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the existence of negative environmental issues in the land clearing of palm oil plantation and the decline in soybean production have become a matter of great concern by importing countries, so the permits of the exporting countries of the two vegetable oil producers are very strict. Therefore, coconut oil is considered to be one of the alternative vegetable oils which is environmentally friendly and not too competitive as a staple food such as soybean.

Coconut oil is widely used as raw material for food and non-food industries such as cooking oil, cosmetics, pharmaceuticals, soap making, and biodiesel technical fuel (Kementerian Perdagangan, 2013). The high potential of using coconut oil will certainly be very promising and able to increase markets, especially in industrialized countries. Indonesia has the potential to develop CCO exports to the international markets and the destination countries. Indonesia is not only one of the countries with the largest coconut harvest area in the world (3.26 million ha), but also the highest coconut producer (18.98 million tons) in the world (FAOSTAT, 2019). However, at present, Indonesia only contributes 23% to the world CCO demand. This value is still far lower than the Philippines as the world's main supplier of CCO with a contribution of 61%. Other competing countries, such as Sri Lanka, the Netherlands, and

Malaysia contributed 5%, 2%, and 2% to the world CCO demand, the remaining 7% was completed by other countries (UNComtrade, 2019).

The research regarding the demand for Indonesian CCO in the international market during 1980-2005 had been conducted by Turukay (2009) and it was found that export prices and domestic prices of Indonesian CCO, soybean oil price, GDP of importing country, currency exchange rate, RCA index and dummy variable (transition of palm oil as a major supplier of cooking oil) had significant effect on export demand of Indonesian CCO. Furthermore, Djoni et al. (2013) found that export prices of Indonesian CCO, population and GDP real per capita of importing countries, real exchange rate, and export prices of Philippines CCO influenced the export volume of Indonesian CCO in four major importing countries (the Netherland, China, Malaysia, and Singapore).

The success of a country in the international trade can be seen from its export competitiveness (Bustami and Hidayat, 2013). The previous research on Indonesian CCO is still limited to the determinant of export volume and there were no studies on the determinant of Indonesian CCO competitiveness in destination countries yet, including the United States. So, this study discusses about the competitiveness of Indonesian

CCO and examine what factors influence the competitiveness of Indonesian CCO in the destination countries. In addition, this research will also examine how trade openness of importing countries affects the competitiveness of Indonesian CCO. Trade openness, known as increasing flows of international trade, is considered to bring changes to economic growth and competitiveness (Pilinkiene, 2016). Hence, it becomes an important determinant to observe how it affects the competitiveness of Indonesian CCO.

## METHODS

The data used in this study were secondary data (table 1). The time series data for 22 years (1996-2017) was used to analyze CCO export competitiveness, and the panel data analysis was used to analyze factors affecting the export competitiveness of Indonesian CCO in destination countries. Five destination countries (the United States, the Netherlands, Malaysia, China and Singapore) were chosen based on the order of the export value of Indonesian CCO to the destination countries and their continuity during 1996-2017. In addition, selected countries were also export destination countries from the Philippines, with the aimed to see the impact of the main competitors on the competitiveness of Indonesian CCO.

## Analytical Framework

### *Analysis competitiveness of Indonesian CCO to destination countries*

Revealed Comparative Advantage (RCA) is a method of competitiveness analysis to measure the comparative advantage that reflects the competitiveness of a product with other products in the world export market (Sari and Hartono, 2010). The calculation of the RCA index, formulated by Balassa (1965) as follows:

$$RCA = \frac{X_{ij} / X_t}{W_{ij} / W_t}$$

Yu and Qi (2015) classified the RCA index of a commodity into four categories of comparative advantage that is a very strong advantage ( $RCA > 2.5$ ), strong advantage ( $1.25 \leq RCA \leq 2.5$ ), moderate advantage ( $0.8 \leq RCA < 1.25$ ), and weak disadvantage ( $RCA < 0.8$ ).

