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Driving Factors for Indonesian Palm Cooking Oil Exports

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Abstract

Several main factors are thought to have caused palm cooking oil exports from Indonesia to increase rapidly recently. Therefore, this research seeks to investigate some of these determinants from a competitive advantage perspective. By using the descriptive statistical method and the ordinary least squares regression method, this research shows that the increase in palm cooking oil exports is not only determined by the product competitiveness factor but is also influenced positively and significantly by the state of market demand in the past, improvements in export prices, and the occurrence of an increasingly deep downstream industry. As a result, Indonesia's palm cooking oil exports have increased rapidly. Apart from that, there is a tendency for Indonesia to prefer producing products that have higher economic value rather than concentrating on producing products that have low economic value.

Keywords: *Exports of palm cooking oil; past demand; product competitiveness; export prices; the deepening industrial strategy.*

1. Introduction

Indonesian palm cooking oil exports recently seem to have experienced a rapid increase. Based on data from WITS, in 2010, Indonesian exports of palm cooking oil were still around US$6,459.35 million. However, in 2022, it would have increased sharply to US$26,246.83 million, or an average increase in demand of 12.39 percent every year. As a result of an increase in Indonesian palm cooking oil exports, Indonesia has become one of the largest exporters of palm cooking oil in the world. In 2010, the Indonesian export share only reached 32.77 percent; however, in 2022, it reached 58.04 percent. This situation ultimately also caused the share of Indonesian palm cooking oil exports in national exports to increase. In 2010, Indonesia's palm cooking oil export contribution was still 3.88 percent, but in 2022 the contribution reached 8.32 percent.

Another critical issue is the state of palm oil production and marketing. It seems that the production and marketing of Indonesian palm cooking oil have experienced a shift. Previously, Indonesia relied more on selling palm oil in the form of raw materials (CPOPK); recently, it has shifted to processed products in the form of palm cooking oil (RPO). Indonesia today seems to prefer producing goods that have a higher economic value than goods that have a lower economic value (see Figure 1).

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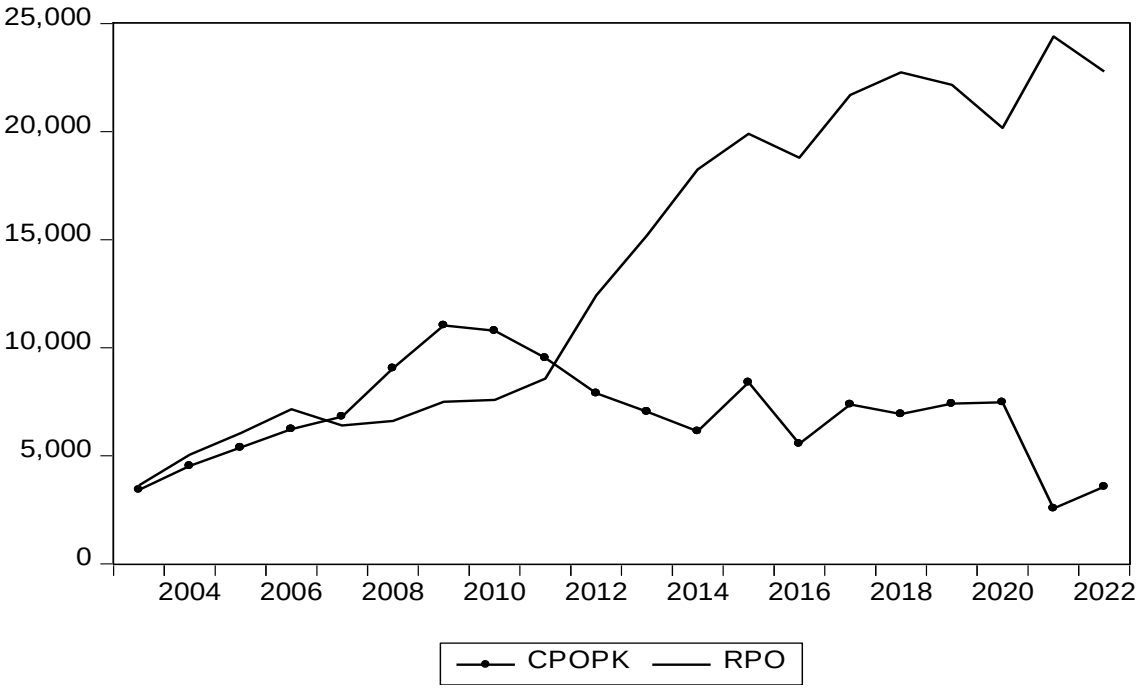

Note: Reprocessed from WITS statistics, World Bank, 2024.

