

## Export intensity and competitiveness of Indonesia's crude palm oil to main destination countries

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**Abstract:** Palm oil is a superior product from Indonesia that is continuously and widely used for daily needs such as cooking, grooming, and manufacturing. However, this potential must be supported by oil palm business actors' performance to maintain its intensity and competitiveness. This study investigates how various factors affect Indonesia's crude palm oil (CPO) export intensity and competitiveness by employing panel regression and the basic gravity model. The panel data used here is a 20-year time series with cross-sections from five major importers from 1999 to 2018. The results show that the importer's gross domestic product (GDP) and quantity of export significantly and positively affect Indonesia's CPO export intensity, while the exporter's GDP and economic distance has a significant and negative effect. The factors that positively and significantly influence competitiveness are soybean's import value and Roundtable on Sustainable Palm Oil (RSPO) certification, while Malaysian CPO's export and population of importing countries negatively affect Indonesian CPO competitiveness.

**Keywords:** bilateral trade; export; gravity model; panel data; revealed comparative advantage

Crude palm oil (CPO) is a superior product from Indonesia and extensively used for daily activities such as cooking, grooming, and manufacturing. In 1999 total production only reached 7.2 million tons, but in 2018 it had reached 41.5 million tons, with an average increase in palm oil production of 1.8 million tons annually (USDA 2020). It shows that Indonesia potentially dominates the international palm oil market due to its large production. This large production is also in line with the large CPO exports. According to UN Comtrade (2020), Indonesia managed to record the largest CPO exports to the international market by USD 6 billion in 2018. It was also supported by trade openness

and agreements (Yang and Martinez-Zarzoso 2014). Indonesia's export destination countries are all countries where have their own needs and characteristics in processing Indonesian CPO products because these products have very varied benefits. In the European Union, CPO is specifically used in the food, detergent, and oleochemical sectors, while in the Asia Pacific, it is used to develop alternative fuels and biomass. The product is highly contested such that only a few countries have primarily managed to obtain this product because of this advantage. According to data from UN Comtrade (2020), countries that have consistently succeeded in taking the share of Indonesia's CPO market

for 20 years are India, the Netherlands, Singapore, and Italy. Even though the export looks large, it is also necessary to look at the export intensity for several years. It can be used as a reference to whether the commodity has high consistency or tends to fluctuate. The gross domestic product, which is usually used as a benchmark to measure a country's economy, has a reciprocal relationship with the export. Consequently, raising export intensity and economies of scale in foreign markets may increase firm performance (Boehe et al. 2016).

Export intensity (EI) is related to the ratio of export sales and total sales of firms in a country (Hofmann 2013), both small to medium-sized enterprises (SMEs) and multinational enterprises. On a larger economic scale, all business actors' accumulated export intensity in a country potentially boosts the nation's income. Higher export intensity can be described as a successful penetration of superior products from a country into the international market. However, policymakers have a role in the success or failure of the country's superior products to enter the target market due to its macroeconomic scope. The typical problems faced by Indonesian CPO business actors are trade barriers in the form of certification and consumer protection against nutritional content that is deemed less healthy for the body. It can affect the intensity of exports and, over time, affect Indonesia's gross domestic product (GDP). Therefore, it is necessary to perform research to see what factors influence the intensity of exports of a country's superior products from the macroeconomic scope.

When viewed in terms of quantity, Indonesian crude palm oil has an advantage over other countries because of the large and dominant absorption in the international market. However, apart from quantity, another thing needed is the quality of the CPO. How do these products differentiate, the price of the product is affordable, and the ease of obtaining the product is various competitiveness that various business actors must adopt. In the international market, Indonesian CPO products, compared to similar products in other producing countries such as Malaysia, can still compete because Malaysia has focused on downstream products and various trade agreements with specific countries so that their CPO products are more recognized. In this case, Indonesia needs to increase its CPO's competitiveness so that the CPO product quality will be well maintained in the future. However, before determining the potential to be developed, it is essential to research the factors affecting a product's competitiveness.

The qualitative and quantitative measure of competitiveness heavily depends on the unit of analysis. The most

popular measurement of competitiveness used is the revealed comparative advantage (RCA), developed by Balassa (1965). The RCA is one of the simplest and easiest analytical tools but has a wide range of interpretations. RCA becomes a fundamental analysis in examining the comparative advantage in a country. RCA analysis has certain limitations where this analysis only shows events at one particular point. Therefore, to overcome this limitation, we use a time series to get a more comprehensive depiction of competitive advantage.

Many researchers have used the gravity model as a research base to look at the factors that influence trade flows, with the dependent variable export of a commodity and the independent variable in the form of GDP of both countries and geographical distance (Jambor et al. 2016). However, only slight researchers have begun to adjust the model to better represent their results, for example, by replacing geographical distance with economic distance and nominal GDP with real GDP.

Research on the factor influencing the export intensity of a country's primary commodities and competitiveness is still lacking. Here, we try to combine it with the gravity model approach. The objectives of this research are: *i*) finding out the factors that influence the intensity of Indonesian CPO's exports in the primary importer market; and *ii*) finding out the factors that affect Indonesian CPO competitiveness among the primary importer market.

