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Research article

Effect of International CPO Prices, Substitution Goods Prices, and Exchange Rates on Crude Palm Oil (CPO) Export Volume in Indonesia

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Abstract: This study aims to analyze the effect of international CPO prices, substitution goods prices, and exchange rates on CPO export volume in Indonesia in the long and short term. The type of research used is quantitative. The data used in this study used secondary data in the form of time series data from January 2014 to June 2022. The data was obtained from the websites of Bank Indonesia (BI), the Indonesian Central Statistics Agency (BPS), the Ministry of Trade and Economic Research. The analysis method used in this study is the Error Correction Model (ECM). The results of research that has been conducted where international CPO prices in the short and long term have a significant and positive influence on Indonesia's CPO export volume. Meanwhile, the price of substitution goods in the short and long term has a negative relationship with CPO Export Volume. Then the variable exchange rate in the long term and in the short term has a significant influence on the CPO Export Volume. For this reason, the government is that it can be used for information and input materials to improve CPO exports for the better in the future. This can be done in several ways to reduce export costs charged to producers so as to maximize international CPO prices in Indonesia.

Keywords: International CPO prices, prices of substitution goods, and exchange rates, CPO exports, ECM

JEL Classification: F30, F40, P40

Abstrak: Penelitian ini bertujuan untuk menganalisis pengaruh harga CPO internasional, harga barang substitusi, dan nilai tukar terhadap volume ekspor CPO di Indonesia dalam jangka panjang maupun jangka pendek. Jenis penelitian yang digunakan adalah kuantitatif. Data yang digunakan dalam penelitian ini menggunakan data sekunder berupa data time series dari bulan Januari 2014 sampai dengan Juni 2022. Data tersebut diperoleh dari website Bank Indonesia (BI), Badan Pusat Statistik (BPS) Indonesia, Kementerian Perdagangan dan Economic Research. Metode analisis yang digunakan dalam penelitian ini adalah Error Correction Model (ECM). Hasil penelitian yang telah dilakukan dimana harga CPO Internasional dalam jangka pendek dan jangka panjang memiliki pengaruh signifikan dan positif terhadap volume ekspor CPO Indonesia. Sedangkan harga barang substitusi sebaliknya dalam jangka pendek maupun panjang mempunyai hubungan negatif terhadap Volume Ekspor CPO. Kemudian variabel nilai tukar kurs dalam jangka panjang dan jangka pendek memiliki pengaruh yang signifikan terhadap Volume Ekspor CPO. Untuk itu pemerintah agar dapat digunakan untuk informasi dan bahan masukan untuk meningkatkan ekspor CPO menjadi lebih baik di masa mendatang. Hal ini dapat dilakukan dengan beberapa cara untuk menekan biaya ekspor yang dibebankan kepada produsen sehingga dapat memaksimalkan harga CPO internasional di Indonesia.

Kata Kunci: Harga CPO internasional, harga barang substitusi, kurs, ekspor CPO, ECM

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1. INTRODUCTION

Indonesia relies on the food agriculture sector as one of the important sectors in the economy. Indonesia's natural condition is in a tropical climate and the condition of Indonesia fertile soil because it is passed by mountain trails that are still active. The food agriculture sector deserves more attention. The agriculture sector is also expected to be one of the largest components in its distribution for an increase in Gross Domestic Product (GDP), the acquisition of foreign exchange when exported, as one of domestic food security, the provision of employment and an increase in people's income (Saleh, 2020). Based on its large contribution to GDP in 2021 which was around 13,28 percent and the second only to the manufacturing industry sector of 19,25 percent (Ministry of Agriculture Republic of Indonesia, 2021).

The economy of a country cannot be separated from activities on international trade. International trade is carried out with export and import activities. Indonesia has a variety of commodities from various sectors that can become export commodities. One of the agricultural sectors with considerable potential is the plantation sub-sector (Ridwannulloh & Sunaryati, 2018a). This sub-sector is a provider of raw materials for the industrial sector, labor absorbers, and foreign exchange earners. The contribution of the plantation subsector in 2020 was 3,63 percent of total GDP and 26,50 percent of the agriculture, forestry, and fisheries sectors or was the first in the sector (Indonesian Statistics, 2020).