Figure 1: Exports of Indonesian Crude Palm oil and Crude Palm Kernel Oil, and Palm Cooking Oil (2004-2022)

Nurkhoiri's research in 2017 (2017) showed that the trend in the RCA index for Indonesian processed products, both palm cooking oil from CPO and palm kernel oil, was increasing while Malaysia's was decreasing.

Tan and Tan (2017) stated that Indonesian CPO domestic production had a significant positive impact in the short term and the long term on Indonesian CPO export volume growth (1990–2015). Specifically, the world CPO export price has a positive and very significant relationship as a determinant of the growth of the export volume of Indonesian CPO both in the long and short term.

Pratiwi (2021) stated that Indonesia's palm oil export was strongly competitive in its main partner countries. Several factors had a positive and significant effect on Indonesia's exports, namely the exchange rate factor, economic distance, real GDP per capita of partner countries, free trade agreements, and non-tariff measures.

Rosyadi et al.(2021) stated that the factors that influence the intensity and competitiveness of CPO exports showed that the gross domestic product (GDP) and export quantity of importers had a significant and positive effect on the intensity of Indonesia's CPO exports, while GDP and the economy of exporters had a significant and negative influence.

Zainuddin (2022) examines the fact that the competitiveness of Indonesian and Malaysian RPO exports to the Indian market. In 2020 and 2021, the COVID-19 pandemic will have the impact of decreasing the competitiveness of the two countries' RPO exports on the Indian market.

Many arguments regarding the determinants of exports have been explained by previous researchers. This attracts the author to examine them again in the Indonesian palm cooking oil export that has occurred recently. In terms of the availability of raw materials, it is known that Indonesia is one of the world’s largest production countries. Moreover, it is suspected there are other factors can also determine export performance. Therefore, this study seeks to determine what factors determine the performance of Indonesian palm cooking oil exports.

2. Literature Review

Many nations around the world have based their economic growth on export activity. According to Goswami et al. (2019), almost 7 out of the 10 OECD countries they examine believe that the source of their economic growth comes from exports related to the global economy. 5 of those 7 countries—namely, Hungary, India, Indonesia, Mexico, and Tunisia—had a statistically significant correlation between exports and their economic development.

One reason for firms to pursue international markets is to expand sales by capitalizing on growth opportunities in other countries. Entering a newly industrialized country may offer agribusiness companies a piece of this potential for rapidly growing sales and profits. The potential for expanding international sales is especially important if the domestic market is experiencing slow, or no, sales growth (Barnard et al., 2021).

According to Lipsey and Chrystal (2015), a country has a comparative advantage compared to other countries in producing goods if the opportunity cost of production is lower than that of its rival countries. Opportunity costs depend on the relative costs of producing two products, not on absolute costs. In the concept of trade gains through economies of scale, industrial companies that have a larger operating scale, the more efficient the use of their machines, the longer-term average cost derived from economies of scale decreases.

Heckscher-Ohlin Theorem states: A country will export commodities whose production requires intensive use of the country's relatively abundant and cheap factors of production and import commodities whose production requires intensive use of the country's production factors that are relatively scarce and expensive. In short, a relatively labor-rich country will export relatively labor-intensive commodities and import relatively capital-intensive commodities (Salvatore, 2013; Appleyard & Field, 2014).

The same thing was stated by Preciados and Zabala (2019): endowment factors determine countries' comparative advantages. Preciados and Zabala, who conducted empirical testing of the Heckscher-Ohlin model in trade between Japan and the Philippines, concluded that the Philippines had a comparative advantage in the production of labor-intensive products, while Japan had a comparative advantage in producing capital-intensive products.

