ANALYSIS OF COMPETITION FOR INDONESIAN PALM OIL DERIVATIVE PRODUCTS IN THE ITALIAN MARKET

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Abstract: Indonesia is the world's largest producer and exporter of palm oil that has been recognized by foreign countries. Italy is the largest importer of Solid Palm Oil Fraction (SPOF) in the European Union. This article examines the analysis of SPOF Indonesia's competition in the Italian market. The method used is AIDS with a SUR approach that iterates through the application of STATA. The secondary data used is a time series on import value and quantities from 2004 to 2021 by Italy. The results showed that the price elasticity and expenditure of Indonesian SPOF imports were more elastic than Malaysia and the Netherlands. SPOF Indonesia is a luxury good but the price is lower. The elasticity of own price (Hicksian), the Netherlands is more elastic, while Indonesia is Marshallian. Cross price elasticity (Hicksian and Marshallian), the relationship between Indonesia-Malaysia compete by means of substitution. Meanwhile, the Netherlands-Indonesia and the Netherlands-Malaysia complement each other. Therefore, the Indonesian must add quality classes and added value to SPOF products in accordance with the quality of Malaysian and Netherlands products to increase consumer attractiveness. As a result, there will be bilateral cooperation between the two main producing countries of the SPOF in the Italian market to prevent a trade war.

Keywords: AIDS, competition, elasticity demand, solid palm oil fraction

Abstrak: Indonesia merupakan produsen dan eksportir minyak sawit terbesar di dunia yang telah diakui oleh mancanegara. Italia adalah importir Solid Palm Oil Fraction (SPOF) terbesar di Uni Eropa. Artikel ini mengkaji analisis persaingan Spof Indonesia di pasar Italia. Metode yang digunakan adalah AIDS dengan pendekatan SUR yang melakukan iterasi melalui penerapan STATA. Data sekunder yang digunakan adalah deret waktu tentang nilai dan kuantitas impor dari tahun 2004 hingga 2021 oleh Italia. Hasil penelitian menunjukkan bahwa elastisitas harga dan pengeluaran impor SPOF Indonesia lebih elastis dibandingkan Malaysia dan Belanda. SPOF Indonesia adalah barang mewah, tetapi harganya lebih rendah. Elastisitas harga sendiri (Hicksian), Belanda lebih elastis, sedangkan Indonesia adalah Marshallian. Elastisitas harga silang (Hicksian dan Marshallian), hubungan antara Indonesia-Malaysia bersaing dengan cara substitusi. Sementara itu, Belanda-Indonesia dan Belanda-Malaysia saling melengkapi. Oleh karena itu, Indonesia harus menambah kelas kualitas dan nilai tambah pada produk SPOF sesuai dengan kualitas produk Malaysia dan Belanda untuk meningkatkan daya tarik konsumen. Berharap akan ada kerja sama bilateral antara dua negara penghasil utama SPOF di pasar Italia untuk mencegah perang dagang.

Kata kunci: AIDS, persaingan, elastisitas permintaan, fraksi minyak sawit padat

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INTRODUCTION

Among other major commodities, palm oil is Indonesia's leading product. The annual production capacity is around 49 million tons, Indonesia is the world's largest palm oil producer and a significant exporter of commodities (Kementan, 2020). Indonesia earned 250 trillion rupiahs from foreign exchange for palm oil exports (Kementan, 2022). This means that there is an increase in world demand for palm oil. Data from the Ministry of Trade of the Republic of Indonesia implies that palm oil is included in the list of the top 3 main products of Indonesia. From 2004-2021, Indonesia exported palm oil derivatives to the world's 11th largest importer market, Italy (Figure 1).

From 2013 to 2021, Indonesia led the export trade. Malaysia and the Netherlands, on the other hand, have consistently been the leading exporters of palm oil derivatives to the Italian market. As the largest palm oil producer, Indonesia has the capacity and strength to increase exports to Italy and the world market. FAOSTAT (2022) shows that Indonesian palm oil production in the world reached an average of 25.43 million tons per year from 2004 to 2019. Increased and sustainable palm oil production capabilities as well as increasing demand from market destination countries. Provide opportunities for exporting countries to increase export trade. Based on BPS (2022) that Indonesia exports palm oil to importing countries in 2012-2020. One of them is that Italy occupies the ninth position with an average annual volume of 673.6-tons (11.11%) of Indonesia's total exports. The Netherlands is the third largest supplier of palm oil derivatives to Italy. The average amount of the Netherlands-derived palm oil exported to Italy is 45,590.87 tonnes. The Netherlands is a major importer of palm oil derivatives from Indonesia and Malaysia, which are then re-exported to other importing countries. This is known as the entrepot trade (Yueng, 1967; Gurwitz, 2019; Ganapati et al. 2022). The Netherlands is both an importer and an exporter, because of its strategic presence in Rotterdam (Europe's largest port and the second largest port in the world). And the presence of the company Cargill (Cargill, 2022a) in the Netherlands, which is RSPO certified and follows the policy of the NDPE – 'No Deforestation, No Peat, No Exploitation' (Daley, 2020).

World rivalry is a popular topic that is usually discussed because it is an unavoidable phenomenon in every country (Rachmi et al. 2018). Fitrianti et al. (2019) stated in their study, there is fierce competition between the vegetable oil market and Indonesian palm oil prices, following the increase in the prices of Malaysian palm oil, soybean oil and rapeseed oil, but leading the movement of sunflower oil prices. However, the long-term phase of soybean oil prices followed the decline in Indonesian palm oil prices. From the research of Dewanti et al. (2020) using the AIDS model shows that the factors affecting demand for imports of Indonesian crude palm oil in international markets are very different, and Indonesian crude palm oil can compete with Philippine crude palm oil in the US and German markets. This competition is indicated by the value of the elasticity of substitution (positive). Tandra et al. (2022) revealed that palm oil is an important raw material used in the manufacture of daily necessities and competes with vegetable oils. However, due to the movement of the palm oil trade, the competition for palm oil is fierce and complicated. Stability and duration analysis shows that the global palm oil market is highly competitive. The survey results of Wibowo et al. (2021) show that Indonesian exporters apply LPCS (Local Currency Price Stabilization Strategy) to European countries but are more competitive with other importing countries. However, Indonesian exporters need to be more aware of market competition and future palm oil pricing strategies, especially regarding new demand from India and China.