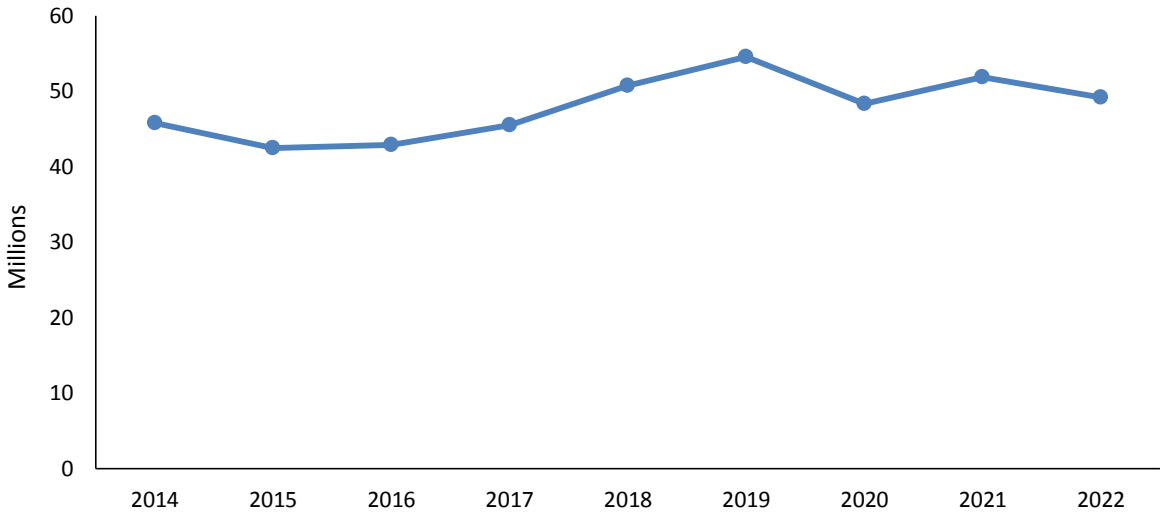

Figure 1. Trend of CPO export value data, 2014-2022
Source: Indonesian Palm Oil Association, 2022

Indonesia is a country that has a huge wealth of natural resources; Indonesia can become a producer of plantation commodities, especially palm oil commodities, and can even become the largest CPO exporting country in the world. Figure 1 explains that data on the export value of palm oil tends to be volatile. The export value of Indonesia's Crude Palm Oil in 2015 reached US$ 42471813719 billion. This value increased from US$ 45788787623 billion in 2014. According to (Indonesian Statistics, 2021b) volume CPO export in Indonesia is influenced by several factors, one of which is the international CPO price (Lubis et al., 2020). CPO exports decreased in value in 2022 compared to 2021, due to the relative decline in CPO prices in 2020. This indicates that international prices greatly affect CPO exports volume.

The second factor that can affect the volume of CPO exports is the exchange rate of the IDR against the dollar. The exchange rate has an important role, because exports and imports will be affected by the increase and decrease in the exchange rate of the country's currency. In this context, IDR depreciation has a strong influence on export performance. The exchange rate can change over time, the change affects the economy because if the IDR currency weakens or depreciates against the dollar currency, domestic goods become relatively cheap for foreigners

and external goods become expensive for the public. If the IDR appreciates against the dollar, then Indonesian goods become more expensive for foreigners and foreign goods become cheaper for Indonesian (Ermawati et al., 2021).

Data from Bank of Indonesia (2022) in the early period of 2016, the IDR exchange rate against the dollar was in the range of IDR. 13.436 where the figure continued to increase until 2021 to IDR. 14.269, meaning that the exchange rate weakened or depreciated. Exchange rate depreciation did not only occur in the 2016 period, but in 2017 the IDR exchange rate against the US dollar also experienced a similar weakening. According to Bakrie et al (2022) the factor that affects CPO exports, namely the price of substitution goods. The price of the substitution item in question is sunflower oil. Sunflower oil is the main oil used for cooking. This oil is different from cooking oil in Indonesia which is from palm oil. The Russian and Ukrainian wars that took place had an impact on the world's vegetable oil commodities. The country with a sunflower land area of 6 million hectares and producing 13.6 million tons is Ukraine, then Russia ranks second by producing about 10.5 million tons annually (Palm Oil Agribusiness Strategic Institute, 2022). Looking at the existing data and current conditions, the conflict involving the two countries has an impact on the sunflower oil supply chain. The distribution of sunflower oil from Russia and Ukraine to importing countries has become hampered. This has led to a gap between the supply and demand of sunflower oil on the world market. The gap is then filled by palm oil to substitute the world's sunflower oil needs.

