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# Market Share Analysis and Forcasting Export Trend of Indonesian Palm Oil: Response to Trade War 2025

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**Abstract**
The tariff war between the US and China in 2025 is a signal for Indonesia as the world's largest palm oil exporter that relies on both markets. Market diversification needs to be carried out to avoid instability and uncertain conditions. This study aims to analyze market share through the competitiveness of palm oil in 5 main export destination countries. The EPD method is used with secondary data from 2013-2023. After identifying the countries with the most potential for market penetration, the forecast of the value of Indonesian palm oil exports to these countries was carried out using the ARIMA method with monthly secondary data from January 2013 to May 2023. The EPD analysis results show that Pakistan has the highest Rising Star position, which means it has the greatest potential to be used as a destination for Indonesian palm oil exports. Meanwhile, the results of the ARIMA modelling found that the most appropriate forecasting model was ARIMA (1,1,1) without a constant. As a result, the forecast of the value of Indonesian palm oil exports to Pakistan shows a significant upward trend of 0.4% per month. This study found that the Pakistani market could be used as an export destination to diversify the market and, simultaneously, as an entry point to surrounding countries to prioritize the sustainability of the Indonesian palm oil trade.

**Keywords**— ARIMA; Export; Forcasting; Export Product Dynamic; Palm Oil

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## Introduction

Globalisation of trade provides flexibility while simultaneously exerting pressure on market participants. One event that caused global economic turmoil was the action taken by President Donald Trump on 2 April 2025, when he announced a new US import tariff policy that shook the world and was dubbed “Liberation Day” (Wahyuni, 2025). These tariffs were imposed on more than 180 US trading partner countries, including several Asian countries such as Cambodia (49%), Vietnam (46%), Sri Lanka (44%), Thailand (36%), China (34%), and Indonesia (32%). In April 2025, the import tariff for China even rose to 245%, to which China responded with a 145% tariff on the US. Trump described this as retaliation and claimed it was a way to increase national revenue. The trade war was fiercely contested between the US and China, while other countries could negotiate tariffs through agreements that benefited the US (Maharani, 2025). The imposition of these tariffs automatically caused an economic shock and dealt a severe blow to exporting countries while also potentially triggering a global economic crisis.

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China and the US have long been Indonesia's largest export markets, with average export values of 48.856 million USD and 25.793 million USD for all commodities during 2019-2023 (BPS, 2025). According to BPS (2024), the industrial sector ranked second with 18.98%, and palm oil as its main commodity. As the largest palm oil producer, Indonesia meets the demand from China and the US by exporting 4.2 million tonnes and 1.7 million tonnes of palm oil, valued at 3.6 billion USD and 1.5 billion USD, respectively (UNComtrade, 2025). However, due to the tariff war, Indonesia must formulate strategies to secure markets so as not to depend on these two markets and risk experiencing supply shocks or uncertainties arising from unpredictable policy impacts.

Palm oil is an important and economically beneficial vegetable oil used as a raw material for food and non-food products. Indonesia is the world's largest palm oil producer, with an average production capacity of 37 thousand tonnes annually (2018-2022). The production capacity of palm oil makes it Indonesia's largest contributor to industrial sector exports, with average exports of 26 thousand tonnes per year valued at 29 thousand USD (FAOSTAT, 2025). The largest markets are China and the US, with 4.2 billion tonnes and 1.3 billion tonnes between 2019 and 2023 (UNComtrade)

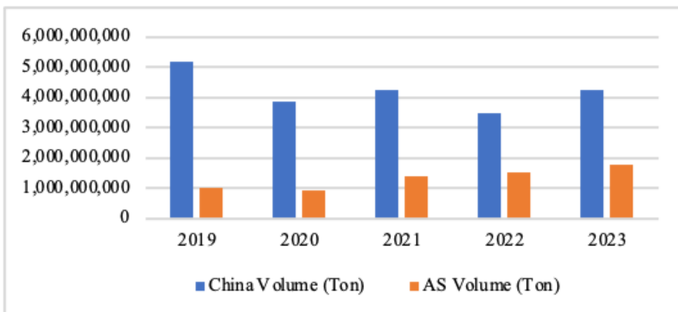


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**Figure 1**. Indonesia's Main Destination Country
Sources : UNComtrade, 2025