Export Product Dynamic (EPD) analysis aims to determine the position of a country in the world market by showing how much its strength or its ability to export (Wardani et al., 2018). The determination of EPD's position is determined by comparing changes in market share over time and the dynamics of exported products. This change in market share indicates whether a country has a competitive advantage in these products or not (Estherhuizen, 2006).

X-axis: Growth in market share of total exports (Indonesia)

$$\frac{\sum_{t=1}^n \left( \frac{X_{ij}}{W_{ij}} \right)_t \times 100\% - \sum_{t=1}^n \left( \frac{X_{ij}}{W_{ij}} \right)_{t-1} \times 100\%}{T}$$

Y-axis: Growth in product market share

$$\frac{\sum_{t=1}^n \left( \frac{X_t}{W_t} \right) \times 100\% - \sum_{t=1}^n \left( \frac{X_t}{W_t} \right)_{t-1} \times 100\%}{T}$$

Description:

$x_{ij}$  = export value of Indonesian CCO to destination countries

$x_t$  = total value of Indonesian exports to destination countries

$W_{ij}$  = export value of world CCO to destination countries

$W_t$  = total value of world exports to destination countries

T = number of years

### Analysis of the factors that affect the competitiveness of Indonesian CCO to destination countries

Panel data regression analysis was used to estimate the factors that influence the competitiveness of Indonesian CCO to destination countries. In this study, the results of the Indonesian RCA index were used as the dependent variable.

$$\text{LnRCA}_{ij} = \alpha_{ij} + \beta_1 \text{Ln}Q_{ij} + \beta_2 \text{Ln}TO_j + \beta_3 \text{LnRER}_{ij} + \beta_4 \text{Ln}X_{pj} + e_{ij}$$

$\text{RCA}_{ij}$  = Indonesian RCA index to destination countries

$\alpha_{ij}$  = Intercept

$\beta_1$ - $\beta_4$  = Regression coefficient

$Q_{ij}$  = Export volume of Indonesian CCO to destination countries (Kg)

$TO_j$  = Trade openness of destination countries

$\text{RER}_{ij}$  = Real exchange rate (IDR/destination country currencies).

$X_{pj}$  = Export value of Philippines CCO to destination (US\$)

$e_{ij}$  = Error term

### RESULTS AND DISCUSSION

The results show that Indonesian CCO had competitiveness in the five destination countries (the United States, the Netherlands, Malaysia, China, and Singapore). The average of RCA index in each country showed that Indonesian CCO had a very strong comparative advantage and EPD analysis also showed that Indonesian CCO was in the rising star position in the Netherlands,

**Table 1.** Data sources in this study

Data	Sources
Export value of CCO and total value of export	UNComtrade (comtrade.un.org)
Exchange rate	The United Nations Conference on Trade and Development (unctad.org)
GDP of destination countries	The World Bank (worldbank.org)

**Table 2.** Export Product Dynamic (EPD) Classification

Share of Country's Export in World Trade (X)	Share of Product in World Trade (Y)	
	Rising/ Dynamic (+)	Falling/ Stagnant (-)
Rising/ Competitive (+)	Optimal "Rising Stars"	Vulnerable "Falling Stars"
Falling/ Non Competitive (-)	Weakness "Lost Opportunity"	Restructuring "Retreat"

Source: Estherhuizen (2006)

Malaysia, China, and Singapore (table 3). This shows that Indonesian CCO is a dynamic product in those destination countries where it can grow rapidly and characterized by the increasing demand in those destination countries. The increasing demand for coconut oil is along with many discoveries about alternative renewable energy sources derived from vegetable oil. Research says that biodiesel production from coconut oil is relatively higher and it has much better lubrication properties than other vegetable fuels (Hossain et al., 2012). Health specialists also said that coconut oil has health benefits for weight loss, cholesterol reduction, prevention of cardiovascular disease, and anti-inflammatory effects (Lima and Block, 2019). In the United States, Indonesian CCO was in a falling star position which indicates that Indonesian CCO had a competitive advantage, but the commodity of Indonesian CCO in the United States market was not dynamic. It also indicates that on average there is an increased growth in Indonesian CCO

