

DETERMINANT EXPORT VOLUME OF CRUDE PALM OIL (CPO) IN INDONESIA AND MALAYSIA IN THE EUROPEAN UNION MARKET

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Abstract: Crude Palm Oil (CPO) is one of the leading export commodities of Indonesia and Malaysia. After India, the European Union has become the top Indonesian and Malaysian CPO export market share. However, Indonesian and Malaysian CPO exports indicate constraints on CPO exports to the European Union (E.U.). In addition, the European Union also issued a Renewable Energy Directive policy that can impact CPO exports. Therefore, this study is at 1) Describes the development of Indonesian and Malaysian CPO export volumes in the European Union from 1990 to 2019. 2) Analyze The determinants of Indonesian and Malaysian CPO export volumes in the EU Market from 1990 to 2019 3) Describe the impact of the Renewable Energy Directive (RED) policy on Indonesian and Malaysian CPO exports in the European Union Market. This study's data type is secondary data in an annual time series with a time range from 1990 to 2019. The study was analyzed descriptively, and the Regression Analysis was multiple. The results showed that the development of Indonesian and Malaysian CPO export volumes in the European Union fluctuated but tended to increase from 1990 to 2019. Indonesia's CPO export volume in the European Union significantly affects International CPO prices, real exchange rates, and RED Policies. In contrast, the volume of Malaysian CPO exports in the European Union significantly influences International CPO prices and real exchange rates. The RED policy positively influenced the volume of Indonesian and Malaysian CPO exports in the European Union before and after enacting the policy. In the future, it is necessary to increase the use of CPO in the country and develop palm oil derivative products to get priority and sustainability.

Keywords: *Crude Palm Oil, Exports, Determinants*

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INTRODUCTION

International trade is considered an "engine of growth" (Yanita et al., 2020). Activities carried out in international trade are exports and imports; vegetable oil is one of the leading commodities relatively active in global business.

Many publications also reported that adopting the vegetable oil industry affected the Village's wealth (Gatto et al., 2015) and increased household consumption and nutrition (Michael Euler et al., 2015). It also improved household living standards, including food and non-food expenditures, calorie

consumption, and dietary quality (Euler et al., 2017). Furthermore, (Edwards, 2019) reported that rural areas with more intensively increasing palm oil production experienced faster *poverty reduction*. The palm oil sector lifted around 2.6 million rural Indonesians from poverty this century. Earlier publications also reported the same results in Indonesia and Malaysia (Rasiah & Shahrin, 2001; Sandker et al., 2007; Simeh, A., Ariff, T.M., & Ahmad, 2001)

Indonesia and Malaysia are two countries that contribute significantly to world CPO production if the total export volume of the two countries reaches

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89.18% (UNCOMTRADE, 2021). The current market share of Indonesian and Malaysian CPO has grown in the European Union market, with a total CPO import volume in 2019 of 29.18%. It occupies the second position as the largest CPO importer globally (UNCOMTRADE, 2021). CPO is used as the primary raw material for various industrial sectors in the European Union, be it for the food industry, cosmetics, renewable energy, or biofuel.

The volume of Indonesian and Malaysian CPO exports to the European Union for 2015-2019 fluctuated and decreased by 39.07% (UNCOMTRADE, 2021). Various factors can affect CPO exports, such as international CPO prices, CPO production levels, actual exchange rates, and the Renewable Energy Directive (RED) Policy. In addition, existing policies limiting CPO-based biofuels can affect oil palm-producing countries, especially Indonesia and Malaysia (Ramdana, 2020). The European Union government applies sustainable criteria for biofuel raw materials, namely CPO. On the other hand, it carries out a black campaign by assuming that CPO is not environmentally friendly to protect its domestic vegetable oil interests.

Based on the description above, this research aims to: 1) Describe the development of Indonesian and Malaysian CPO export volumes in the European Union from 1990 to 2019. 2) Analyze the factors that affect the volume of Indonesian and Malaysian CPO exports in the European Union Market from 1990-2019. 3) Describe the impact of the Renewable Energy Directive (RED) policy on Indonesian and Malaysian CPO exports in the European Union Market.