**Literature review.** Boehe et al. (2016) examined how the export scope's curvilinear effect varies contingently on EI and destinations. They used panel regression with firm and period fixed effects (FE) to control for unobserved heterogeneity across the firms caused by various factors, such as exporters' internal resources and differentiated capabilities as well as unobserved temporal shocks (e.g. economic and political crises or other types of external impacts). The results show that export intensity positively affects firm performance if emerging economies (EE) firms serve a limited number of export destination countries in other EEs and negatively affect firm performance if EE firms serve a large number of export destination countries in other EEs. This research can present a complete picture of the export intensity. However, more research is needed on the EI approach, especially for superior commodities on a macroeconomic scale. The EI approach will be even more integrative, and in the future, it will be able to link the performance of business actors individually and country level collectively.

Rifin et al. (2020) researched Indonesia's palm oil trade and its international market challenges. This

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study aims to assess the suspension of Indonesia's palm exports to the European Union in terms of Indonesia's economic conditions. They used macroeconomic indicators and sectoral condition as a factor which is impacting the Indonesia palm oil export. The results show that the suspension will not significantly impact Indonesia's economic growth through GDP and welfare level. Rosyadi et al. (2020) researched whether the certification and trade barrier can affect Indonesian crude palm oil export. The analysis shows a significant and positive effect. It confirms that certified palm oil products will increase Indonesia's palm exports to major importing countries. Both of these studies are sufficiently capable of capturing the characteristics of superior commodities in a country.

Furthermore, there are complementary factors that seem to need further investigation, which has not yet been found in research on exports and may draw attention to further research, e.g. the country's sustainability product standards. Because directly or indirectly, these standards can affect the country's exports. The exporting country must fulfil the international standard for the export product.

Other research on the competitiveness of agricultural products was also conducted by Simo et al. (2016). They aimed to evaluate cattle production's breeding processes, focusing on raw cow milk production and dairy products; and comparing the domestic supply's competitiveness with the EU-27 countries. Authors use various indices such as revealed comparative advantage (RCA), relative import advantage index (RMA), relative export advantage index (RXA), and relative trade advantage index (RTA) to assess the competitiveness of the aggregated groups of milk and milk products commodities (HS 0401-0406). The result shows that Slovak Republic has a comparative advantage over the EU-27 countries in the commodity 0401 (milk and cream, concentrated or containing added sugar or other sweeteners), but other monitored commodities have a comparative disadvantage.

Research that examines the factors that influence a superior agricultural product's competitiveness turns out that only a few have done it. According to Simo et al. (2016), competitiveness is associated with the application of products in the domestic and foreign markets of organizations, integration groups, or countries to successful participation in the exchange of products of material or immaterial nature at different levels of trade. The geographical indication, factor endowments, and regional economic integration can also positively affect competitiveness (Torok and

Jambor 2016). Each country has a strategy in creating a competitive advantage for its products and knowing its influencing factors. Also, competitiveness plays an essential role in winning the international market. As a consequence, each country needs to focus more on the pricing strategy of their exported product.

The studies on the export intensity approach discussed above have become our reference for finding new things. Based on research conducted by Boehe et al. (2016) and Hofmann (2013), the export intensity approach is specially used in individual firms, whereas in our opinion, it could be better if it is used on aggregate data for macroeconomic scales. Moreover, in many developing countries, including Indonesia, none have yet implemented the export intensity approach for analyzing the superior commodity performance in the international market. Therefore, it can be used as one of the essential sources in conducting such research as well as making fruitful policy.

## MATERIAL AND METHODS

In approaching the first objective, we implemented the EI method developed by Eor (2004). It is more suitable for this research because this method can measure the aggregate export intensity of a country's superior commodities than export intensity methods conducted by Boehe et al. (2016) and Hofmann (2013). Furthermore, following Eor (2004), if the EI is greater than 1, it implies that country  $i$ 's exports to country  $j$  are relatively higher than country  $i$ 's exports to the whole world, so country  $i$ 's export dependency on country  $j$  is relatively high. The  $i$  in this research is the exporter (Indonesia), and  $j$  is the importer (India, Italy, Netherlands, and Singapore). The EI index, therefore, is defined as follows:

$$EI_{ij}^k = \frac{x_{ij}^k / m_j^k}{x_i^k / M_w^k} \quad (1)$$

where:  $x_{ij}^k$  – the country  $i$ 's commodity  $k$  export to country  $j$ ;  $k$  – CPO;  $m_j^k$  – country  $j$ 's CPO total imports;  $x_i^k$  – country  $i$ 's CPO total exports (to all countries);  $M_w^k$  – the world's CPO total imports.