market share but it is not accompanied by an increase in demand in the United States. RCA trend of Indonesian CCO was considerably fluctuated during 1996-2017. Analysis of RCA trends in the United States and China showed a positive trend but in the Netherlands, Malaysia, and Singapore, the RCA trend of Indonesian CCO had decreased. The increasing trend of RCA in the United States shows that Indonesian CCO were commodities that had a strong comparative advantage, but based on export dynamic, Indonesian CCO was in vulnerable position. Ningsih and Kurniawan (2016) stated that a product which has increased in RCA index may not be categorized as a product with good export performance. A product with an increased RCA value can be said to be "falling star" if the increase in RCA is caused by a decrease in the share of export destinations which means the market size for the product is getting smaller. The decrease in size or the decrease of CCO market demand in the United States might be due to the

**Table 3.** The average results of RCA index and EPD of Indonesian CCO in 1996-2017

Country	RCA Index	EPD		Market Position
		X-axis	Y-axis	
United States	27.90	40.14	-0.25	Falling Star
Netherlands	42.78	15.74	0.07	Rising Star
Malaysia	20.69	8.45	5.99	Rising Star
China	44.60	45.96	1.40	Rising Star
Singapore	4.41	501,646.6285	1.08	Rising Star

Source: Secondary Data Analysis, 2019

fact that the United States was also a competitor of Indonesia in the vegetable oil industry. The United States was one of the largest exporters of soybean oil in the world. During this period the United States might want to maintain its trade by reducing CCO imports from Indonesia.

China was the third largest market share for Indonesian CCO after the Netherlands and the United States. The increasing RCA trend of Indonesian CCO and the rising star position in China were caused by the demand for its derivative products which is made from coconut oil. In China, Indonesia was one of the largest exporting countries for commodities such as palm oil, coconut oil, cocoa products, and rubber (Riyani et al., 2018). The average Indonesian CCO market share in China in 2000-2017 was 49.92% (UN Comtrade, 2019). Most of Indonesian agricultural exports to China are raw or intermediate materials which will be used as industrial raw materials in China. Therefore, despite there was an increasing in import tariffs, the demand

for Indonesian agricultural commodity exports from China remained high to maintain the sustainability of the domestic industrial production process in China (Riyani et al., 2018).

The declining RCA trend of Indonesian CCO in the Netherlands and Malaysia occurred in which these two countries were not only as importing countries but also as re-exporting countries. Sukmaya (2017) found that the relationship between Indonesian and the Netherlands exports is complementary in both the compensated and uncompensated elasticity. This means that if the export price of the Netherlands CCO rises, the export share of Indonesian CCO will decrease. So it is necessary to do cooperation between the two countries to reduce the negative impact of the crude coconut oil trade. On the other side, Malaysia is one of the ten largest countries in coconut production (FAOSTAT, 2019). The declining RCA trend of Indonesian CCO could have been happened because Malaysia

tried to increase the production and specialization of its coconut oil so that it was able to increase exports and reduce CCO imports from Indonesia.

Post-harvest processing machineries technologies has been developed by The Malaysian Agricultural Research and Development Institute (MARDI) to facilitate the production systems include decorticating of coconut husk, dehusking of coconut, and processing systems for young coconut and virgin coconut oil (Hamid et al., 2018). Beside that, the national government of Malaysia has approved a funding allocation totaling RM 71,5 million for the national investment of the coconut sector (Sangeetha et al., 2019). During the 1996-2014, the production trend of Malaysia's coconut oil increased by 588.7 tons annually (FAOSTAT, 2019), and the CCO export trend in 1996-2017 also increased by US\$ 738,901 annually (UNComtrade, 2019). This also proves that in the last five years (2012-2017), export market share of Indonesian CCO in 2012-2017 in Singapore declined fairly high. Indonesia lost almost 20% of its market share in that period. Based on UNComtrade (2019), in recent years Malaysia has captured the CCO market share of Indonesia in Singapore, and now Malaysia has become the main supplier of CCO in Singapore and controlled more than 80% of the CCO export market