Indonesia exports palm oil derivatives to 11 countries (Figure 2). Italy is in 11th position with total imports of 860,455 tons. China is the main market in the first position that dominates Indonesia's exports of palm oil derivatives. The lowest volume exported by Indonesia to the Italian market was 73.09 thousand tons in 2012, then the highest was in 2014 (751.12 thousand tons). Italy is the main market for palm oil derivatives among other European Union countries. Khatiwada et al. (2018) suggests that by 2025, a total of 51 million tonnes of palm oil will be needed to meet domestic and international demand. The benefits of palm oil as a medicine and food supplement (Kalustian, 1985). Palm oil that is beneficial to human health is vitamin E (Abu-Fayyad dan Nazzal, 2017; Fitriani, 2019), carotene (Gee, 2007; Ng and Choo, 2016) and triglycerides (Zainol et al. 2012). Palm oil is a vegetable oil with high yields, multiple economic benefits, and multiple uses (Sundaraja et al. 2020). Palm oil can replace most other vegetable oils and has many uses in the food industry (Berger, 1986), oleochemicals and biodiesel

(Absalome et al. 2020). The factors that affect the production of biofuels and bioenergy production, contribute different benefits in the form of solid, liquid and gas biofuel production from various types of palm oil raw materials (Kaniapan et al. 2021). According to Gerasimchuk and Yam Koh (2013) that in 2012, Italy used slightly less than 1 million tonnes of palm oil with its consumption having increased significantly not only in the energy sector but also in the food sector and other uses. EU countries including Italy increased the total use of palm oil by 63%. Palm oil is used in large volumes by the food, personal care, and biofuel industries. However, the general increase in palm oil consumption in Europe can be attributed to its increased use, mostly as biodiesel. Italy use important and valuable vegetable oils that serve as a source of raw materials for the food (Di Genova et al. 2018; Aguiar et al. 2018) and non-food industries (Aguiar et al. 2018). Most palm oil is found in food-related products such as margarine, spreads, ice cream, confectionery fats, emulsifiers, and vanaspati. While non-food (biofuels, candles, cleaning products, cosmetics. detergents, shampoos, skin moisturizers and lotions, soaps, and toothpastes).

The world's average palm oil price fluctuated (Figure 3). However, the market price of palm oil in Italy also changes from year to year. In 2019, 1 kg of palm oil will reach $1.24 in 2017 and $1.26 in 2018. In 2019, export prices will fall by 7.026% to $1.17 per kilogram (Wamuci, 2022).
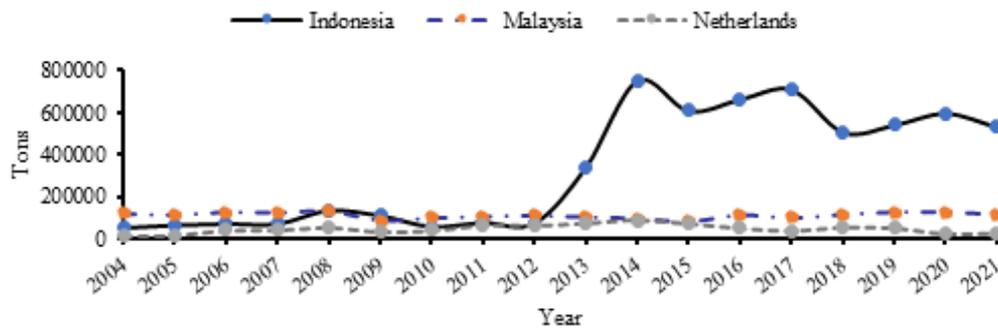

Figure 1. Exports of palm oil derivatives from Indonesia, Malaysia, and the Netherlands to Italy (2004-2021) (UN Comtrade, 2022)
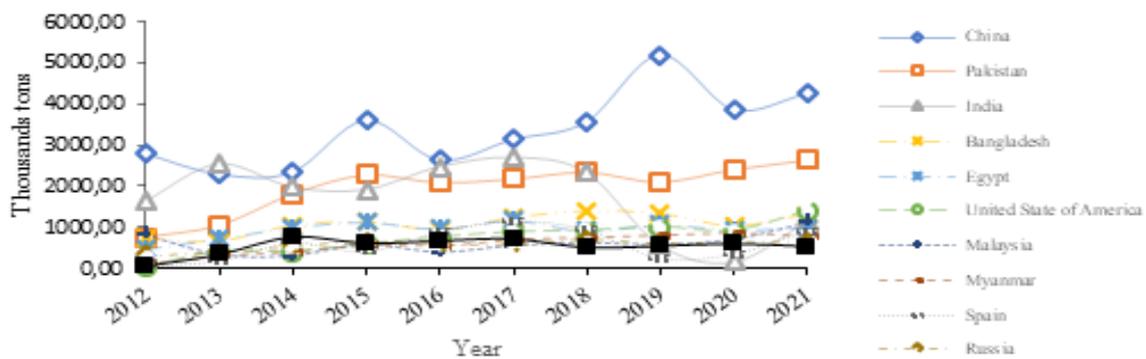

Figure 2. Exports of Indonesian palm oil derivatives to 11 main countries in 2012-2021 (thousands of tons).