RESEARCH METHODS

This research was conducted from June to July 2021. This study's data type is secondary data in an annual time series from 1990 to 2019. The CPO commodities studied are product classification commodities with the H.S. code 151110 (vegetable oils, palm oils, and their fractions, crude, not chemically modified).

The analytical method used is descriptive and quantitative methods. The research used a descriptive approach to describe the development of export volume and the impact of the RED policy on Indonesian and Malaysian CPO exports in the European Union from 1990 to 2019. At the same time, the quantitative method is used to determine the effect of factors such as international CPO prices, CPO production, real exchange rates, and

Red policy on the volume of Indonesian and Malaysian CPO exports in the European Union.

The factors that affect the export volume of Indonesian and Malaysian CPO in the European Union Market can be identified using Multiple Linear Regression Analysis. The model formulation is carried out by including variables expected to statistically affect the volume of Indonesian and Malaysian CPO exports to the European Union market.

Factors affecting the volume of Indonesian CPO exports in the European Union:

$$Y_I = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 D_1 + \varepsilon$$

Factors affecting the volume of Malaysian CPO exports in the European Union:

$$Y_M = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 D_1 + \varepsilon$$

Information:

- Y.I. = Volume Indonesian CPO exports to the European Union (US\$)
- Y.M. = Volume Malaysian CPO exports to the European Union (US\$)
- X1 = CPO price international (US\$/ton)
- X2 = Total Indonesian and Malaysian CPO Production (tonnes)
- X3 = Valuer real exchange rate of Indonesian Rupiah and Malaysian Ringgit (Rp/Euro and R.M./Euro)
- D1 = Dummy variable (D = (1) after the 2009-2019 RED policy,
- D = (0) before the 1990-2008 RED policy)
- ε = Random error

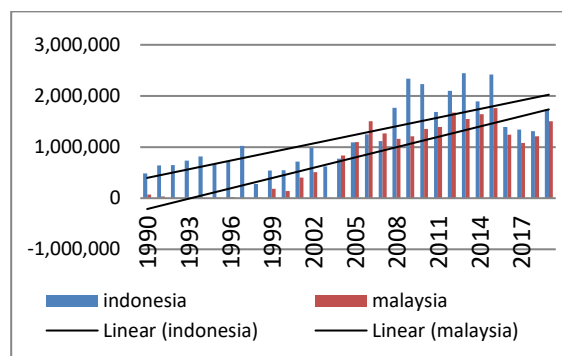
RESULTS AND DISCUSSION

Development of Indonesian and Malaysian CPO Export Volume in the European Union

The development of Indonesian and Malaysian CPO export volumes in the European Union Market for the 1990-2019 research period fluctuated but increased. As a result, the average growth of Indonesian CPO export volume in the European Union is 10.16% per year, while Malaysia's is 13.88% per year.

The highest volume of Indonesian CPO exports was in 2013, which increased by 16.42% from the previous year. However, the stock was still relatively high at the end of the last year, so sales retreated to early 2013 (GAPKI, 2013). Likewise, Malaysia, which had the highest export volume in 2015, experienced an increase of 7.32% due to Malaysia setting zero percent for its export tax (GAPKI, 2015). It is also because CPO is vegetable oil with a lower price than other vegetable oil products in the European Union, resulting in

increased demand for Indonesian and Malaysian CPO imports.



Source: UN COMTRADE, 2021 (processed)

Figure 1. Development of Indonesian and Malaysian CPO Export Volume in the European Union 1990-2019

On the other hand, there was also a decline in Indonesian and Malaysian CPO exports to the European Union. Malaysian CPO experienced a decrease in export volume from 1993 to 1997. It was due to the demand for world CPO imports still being dominated by the United States, causing the volume of Malaysian CPO exports to the European Union to be unstable (Purba & Hartoyo, 2010). A drastic decline in CPO exports also occurred in Indonesia in 1998, reaching 72.8%. This decline in export volume occurred because Indonesia was at the peak of the economic crisis. In addition, a government policy limits CPO exports by imposing an export tax of up to 60%. It is also due to the scarcity of cooking oil in Indonesia (Agustian & Hadi, 2004). As a result, export costs are very high, making it more difficult for producers to profit from exporting CPO abroad than selling domestically (Buana and Dja'far 2003). This policy will cause the domestic cooking oil scarcity to be resolved, and then the domestic cooking oil price can return to normal.