Several studies have reported that Indonesian agricultural commodities have strong competitiveness in the Chinese and US markets, with the US even becoming the largest market absorber for commodities such as shrimp, coffee, Tuna-Cakalang-Tongkol, and cloves, while China is the largest importer of Indonesian coconut oil (Hartanto et al., 2021; Hidayah et al., 2022; Nadiyah Ananda et al., 2023; Purba et al., 2021). However, despite still showing a positive trend, this competitiveness has declined. Malau et al. (2022) reported on pepper exports to the USA, which depicted a decrease in export value and market share. The same trend is seen in natural rubber commodities, which have experienced a continuous decline in export value from 2018 to 2022 and showed no competitiveness during 2021-2022 in both countries (Christian et al., 2024; Muslika & Tamami, 2019). The government noted this signal, which continues to increase trade activities with China and the US rather than diversify markets.

Indonesia's dependence on the US market has turned out to be a double-edged sword; the US can exert strong control over the continuation of its trade activities, notably through import tariff policies (Arisanto, Puguh T., & Wibawa, Adi, 2021). This serves as a warning for Indonesia to reorganise its progressive market strategy to minimise market dependence and remain resilient. Research by Abreha et al. (2020)

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found that diversifying markets towards rapidly growing countries such as China and BRICS nations has improved a country's export performance. Countries with diverse export markets exhibit greater economic stability, reduced volatility in export revenues, and an increased capacity to withstand external shocks, as well as to drive economic growth supported by enhanced innovation, competitiveness, and access to a broader range of trade opportunities (Ninaquispe et al., 2024).

Based on the above explanation, this study focuses on (1) identifying potential markets to serve as export destinations for Indonesian palm oil and (2) forecasting market conditions by examining the export value of Indonesian palm oil to those countries over the next five years. This research contributes by providing information on the competitiveness of palm oil in export destination countries and analysing the dynamics of export growth in these countries. With this information, policymakers can understand the market situation, which will guide policy directions in exploring and diversifying markets for Indonesian palm oil exports.

## Literature Review

Research on export market diversification has increasingly been conducted in response to fluctuations in the global market. Export diversification focuses on expanding a country's range of products and services to the global market (Jebli et al., 2022). This concept is based on reducing economic dependence on a limited number of sectors or goods, promoting greater economic stability and sustainability in the face of international demand fluctuations and commodity price changes (Sintes, 2024; Mora & Olabisi, 2023). The scientific literature highlights that diversification can reduce export income volatility and enhance macroeconomic stability (Quiñónez et al., 2021). This effect arises from the reduced risk associated with dependence on a few products (Lee & Zhang, 2019), whose prices can be highly volatile in international markets due to external factors such as changes in international policy, global economic fluctuations, or natural disasters (Yevhen, 2022).

Market share analysis uses the EPD (Export Product Dynamic) method to observe the performance of an export commodity in its target market, determining whether the product exhibits dynamic growth. Related research has been conducted on several export commodities such as Indonesian Tuna-Cakalang-Tonggkol to the US market (Hartanto et al., 2021), seaweed exports to six main destination countries (Adiguna et al., 2022), coffee (Manalu et al., 2019), and coconut oil (Yulhar & Darwanto, 2019). The results will illustrate market attractiveness and business strength, and the combination of these factors generates a positional character consisting of a rising star, falling star, lost opportunity, or retreat (Fitri et al., 2023).