According to Berlian (2014) the politics of palm oil in downstream Indonesia was discussed in 2010, and in 2011, the implementation of this policy had only begun through political measures including the export tariff policy. This palm oil downstream policy aims to change Indonesia's position not only as the world's largest exporter of Crude Palm Oil. But also, as the largest exporter of downstream palm derivative products in the world, as well as increasing the added value of domestic palm industry products. With the support of this policy, the SPOF industry is growing rapidly. SPOF Indonesia has dominated the Italian market since 2008 (Figure 4). Since then, SPOF Indonesia has become Italy's preference. The two competing countries, such as Malaysia and the Netherlands, are competing against Indonesia in the Italian market. This implies an increase in demand for food and cosmetic products as well as the use of renewable raw materials for palm oil and the European Union's policy of 20 percent for energy. And at least 10 percent for transportation fuel in European Union countries increasingly encourages the increase in the need for palm oil in Italy as well. Therefore, there is SPOF trading with the Harmonize System (HS) code 15119019 which is more specific in solid form. SPOF is a solid at room temperature and is frequently thought of as a by-product of palm olein (Hariyadi, 2015). This commodity is SPOF which has the highest level of trade compared to SPOF or liquid palm oil fraction (LPOF) with other eight-digit HS in Italy and import destination countries in the EU. For this code, the value and quantity of Italian imports to Indonesia are below Malaysia in the last six years, but surpassing the Netherlands, which is Indonesia's export competitor. The fluctuations in the value and number of exports from the three importing source countries of SPOF explain the competition between the three import source countries in the Italian market. This has become a driving factor for many countries to supply SPOF to these countries. It is estimated that the use of SPOF will increase in the future, encouraging the world's SPOF producing countries to compete for the main position as SPOF exporters in the European Union, especially in the Italian market. The Indonesian government has made efforts, to win the competition with SPOF Malaysia. And continue to strive to increase Italy's demand for SPOF Indonesia. Based on the background described above, this study aims to explore and analyze of competition for Indonesian palm oil derivative products in the Italian market.
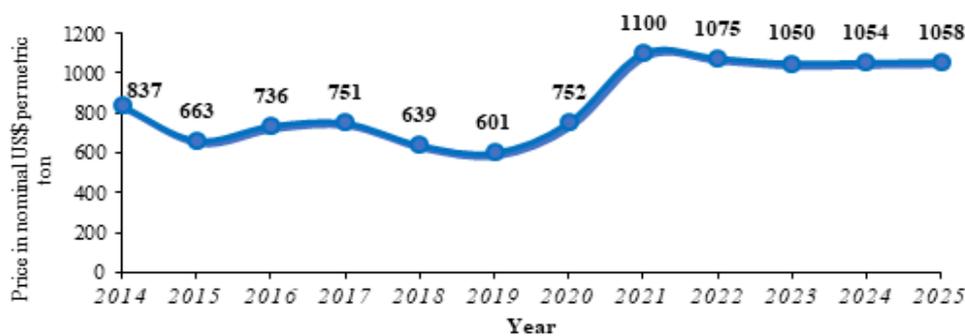

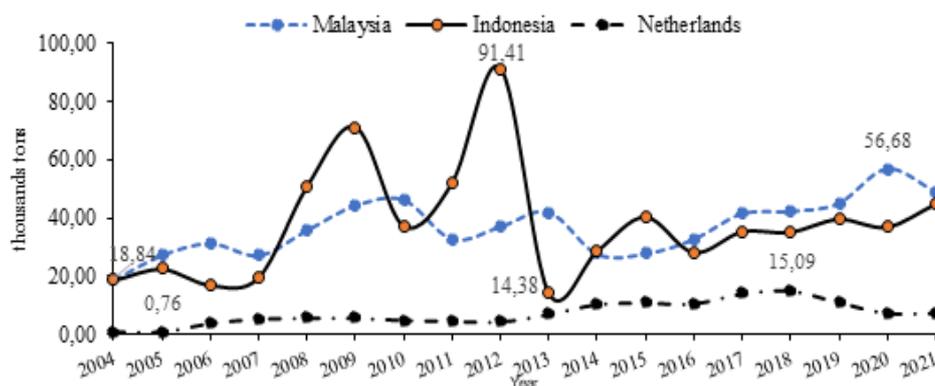Figure 3. Average price of palm oil worldwide from 2014 to 2025 (Statistica, 2022)

Figure 4. Italy imports of SPOF Indonesia, Malaysia and the Netherlands, 2012 -2021 (in tons) (Trade Map, 2022)

METHODS

According to Chang and Nguyen 2002, the model which was first introduced by Deaton and Muellbauer (1980) can be used because it is able to analyze the import demand of a commodity. The AIDS specifications used in the data analysis are as follows:

$$[1]\ w_i = \alpha_i + \sum_{j=1}^{n} \gamma_{ij} \ln P_j + \beta_i \ln\left(\frac{x}{p^*}\right)$$

Where: w (share of imports (%)); P (import price (US$/ton));$\alpha_i$,$\gamma_{ij}$ and β_i (parameters); x (Total imports (US$)); n (quantity of imported goods); p*(Price index stone).

The index stone price in the formula is:

$$[2]\ \ln p^* = \sum_i w_i \ln p_i$$

There are three model equations for Indonesia, Malaysia, and the Netherlands representatively to analyze the demand for SPOF in the Italian market, which in our research are formulated as follows:

$$[3]\ W_{ina} = \alpha_1 + \gamma_1 \ln P_i + \gamma_2 \ln P_m + \gamma_3 \ln P_b + \gamma_4 \ln P_r + +\beta_1 \ln\left(\frac{X}{P^*}\right)$$
$$[4]\ W_{mly} = \alpha_2 + \gamma_5 \ln P_i + \gamma_6 \ln P_m + \gamma_7 \ln P_b + \gamma_8 \ln P_r + \beta_2 \ln\left(\frac{X}{P^*}\right)$$
$$[5]\ W_{bel} = \alpha_3 + \gamma_9 \ln P_i + \gamma_{10} \ln P_m + \gamma_{11} \ln P_b + \gamma_{12} \ln P_r + \beta_3 \ln\left(\frac{X}{P^*}\right)$$

where: W_{ina}(Share of Indonesian imports); W_{mly} (Share imports from Malaysia); W_{bel} (Share import Netherlands Belanda), P_i (Imports price from Indonesia (US$/ton)); P_m (Imports price from Malaysia (US$/ton)); P_b (Import price from Netherlands (US$/ton)); P_r (Import price from rest of world (US$/ton)); α_1, α_2, α_3 (Intercept); γ_1,γ_2,γ_3… γ_{12} (Coefficient); β_1, β_2, β_3 (Coefficient); x/p*(Total import value that effected by the corrected stone price index).

The hypothesis in this study is founded on economic theory and economic logic, which have been detailed in the background and earlier research works. The tentative hypotheses to analyze the competition for palm oil derivative products in the Italian market are as follows:

1. The SPOF import price has a negative (-) relationship with the SPOF import volume, implying that the higher the SPOF import price, the lower the SPOF import volume in the Italian market.

2. The SPOF import price has a positive (+) relationship to the SPOF import volume, this indicates that the lower the SPOF import price, the higher the SPOF import volume in the Italian market.