The availability of sunflower oil, which is experiencing scarcity due to the Russian invasion of Ukraine, EU producers are looking for alternatives by using palm-based cooking oil. Therefore, it can be strengthened by research from Kanchymalay et al (2017), Amiruddin et al (2021) and Zainal (2013) those who state that the price of substitution goods affects the quantity of CPO exports from Indonesia. Likewise, in line with research from Lestari & Oktavilia (2020) and Zaidon & Karim (2022) that the international CPO price variable and the sunflower oil price had a positive and significant effect on the volume export CPO price in Southeast Asia. Research conducted by Rosita et al (2014), Ridwannulloh & Sunaryati (2018) and Azwar (2016) shows that the IDR exchange rate has a significant negative effect in the short term and long-term effect on Indonesia's CPO export volume. Research from Alatas (2015), Reynalto & Ernah (2020), Truong et al (2022), Radifan (2014), Asliyana & Setyowati (2022), Destiarni et al (2021) and Prabowo et al (2020) that international CPO prices and IDR exchange rates have a positive effect on CPO export volume. However, in contrast to the research of Hamzah & Santoso (2020), Esquivias et al (2020), Danladi et al (2015) shows that the price of CPO and the IDR exchange rate against the US dollar have a negative influence on the volume of CPO exports in Indonesia. Research from Yanita et al (2019) and Prasetyo et al (2017) that ECM analysis also resulted that CPO production and CPO prices have no effect on Indonesian CPO exports.

While the opinion of A. Daengs et al (2021) the Indonesia development, export-import transactions are very vital economic activities. Plantation products are exported and become the leading commodity, namely palm oil. Palm oil has good prospects as a source of foreign exchange income and is able to create employment opportunities while increasing the people welfare in the production processing. Palm oil is one of Indonesia's main export commodities in international trade. Palm fruit is an important part of palm oil plants which will be processed into semi-finished oil, namely Crude Palm Oil (CPO) and finished oil (Palm Oil). The novelty in this study is by adding variables in the price of sunflower oil substitution goods. Departing from the background described above, this research needs to be carried out regarding the effect of international CPO prices, substitution goods prices, and exchange rates on crude palm oil (CPO) export volume in Indonesia.

2. RESEARCH METHODS

2.1. Data collection

The Errror Correction Model (ECM) model is a model used to correct regression equations between individually non-stationary variables in order to return to their equilibrium or equilibrium values in the long term (Tyas, 2022). This model was introduced popularized by Enger-Sargan,

which was used to solve the problem of non-stationary time series data (level derivation) and overcome the problem of direct regression. In estimating the Error Correction Model (ECM) model, it is necessary to test the stationaries of the data.

This type of research uses a quantitative approach where this quantitative research is carried out using a formal, specific, structured design, and has a detailed operational design (Oflazoglu, 2017). In this study, the data that will be used is secondary time series data obtained from the websites of Bank of Indonesia (BI), Indonesian Statistics, the Ministry of Trade and Economic Research. The data used includes International CPO Prices (IDR/Kg), Substitution Item Prices (Metric Tons) and Exchange Rates. All of these data are transformed in the form of natural logarithm (ln) to provide valid and consistent results. The research was conducted in Indonesia using secondary data analysis in the form of time series data and is quantitative in the form of numbers. This research uses data from the period January 2014 to June 2022.

2.2. Research Model

This research used an econometric model with the ECM. Econometric modelling is intended to estimate economic phenomena in the long and short term, and can solve problems in models that are not stationary. With ECM modeling, it can be seen how the influence of international CPO prices, prices of substitute goods, exchange rates on export volumes in Indonesia. The analytical method used is multiple regression analysis with the Error Correction Model (ECM) analysis method with the following long-term equation model. The application of the use of ECM analysis is the discovery of influences between variables. Oil prices consistently display a dynamic trend. This also has to do with oil exports. It might be impacted by uncertain global trade circumstances and policies. The shock that happens might have both immediate and long-term effects. Additionally, both a short-term and long-term relationship analysis is done using the ECM model. The long-term circuit can be formulated with the following equation:

$$lnEXCPO_t = \beta_0 + \beta_1 lnINT_t + \beta_2 lnSUB_t + \beta_3 lnKURS_t + e_t \quad (1)$$