In addition to the analysis of target market shares, forecasting is also necessary to anticipate the future conditions of these markets. The forecasting method used is ARIMA (Autoregressive Integrated Moving Average), which is a combination of the Autoregressive (AR) and Moving Average (MA) models (Wei, 2006). This method has been widely applied to predict export values and volumes, such as coffee, rubber exports, fruits and vegetables, oil and gas, and even coal (Agustina et al., 2024; Atmanegara, 2022; Agbo, 2023; Phung et al., 2024; Ihwati et al., 2022). Forecasting the export value of Indonesian palm oil will provide accurate information on how economically potential target markets can be prioritised. Furthermore, this information can contribute to formulating policies aimed at reducing market dependency and global economic uncertainty, as an effort to maintain national economic stability.

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## Research Method

The method consists of two types: determining potential destination markets and forecasting palm oil export potential. The two methods are:

**Export Product Dynamic (EPD)**

The data used in this study is secondary data in the form of 10-year time series from 2013 to 2023. Using EPD analysis, this data is used to analyze the growth of palm oil export markets in export countries. The data source comes from UNComtrade, BPS, FAOSTAT, and WorldBank. The export destination countries selected include the US, China, India, Pakistan and Egypt, with consideration of the largest importer of Indonesian palm oil based on BPS data (2024).

Export Product Dynamic Analysis (EPD) was used in this study to determine the position of Indonesian palm oil in its export destination countries and show its market strength. Through the results of EPD analysis, it is possible to know which countries are targeted for market expansion or market diversification. The EPD position is determined by comparing market share changes year after year and dynamic product export growth. The change indicates whether a country is competitive in its export commodities, which is described through a matrix into the fourth quadrant: Rising Star, Falling Star, Lost Opportunity, and Retreat (Esterhuizent, 2006).The EPD matrix consists of information on market appeal and business strength. Market attraction is calculated based on a product's demand growth for a specific market purpose. At the same time, business strength information is measured based on a country's market share growth in a specific market goal. This combination of market appeal and business strength produces the position character of the product you want to analyze into four categories.

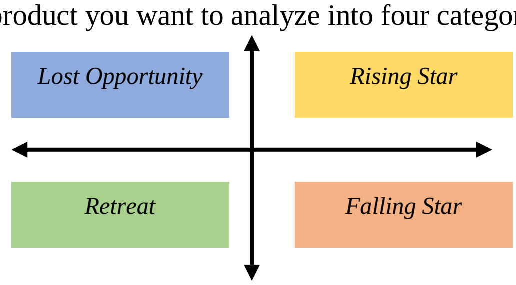


**Figure 2.** Quadrant Position Competitiveness EPD Method
Source : (Esterhuizent, 2006)

The matrix consists of market attractiveness information and business strength. Market attractiveness is demonstrated by the growth of a product's demand for specific market purposes and information of business strength gained from market growth or market share. Mathematically EPD is formulated as follows (Esterhuizent, 2006; Malau et al., 2022; Manalu et al., 2019).

X axis: Growth of export market share

$$\sum_{t-1}^{t}\left(\frac{X_{ij}}{W_{ij}}\right) x\ 100\%z - \sum_{t-1}^{t}\left(\frac{X_{ij}}{W_{ij}}\right) t-1\ x\ 100\%$$

Y axis: Growth of market share products

$$\sum_{t-1}^{t}\left(\frac{X_{it}}{W_{it}}\right) x\ 100\% - \sum_{t-1}^{t}\left(\frac{X_{it}}{W_{it}}\right) t-1\ x\ 100\%$$

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Where:
X_ij = Indonesia palm oil export value to destination country (US$)
X_it = Total value of Indonesian export to destination country (US$)
W_ij = World palm oil export value to tujaun country (US$)
W_it = Total value of world export to destination country (US$)
t = Number of observation periods