As with demand, a price change leads to a change in the quantity supplied. They change with movements along the supply curve. When the demand curve for goods shifts rightward, then the price rises to a new equilibrium at which the quantities supplied and demanded again coincide (Landsburg, 2014).

Comparative advantages can also be created. Braunerhjelm and Thulin (2014) stated that the dynamic component of comparative advantage supported by investment in R&D implied that every one percentage point increase in R&D investment increased the share of high-tech exports by about three percentage points.

Improved grading and quality management present an opportunity to attain a competitive advantage for certain products in worldwide markets. According to Chandrasekaran and Raghuram (2014), new varieties are being introduced into the market due to the ever-increasing demand for commodities. This is because consumers demanded the best-quality product and were willing to pay for quality and a unique taste.

Issabekov (2019) researched on the relationship between competitiveness and exports in Kazakhstan showed that Kazakhstan's main exports were fuels, minerals, metals, vegetables, and chemicals. A positive trend was seen by RCA in Kazakhstan in 2014–2016 for all the above products.

According to Matkovsky et al. (2022) almost all Western Balkan countries, except Albania, have a comparative advantage in agricultural products. The level of comparative

advantage varies greatly from both macroeconomic and microeconomic perspectives. They suggest that more efforts are needed to improve competitiveness.

Eshetu and Goshu (2019) said that the population size of Ethiopia, foreign direct investment, and institutional quality index of Ethiopia positively and significantly affected the volume of coffee exported by Ethiopia to its major trade partners. The population of partner countries, weighted distance, lagged export volume, and real exchange rate between Ethiopia and its partner countries negatively and significantly influenced the export volume of Ethiopian coffee to its major trade partners.

Adelina et al. (2020) researched the export determinants of Indonesian cacao. They found that gross domestic product affected the export of Indonesian cocoa positively and significantly, while the real exchange rate, distance, and export duty policy for cocoa beans had a negative and significant effect in the period 2009–2018.

Uroos et al. (2021) researched Pakistan's export growth in terms of price margin and quantity, excluding extensive margin. Their research results showed that price margins had negative growth in all countries except Afghanistan between 2003 and 2020. Extensive margin: 1.34 percent, price margin: 17 percent, and volume margin: 24 percent. Their research showed that the price margin was a negative contribution, while the volume margin was a significant and positive contribution to export growth.

Petryle (2022) found that the pandemic crisis had positive effects on the export of leisure goods such as tobacco, ships or boats, musical instruments, food, albuminoidal substances, and chemical products. The expected negative effects were on Lithuania’s exports of meat, clothing, footwear, vehicles, and mineral fuels. However, the decrease in the export of cutlery, furniture, and various articles of stone, plastic, cement, copper, nickel, and lead is somewhat of a surprise.

Haryadi and Amril (2020), who researched exports and export competitiveness in Jambi province, found that five commodities had more than one competitiveness (RCA), namely vegetable oil, rubber, plywood, paper, and fuel. The determinants of Jambi province's exports came from the prices of commodity exports and imports of raw materials, the stability of the rupiah exchange rate, and Jambi province's GDP growth.

Li et al. (2022) said that free international trade brought opportunity and motivated domestic firms in emerging markets to innovate and compete globally. Consequently, domestic firms improved their competitive position in ways that benefited their countries. Exporting firms were more likely than non-exporting firms to engage in innovation.

From the results of his research, Jitsutthiphakorn (2021) found that innovation had a significant and positive impact on firm productivity, and firm productivity had a significant and positive impact on the firm's survival in the export market. Concerning policy, his study confirmed that Asian countries needed to promote industry to enhance productivity and reinforce their competitiveness.

Yee et al. (2016) who researched Malaysia's export determinants, stated that inflation had a negative relationship as a higher aggregate price increased the cost of production and decreased the price competitiveness of exports.

The findings of the study by Riyani et al. (2018) demonstrated that the demand for Indonesian agricultural exports increased despite the situation of rising agricultural export prices and tariffs on agricultural commodity imports in China.

According to Liew et al. (2021), the price factor, GDP per capita, and the economic crisis that occurred were negatively related to Malaysia's export competitiveness. In contrast, labor participation and capital formation were positively related to Malaysia's competitiveness.