Determining the factors that influence the export intensity, we combined it with the gravity model. The gravity model is the most popular and has long been a powerful tool for international trade research. Besides, following Balogh and Leitão (2019) research, the gravity model can also measure trade between regions and other external factors. The gravity model was first

introduced by Tinbergen (1962) that explains the proportionality of trade between two countries to their economic mass, mainly expressed in the GDP and population, and inversely proportional to the geographical distance between them. In its development, the gravity model is augmented to interpret the best results without losing substance by adding supporting variables (Bergstrand 1989). In this study, we tried to use EI calculation analysis, which was included as the dependent variable combined with this model and added one supporting variable. Based on the descriptions above, the equations formed for this study are as follows:

$$EI_{ij}^k = \alpha_{ij} + \beta_1 GDP_i + \beta_2 GDP_j + \beta_3 Ecodist_{ij} + \beta_4 Quantity_{ij}^k + e_{ij} \quad (2)$$

where:  $EI_{ij}^k$  – CPO's export intensity from country  $i$  to country  $j$ ;  $\alpha_{ij}$  – the intercept;  $\beta_1$ – $\beta_4$  – the coefficient;  $GDP_j$  – country  $j$ 's real GDP (USD);  $GDP_i$  – country  $i$ 's real GDP (USD);  $Ecodist_{ij}$  – the economic distance;  $Quantity_{ij}^k$  – CPO's export volume from country  $i$  to country  $j$ ;  $e_{ij}$  – an error term;  $i$  – exporting country (Indonesia);  $j$  – the main importer countries (India, the Netherlands, Singapore, and Italy).

GDP implies the market size of both countries. This variable is also used by Balogh and Leitão (2019) to see the economic size of a country. The economic distance in real terms reflects the cost of the distance between the two countries, where according to Li et al. (2008), the economic distance formula is the geographical distance between the two countries multiplied by the ratio of the total GDP of the importer country to the total GDP of the destination country. Economic distance is the distance of the capital city between exporting and importing countries because it is usually functioning as a business and trade centre. We have already ensured that the capital city which is used in this study also functions as a business and trade centre.

Balassa (1965) first introduced the RCA method, a method used to analyse how strong or competitive a product comes from a particular country based on export value. The calculation of the revealed comparative advantage (RCA) index in this study is written in the following equation (Balassa 1965):

$$RCA_{ij}^k = \frac{x_{ij}^k / x_{ij}}{X_w^k / X_w} \quad (3)$$

where:  $RCA_{ij}^k$  – the revealed comparative advantage index;  $x_{ij}^k$  – CPO's export value of exporting countries

to destination countries;  $x_{ij}$  – the total export value (all commodities) of exporting countries to destination countries;  $X_w^k$  – total CPO's export value in the world market;  $X_w$  – the total export value (all commodities) in the world market.

If RCA is larger than one, a given country has a comparative advantage compared to the reference countries. In contrast, a revealed comparative disadvantage is indicated by RCA's value with less than one (Torok and Jambor 2016).

We use a panel data regression method to analyse the factors that affect Indonesian CPO's competitiveness with the main destination countries. In this study, the results of the Indonesian RCA index were used as the dependent variable. RCA in this model is assumed to be an indicator that describes the competitiveness of Indonesian CPO. The following model is necessary to transform the model to semi-logarithmic (log-lin) on the dependent variable. The semi-logarithmic model is used in this study because we want to see the absolute change of the dependent variable caused by the independent variable's relative change. We used a semi-logarithmic model to represent the results of the analysis as correctly as possible. Other than that, we have also tried several models, and this is the best one. The equations formed for this study are as follows:

$$\begin{aligned} \ln RCA_{ij}^k = & \alpha_{ij} + \beta_1 Exportvalue_{mj}^k + \\ & + \beta_2 Openness_j + \beta_3 Soybean_{wj} + \\ & + \beta_4 Population_j + RSPO + e_{ij} \end{aligned} \quad (4)$$

$\ln RCA_{ij}^k$  – CPO's competitiveness from country  $i$  to country  $j$ ;  $\alpha_{ij}$  – the intercept;  $\beta_1$ – $\beta_4$  – coefficient;  $Exportvalue_{mj}^k$  – Malaysia's CPO export value to country  $j$  (USD);  $Openness_j$  – country  $j$ 's openness;  $Soybean_{wj}$  – country  $j$ 's soybean import value from the world (USD);  $Population_j$  – country  $j$ 's population; RSPO – Roundtable on Sustainable Palm Oil (dummy variable);  $e_{ij}$  – an error term.

Malaysia is Indonesia's biggest competitor in CPO exports globally, accounting for nearly 25% of the world's total CPO demand (UN Comtrade 2020). According to Kiganda (2017), openness implies removing or reducing restrictions or barriers on the free exchange of goods between nations (imports and exports) and is measured by the sum of exports and imports of goods and services measured as a share of gross domestic product. In this study, soybean commodity ( $Soybean_{wj}$ ) is categorized as a competing commodity.