**ARIMA**

After obtaining a potential destination market, forecasting is done using the ARIMA method that uses 125 monthly data from January 2013 to May 2023 according to the data availability in UNComtrade 2025. Autoregressive Integrated Moving Average (ARIMA) is a model George Box and Gwilym Jenkins developed to project future values based on time series data. The ARIMA model consists of three main components: autoregressive (AR), moving average (MA), and autoregressive moving average (ARMA). Using ARIMA, we can make more accurate predictions about future developments based on patterns in historical data (Wei, 2006). The Autoregressive Integrated Moving Average (ARIMA) model is a model that fully ignores the independent variable in forecasting. ARIMA uses past and present values of dependent variables to produce accurate short-term forecasting. ARIMA is suitable if time series observations are statistically related (dependent). The following are common forms of ARIMA (p,d,q) models based on Box-Jenkins:

$$\emptyset_p(B)(1-B)^d Zt = \theta_q(B)\alpha_t$$

Where:
$Zt$ = Data observation at t time
$\emptyset_1 \ldots \emptyset_p$ = Coefficient order p
$\theta_1 \ldots \theta_q$ = Coefficient order q
B = Backward shift operator
d = Coefficient order d (differencing)
$\alpha_t$ = error at t time

This research uses the basis of some of the earlier literature (Atmanegara, 2022; Mahmoud Sayed Agbo, 2023; Rakhmawan et al., 2015; Sukraini, 2017; Zahra Ihwati et al., 2022). The analysis process consists of several stages, including:

**Stationarity Test (Unit Root Test)**

The data is used in time series and requires stationary tests to avoid falsehood of the resulting information (Dettling, 2020). So, before the analysis of predictions, it is necessary to test the Augmented Dickey-Fuller (ADF) test and Phillip Peron (PP) test. Both tests are performed simultaneously to see robustness (Amaefula, 2021). The assessment criteria are if the value of the p-value is greater than the value of its significance (0.05), then H0 is accepted (nonstationary data). So, testing back at the first difference level is necessary until H0 is rejected (stationary data).

**Determination of AR and Ma Order**

After the data is analyzed is stable or stationary, further identify the order p and q obtained from the characteristics of the ACF correlogram plot (Autocorrelation Function) and PACF (Partial Autocorrelation Function). Next, we can determine the order lag of AR and MA components. The

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Autocorrelation Function (ACF) is a function that indicates the magnitude of the correlation between observations at t time and the observation of the previous time. The partial autocorrelation function (PACF) indicates the magnitude of the partial correlation between observations at t time and previous observations. ACF and PACF tests will determine the best ARIMA model for forecasting.

**Estimation of ARIMA models**

After getting the AR and MA orders, the next stage is determining the best ARIMA forecasting model. This can be done with an assessment based on the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). AIC and BIC values lower than model comparison indicate which models are best. Estimated ARIMA models, these criteria help identify combinations of AR orders, integrated (I), and MA (p,d,q). Then, by comparing the AIC and BIC values, the lowest value is chosen as the most appropriate model, assuming an efficient, accurate model for forecasting future trends.

**White Noise Test**

The test of the White Noise Residual model is performed after estimating the ARIMA model to verify that it does not contain significant autocorrelation in the residual. When the model is white noise, the residual is random, unrelated, and has consistent mean and variance. This condition describes that the model effectively calculates all possible trends, seasons, and autocorrelations in the data. White Noise test includes vital stages in validating the resistance of ARIMA models for forecasting. Identification of the last phase of palm oil export forecasting is the forecasting stage to predict the value of Indonesian palm oil exports to Pakistan. Forecasting uses the ARIMA model for the lowest AIC/BIC tilapia and highest likelihood log value. The time corridor in the study was used for the next 60 months, from June 2023 to May 2028, using Stata 16.0.