Factors Affecting the Export Volume of Indonesian and Malaysian Crude Palm Oil in the European Union

This study shows that the dependent variable (Y) is the volume of Indonesian and Malaysian CPO exports to the European Union. The independent variable (X) is the international CPO price, Indonesian and Malaysian CPO production, the real exchange rate, and the RED policy. The method to determine the effect of these factors can be seen using multiple linear regression analysis with SPSS 16 tools.

Table 1. Results of the Coefficient of Determination and F-Test on Indonesian and Malaysian CPO Regression Models

| Model | R | R Square | Adjusted R Square | F | Sig. |
|-----------|-------|----------|-------------------|------|-------|
| Indonesia | 0.897 | 0.804 | 0.773 | 25,7 | 0.000 |
| Malaysia | 0.920 | 0.847 | 0.823 | 42,3 | 0.000 |

Source: SPSS 16 (data proceed)

Based on table 1, it can be seen that the coefficient of determination (R^2) in the Indonesian regression model is 0.804. It indicates that 80.4% of the variation in the volume of Indonesian CPO exports in the European Union can be explained by the variables of international CPO prices, Indonesian CPO production, real exchange rates, and RED policies. In comparison, the other 19.6% are explained outside the model. While the coefficient of determination (R^2) in the Malaysian regression model of 0.847 indicates that 84.7% of the variation in the volume of Malaysian CPO exports in the European Union can be explained by the global CPO price variables, Malaysian CPO production, real exchange rates, and RED policies. At the same time, 15.3% is presented outside the model.

The results of the F test show that factors such as international CPO prices, Indonesian and Malaysian CPO production, real exchange rates, and RED policies simultaneously or jointly significantly affect the volume of Indonesian and Malaysian CPO exports in the European Union. It is indicated by the significant value obtained, which is 0.000, smaller than the required alpha (α) significance level of 0.05 (5%).

Table 2. Results of t-test on Indonesian and Malaysian CPO Regression Model

| Model | Indonesia | | | Malaysia | | |
|-------------------------|----------------------------------|--------|-------|----------------------------------|--------|-------|
| | Unstand ardzied Coefficients (B) | T | Sig. | Unstand ardzied Coefficients (B) | T | Sig. |
| (Constant) | 109483.9 | 0.529 | 0.602 | -562671 | -3.342 | 0.003 |
| International CPO Price | 942,305 | 2,762 | 0.011 | 618,515 | 2.23 | 0.035 |
| CPO Production | -0.02 | -1.495 | 0.147 | 0 | -0.06 | 0.952 |
| Real Exchange Rate | 56,649 | 2,193 | 0.038 | 98,822 | 4.705 | 0 |
| RED Policy | 831256.7 | 3.115 | 0.005 | 109816.7 | 0.506 | 0.617 |

Source: SPSS 16 (processed data)

Based on the table above, it can be seen that the results of the t-test in the Indonesian regression model have the value of Sig. The international CPO price obtained is 0.011, the real exchange rate is 0.038, and the RED policy is 0.005, which is smaller than the required alpha (α) significance level of 0.05 (5%). It means that the international CPO price, the real exchange rate, and the RED policy partially significantly affect the volume of Indonesian CPO exports to the European Union. Meanwhile, Indonesia's CPO production partially does not significantly affect the volume of Indonesian CPO exports in the European Union because of the value of Sig. Obtained 0.147 is greater than 0.05.