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According to UN Comtrade (2020), for 20 years, palm oil has always competed with soybean oil in terms of price competitiveness. Population (*Population<sub>ij</sub>*) represents the relationship with each individual's purchasing power in the destination country. Roundtable on Sustainable Palm Oil (RSPO) is a dummy variable where 0 is RSPO has not applied (1999–2007), and 1 RSPO has applied (2008–2018). Data on RSPO certification participation is obtained from the RSPO member dataset, which is available on the RSPO website (RSPO 2020). The certification variable was included in the RSPO variable to see whether there is a real difference in Indonesian crude palm oil's export intensity before or after this certification takes effect. Because this certification variable has two interesting points of view (both in terms of exporters and importers), from the exporters' side, this certification is still considered to be hampering the export of its superior commodities because it can simultaneously reduce the potential for bigger exports. However, from the importers' side, this certification is a way for them to get more guaranteed products and good quality to add value to the product itself even though it has considerable export potential. With this certification, the product must meet the standards made by the certification organization. RSPO was also chosen because the importer countries in this study have implemented RSPO in their palm-oil-product supply chain.

The data used in this research is secondary data obtained from information collected from national and international agencies. The data source used is an open-source platform to have an actual and comprehensive

nature. These data include export-import data retrieved from UN Comtrade (2020), distance proxies from the Center d'Etudes Prospectives et d'Informations Internationales (CEPII 2020), and gross domestic product and population from The World Bank (2020). The data structuring model, which is used in this research, is panel data. Panel data can reduce problems with omitted variables because panel data can accommodate information on cross-section and time-series variables (Baltagi 2005). Panel data can also explain the dynamics of individual adjustments within a specific time frame so that these changes can be observed to follow trade flows' speed. In this research, panel data is in time series for 20 years (1999–2018) with cross-sections from four major importing countries: India, the Netherlands, Singapore, and Italy. These countries were selected based on the value rank of Indonesia's CPO imports and their continuity during 1999–2018. One of the things that distinguish this research from other similar RCA studies is that we used real GDP and export value rather than the nominal value because using the real value will eliminate the inflation effect of the economic variable used in this study.

The best model selection in panel data regression analysis was also performed (Tables 1–2). A Chow test is performed to determine whether the best model in the analysis is the common effect model (CEM) or fixed effect model (FEM) (Baltagi 2005). The choice of regression model only reached the Chow test. The number of cross-sections must be greater than the number of independent variables to meet the random effect model requirement.

Table 1. Analysis to determine the best model for export intensity (EI) data panel analysis

Variable	Variable description	Data source	Common effect model	Fixed effect model
<i>C</i>	intercept	–	0.3806 <sup>ns</sup>	3.4455 <sup>***</sup>
<i>GDPreal<sub>i</sub></i>	real GDP of exporter country (USD)	The World Bank (2020)	0.0019 <sup>ns</sup>	–0.0041 <sup>**</sup>
<i>GDPreal<sub>j</sub></i>	real GDP of importer countries (USD)	The World Bank (2020)	0.0014 <sup>***</sup>	0.0023 <sup>***</sup>
<i>Ecodist<sub>ij</sub></i>	economic distance between exporting and importing countries	CEPII (2020)	0.0001 <sup>ns</sup>	–0.0021 <sup>***</sup>
<i>Quantity<sub>ij</sub></i>	CPO's export volume from exporter country to importer countries	UN Comtrade (2020)	0.0001 <sup>ns</sup>	0.0003 <sup>**</sup>
<i>R</i> <sup>2</sup>	–	–	0.4486	0.6942
Adjusted <i>R</i> <sup>2</sup>	–	–	0.4192	0.6644
<i>F</i> -test (statistic)	–	–	15.2531	23.3478
Chow test	–	–	–	0.0000

\*\*\*, \*\*Significant at 1%, and 5% probability level, respectively; <sup>ns</sup>nonsignificant; CPO – crude palm oil

Source: Own composition

Table 2. Analysis to determine the best model for revealed comparative advantage (RCA) data panel analysis

Variable	Variable description	Data source	Common effect model	Fixed effect model
<i>C</i>	intercept	–	4.8103***	2.2269***
<i>Exportvalue<sub>mj</sub></i>	Malaysia's CPO export value to importer countries (USD)	UN Comtrade (2020)	–0.0000 <sup>ns</sup>	–0.0006***
<i>Openness<sub>j</sub></i>	importer countries openness	UN Comtrade (2020)	–0.4992***	0.1431 <sup>ns</sup>
<i>Soybean<sub>j</sub></i>	soybean import value of importer countries from the world (USD)	UN Comtrade (2020)	–0.0001 <sup>ns</sup>	–0.0004*
<i>Population<sub>j</sub></i>	importer countries population	The World Bank (2020)	0.0009***	0.0048**
<i>RSPO</i>	dummy variable of Roundtable on Sustainable Palm Oil (RSPO) certification	RSPO (2020)	0.1058 <sup>ns</sup>	0.1897*
<i>R<sup>2</sup></i>	–	–	0.6431	0.7633
Adjusted <i>R<sup>2</sup></i>	–	–	0.6190	0.7366
<i>F</i> -test (statistic)	–	–	26.6705	28.6230
Chow test	–	–	–	0.0000

\*\*\*, \*\*, \*Significant at 1, 5, and 10% probability level, respectively; <sup>ns</sup>nonsignificant; CPO – crude palm oil