share in Singapore. Based on the results of the analysis, the factors affecting the competitiveness of Indonesian CCO to the destination countries during 1996-2017 were exported volume of Indonesian CCO, trade openness, and export value of Philippines CCO, while real exchange rate had no significant effect to Indonesian CCO competitiveness. The export volume had a positive influence on the RCA of Indonesian CCO, where every one percent increase in the export volume will increase by 0.87% RCA of Indonesian CCO. This result is consistent with Lotfi and Karim (2016) that export quantity can influence the export competitiveness. Increased competitiveness can be defined as the success to compete with competitors. 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), so that it can generate more profits. The increasing of export volume will increase the RCA of Indonesian CCO, and vice versa (figure 1). When the export volume of CCO in the destination countries increase, this implies that there is an increase in demand from the destination countries. In this case, Indonesia must be able to maintain the availability of CCO for more export expansion with the aim of Indonesia being able to maintain its market and be able to compete in

**Table 4.** The results of the analysis of factors that affect the competitiveness of Indonesian CCO to destination countries in 1996-2017

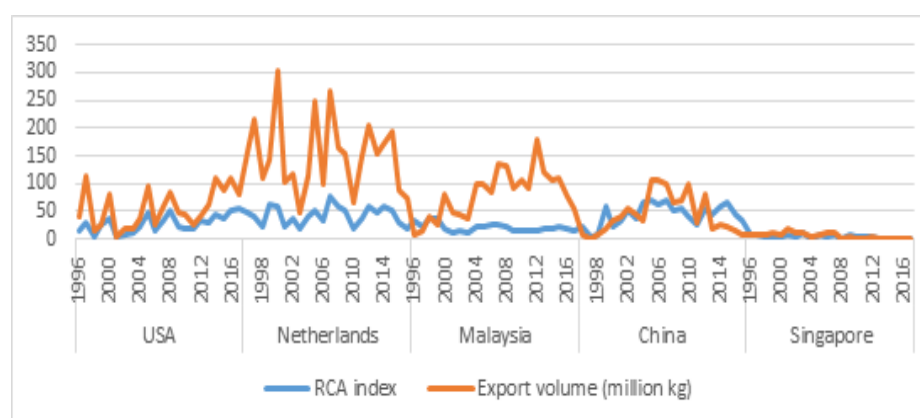
Variable	Expected Value	Coefficient	Std. Error	t-Statistic	Probability
C		-1.346472	3.772988	-0.356871	0.7219
LnQ <sub>ij</sub>	+	0.725931	0.035427	20.49116	0.0000***
LnTO <sub>j</sub>	+	-0.510048	0.290617	-1.755052	0.0823*
Ln RER <sub>ij</sub>	+	-0.607841	0.425500	-1.428536	0.1562 <sup>ns</sup>
LnX <sub>pi</sub>	-	-0.191221	0.054643	-3.499450	0.0007***
R <sup>2</sup>		0.878951			
Adjusted R <sup>2</sup>		0.869363			
Prob (F-statistic)		0.000000			

Source: Secondary Data Analysis, 2019

Description: \*\*\*) Significant at 1% probability level, (t-table: 2,623)

\*) Significant at 10% probability level, (t-table: 1,659)