The results of the t-test on the Malaysian regression model show the Sig value. It is generated by the international CPO price of 0.035 and the real exchange rate of 0.000. It can be interpreted that global CPO prices and real exchange rates partially significantly affect the volume of Malaysian CPO exports in the European Union. It is because the significance value of each of these variables is smaller than the required alpha (α) significance level of 0.05 (5%). While the value of Sig. Malaysian CPO production is 0.952, and the RED policy is 0.617 partially has no significant effect on the volume of Malaysian CPO exports in the European Union because the significance value is more significant than 0.05.

Based on the results of the multiple linear regression that has been carried out, international CPO prices have a positive and significant impact on Indonesian and Malaysian CPO exports in the European Union. It is shown in the Indonesian regression model, which has an International CPO price coefficient of 942,305 with a significance of 0.011. Therefore, if the international CPO price is increased by US\$ 1, it can increase the volume of CPO exports by 942,305 tons (*ceteris paribus*). This result is also in line with Malaysia, where the coefficient value indicated by international CPO prices is 618,515 with a significance of 0.035. Therefore, if the international CPO price is increased by US\$1, the volume of CPO exports will increase by 618,515 tons (*ceteris paribus*).

The following variable is the production of Indonesian and Malaysian CPO, which has no significant effect on the export volume of Indonesian and Malaysian CPO in the European Union. The Indonesian CPO production coefficient value is -0.020, with a significance of 0.147, explaining the negative and insignificant effect. If Indonesia's CPO production is increased by 1 ton, the value of Indonesian CPO exports to the

European Union will decrease by 0.020 tons. On the other hand, Malaysian CPO production shows a positive and insignificant effect, with the coefficient value of Malaysian CPO production of 0.000 with a significance of 0.925. If Malaysia's CPO production increases by 1 ton, the volume of CPO exports will be constant. This research shows that the Production variable does not necessarily increase the volume of CPO exports in Indonesia and the European Union. Domestic CPO production is not entirely used for export, but some are used for domestic consumption, 32.27%, and the remaining 8.88% is used as stock (GAPKI, 2020).

The real exchange rate also positively and significantly influences Indonesian and Malaysian CPO export volume. The coefficient value shown by the real exchange rate of the rupiah against the euro is 56,649, and the significance is 0,038. When the exchange rate increases by 1 Rupiah/Euro, Indonesian CPO exports will increase by 56,649 tons. The coefficient value generated by the real exchange rate of the euro against the Malaysian ringgit is 98.822, with a significance of 0.000, which indicates that the real exchange rate has a positive effect. When the exchange rate increases by 1 Malaysian Ringgit/Euro, the export volume of Malaysian CPO will increase by 98,822 tons. This relationship aligns with research conducted by (Widyastutik. & Ashiqin., 2011), which states that this exchange rate variable positively affects Indonesia's CPO exports.

The RED policy used as a dummy variable in the study is a value of 0 before the RED policy (1990-2019) and one after implementing the RED policy (2009-2019). The RED coefficient value in the Indonesian regression model is 831,256.733, with a significance of 0.005. There is a positive and significant relationship indicating that before or after implementing the RED policy, the volume of Indonesian CPO exports to the European Union tends to be positive or increase (*ceteris paribus*). While the RED coefficient value in the Malaysian CPO regression model also shows a positive and insignificant relationship with a value of 109,816,708 and a significance of 0.617, which means either before or after the implementation of the RED policy, Malaysia's CPO export volume to the European Union has increased or tends to be positive. This study's results align with those of (Khairunisa & Novianti, 2018). They explain that the dummy variable, namely the Renewable Energy Directive policy, has a positive relationship with CPO exports in the European Union.

Impact of the Renewable Energy Directive (RED) Policy on Indonesian and Malaysian CPO Exports in the European Union

The estimation results in the model show that the RED Policy positively affects the volume of Indonesian and Malaysian CPO exports in the European Union. It means that before or after the implementation of the RED policy, the volume of Indonesian and Malaysian CPO exports to the European Union tends to be positive or increase.