Source: Own composition

## RESULTS AND DISCUSSION

In the last 20 years, Indonesia has several dominant crude palm oil importer countries, both from the European Union and the Asia Pacific regions. However, not all countries are consistently importing Indonesian CPO products due to various factors such as the need for sus-

tainable value, protection of similar domestic products, and the quality of products from competing countries that can better meet consumer tastes. Figure 1 shows the expansion of Indonesian CPO to four major importing countries in 18 years (2001–2018) (UN Comtrade 2020). Indonesia exports the most considerable portion of its CPO to India, with 48.19% of its international total

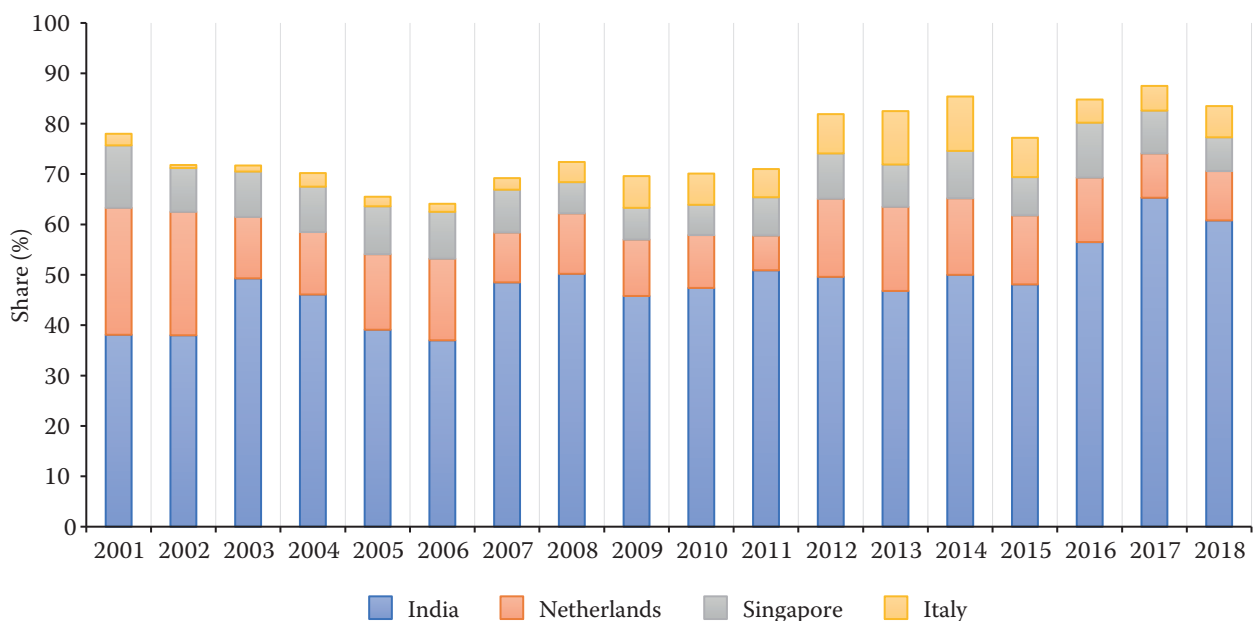


Figure 1. Market share of the top four leading importer countries of Indonesia's CPO 2001–2018

CPO – crude palm oil

Source: The authors' calculations on the basis of the UN Comtrade (2020)

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market share. After that, it can also be seen that Indonesia has expanded its market share to the Netherlands, which takes 13.81% of Indonesian CPO's market share. Indonesia and the Netherlands have a unique relationship due to colonization in the past. The Netherlands was also the first country to bring oil palm to Indonesia, implementing their interest in these plants and have indeed planned to develop them in Indonesia. Other than that, Indonesia has created 8.50% and 4.86% of the total CPO's market share to Singapore and Italy. Indonesia has consistently become an exporter for these two countries in the last 18 years.

Figure 2 shows the export intensity index from the four biggest Indonesia's CPO importers in 20 years (1999–2018). In order of an average of 20 years, the country with the largest number was owned by Italy (2.04), then the Netherlands (1.36), India (0.90), and finally Singapore (0.60). It is interesting because the Indonesian CPO always gets various comments from the European Union about its relationship with environmental aspects. However, not all states of the European Union discriminate against oil palm. A country like Italy is a potential market for Indonesian CPO because of its ability to dominate the market share in the Italian market for the past seven years, and Indonesia's CPO position is far above that of its competitor, Malaysia. Table 3 shows that the GDP of importer countries has a positive and significant value. It confirms that the

more a country's economic size increases, the export intensity will also increase. The importer's GDP can illustrate the country's economic strength, which can also get stronger when purchasing power also increases. This high purchasing power of the people will motivate firms to produce their products to increase the export intensity. In other words, this higher purchasing power is an indirect incentive for companies that can be adopted to increase their production. However, the greater the importer's GDP, the higher its production capacity, which means the country has sufficient capacity to meet domestic demand and produce goods as import substitution.