## Results and Discussion

Based on the EPD results shown in Table 1 of 2013 to 2023, India, with matrix positions in the quadrant of Lost Opportunity, is the market that decreases. This means there is a decrease in the total market share of exports and palm oil in the Indian market. India is not a strategic destination market for Indonesia to diversify the market. The Egyptian market is in a Retreat position, and Indonesia has lost its share of the export market for both overall and palm oil products. Meanwhile, other markets show the position of market share of Rising Star, meaning Pakistan, China, and US markets are still open to Indonesian palm oil, and its market share is growing positively, fast and dynamically. The first rankings were occupied by Pakistan (0.00028268%), China (0.000138%), and the US (0.0000583%).

**Table 1.** Results of EPD Analysis of Indonesian Palm Oil in 5 Export Destinations Countries 2013-2023

| No | Destination Country | Average Growth of State Export Share (%) Y-axis | Average Growth of Palm Oil Export Share (%) X-axis | Description |
|---|---|---|---|---|
| 1 | US | 0.00000583 | 0.00510571 | *Rising Star* |
| 2 | India | 0.00002224 | -0.0010064 | *Lost Opprotuniity* |
| 3 | Pakistan | 0.00028268 | 0.00301937 | *Rising Star* |
| 4 | China | 0.000138066 | 0.00341603 | *Rising Star* |
| 5 | Egypt | -0.000007454 | -0.0029013 | *Retreat* |

Sources : FAOSTAT Data Processed (2025)

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Based on Table 1, the market share of palm oil and total Indonesian exports to Pakistan tend to increase and show positive trends. Compared to the other three countries, Pakistan's market share shows the most potential for diversifying Indonesia's palm oil market. The findings contrast with research by Gultom & Sinaga (2023), which calls Indonesia's palm oil exports to Pakistan relatively low and excludes potential markets. However, this research is in harmony with Prabowo et al. (2021), who state that developing the market share of Indonesia's CPO to Pakistan is still very easy to do because it is to the needs of the CPO there.

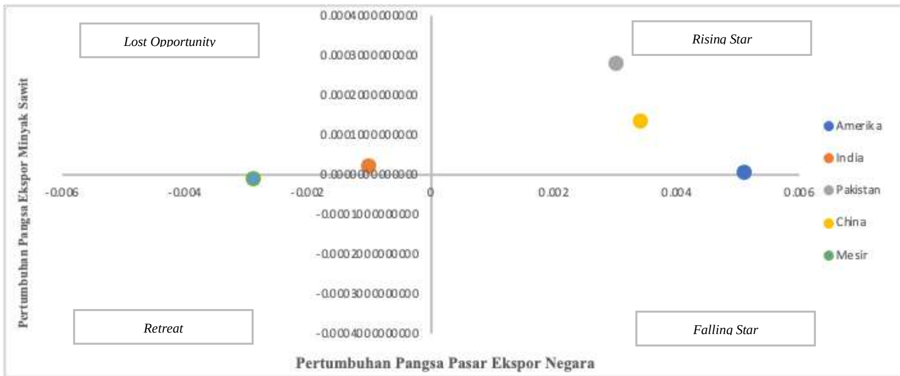


**Figure 3.** Competitive Competitive Power Position with EPD Analysis
Source: FAOSTAT processed, 2025

Pakistan imports three kinds of palm oil products: crude palm oil (CPO), processed palm oil (RPO), and processed palm core oil (RPKO). The most dominant product is refined palm oil, which has a value of 2.17 billion USD in 2023 and grew by 15% from 2019 to 2023. Pakistan is a strategic market for Indonesia, which is strengthened by the findings that Indonesia has experienced a trade surplus since the implementation of IPPTA (Indonesia-Pakistan Preferential Trade Agreement). Palm oil is the main driver of Indonesia's exports, up to 1.48 billion USD or 61% of the total Indonesian-Pakistan exports; this makes Pakistan a strategic destination as well as a gateway to Indonesia's commodity market access to Central Asia (Tampubolon et al., 2022). This is supported by another study that suggests that Indonesia is still dwelling on "traditional markets" due to not penetrating new markets such as the Middle East, Central Asia and South Asia, potentially becoming a "non-traditional market" (Widyastutik et al., 2023).