It can happen due to various things, one being that the European Union does not have sufficient land to fulfil the biofuel raw material. Therefore, the European Union must import approximately 40% of vegetable oil to produce biofuel (Dewi in (Ramdana, 2020)). In addition, the existence of global certifications such as the Roundtable on Sustainable Palm Oil (RSPO), Indonesian Sustainable Palm Oil (ISPO), and Malaysian Sustainable Palm Oil (MSPO) can strengthen the position of Indonesian and Malaysian CPO in the European Union. It is necessary to face the RED policy.

On the other hand, Indonesia and Malaysia also cooperate in the palm oil industry to strengthen their bargaining power as the global palm oil producers. Therefore, the world does not quickly suppress the CPO industry in these two countries. This form of cooperation was formed on November 21, 2015, called the Council of Palm Oil Producing Countries (CPOPC), an intergovernmental organization with members of palm oil-producing countries (Pratiwi, 2019)

CONCLUSION

The development of Indonesian and Malaysian CPO export volumes in the European Union fluctuated for the 1990-2019 period but tended to increase. Meanwhile, international CPO prices, real exchange rates, and the RED Policy significantly influence Indonesia's CPO export volume. However, Indonesia's CPO production has little effect. Meanwhile, the Malaysian regression model shows that international CPO prices and the real exchange rate significantly affect the volume of Malaysian CPO exports to the European Union. In contrast, Malaysian CPO production and the RED policy have no significant effect. The Renewable Energy Directive (RED) policy positively influences the volume of Indonesian and Malaysian CPO exports. In the future, it is necessary to increase the use of CPO in the country and develop palm oil derivative products that need to get priority and be sustainable.

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ATTACHMENT

Appendix 1. Coefficient of Determination Results on Indonesian and Malaysian CPO Regression Models

| Model | R | R Square | Adjusted R Square | Std. An error in the Estimate |
|-----------|-------|----------|-------------------|-------------------------------|
| Indonesia | 0.897 | 0.804 | 0.773 | 308254,462 |
| Malaysia | 0.920 | 0.847 | 0.823 | 289988,856 |

Source: SPSS 16 (data dolah)

Appendix 2. F Test Results on Indonesian CPO Regression Model

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|--------|-------|
| Regression | 9.773E12 | 4 | 2.443E12 | 2.5712 | .000a |
| Residual | 2.376E12 | 2 | 1.188E12 | | |
| Total | 1.215E13 | 9 | | | |

Source: SPSS 16 (data dolah)

Appendix 3. F Test Results on Malaysian CPO Regression Model

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|-------|-------|
| Regression | 1.064E13 | 4 | 2.660E12 | 2.337 | .000a |
| Residual | 1.571E12 | 2 | 7.856E11 | | |
| Total | 1.221E13 | 9 | | | |

Source: SPSS 16 (data dolah)

Appendix 4. Results of t-test on Indonesian CPO Regression Model

| Model | Unstandardized Coefficients | Standardized Coefficients | T | Sig. |
|--------------------------|-----------------------------|---------------------------|------|------|
| | B | Std. Error | Beta | |
| 1 (Constant) | 109483,929 | 207081.255 | | .602 |
| International CPO Price | 942,305 | 341.142 | .337 | .011 |
| Indonesia CPO Production | -.020 | .013 | .392 | .147 |
| Real Exchange Rate Rp | 56,649 | 25,832 | .425 | .038 |
| RED Policy | 831256,733 | 266854,933 | .629 | .005 |

a. Dependent Variable: Indonesian CPO Export Volume

Source: SPSS 16 (data dolah)

Appendix 5. Results of t-test on Malaysian CPO Regression Model

| Model | Unstandardized Coefficients | Standardized Coefficients | T | Sig. |
|--------------------------|-----------------------------|---------------------------|-------|------|
| | B | Std. Error | Beta | |
| (Constant) | -562671.301 | 168.383 | | .003 |
| International CPO Price | 61,8515 | 277.393 | .220 | .035 |
| Malaysian CPO Production | .00 | .011 | -.013 | .952 |
| Real Exchange Rate | .98 | 21.005 | .4 | .000 |
| RED Policy | 10,9816,708 | 216.987 | .083 | .617 |

a. Dependent Variable: Malaysian CPO Export Volume

Source: SPSS 16 (data dolah)