Suppose the importers' GDP had a significantly positive effect, while exporters' GDP is weak. In that case, it implies that the market is primarily influenced by the economic scale on the demand side, meaning that the recent development of global trade is mainly demand-driven (Zhang et al. 2018). We can also see that the importing countries of Indonesian CPO have a far greater GDP than Indonesia. Because when a country becomes a larger importer, there will be a significant dependency as an exporter country. Suppose the country's importers, who are the primary consumers, reduce the number of purchases or even no longer buy CPO from Indonesia. In that case, it will directly affect the Indonesian economy, where CPO is the largest single commodity contribution to Indonesia's GDP. Furthermore,

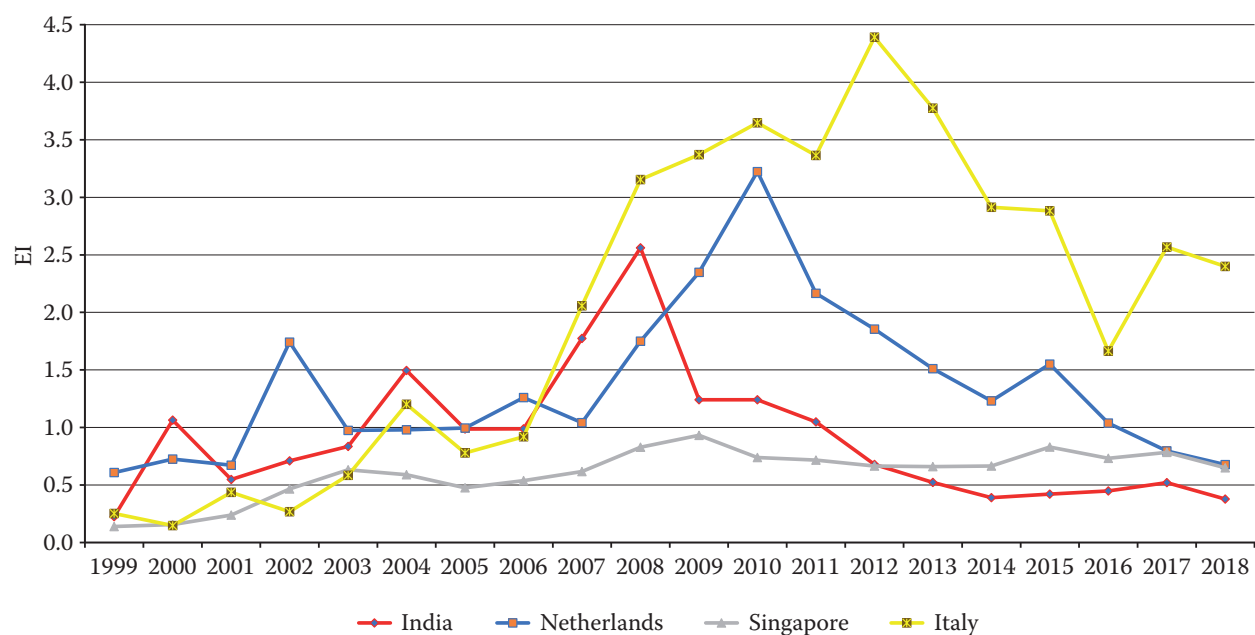


Figure 2. The EI index of Indonesia's CPO 1999–2018

CPO – crude palm oil; EI – export intensity

Source: The authors' calculations on the basis of the UN Comtrade (2020)

Table 3. Factors that affect the export intensity of Indonesia's crude palm oil (CPO) to importer countries in 1999–2018

Variable	Sign of expectation	Coefficient	SE	<i>t</i> -test	Probability
<i>C</i>		3.4455***	0.5146	6.6948	0.0000
<i>GDPreal<sub>i</sub></i>	+	−0.0041**	0.0017	−2.4106	0.0185
<i>GDPreal<sub>j</sub></i>	+	0.0023***	0.0005	4.6944	0.0000
<i>Ecodist<sub>ij</sub></i>	−	−0.0021***	0.0003	−7.2687	0.0000
<i>Quantity<sub>ij</sub></i>	+	0.0003**	0.0001	2.2583	0.0270
<i>R</i> <sup>2</sup>			0.6942		
Adjusted <i>R</i> <sup>2</sup>			0.6644		
Probability ( <i>F</i> -statistic)			0.0000		

\*\*\*, \*\*Significant at 1%, and 5% probability level, respectively; <sup>ns</sup>nonsignificant; SE – standard error

For the explanation of variables and data sources, see Table 1

Source: Own composition

it will have a domino effect on all CPO business actors in that country. It is also supported by the fact that GDP used in this study is real GDP where prices are considered constant, so the main problem is in the business actor's productivity. It is proven with the data from USDA (2020) that there has been a sharp decline in Indonesian CPO companies' productivity over the last three years.