where, $lnEXCPO_t$ is export volume; β_1, β_2, β_3, β_4 is coefficient; $lnINT_t$ is International CPO prices (IDR/kg); $lnSUB_t$ is substitution good prices (metric tons), $lnKURS_t$ is IDR exchange rate; e is error term, and t is time series. On the contrary to measure the short-term using the ECM model can be expressed as follows:

$$\Delta lnEXCPO_t = \beta_0 + \beta_1 \Delta lnINT_t + \beta_2 \Delta lnSUB_t + \beta_3 \Delta lnKURS_t + \beta_4 \Delta lnINT_{t-1} + \beta_5 \Delta lnSUB_{t-1} + \beta_6 \Delta lnKURS_{t-1} + ECM + \mu_t \quad (2)$$

ECM is characterized by the inclusion of ECT elements where ECT is the Error Correction Term in the model. If the statistically significant ECT coefficient is a probability value of less than 5%, then the model specification used is valid; μ is confounding variable; and t is period of time.

3. RESULTS AND DISCUSSION

3.1. Descriptive statistic and correlation

The EXCPO Price, International CPO Prices, Exchange Rates, and Substitution Goods Prices in the last eight years has been fluctuated. The CPO price variable has a maximum value of 6.14E+10 USD/ton and a minimum 3.75E+10 USD/ton, which is quite different. The fluctuation can also be seen from the relatively large standard deviation value. The International CPO Prices, Substitution Goods Prices, and Exchange Rates use to be lower compared to EXCPO Price. Although fluctuated, The International CPO Prices tends to be lower than EXCPO prices. The International CPO Prices variable has a maximum value 20138.24 IDR/Kg and a minimum 5851.595 IDR/Kg. While Exchange Rates relatively stable, variable has a maximum value of 16367.00 and has a minimum value 11404.00. And then Substitution Goods Prices, variable has a maximum value of 1972.238 metric tons and has a minimum value 814.4223 metric tons. In summary, the descriptive analysis of the variables used in this study can be seen in Table 1.

Table 1. Descriptive statistics of main variables

Variables	Obs	Mean	Min	Max	Std. Dev
EXCPO	96	4.78E+10	3.75E+10	6.14E+10	5.21E+09
INT	96	9458.903	5851.595	20138.24	3393.523
KURS	96	13679.77	11404.00	16367.00	910.3767
SUB	96	1078.124	814.4223	1972.238	267.7418

Source: Author's calculation

Palm oil is a plantation commodity that has a fairly important role and is a foreign exchange earner in economic activity in Indonesia because it has the ability to produce vegetable oil which is needed by the industrial sector. Indonesia, which is a country with a large palm oil productivity value, has an advantage in marketing palm oil. Indonesia's palm oil production is mostly exported abroad and the rest will be sold domestically. Indonesia's palm oil exports will be distributed to five continents including Asia, Africa, Australia, America, and Europe with the main destination being in Asia. There are five top CPO importing countries in Indonesia in 2020 including India, Spain, Malaysia, Italy and Kenya. Total CPO exports to the five countries reached 86.68 percent of Indonesia's total CPO exports (Indonesian Statistics, 2021a).

Table 2. Data stationarity test

Unit root test results at level			Statistic	Prob.**
ADF – Fisher Chi-square			27.0395	0.9989
ADF – Choi Z-stat			28.7657	0.0007
Series	Prob.	Lag	Max Lag	Obs
lnEXCPO	0.0000	0	12	101
lnINT	0.9976	0	12	101
lnSUB	1.0000	9	12	92
lnKURS	0.1634	0	11	95
Unit root test results at first difference			Statistic	Prob.**
ADF – Fisher Chi-square			27.0395	0.9989
ADF – Choi Z-stat			28.7657	0.0007
Series	Prob.	Lag	Max Lag	Obs
lnEXCPO	0.0000	2	12	98
lnINT	0.0000	0	12	100
inSUB	0.3816	11	12	89
inKURS	0.0001	0	11	94
Unit root test results at second difference			Statistic	Prob.**
ADF – Fisher Chi-square			27.0395	0.9989
ADF – Choi Z-stat			28.7657	0.0007
Series	Prob.	Lag	Max Lag	Obs
lnEXCPO	0.0000	3	12	96
lnINT	0.0000	8	12	91
lnSUB	0.0000	12	12	87
lnKURS	0.0000	4	11	89