Based on research supporting this finding, Pakistan meets palm oil needs by importing 60% of its palm oil from Indonesia and Malaysia (Saragih et al., 2025). Market competition between the two is a form of palm oil export. Malaysia is superior in exporting crude palm oil (CPO), while Indonesia is shifting to export processed palm oil products. Processed palm oil provides a higher added value than crude palm oil, giving Indonesia more comparative advantages over processed palm oil (Chalil & Barus, 2018). Another study says that Indonesia's palm oil exports to Pakistan are affected by prices and exchange rates in the long run (Girsang et al., 2018). When Indonesia's palm oil prices drop, and the rupiah currency depreciates, demand for Pakistan's palm oil will increase. In addition, changes in the price of substitution goods, namely soybean oil, also affect the volume of Indonesian palm oil exports to Pakistan. Products with close substitutions tend to have more elastic demand. The decrease in price causes consumers to buy more products and fewer substitutions, and the increase in prices leads consumers to buy fewer products and more substitutions (Saragih et al., 2025).

## ARIMA Forecasting Results

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Modelling data on Indonesia's palm oil export value to Pakistan is done through several stages. The first phase identifies data in a time series using the plot time series value for exporting Indonesian palm oil to Pakistan, as shown in Figure 3. The trend shows fluctuations throughout the year but shows positive growth trends.

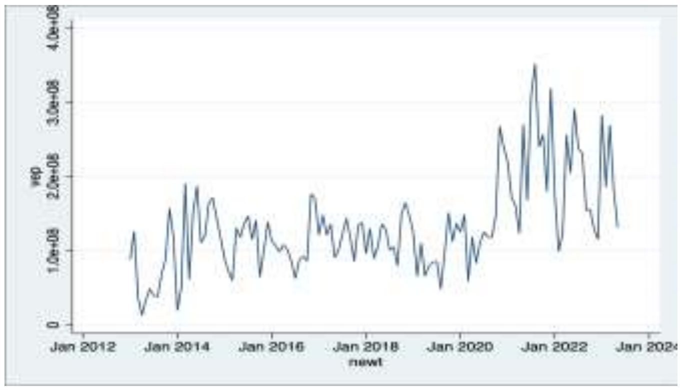


**Figure 4.** Indonesia palm oil export value to Pakistan January 2013 – May 2023
Source: UNComtrade Processed, 2025

The next stage is the stationary test of data using two tests: ADF (Augmented Dickey Fuller) test and PP (Phillip Perron) test. Here are the results of both stationary tests:

**Table 2.** Results of ADF and PP Data Export Value of Indonesian Palm Oil to Pakistan at Level

| Description | | Export Value | |
|---|---|---|---|
| | | ADF test | PP test |
| Test Statistic | | -5.477 | -5.460 |
| | 1% | -3.502 | -3.502 |
| Critical value | 5% | -2.888 | -2.888 |
| | 10% | -2.578 | -2.578 |
| p-value | | 0.0000 | 0.0000 |

Sources : Data is Processed, 2025

Table 2 test results showed that the data had been stationary at level seen from the ADF and PP test t-statistic scores greater than the critical value (1%, 5%, and 10%), as well as a smaller p-value than the 0.05 significance threshold. $H_0$ is rejected because the data does not have a root unit or the data has been stationary. Stationary data can be continued to the next stage of knowing the order of AR and MA fit for the ARIMA model that efficiently forecast the value of Indonesian palm oil exports to Pakistan with the next 60 months. Because the export value data has been stationary, order I is sure to be worth 1. While the order $p$ and $q$ is represented from the number of lags passing through the confidence bands in the PACF and ACF Plot as seen in Figure 4. used in AR and MA models. The visible cut off number of lag describes the probability of the order is $p$ = 1 (PACF) and $q$ = 2 (ACF). The use of the order is limited to the previous literature that orders 10 and above are considered to produce excessive information so that it is ignored (Dettling, 2020).