There are three restrictions used to fulfill the demand function in economic theory (Deaton and Muellbauer, 1980), namely:

$$[6]\ Adding\ Up,\ \sum_{i=1}^{n} \alpha_i = 1,\ \sum_{i=1}^{n} \gamma_{ij} = 0,\ \sum_{i=1}^{n} \beta_i = 0$$
$$[7]\ Symmetry,\ \gamma_{ij} = \gamma_{ji}$$
$$[8]\ Homogenity,\ \sum_{i=1}^{n} \gamma_{ij} = 0$$

Since in the specification the adding-up restriction model has been met. Then for the restriction of homogeneity and symmetry must be entered into the model and tested empirically. To be consistent with utility theory, the following additional restrictions must contain homogeneity and symmetry (Suharno, 2010) utility maximizing, and partial model that enables the provision of knowledge on the interrelatedness among the competing commodity groups in a complete demand system. The dynamics which took place in the economy of contemporary Indonesia has created an urgent need for policy makers and scholars of food and agriculture sector of this country to have a knowledge on the spending behavior of the households in their response on changing consumption determinants like income, relative prices, the introduction of new brands in manufactured foods, an intensifying advertisement, changing mode of retailing, etc., as well as the changes in the demography of households themselves. The need is reinforced, as Indonesia after enjoying two decades of economic booming was hit by a devastating economic crisis that broke out in July 1997, the ramification of which prevails until the time of study. The consequences of this crisis are manifold. Economically speaking, the crisis has (i. The results of the research of Baharumshah and Mohamed (1993) suggest that the demand estimation system used in their study works well because it meets the theoretical homogeneity and Symmetry restrictions. To be consistent with utility theory, the following additional restrictions must contain homogeneity and symmetry.

The analysis of the elasticity of demand is an important analysis derived from the estimation of the AIDS model (Mizobuchi and Tanizaki, 2014). The results of the elasticity of demand obtained from the analysis of

the model will reveal the elasticity of the quantity of demand to measure the degree of sensitivity to changes in the amount of import demand in the destination market. The estimation of the equation models [3], [4] and [5] was carried out using the Seemingly Unrelated Regression (SUR) method with iterations through the STATA software version 15. Juanda (2009) suggests that the SUR method is a method or model that is commonly found in economic or business modeling. In other words, this model consists of a collection of endogenous variables which are considered a collection because of their close conceptual relationship with each other. According to Sheng dan Sharp 2019which includes private vehicles, public transport, and motorcycles, is regarded a vital link that connects people and economic activities across New Zealand. Given the fact that road passenger transport modes are considered substitutes/complements to one another, there is a strong possibility that an interrelationship exists between the travel demand functions, primarily due to the correlation between their disturbances. This research gap is addressed in this study using a seemingly unrelated regression (SUR, the SUR model can be considered as a simplified version of the general linear model in which certain coefficients in the matrix are constrained to be equal to zero, or as a generalization of the general linear model in which the right-hand side explanatory variables are allowed to be different in every equation. AIDS parameter estimates are used to calculate price elasticity and expenditure elasticity (Rifin, 2013). The price elasticity is calculated from the uncompensated (Marshallian), which represents the effect of price and income, and the price elasticity of demand (compesated), which includes only the price effect. Analysis of the elasticity of demand to describe the level of elasticity of SPOF from the source country of imports by looking at the coefficient parameter of the AIDS estimate to review the elasticity of expenditure and prices (Jung and Won, 2002). According to Huang, et al. (2010) in Yuliastuti et al. (2013) that one of the advantages of the AIDS model is that it can provide estimates of price elasticity, cross elasticity, and expenditure elasticity. Mathematically, the elasticity of expenditure and prices (Hicksian and Marshallian) with the estimated parameters of the AIDS approach and the share of SPOF imports in the Italian market. The AIDS model parameters can then be used to construct elasticity (Niquidet and Tang, 2013). The value of the elasticity of demand will be obtained by calculating the following equation:

[9] Expenditure elasticity $\eta_i = 1 + \dfrac{\beta_i}{w_i}$

[10] Compesated elasticity $E_{ij}^* = -\delta_{ij} + \dfrac{Y_{ij}}{w_i} + w_j$

[11] Uncompesated elasticity $E_{ij}^* = -\delta_{ij} + \dfrac{Y_{ij}}{w_i} - \beta_i \left(\dfrac{w_j}{w_i}\right)$

where: δ_{ij} (delta Kronecker (1 for i and 0 otherwise); w_i (share of SPOF import source countries), β_1(Coefficient of total import value); γ_1(price coefficient).

The data used in the AIDS model is secondary data sourced from the ITC-Trade Map database with an eight-digit HS code (15119019-solid palm oil fractions, whether or not refined, but not chemically modified, in packings of > 1 kg or put up otherwise) which is monthly data for the period January 2004 to December 2021 (216 months). The variable price of imports from the source country of the SPOF import is the unit price. Then by dividing the import value by the volume to get the result.

RESULTS

Indonesia, Malaysia, and the Netherlands dominate the SPOF market with a market share of 92.21% in the Italian market (see column mean). Table 1 implies that the average share of SPOF imports shows that Malaysia had the highest average share of 49.68 percent, Indonesia had the second highest share of 32.91 percent, and the Netherlands had an average share of 9.62 percent. Italy can pay for the minimum SPOF price of US$ 7.419795 per ton and the maximum SPOF price of US$ 10,59108 per tonn. The cheapest and most expensive prices were obtained by ROW at US$ 5,825143 per ton and US$ 8,365722 per ton, respectively. Judging from the three sources of SPOF imports in the Italian market, the Indonesian SPOF price is cheaper (US$ 5.971863 per ton) than the Malaysian and Dutch SPOF, while the Dutch SPOF is more expensive at US$ 7.869166 per ton. Indonesia has a lower SPOF price than its two rival countries (Malaysia and the Netherlands), because SPOF is typically less expensive than liquid palm oil fractions (olein) or pounds of palm oil itself (Hariyadi, 2015). According to Kellens et al. (2007) interesterification (chemical or enzymatic, they moreover emphasized the substantial benefits of commodities due to their affordable prices. Therefore, after the CoVid-19 pandemic, the Indonesian government can fix the quality of SPOF guaranteed to importers, so that it becomes a

commodity that can attract their interest (importers), therefore, that Indonesia can shift Malaysia's position. The reason that price is a monetary unit that is used as an indicator of consumer decisions to buy cheap goods, so that they can have the goods or services they need to meet their needs.