<sup>ns</sup>) Non significant



**Figure 1.** RCA of Indonesian CCO and export volume in destination countries in 1996-2017

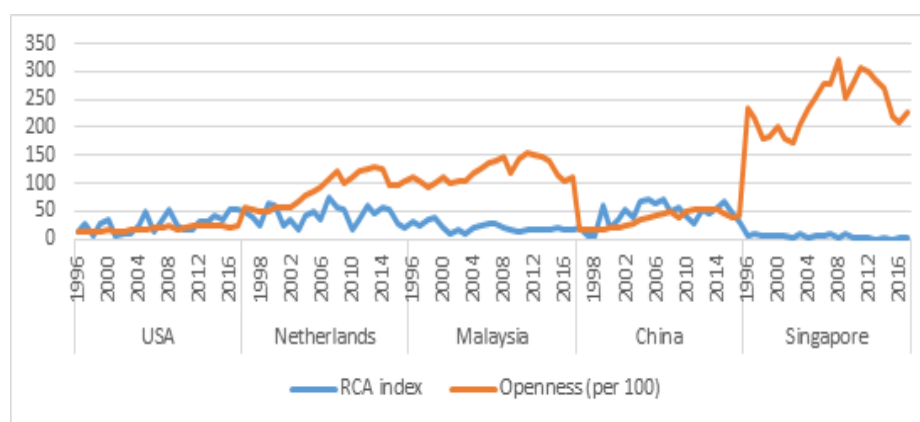
Source: Secondary data analysis, 2019

the destination countries. According to Cvetković and Petrović-Randelović (2017) the size and quality of exports can determine competitiveness. The size of exports implies penetration into foreign markets and continuing the same expansion. Export volume and export dynamics can determine the size of the exports. The export volume is considered to be quantities of exported products

which indicates its strength in terms of capacity, resources, and efficiency. In this regard, export volume to some extent is a measure of a comparative advantage of one sector.

Openness implies the removal or reduction of restrictions or barriers on the free exchange of goods between nations (Kiganda, 2017). Trade openness is expected to have positive impact to





**Figure 2.** RCA of Indonesian CCO and trade openness in destination countries in 1996-2017  
 Source: Secondary data analysis, 2019

international trade. It is calculated by the sum of exports and imports divided by GDP. Some research said that the higher the openness, the greater the exports and imports of a country. Trade openness is positively and significantly contributing to exports and imports growth of Pakistan (Chaudhary and Amin, 2012). Trade openness of the Regional Comprehensive Economic Partnership (RCEP) region also had positive and significant impact on Indonesian food industry exports. It means that the more open a country in the RCEP region to trade, the more Indonesian food industry exports increase (Wardani et al., 2018).

Recently, the impact of trade openness is still being debated. Some found positive, negative or insignificant effect to export and import (Arumta, et al., 2019). This study found that the increasing trade openness from

importing countries might decrease the RCA of Indonesian CCO exports as figure 2 showed. Trade openness from importing countries had negative effect to Indonesian CCO competitiveness where one percent increasing of trade openness will decrease by 0.51% Indonesian CCO competitiveness.

As well as Arumta et al. (2019), the impact of trade openness was negative to Indonesian cut flower export.

Following the theory of comparative cost advantage, trade openness permits import of goods and services at a lower cost than they could be produced (Kalu and Joy, 2015). This is a great opportunity for Indonesia to expand CCO exports in destination countries. However, increased openness will make competitive effects. Not only from CCO producers but also from other vegetable oil producers who can substitute coconut oil. All CCO

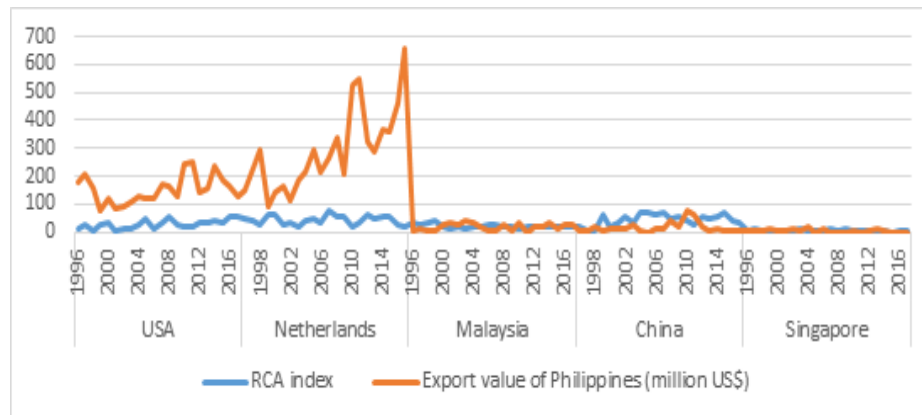
producers will compete to export their products to opened countries. A negative sign might occur because Indonesia is losing in competing with competitors in the destination markets on the CCO commodity. It has enabled countries to look for the good and cheapest things from around the world and offer the best deals to consumers (Lamaj, 2015). In fact, in recent years Malaysia has captured the Indonesian CCO market share in Singapore.