Source: Author's calculations

It is necessary to start the stationary test before regression with the ECM to find out whether the variables used are stationary or not. If the data is not stationary then the resulting estimation result is a spurious regression. The data is tested first at the level, if the data is not stationary then it is continued at the first difference. When the test contains all variables the ADF value is greater than the MacKinnon Value, it means that all variables have been stationary and can then go to the Cointegration Test stage. In the statement, a unit root test was carried out with the Augmented Dickey-Fuller method. It can be seen in the Table 2 that in testing the stationary variable level is Ln EXCPO because the probability value of all variables is below 0,05. In the 1st difference, the

variables known to be stationary are INT dan KURS where the probability value of all variables is below 0,05. Then for the variable known to be stationary on the 2nd difference is SUB.

The next step after ensuring stationary data is to perform a cointegration test. Where this study was conducted based on a test using Johansen to find out whether the residual value of stationary cointegration or not (Rosadi, 2013). From the results of the cointegration test if the ADF value is greater than the critical value of α=5%, then the variable risk variable is cointegrated, so that the variable data in this study has a long-term relationship. According to Gujarati & Porter (2013) a variable it can be called cointegrated when there is a long-term equilibrium relationship. If the data is no longer stationary, then the next step is to identify by ensuring that the data is cointegrated or not, therefore it is necessary to conduct a cointegration test.

This cointegration test is used to signal initially that the model used has a long-term relationship or cointegration relation. The results of the cointegration test are obtained by forming a residual obtained by regressing free variables against OLS bound variables. The condition needed to show that among the variables studied cointegrates by looking at the residual behavior of the regression equation used. With the root test it is stated that the ECT (residual) is stationary at the level. Thus, the results of the stationary test of data against residual further corroborate that among the variables used there is cointegration.

Table 3. Cointegration Test with Johansen

Hypothesis	Trace Statistic	Prob.	Max Eigen Statistic	Prob.
r = 0***	109.7568	0.0000	65.1606	0.0000
r ≤ 1**	44.5961	0.0005	25.5024	0.0114
r ≤ 2**	19.0937	0.0137	16.7336	0.0199
r ≤ 3	2.36007	0.1245	2.3600	0.1245

Source: Author's calculations

By conducting a cointegration test with Johansen, it was carried out with two approaches, namely trace statistics and maximum eigenvalue. Based on the results of the cointegration test that has been carried out with the Trace Statistics approach, there are three cointegrations at a siginifikansi level of 0.05. It turns out that the Trace Statistics value of 109.7568 is much greater than the critical value of 47.8561. Then to strengthen the results of the cointegration test on the Maximum Eigenvalue Statistical with a result of 65.1606 greater than the critical value of 27.5843. Therefore, this result can be concluded that there has been a cointegration between four variables, namely international CPO price, exchange rate, price of substitution goods and CPO export volume.

Table 4 reports the result of ECM estimation in the long run these regression results show the relationship between dependent variables and independent variables. Table 4 shows that the adjusted value of R-Squared is 0.2445. The F-statistical probability value of 0.0000 which shows that independent variables in the long term such as international CPO prices, substitution goods prices and exchange rates together affect the variables of CPO export volume. The value of the international CPO coefficient of 2.2100 with a significance level of 0.0002 < of α = 5% indicates that international CPO prices have a significant positive influence on the volume of CPO exports. While the exchange rate has a coefficient value of 4.27E-05 with a significance level of 0.0002 < from α = 5%, it is concluded that the exchange rate has a positive influence on the volume of CPO exports significantly in the long term. The variable price of substitution goods has a negative influence on the volume of CPO exports can be seen from the value of the coefficient of -0.000205 with a significance level of -0.0002 < of α = 5%.

To find out how the influence of international CPO prices, prices of substitution goods and exchange rates both in the short term and in the long term, an ECM model estimate is carried out. Table 4 shows the estimation results using the ECM model, showing that the ECT value has passed the significance of 0.05 because it shows that the prob value of 0.0000 < 0,05 and has been met because it is already negative. The ECT value of -0.4349 means that the process of adjustment in the short term towards long-term equilibrium occurs quite quickly. Meanwhile, the variables of

international CPO prices, exchange rates and prices of substitution goods show that these variables have no short-term influence on export volumes. It is based on the > probability value of α = 5%.