AIDS Model Estimation

Before estimating the model, we performed restrictions on adding up, symmetry and homogeneity which were tested empirically first to fulfil the model estimation. The three restriction equations represent the properties of the demand function. Adding up restrictions are automatically met in model estimation (Deaton and Muellbauer, 1980). Baharumshah and Mohamed (1993) explained in their research that the demand estimation system used in their study worked well because it satisfies the theoretical homogeneity and symmetry restrictions. According to Eakins and Gallagher (2003), this means that the effect of Italy's total import expenditure on the market share of each country's SPOF import source when a positive value means that an increase in Italy's SPOF import expenditure will increase the country's SPOF import share, and vice versa.

Indonesia's SPOF import share (W_{ina})

In the Indonesian SPOF import share equation (W_{ina}), the variables in the Italian AIDS model have a good significance at the significant level (5%) namely the price of Netherlands SPOF imports and the total value of Italian SPOF imports to SPOF from Indonesian. While not significant at the level of significance in the Indonesian equation is the Indonesian SPOF import price, the Malaysian SPOF import price and the SPOF import price from other countries (ROW). However with a different coefficient sign, namely a negative sign on P_i (Indonesian SPOF import price) and P_m (Malaysian SPOF import price), while a positive sign on P_b (Indonesian SPOF import price), P_r (Indonesian SPOF import price) and x/p* (total value of Italian SPOF imports). For example, P_i has a statistically significant effect on the market share of Indonesian SPOF import demand in Italy, which is 0.7510 > 0.05 percent. The value of the Indonesian SPOF coefficient is negative, namely 0.0165, which means that when P_i increases by one percent. Therefore, that the share of Indonesian SPOF imports in the Italian market fell by 0.0165 percent, ceteris paribus. This means that, if

P_i and P_m increase it will decrease W_{ina} in Italy, ceteris paribus. Meanwhile, if P_b and P_r increase, will increase W_{ina} in Italy, ceteris paribus. The Italian variable x/p* both in the W_{ina} equation is significant at the 5% significance level with a positive coefficient sign. This means that if there is an increase in Italian x/p* it will increase W_{ina}, ceteris paribus.

Malaysia's share of SPOF imports (W_{mly})

The variables in the Italian AIDS model have a good significance at the 5% level of significance in the Malaysian SPOF import share equation (W_{mly}), namely the import price of Netherlands SPOF and the total value of Italian SPOF imports to SPOF from Malaysia. Meanwhile, those are not significant at the level of significance include Indonesia's SPOF import prices, Malaysia's SPOF import prices, and other countries' SPOF import prices (ROW). However, with different coefficient signs, namely a negative sign on P_i (the price of Indonesian SPOF), P_r (the price of other countries' SPOF - ROW) and x/p* (the total import value of SPOF) Italy, while a positive sign on P_m (the price of Malaysian SPOF) and P_b (the price of Netherlands SPOF). For example, the result of the Malaysian SPOF coefficient value is positive, namely 0.0454 which means that if the P_m increases by 1%, will increase the W_{mly} in the Italian market by 0.0454%, ceteris paribus. It can be interpreted that when there is an increase in the P_m, can not benefit Malaysia because the W_{mly} in Italy will continue to decrease consistently and steadily. However, the p-value obtained from the Malaysian SPOF price is not significant for the Malaysian market share because the p-value is less than the 10% real level, which is 0.3900 (0.3900 < 10%). Table 2 illustrates that when the x/p* increases, will decrease x/p*, ceteris paribus. However, these variables in the AIDS model together are able to explain the proportion of W_{mly} in the Italian market which is indicated by a p-value of 0.0310 less than the real level (< 5%). And, if there is an increase in P_i and P_r it will reduce the , ceteris paribus, in the Italian market. Meanwhile, if the and increase, will increase the Malaysian SPOF import share (W_{mly}), ceteris paribus. In the study by Aulia et al. (2019) that if the import price of Malaysian RPO increases, the proportion of Indonesian RPO imports in China will decrease. Furthermore, they argued that if the total value of RPO imports from the United States increased, the percentage of RPO imports from Indonesia would also increase, ceteris paribus. On the other hand, an increase in the total value of RPO

imports from the United States will reduce the share of Malaysian RPO imports, ceteris paribus. This shows that from several export destination markets for palm oil derivatives, Malaysia still outperforms Indonesia because the quality of these commodities has not followed the international standard, namely DOBI.

Share of the Netherlands SPOF imports (W_{bel})

The variables in the Italian AIDS model have a significant significance of 5% on the Netherlands SPOF import share equation (W_{bel}) are the Indonesian SPOF import price, the Malaysian SPOF import price, the SPOF import price from other countries (ROW) and the total value of Italian SPOF imports. against SPOF from the Netherlands. Meanwhile, it is not significant at the real level on the Netherlands SPOF import share equation, only for the Netherlands SPOF import price. However, it has a different coefficient sign, namely a negative sign on the Netherlands SPOF import price and the SPOF import price of other countries (ROW), while the positive sign on the Indonesian SPOF import price, the Malaysian SPOF import price and the total value of Italy's SPOF imports. For example, the Netherlands SPOF coefficient value is negative 0.1246 which means that if the Netherlands SPOF price increases by 1%, the percentage of Netherlands SPOF imports in the Italian market decreases by 0.1246 percent, ceteris paribus. As a result, the increase in the Netherlands SPOF price can be seen as favorable as the percentage of Netherlands SPOF imports in Italy will increase steadily as the total value of Italian SPOF imports is positive. The p-value calculated from the Netherlands SPOF price is 0.8300 > 0.05 which indicates that the p-value is not significant at the 5% significance level. This means, if the and increase, will decrease the in Italy, ceteris

paribus. Meanwhile, if the P_b and P_r increase, it will increase the W_{bel} in Italy, ceteris paribus. The variable x/p* in the Netherlands SPOF import market share equation (W_{bel}) has a good significance level at the 5% significance level with a positive coefficient sign. This means that if there is an increase in the x/p*, it will increase the W_{bel}, ceteris paribus.

R-Square is a regression fit quality indicator that is often used (Israeli 2007) Inequality decomposition values: the trade-off between marginality and consistency. THEMA Discussion Paper, Université de Cergy-Pontoise, France 1999; Shorrocks, Decomposition Procedures for Distributional Analysis: A Unified Framework Based on the Shapley Value (mimeo, therefore in our study we can describe it. Therefore, the estimation of the AIDS model equation (Table 2) implies the R square of Indonesia, Malaysia, and the Netherlands with their respective values of 10.17%; 6.67%; and 31.61%. If viewed based on the value of R Square Indonesia shows that 10.17% of the variance in the level of Indonesian SPOF market share can be explained by changes in the SPOF price variable from the three import sources, the price of the ROW and the total value of Italy's SPOF imports with a p-value of 0.000 which is much smaller than the 0.05 level of significance (0.000 < 5%). While the rest (100% - 10.17% = 89.83%) is explained by other indicators outside of this study. So, it can be concluded that the theory used as the basis of this research is in accordance with the facts in the Italian market. Although the contribution given is very small or in other words the influence of SPOF prices from the three import sources, the price of ROW and the total value of Italy's SPOF imports to Indonesia's SPOF share is small or low.