Philippines, Sri Lanka, and Malaysia are competitors for Indonesian CCO commodity in the main destination countries. According to the Asian and Pacific Coconut Community (APCC), exports of Indonesian coconut products are still lower compared to the main competitor countries (the Philippines). However, when compared to the level of CCO export prices between the two countries, the price of Indonesian CCO is cheaper than the Philippines. This indicates that the influence of non-price factors is still quite significant. Factors related to product quality, high transportation costs, and the complexity of export procedures are thought to have contributed to the export of Indonesian CCO that have not been maximized (Departemen Pertanian, 2005). The export share of Philippines CCO during 1996-2017 in the United States and the Netherlands were around 71% and 61% respectively, while the export share

of Indonesian CCO were only 23% in the United States and 29% in the Netherlands (UNComtrade, 2019). The main quality problem associated with coconut oil is contamination. The Netherlands as the largest CCO importer country sets several quality requirements for coconut oil. The coconut oil should be cleaned of metals, dirt and other foreign material, and for organic coconut oil must comply with organic standards for the production of the raw material: no use of synthetic pesticides, use of natural fertilisers, natural control of weeds, full traceability, internal control system, etc. (CBI, 2016).

The export value of Philippines CCO as a competitor greatly affects the competitiveness of Indonesian CCO. The increase in export value of Philippines CCO had a negative effect on the competitiveness of Indonesian CCO. Every one percent increase in the export value of Philippines CCO will decrease by 0.19% RCA of Indonesian CCO. The increase in the export value of Philippines CCO had reduced the competitiveness of Indonesian CCO in 2010 and in the past few years in the Netherlands and several other destination countries (figure 3).

The existence of a reliable and strong competitor is a driving force in providing pressure between companies to compete and innovate in order to improve their competitiveness



**Figure 3.** RCA of Indonesian CCO and export values of Philippines CCO in destination countries in 1996-2017

Source: Secondary data analysis, 2019

(Pudyastuti et al., 2018). In line with previous research, Radityo et al. (2014) stated that competitors will affect the export competitiveness where the increasing market share of competitors in the world can reduce the export competitiveness.

**CONCLUSION AND SUGGESTION**

Indonesian had competitiveness in the five destination countries (the United States, the Netherlands, Malaysia, China, and Singapore). RCA index in each destination country showed that Indonesian CCO had a very strong comparative advantage. EPD of Indonesian CCO was in a rising star position in the Netherlands, Malaysia, China, and Singapore, which shows that Indonesian CCO was a dynamic product in the world where its product grows rapidly and characterized by increased demand in the world market. In the United

States, Indonesian CCO is in a falling star position which indicates that Indonesian CCO has a competitive advantage, but the commodity of Indonesian CCO in the United States market is not dynamic. The export volume of Indonesian CCO had positive effect, while trade openness of importing countries and export value of Philippines CCO had negative effect on the competitiveness (RCA) of Indonesian CCO

As one of the efforts to improve the competitiveness of Indonesian CCO export, the government and exporters need to know and choose which markets are the main priorities to be developed. The trade openness of the importing countries must be utilized to be a privilege to increase the export and competitiveness of CCO. On the other hand, the trade openness of the importing countries must be watched out because if the trade of the

importing countries are more open, the competition of CCO will be tighter. It is very important to maintain the quality, quantity, and continuity of CCO according to the needs of the importing country. The government and CCO exporters need to lobby the destination countries to import CCO from Indonesia, and to convince the destination countries, the quality of the CCO needs to be improved, so that Indonesian CCO will become more competitive than others.

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