3. Methodology

The export data used in this study came from World Bank publications' WITS statistics (World Integrated Trade Solution), which covered the observation period from 2004 to 2022. The observed commodities in this study are commodities with the HS 151190 and HS 151329 classification codes. The same thing applies to CPO (crude palm oil) and CPKO (crude palm kernel oil) production data; this study uses export data from WITS statistics.

This study uses a descriptive statistical method and an ordinary least squares regression (OLS) method. The descriptive statistical method is mainly used to explain an industrial deepening strategy applied by Indonesia, and the OLS regression method is used to explain the relationship between independent variables and dependent variables that have serial data. The OLS regression method can be written as follows (Gujarati, 2015; Sumodiningrat, 2018):

$$LNXP = \alpha_0 + \beta_1 LNMX + \beta_2 LNXP1 + \beta_3 LNPO + \beta_4 LNPK + \varepsilon \quad (1)$$

Where XP is the export value of the Indonesian palm cooking oil; MX is the market export share of the Indonesian palm cooking oil, which denotes the export's competitiveness; XP1 is the Indonesian palm cooking oil exports in the past, which denotes past demand; PO is the price of palm cooking oil exports made from CPO; PK is the price of palm cooking oil exports made from CPKO; and PO and PK are FOB prices calculated from the value of palm cooking oil exports divided by the volume of palm cooking oil exports.

4. Results and Discussion

4.1. Palm Cooking Oil Exports

Table 1 shows the development of Indonesian palm cooking oil exports on the world market and its export share. Indonesian palm cooking oil exports continue to increase until they reach their peak in 2022. Likewise, its export share also continues to increase. Indonesia is known to have become the largest exporter of palm cooking oil, especially since 2012, and will continue to peak until 2022. Currently, Indonesia has been recorded as the world's number one largest exporter of palm cooking oil.

Table 1: Indonesian Palm Cooking Oil Exports (2004-2022)

Years	Export Volume (million USD)	Export Share (Percent)
2004	2114.04	27.27
2005	2301.78	30.93
2006	2934.45	33.04
2007	4319.92	30.77
2008	6066.03	28.77
2009	4837.67	31.43
2010	6459.35	32.77
2011	9416.97	34.13
2012	11784.97	43.46
2013	11808.93	46.70
2014	14409.55	53.20
2015	12046.73	54.98

2016	12661.07	55.07
2017	15647.01	55.80
2018	14319.58	57.39
2019	11943.50	54.88
2020	13704.59	56.76
2021	25822.44	64.20
2022	26246.83	58.04

Note: Tabulated from HS 151190 and HS 151329 Data, WITS Statistics, World Bank, 2024.

Exports of Indonesian palm cooking oil have increased rapidly, especially since the government implemented government regulations in 2009, which were implemented in 2010 regarding the downstream of the domestic industry. Until now, exports of Indonesian palm oil cooking oil to the world market have continued to increase and control more than half of the market.

4.2. Determining Factors

Table 2 shows the results of estimating the best regression line equation, which has an F probability value of 0.0000. In Table 2, it can be seen that all determining variables are significant at a statistical error level of less than 3 percent. This means that all determining variables are suitable for use in making decisions.

Table 2: Determinant of the Indonesian Palm Cooking Oil Exports

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.146222	0.227456	-18.22864	0.0000
LNMX	1.423024	0.049604	28.68789	0.0000
LNXP1	0.203111	0.031835	6.380065	0.0000
LNPO	0.812744	0.068886	11.79839	0.0000
LNPK	0.110316	0.044555	2.475980	0.0267

Note: See Appendix 1.

Export competitiveness (MX) appears to have a positive and dominant influence in determining the performance of national palm cooking oil exports. With an elasticity coefficient of 1.4230, this means that for every 1 percent increase in competitiveness, Indonesian palm cooking oil exports will increase by 1.4230 percent. This competitiveness factor is the main determining factor in determining the export performance of Indonesian palm cooking oil because it is known that Indonesia is a country that has a competitive advantage in abundant sources of production raw materials.

Another factor that has influenced the increase in Indonesian palm cooking oil exports is past export demand (XP1). The contribution of this factor reached 20.31 percent. So, if there is an increase in past demand of 1 percent, then this will cause Indonesian palm cooking oil exports to increase by 0,2031 percent. This is in line with applicable economic theory. In the short run, for an oligopoly industry, the effect of an increase in demand for the industry's product would cause sales to increase.