Table 1 Description of the dependent and independent variables

Variable	Obs	Mean	Std. Dev.	Min	Max
W_{ina}	216	0.329085	0.1688104	0.008493	0.872059
W_{mly}	216	0.496827	0.1699980	0.018268	0.867317
W_{bel}	216	0.096178	0.0561352	0.003521	0.292039
P_i	216	6.558382	0.2847340	5.971863	7.188557
P_m	216	6.905074	0.2106990	6.259828	7.323364
P_b	216	6.933812	0.2440431	6.407456	7.869166
P_r	216	7.000077	0.3954513	5.825143	8.365722
x	216	8.758103	0.4825611	7.419795	10.59108

Table 2 illustrates the value of Malaysia's R square that 6.67% of the variance of the Malaysian SPOF market share level, can be explained by changes in the SPOF price variable from the three import sources, the price of ROW and the total value of Italian SPOF imports with a p value of 0.000 which is smaller. from the 5% significance level (0.000 < 0.05). While the rest (100%-6.67% = 93.33%) is explained by variables that are not in this study. So, it can be concluded that the theory used as the basis of this research is in accordance with the facts in the Italian market. And presumably the contribution given is very small or in other words the influence of SPOF prices from the three import sources, the price of ROW and the total value of Italian SPOF imports on Malaysia's SPOF share is small or low.

When researched based on the Netherlands R Square value shows that 31.61% of the variance of the Netherlands SPOF market share level can be explained by changes in the SPOF price variable from the three import sources, the price of ROW and the total value of Italian SPOF imports with a p value of 0.000 which is smaller from the significance level of 0.05 (0.000 < 5%). While the rest of these variables (100%-31.61%=68.39%) is explained by other factors outside this research. And, it can be concluded that the theory used as the basis of this research is in accordance with the facts in the Italian market. And if the contribution given is very small or in other words the influence of SPOF prices from the three import sources, the price of ROW and the total value of Italian SPOF imports on the Dutch SPOF share is small or low.

The magnitude of R^2 in the Italian market indicates that the SPOF price of the three import source countries contributes to the SPOF share of the three sources, namely the Dutch SPOF. Based on the results of calculations using the three equations in the AIDS

model above, it can be seen that the two independent variables, namely SPOF prices from the three import source countries used in this study affect the share variables of the three import sources. Where of the three equations that has a good or dominant influence is the Dutch SPOF market share. The reason is that the Netherlands maintains good cooperative and bilateral relations and maintains trade harmony between the two main producing countries of palm oil and its derivatives, so that the implementation of import trade is stable and smooth. Then the Netherlands will make a good performance improvement on the entrepot trade to Italy and other importing market countries. On the other hand, the Netherlands and Italy are members of the European Union, so there are not too many regulations that can hinder their trade relations. According to L'Aja (2012) that Italy is firmly entrenched among the Netherlands' top ten trading partners; in fact, it is the seventh trading partner, the sixth target market for Netherlands exports and the ninth market of origin for imports.

The low value of R square in the model is probably caused using time series data which can only be explained in a certain period. The AIDS model in our research only applies to SPOF products (HS15119019), so that substitutions and complements that can be explained are also limited to the products analyzed. However, the relatively low value of R square does not prevent it from being used in the analysis. The final decision, to accept or reject the model depends on the logical considerations of the model itself. In other words, the most important thing is the consistency between the parameters generated and the applicable theory. This is explained by Teoh et al. (2011) that the lower R-square interpretation suggests that more specific information from Italy is included in the share and SPOF pices from the three import source countries (Indonesia, Malaysia, and the Netherlands).

Table 2. Results of analysis of the AIDS model with SUR iteratively

Variabel	α	P_i	P_m	P_b	P_r	X/P*	R-Square
W_{ina}	-0.6155	-0.0165	-0.0755	0.0608	0.0312	0.1067	0.1017
	(0.0020)	(0.7510)	(0.1170)	(0.0000)	(0.1130)	(0.0000)	(0.0000)
W_{mly}	0.9119	-0.0755	0.0454	0.0657	-0.0355	-0.0502	0.0667
	(0.0000)	(0.1170)	(0.3900)	(0.0000)	(0.0650)	(0.0310)	(0.0000)
W_{bel}	0.4840	0.0608	0.0657	-0.1246	-0.0019	0.0414	0.3161
	(0.0000)	(0.0000)	(0.0000)	(0.8300)	(0.0000)	(0.0000)	(0.0000)

Indonesia has an expenditure elasticity of 1.3241, meaning that the Indonesian SPOF imported by Italy is a luxury item (Table 3). The meaning of the value implies that if Italy's SPOF import spending increases by 1%, the amount of imports by Italy will increase by 1.3241 percent, ceteris paribus. Malaysia has an elastic expenditure elasticity value of 0.8989, meaning that the Malaysian SPOF imported by Italy is a normal good. This description, implies that an increase in SPOF import expenditure by Italy to Malaysia by 1%, will increase SPOF import expenditure by Italy by 0.8989 percent, ceteris paribus. Italy's expendituring elasticity for the Netherlands is 0.5691. This means that the Netherlands SPOF is also the same as Malaysia, namely normal goods (inelastic). The explanation is that if Italy increases SPOF import spending by 1%, ceteris paribus, it will increase the number of imports made by Italy against the Netherlands SPOF by 0.5691 percent. For normal goods, the coefficient of expenditure elasticity must be positive (Ahn et al. 2020).

Comparison of expenditure with value, Indonesia's SPOF is higher than the Malaysian or the Netherlands SPOF. Because the absolute value of Indonesia's SPOF is more than one percent and is high. Indicates that Indonesia's SPOF demand will be higher and more profitable. This indicates that SPOF Indonesia will be more desirable, because when Italy will increase budget expenditures on SPOF Indonesia.