Economic distance shows the adverse effect and significant value, where the economic distance reflects the costs of the two countries, the farther the distance between the two countries, the cost will be more expensive, and export intensity will also weaken. This result in line with Balogh and Leitão (2019) that distance has a significant impact on agricultural trade. High logistics costs can also adversely affect Indonesia's trade balance if further supported by the declining global economic conditions. Nevertheless, in this digital era, transportation costs can be reduced by digitizing services, in line with facing the Industrial Revolution 4.0. The supply chains ecosystem has started to shift to automation systems such as artificial intelligence (AI) and the internet of things (IoT). Because this technology is directly connected to the user, future transportation has a dynamic price. Many countries have also entered into various agreements and negotiations, especially producer countries and partners, which have led to free trade agreements to reduce costs caused by the distance between countries.

Quantity shows a positive effect and significant value to export intensity. When consumers like a product, the demand for the product will also increase, a company or country will be competitive if it can sell products that meet the requirements of foreign demand (in terms of price, quantity, and quality) to generate more profits. The total valuation of world palm oil exports (CPO) in 2018 reached USD 6 billion, and Indonesia is among

the countries that contribute the most, which is took 46% of world CPO exports (UN Comtrade 2020).

The analysis (Table 4) shows that Malaysia's CPO export value has a negative and significant value, as expected before. When the amount of consumption of similar products from other competitors decreases, it proves that our products have an advantage so that consumers prefer to buy our products. According to USDA (2020), Indonesia has the largest CPO plantation area and production globally, with an average increase in production each year of 1.8 million tons. However, Indonesia has successfully implemented a better diplomatic strategy from product factors and external factors than Malaysia. One example is by entering into trade agreements with various major importing countries. One of them is by strengthening trade relations between Indonesia and India through the Comprehensive Economic Cooperation Agreement (CECA) in 2009. Palm oil is one of the products with non-tariff barriers on the following Indonesian products imposed by India.

Soybean's import value variable shows positive and significant value to Indonesia's CPO competitiveness. For 20 years, palm oil has always had the lowest price compared to two other vegetable oils, namely sunflower oil and soybean oil. The highest increase in palm oil prices occurred in 2007 at 64%, and the lowest occurred in 2009 at −29% (UN Comtrade 2020). Besides that, it is also supported by the positive trend of Indonesian palm oil prices in the international market. Based on UN Comtrade (2020) data, we found an average increase of palm oil prices USD 0.0219 per kg each year. It implies that the quality of Indonesian palm oil export has improved.

In this study, the *RCA* will increase when the population decreases, which means that the importing coun-



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Table 4. Factors that affect the competitiveness of Indonesia's crude palm oil (CPO) to importer countries in 1999–2018

Variable	Sign of expectation	Coefficient	SE	<i>t</i> -test	Probability
<i>C</i>		2.2267***	0.6087	3.6574	0.0005
<i>Exportvalue<sub>mj</sub></i>	–	–0.0006***	0.0002	–3.3635	0.0012
<i>Openness<sub>j</sub></i>	+	0.1431 <sup>ns</sup>	0.1602	0.8934	0.3747
<i>Soybean<sub>j</sub></i>	+	2.2269*	0.0002	–1.7302	0.0879
<i>Population<sub>j</sub></i>	–	–0.0006***	0.0022	2.2370	0.0284
<i>RSPO</i>	+	0.1897*	0.1099	1.7253	0.0888
<i>R</i> <sup>2</sup>			0.7633		
Adjusted <i>R</i> <sup>2</sup>			0.7366		
Probability ( <i>F</i> -statistic)			0.0000		

\*\*\*, \*\*, \*Significant at 1, 5, and 10% probability level, respectively; <sup>ns</sup>nonsignificant; SE – standard error

For the explanation of variables and data sources, see Table 2

Source: Own composition

try's population shows negative and significant results (Figure 3). The estimated coefficient of the population for importers is expected to be ambiguous as 'economies of scale' could increase imported goods with the increase in population. The 'absorption effect' could have the reverse impact on traded goods as the population increases (Mehchy et al. 2015). In this term, Indonesian CPO products have a good value because when the importing country's population decreases, the demand for Indonesian CPO does not decrease and even increases. This statement is also supported by Ostfeld et al. (2019) that crude palm oil is found in a variety

of products, including foods, body products, detergents, and biofuels so that CPO does have a good value. Other than that, when the population decreases, the GDP per capita will automatically increase, so logically purchasing power will increase, and consumers will have more power to buy. So that the product will automatically have high competitiveness because consumers will highly value the product.