Table 4. Long-term ECM model estimation results

Dependent variable = lnEXCPO			
Variables	**Coefficient**	**t-stat**	**Prob.**
Long-term			
Constant	24.0108	152.9787	0.0000
lnKURS	4.2700	3.8911	0.0002
lnINT	2.2100	2.7526	0.0071
lnSUB	-0.0002	-2.0244	0.0458
R^2 = 0.2445; F-stat = 9.9267 (0.0000)			
Short-term			
Constant	-0.0022	-0.2692	0.7884
Δ(lnINT)	2.3700	1.6168	0.1094
Δ(lnSUB)	-8.4900	-0.5250	0.6009
Δ(lnKURS)	3.9100	1.7822	0.0781
ECM (-1)	-0.4349	-4.9682	0.0000
R^2 = 0.2382; F-stat = 7.0365 (0.0000)			
Diagnostic test	F-Stat (prob.)		
Normality Test	0.9581		
Linearity Test	0.6801		
Multicholinearity Test	0.0246		
Heteroskedasticity Test	0.0992		
Autocorrelation Test	0.0000		

Source: Author's calculation

The results of the study also stated that the three variables had met the classical assumption test, namely the normality test, linearity test, multicollinearity test, heteroskedasticity test, and autocorrelation test. Normality tests are performed to see whether the data is normally distributed or is close to normal distribution. This test is carried out through a histogram-normality test, if the probability value > 0.05 then it is assumed that the data is distributed normally. Based on the results of the normality test, the result was found that the probability value was 0.9581 > 0,05. It can be interpreted that the data is normally distributed because the probability value is > α = 5%. The linearity test used in this study was to use the *Ramsey Reset* test. Based on the Linearity test, it can be concluded that the model used is appropriate because the probability of F statistic 0.6801 > 0,05.

The results of the multicollinearity test in the testing of symptoms multicollinearity can use the partial method between independent variables. The rule of thumb of this method is that if the correlation coefficient is more than 0,85 then the model used contains the symptoms of multicollinearity and if the correlation coefficient is less than 0,85 then there is no symptom of multicollinearity in the model (Ajija et al., 2020). The Variance Inflation Factor (VIF) value is used to determine the presence of multicollinearity. A regression model can be said to be free from multicholinearity if it gets a VIF value smaller than 10. Based on the results of the calculation of the VIF value, the value of each variable is obtained which is less than 10. Thus, it can be interpreted that the regression equation is free from multicollinearity.

The results of the heteroskedasticity, in heteroskedasticity testing, this study used the Breusch-Pagan test which was seen from the Obs*R-Squared value on the resulting output. If the probability value is greater than α = 5% then the data escapes the heteroskedaticity problem. Based on table 4, the probability value of Obs*R-Squared is obtained, which is 0.0992 greater than α = 5%, so it can be concluded that the data used in this study are free from heteroskedasticity problems.

The Autocorrelation test describes the relationship between one residual and another observation residual. In identifying autocorrelation in the equation can be done with the *LM test.* The LM test procedure is that if the Obs*R-Squared value is smaller than the table value then the model can be said to contain no autocorrelation. The autocorrelation test results show that the probability value of Obs*R-Squared is 0.0000 < 0,05, so it can be assumed that the data passed the autocorrelation test.

3.2. Discussion

Based on the output results of the Error Correction Model (ECM), the variable international CPO price is proven in the long term to have a significant and positive influence on Indonesia's CPO export volume, which is 2.2100. In line with the theory conveyed by Paul et al (2017) the positive relationship between commodity and supply prices, the higher the market price, it will stimulate producers to offer more commodities and vice versa, so that if prices increase, the supply of goods and services also increases. Research from Daengs et al (2021) also explains the same thing that international CPO prices have a significant influence on Indonesia's CPO Export Volume. Thus, the second hypothesis in this study is acceptable. On the other hand, the variable international CPO price in the short term has an insignificant effect on the volume of CPO exports in Indonesia during the 2014M1-2022M6 period. This means that the variable international CPO price requires a certain amount of time to affect Indonesia's CPO export volume.