Hicksian Elasticity (Compensated elasticity)

a. Own Price Elasticity

SPOF Indonesia's own price elasticity value is -0.7210. This means that when there is an increase in the SPOF price from Indonesia, the demand for Indonesian SPOF in the Italian market will decrease by 0.7210. The elasticity value from Malaysia with the value is -0.4118. This means that when there is an increase in the price of SPOF Malaysia, it can cause a decrease in demand from Italy for SPOF Malaysia by 0.4118%. Meanwhile, the elasticity value from the Netherlands is -2.1996. This means that when there is an increase in the SPOF price from the Netherlands, it will reduce the demand for Dutch SPOF by 2.1996% in the Italian market. The results of the analysis of the AIDS approach (Table 3), the value of the own price elasticity for Indonesia and Malaysia is inelastic. This

is because the value of the own price elasticity obtained from the two source countries of SPOF imports is less than 1 (0<E<1), so it is less responsive to Italian SPOF requests. This, implying that the two source countries of imports in the Italian market, are said to be inelastic in their SPOF demands. Meanwhile, the value of the own price elasticity for the Netherlands is more elastic because the value is greater than 1 (E>1>∞). The reason is that the Netherlands has a main port (Rotterdam), for importing SPOF to other EU member countries. The port can manage every transaction on SPOF to Italy properly, because the Netherlands and Italy are members of the European Union. The two countries can also carry out land transactions because the capital cities of Rome and Amsterdam are about 829km apart compared to Indonesia and Malaysia (which must cross the sea and many other countries' borders). Moreover, Cargill's presence in the Netherlands can provide the best quality SPOF for Italian demand. Because Cargill's corporate goal is to provide food to the world in a safe, responsible and sustainable way (Cargill 2022). Cargill, (Efeca 2020) a major palm oil company is increasingly adopting a NDPE policy, to ensure palm oil sustainability. This is what drives Italy to request SPOF every year to the Netherlands.

b. Cross Price Elasticity

The value of cross-price elasticity between Indonesia and Malaysia is 0.0684 which is negative. This means that if the import price of SPOF Malaysia increases (up) by 1%, the share of Indonesia's SPOF imports will also decrease by 0.0684%, ceteris paribus, in the Italian market. Likewise, Malaysia-Indonesia whose value is 0.1853 with a negative sign. The value of cross price elasticity between Indonesia and the Netherlands has a positive value of 0.2160. This means that if the import price of Indonesian SPOF increases by 1%, the share of the Netherlands SPOF imports will also increase by 0.2160 percent, ceteris paribus, in the Italian market. Likewise, the Netherlands-Indonesia, which has a value of 0.4906. The value of the lost price elasticity between Malaysia-the Netherlands is positive at 0.1224. This means that if the import price of SPOF Malaysia increases by 1%, the import share of SPOF Malaysia will also increase by 0.1224 percent, ceteris paribus, in the Italian market. Likewise, the relationship between the Netherlands- Malaysia has a value of 0.4685.

Table 3. Results of the analysis of the elasticity of demand

Compensated/Hicksian				
	Indonesia	Malaysia	Netherlands	ROW (Rest of the World)
Indonesia	-0.7210	-0.0684	0.2160	0.1200
Malaysia	-0.1853	-0.4118	0.1224	-0.0794
Netherlands	0.4906	0.4685	-2.1996	-0.0528
Uncompensted/Marshallian				
	Indonesia	Malaysia	Netherlands	ROW (Rest of the World)
Indonesia	-1.1568	-0.3905	0.1537	0.0695
Malaysia	-0.1187	-0.8584	0.1419	-0.0636
Netherlands	0.7742	0.8967	-0.2544	0.0143
Expenditure				
Indonesia			1.3241	
Malaysia			0.8989	
Netherlands			0.5691	

Hicksian elasticity is a superior measure of substitution because it reflects solely the effect of commodity substitution rather than the income/expenditure effect (Nzuma and Sarker, 2010). The substitution and complementary figures (Table 3) imply the low value of the three SPOF import sources in the Italian market. It is proven that, in cross-price elasticity, the relationship between Indonesia and Malaysia has a substitutional competition with a relatively small value. Therefore bilateral cooperation between the two countries is very much needed to reduce the negative impact of trade (trade war) (Sukmaya, 2017). Meanwhile, the relationship between Indonesia and the Netherlands has a complementary nature of competition. The same condition of relations also occurred in Malaysia and the Netherlands. The Netherlands positions itself as a country that is not a producer of palm oil. Therefore, the Netherlands efforts are complementary, so that the two main producing countries (Indonesia and Malaysia) remain generous in exporting palm oil to the Netherlands. So that the palm oil trade is not disrupted. This strategy gave the confidence of the two main producing countries that the Netherlands only traded entrepot. This means that, the Netherlands will import SPOF from Indonesia dan Malaysia and re-export to other importing countries in the European Union in a sustainable manner.

It is concluded that, the value obtained is negative on the cross-price elasticity of the relationship between Indonesia and Malaysia or Malaysia and Indonesia which are substitutes for each other. While the relationship between Indonesia-Netherlands or the Netherlands-Indonesia; as well as Malaysia-Netherlands or Netherlands-Malaysia which are complementary in the Italian market.

Marshallian Elasticity (Uncompansated Elasticity)

a. Own Price Elasticity

The value of the price elasticity itself from Indonesia is –1.1568%, Malaysia is -0.8284 and the Netherlands is -0.2544 (Table 3). Here, each country shows the ability of the value of its elasticity to declare itself as a country that can export to Italy when there is a price change. The results of the price elasticity analysis for Malaysia and the Netherlands are inelastic. This is because the value of the own price elasticity obtained from the two source countries of SPOF imports is less than 1 ($0<E<1$), so it is very sensitive to Italian SPOF demand. As a result, there is a change in prices in the source countries of SPOF imports (Malaysia and the Netherlands), which can cause changes in their market share in a smaller percentage ratio than changes in SPOF prices. Meanwhile, Indonesia's own price elasticity value is more elastic because the value is greater than 1 ($1>E>\infty$). Indonesia's responsiveness to Italy's SPOF demand, when price changes lead to more significant changes in the quantity demanded. So, it is natural that Italy imports more volume of Indonesian SPOF because it has a low price.

b. Cross Price Elasticity

The value of cross price elasticity between Indonesia and Malaysia is -0.3905. This means that changes in the Malaysian SPOF price affect the volume of Indonesian SPOF demand with a relatively small percentage in the Italian market. In short, the volume of Indonesian SPOF import demand will decrease by 0.3905%, if the Malaysian SPOF price increases by 1%, ceteris paribus. On the other hand, the cross-price elasticity between SPOF Malaysia and Indonesia is -0.1187. Changes in Indonesian SPOF oil prices affect the volume of demand for Malaysian SPOF by a relatively small percentage in the Italian market. In conclusion, when the Indonesian SPOF price increases by 1%, ceteris paribus, will increase the volume of Malaysian SPOF import demand by 0.1187% in the Italian market. The value obtained by the relations between Indonesia-Malaysia and Malaysia-Indonesia is negative. So, the relationship between the two countries is said to be mutually competitive in the SPOF market. The sensitivity of Indonesia's SPOF rivalry is higher than that of Malaysia's SPOF.

