demonstrates a non-significant negative influence, suggesting that there is a link between consumption and income in which consumption increases at a rate that is not proportionate to income growth.

The amount of palm oil exported from Indonesia is significantly and favorably impacted by the Rupiah Exchange Rate variable. Because foreign consumers have more purchasing power and can import more commodities, producers tend to export more goods when the rupiah exchange rate rises. The amount of palm oil exported from Indonesia is likewise positively and significantly impacted by the CPO price variable. This demonstrates that producers would typically boost exports in order to improve earnings when the price of CPO rises on the global market. It also shows how price and quantity supplied have a positive relationship, with vendors offering more of a good when its price is higher.

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