This is in accordance with the theory that if there is an increase in the exchange rate or the exchange rate depreciates, exports will remain high. According to (Nopirin, 2019), the exchange rate is an exchange between two different currencies, so you will get a comparison of the value/price of the two currencies. From the comparison value, it will determine the high and low demand and supply in international trade, including the volume of Indonesian CPO exports. Realistic exchange rate management and fairly low changes can lead to business certainty as has happened at some time since it was important in increasing investment and export-oriented activities (Zhu et al., 2023); (Handoyo et al., 2023) . The exchange rate that soars drastically uncontrollably will cause difficulties in the business world in planning a business, especially for those who bring in raw materials from abroad or sell their goods to the export market.

Based on the output results of the Error Correction Model (ECM), the variable price of substitution goods in the long term has a significant and negative influence on Indonesia's export volume of -0.0002. In addition, the variable price of substitution goods in the short term also has a significant and positive influence on the value of Indonesia's exports during the 2014M1-2022M6 period. Meanwhile, the price of substitution goods to Indonesia's CPO export volume in the short term is -8.4900. From these results, it means that the price of an item determines how an item is desired. The higher the price of an item, the lower the demand. This is in line with research conducted by Sidabalok (2017) stating that the price of substitution goods affects the volume of Indonesia's exports to other countries. In accordance with the law of demand, the price is inversely proportional to the quantity (Yunusa, 2020). If the price goes up then the quantity requested goes down, and vice versa.

Based on the output results of the Error Correction Model (ECM), the exchange rate variable in the long term has a significant influence on Indonesia's export volume for the 2014M1-2022M6 period. The effect of the magnitude of the exchange rate variable in the long term is 4.2700. it is in line with research conducted by Ginting (2013) those who state that the IDR exchange rate has a significant effect on export volume. If the IDR weakens, it will encourage exports to be greater. On the other hand, if the stronger exchange rate (appreciation) will cause a decline in Indonesia's exports. Meanwhile, the variable effect of the Exchange Rate in the short term is 3.9100. In accordance with these results, it can be interpreted that both long and short term, an increase in the Exchange Rate will increase the CPO Export Volume. The positive value of the Error Correction Model (ECM) analysis does not match the theories that depreciation or appreciation of currency values will result in changes in exports and imports. If the exchange rate depreciates, that is, the value of the domestic currency weakens against foreign currencies, then the volume of exports will increase. In other words, if the dollar exchange rate increases, the volume of exports will also

increase (Mankiw, 2020). The results of the ECM analysis also do not match the theory expressed by Arize et al (2022) those who also conducted research for various countries, including Indonesia, the Philippines, and Thailand that there is a negative and significant relationship between the exchange rate and exports. In a study conducted by Huda & Widodo (2017) the CPO production have negative and significant relationship between the exchange rate and exports both in short- and long-term.

4. CONCLUSIONS

The conclusion that can be drawn from the explanation above is that international CPO prices have a significant and positive effect in the long term, on Indonesia's Export Volume in 2014M1-2022M6, it can be interpreted that when international CPO prices show an increase, then Indonesia's CPO Export Volume also increases. The change in international CPO prices in the short term does not have a significant effect on Indonesia's CPO export volume. Second, the price of substitution goods in the long term has a negative and significant influence on Indonesia's CPO Export Volume while in the short term it has a significant positive influence on Indonesia's CPO Export Volume. Third, the exchange rate has a positive and significant influence both in the long and short term on Indonesia's CPO Export Volume during the 2014M1-2022M6 period. This indicates that there is a positive influence, it can be said that if there is an increase in the IDR Exchange Rate against the US Dollar (appreciation) then the quantity of exports will increase as well.

The suggestion from this study for the government is that it can be used for information and input materials to improve CPO exports for the better in the future. This can be done in several ways to reduce export costs charged to producers so as to maximize international CPO prices in Indonesia. Then there are several aspects that contribute to this research, namely Indonesia is the largest CPO producer in the world. With a considerable role, Indonesia is expected to be able to improve the quality of palm oil (CPO) in accordance with the standards set by importing countries in the international market. Therefore, it is necessary to synergize government policies that support the downstream competitiveness of the palm oil industry to dominate the international market. This research is limited to variables that affect exports CPO is only from the exporting country, or from Indonesia's internal factors. So that still not able to capture comprehensively, because it is undeniable that the economic conditions of CPO importing countries also have an influence in export demand. This research will be more thorough, if included variables of economic conditions of the largest CPO importer countries, such as GDP or its economic growth and the demand for CPO importing countries

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