In Marshallian elasticity, Indonesia-Netherlands shows a complementary relationship. This is because these two countries have a positive elasticity value, which is 0.1537 and the relationship between the Netherlands and Indonesia is 0.7742. So, these two countries have an elasticity value that is inelastic (0<E<1), or it can be said that the elasticity value is less than one. The explanation that the relationship between Indonesia and the Netherlands (0.1537), if there is a change in the SPOF price affects the volume of the Netherlands SPOF demand with a relatively small percentage in the Italian market. The response was that when the Malaysian SPOF price increased by 1%, ceteris paribus, it would increase the volume of Dutch SPOF import demand by 0.1537 in the Italian market. Vice versa regarding the relationship between the Netherlands and Indonesia are 0.7742. While Malaysia-Netherlands show a complementary relationship. Because these two countries obtained a positive elasticity value, namely the Malaysia-Netherlands relationship of 0.1419 and the Netherlands-Malaysia relationship of 0.8967. So, these two countries have elasticity values that are inelastic, or can be said that their elasticity values are less than one (1). What is explained is that Malaysia's relationship with the Netherlands (0.1419), if there is a fluctuation in the SPOF oil price affects the volume of the Netherlands SPOF demand with a relatively

small percentage in the Italian market. The summary is that when the Malaysian SPOF price increases by 1%, ceteris paribus, will increase the volume of the Netherlands SPOF import demand by 0.1419 in the Italian market. Vice versa regarding the relationship between the Netherlands and Malaysia (0.8967). The conclusion from the cross-price elasticity is that SPOF competition is found in Indonesia-Malaysia or Malaysia-Indonesia relations. While SPOF replace each other found in the relationship between Indonesia and the Netherlands or the Netherlands and Indonesia. Likewise, the relationship between Malaysia and the Netherlands or the Netherlands with Malaysia which substitutes SPOF products on the Italian market.

In summary, the results of the cross-price elasticity (Marshallian and Hicksian) have the same sign, namely positive and negative. Hicksian and Marshallian substitution competition between Indonesia and Malaysia. The competitive relationship is complementary between Indonesia-Netherlands or the Netherlands-Indonesia and Malaysia-Netherlands or the Netherlands-Malaysia. However, the values obtained from these equations are different, that the results of the Marshallian elasticity (cross price) exceed the results of the Hicksian elasticity. The Netherlands increased its SPOF imports from Indonesia and Malaysia so that its market share remains elastic in the Italian market.

The comparison of the own price elasticity, in the Indonesian share model, the value of the Indonesian price coefficient in the Marshallian elasticity is 1.1568, and the minimum for the Hicksian elasticity is 0.7210. That is, the influence of Italian spending to increase Indonesia's SPOF market share. If Indonesia's SPOF trading conditions are more likely to affect income, the demand curve will tend to shift, not move along the curve. For this reason, it is more appropriate for the Indonesian government to improve the quality of SPOF products in the future. And the Indonesian government provides opportunities for entrepreneurs to build palm oil derivative factories. To produce palm oil derivatives such as SPOF and LPOF that have quality in accordance with DOBI standards. The price of Indonesian SPOF is always cheap in the international market, because DOBI (Deterioration of Bleachability Index: ratio of carotene and content of secondary oxidation products) in CPO and its derivatives (ISO 17932 2011) is still below the minimum requirement (AFTA standard 2013) of 2.8. The average DOBI produced by Indonesia is 2.5, far behind Malaysia, which has DOBI reaching

3 (Purwiyanto, 2013 in Liseu, 2014). The results of Purwiyanto's research are strengthened by Hasibuan (2018) that the average DOBI value of CPO and its derivatives in Indonesia is still relatively low, which is less than 2 (<2). The classification of palm oil quality in DOBI is from a value of 1.68 to 3.24 (Thermoscienctific 2019; Gee 2005) namely: < 1.68 (sludge palm oil or its equivalent); 1.68-2.30 (poor); 2.36-2.92 (fair); 2.99-3.24 (good) and > 3.24 (excellent). And there is also a reason because Indonesia only has 323 palm oil derivative factories that can export 42% of SPOF. Meanwhile, Malaysia is already superior and can export up to 80% of palm oil derivative products (Centre for Palm Oil Research, 2013 in Liseu 2014).

Managerial Implications

Indonesia's SPOF share in the future must be increased again, because Italy is a country that already uses palm oil for food and non-food products. So, Indonesia must improve the quality of SPOF to a higher class or raise the level for export to Italy. Where the quality of SPOF must follow the minimum DOBI requirement of 2.8. Bilateral cooperation between friendly and neighbouring producers is further strengthened, to achieve the goal of avoiding price competition, especially in a highly competitive market. And to prevent a trade war that could damage the trade interests between Indonesia and Malaysia.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusions from the results and discussion are that: Indonesian SPOF is a luxury item and is responsive to changes in Italy's total expenditure. If there is a change in the Indonesian SPOF price, Italy will switch to SPOF Malaysia and the Netherlands because the SPOF from both countries has better quality. One of the major strategies to be implemented in Indonesia in accordance with the palm oil downstream strategy is to increase the quality of SPOF products, which will have consequences for boosting export capacity or achievement with quality SPOF goods. Improving SPOF quality by taking into account the standards of goods requested by Italy or other export destination countries can boost market penetration and increase importing nations' preference for Indonesian SPOF products over competitors' products.

Recommendations

Indonesia must increase the quantity of SPOF to strengthen Indonesia's competitive position in the Italian market. The Indonesian government is expected to establish bilateral relations and cooperate with the Italian market through reducing tariffs or harmonizing trade-related barriers in the Italian market.

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