Two other factors have contributed to the rapid increase in exports of Indonesian palm cooking oil, namely the improvement in the price of the palm cooking oil commodity on the world market. The effect of the increase in the price of palm cooking oil from CPO

(PO) as a raw material is sufficient. With an elasticity coefficient of 0.8127, this means that every time there is an improvement in this type of palm cooking oil by 1 percent, it will cause an increase in exports of Indonesian palm cooking oil by 0.8127 percent. Likewise, if the price of core palm cooking oil (PK) increases by 1 percent, it will cause an increase in exports of Indonesian palm cooking oil by 0.1103 percent. This seems to be in line with prevailing economic theory. An increase in prices causes producers to increase their sales.

Another factor that has contributed to accelerating the increase in exports of Indonesian palm cooking oil is that Indonesia has implemented an industry-deepening strategy that was enacted in 2009. This industry-deepening strategy can be seen in Figure 1 through changes in the direction of Indonesian palm oil exports on the world market. Initially, Indonesian palm oil exports were only directed at overcoming weak domestic market demand, but since 2010, Indonesia has increasingly strengthened its industrial downstream program so that Indonesian palm cooking oil exports have gradually been able to exceed exports of CPO and CPKO. This situation has encouraged Indonesian palm cooking oil exports to surpass Malaysia's palm cooking oil exports. Until 2022, Malaysia's palm oil export market share will only reach 29.08 percent, while Indonesia's palm cooking oil export market share has reached 58.04 percent. In 2009, Malaysia's palm cooking oil export market share still reached 51.64 percent and continued to decline since Indonesia was gradually able to successfully carry out its domestic industrial downstream program.

Thus, exports of Indonesian palm cooking oil on the world market continue to increase, both as a result of the government's success in implementing the industrial downstream program in the country, the increase in product competitiveness on the international market, the encouragement of an increase in market demand in the past, as well as improvements in export selling prices that tend to benefit exports of Indonesian palm cooking oil on the world market. The Indonesian palm cooking oil industry is increasingly able to make a large contribution to national exports.

5. Conclusions

We can declare the plan to export Indonesian palm oil for cooking to be a success. The major factors influencing exports of palm cooking oil are rising export competitiveness, followed by rising past demand, rising export prices, and the effective execution of the downstream program for domestic industry. All of these variables have a positive and significant correlation. Indonesia now exports a significant amount of palm cooking oil.

In the future, exports of Indonesian palm cooking oil are expected to continue to increase, considering that there will be an increase in world demand due to population growth. Apart from that, the trend in exports of Indonesian palm cooking oil shows no signs of market saturation. Therefore, efforts are needed to maintain and increase the competitiveness of products on the international market, maintain and increase industrial downstream, and expand the planting area for palm commodities if it is estimated that adequate agricultural production spaces will still be available.

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Appendix 1: Determinants of Indonesian Palm Cooking Oil Exports (2004-2022)

Dependent Variable: LNXP
Method: Least Squares
Date: 02/05/24 Time: 23:20
Sample (adjusted): 2004 2022
Included observations: 19 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.146222	0.227456	-18.22864	0.0000
LNMX	1.423024	0.049604	28.68789	0.0000
LNXP1	0.203111	0.031835	6.380065	0.0000
LNPO	0.812744	0.068886	11.79839	0.0000
LNPK	0.110316	0.044555	2.475980	0.0267

R-squared	0.997237	Mean dependent var	9.079794
Adjusted R-squared	0.996448	S.D. dependent var	0.745281
S.E. of regression	0.044418	Akaike info criterion	-3.169408
Sum squared resid	0.027621	Schwarz criterion	-2.920872
Log likelihood	35.10938	Hannan-Quinn criter.	-3.127346
F-statistic	1263.377	Durbin-Watson stat	2.237450
Prob(F-statistic)	0.000000	Wald F-statistic	2613.691
Prob(Wald F-statistic)	0.000000		

Note: Tabulated from HS 151190 and HS 151329 Data, WITS Statistics, World Bank, 2024