RSPO dummy variable shows a significant and positive value. In the economic aspect, certification was associated with a more significant increase in profit. Share prices of RSPO and non-RSPO concessions

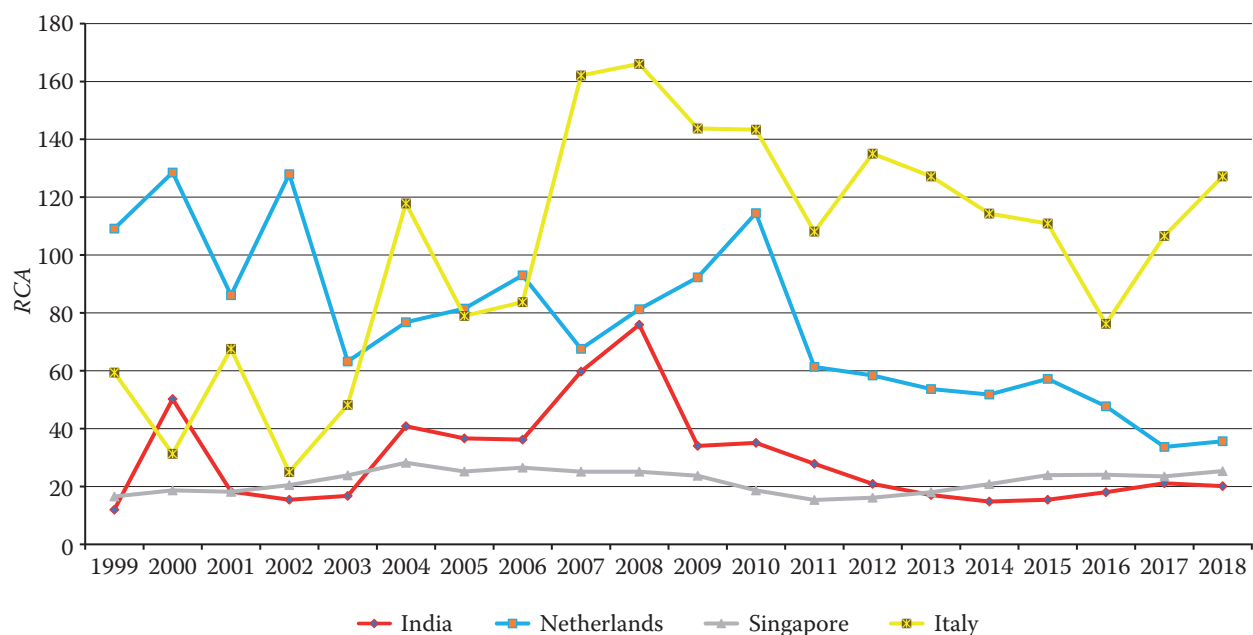


Figure 3. The RCA index of Indonesia's CPO 1999–2018

CPO – crude palm oil; RCA – revealed comparative advantage

Source: The authors' calculations on the basis of the UN Comtrade (2020)

have increased in value between 2005–2016, increasing by USD 1.55 and USD 0.071, respectively (Morgans et al. 2018). Because a guaranteed premium price is applied, the certified oil palm plantations' economic performance might be improved. Other than that, it may also be the case that many consumer goods manufacturers and retailers fall short of the 95% physical certified palm oil content previously required to use the ecolabel, and so greater use of ecolabelling may promote more sustainable consumption and more favourable views of palm oil (Ostfeld et al. 2019). All actors in the supply chain, from smallholders to the corporate level, will be motivated to get a reasonable price and be recognized by the market.

## CONCLUSION

The intensity of exports can be a measure of the superior product of a nation and provides an indication of how much this product can support its economy. Certain commodities' competitiveness represents all business actors in that country, ranging from small-medium enterprises, private companies to state-owned companies. This research's results are essential to be considered by stakeholders to implement a trade policy, which can be a win-to-win solution for all parties. The analysis shows that real GDP importer countries and export quantity having a positive and significant impact on Indonesia's CPO export intensity, while the exporter's GDP and economic distance has a significant and negative effect. Real GDP in this study indicates that prices are constant, so that a reduction in export intensity is due to Indonesian CPO companies' productivity.

Soybean's import value and RSPO dummy variables positively and significantly affect Indonesia's CPO competitiveness, while Malaysia's CPO export and importer population have a negative and significant effect. Indonesian CPO is still superior to competitors, such as Malaysia, because when Indonesia's CPO competitiveness increases, exports from Malaysia's CPO to the same importing country will decrease. The population in importer countries also supports the absorption effect. The anomaly in the absorption effect occurred when the population decreases, but the product has satisfactory qualifications, thereby increasing its competitiveness. Indonesia should realize that this is one of Indonesia's strengths to win the world's CPO market. Therefore, it requires various innovations and research to maintain Indonesia's superior CPO position in various major importing coun-

tries, significantly to develop derivative products from the Indonesian CPO itself.

All actors have their roles in a bilateral trade ecosystem. If business actors want to increase or maintain a high export intensity, they must maintain the products' best quality as expected by consumers. Apart from that, the government must also support what these business actors have done. The role of the government is to maintain the already high purchasing power of the people through various price policies and bilateral agreements between countries/regions so that it will be in line with the increase in production of all palm oil business actors, which in turn can increase the intensity of the country's exports.

Indonesia should pay more attention to its CPO products since its competitiveness continuously decreased over the past five years in two huge importing countries such as India and the Netherlands. The Netherlands has a unique historical value to Indonesia, so it can be an advantage to maintain the exports. All parties, both the government and exporters, must commit to being more intensive in developing their CPO products to have competitiveness in the countries concerned, both in terms of quality and quantity.

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