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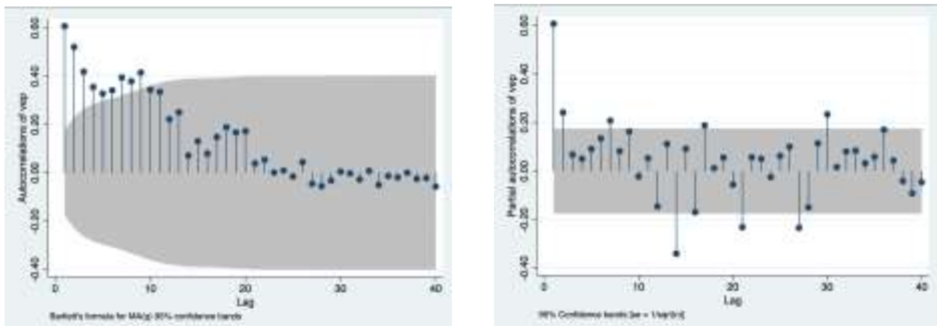

**Figure 5.** The ACF and PACF Plot of Indonesian Palm Oil Export Value to Pakistan

The ARIMA tentative model is (1,1,2) and based on the test results in table 3 shows insignificant so that this model does not pass. So overfitting and getting some possible models to analyze further by comparing AIC and BIC values and Log Likelihood to get the most appropriate models. Overfitting is one way to check models by customizing more common models than using temporary models (Rakhmawan et al., 2015).

**Table 3.** Diagnose Checking Model Arima results

| Component | Model A | | Model B | | Model C | |
|---|---|---|---|---|---|---|
| | ARIMA (1,1,2) Cons | ARIMA (1,1,2) No-Cons | ARIMA (1,1,1) Cons | ARIMA (1,1,1) No-Cons | ARIMA (1,1,0) Cons | ARIMA (1,1,0) No-Cons |
| Contanta | 0.001 | - | 0.281 | - | 0.915 | - |
| AR1 | 0.000 | 0.212 | 0.001 | 0.004 | 0.000 | 0.000 |
| MA1 | 0.837 | 0.005 | 0.000 | 0.000 | - | - |
| MA2 | 0.879 | 0.652 | - | - | - | - |
| /sigma | 0.376 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Log Likelihood | -2369.436 | -2370.687 | -2370.155 | -2370.83 | -2379.464 | -2379.47 |
| Akaike (AIC) | 4748.873 | 4749.373 | 4748.311 | 4747.66 | 4764.928 | 4762.941 |
| Bayeseian (BIC) | 4762.974 | 4760.654 | 4759.592 | 4756.121 | 4773.389 | 4768.581 |
| | Fail | Fail | Fail | Pass | Fail | Pass |

Sources: Data is Processed, 2025

From the above results, the most fit model is ARIMA (1,1,1) without constants, while ARIMA (1,1,0) without the passing constant is not selected because the AIC and BIC values are greater. The best models are selected based on the smallest AIC and BIC values which means it is getting closer to the actual value (Abidin et al., 2022; Sukraini, 2017).

### Residual Test

White Noise assumption test is conducted on selected ARIMA models with Box-Pierce test (Portmanteau Q test) to test residual independence with the criteria of p-value value > 0.05 then it is said that the model has white noise. Based on Table 4., the value of p-value > 0.05 so that the model meets the assumption of residual, or residual independence is not correlated so that it is valid for use.

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**Table 4.** White Noise Box-Pierce ARIMA (1,1,1) Assumption Test Results Without Constant

| | |
|---|---|
| Portmanteau Q test | 287.9089 |
| Prob > chi2 | 0.05820 |

Sources : FAOSTAT Data Processed, 2025

The next step, testing residual normality using Saphiro-Wilk test on ARIMA (1,1,1) model without constants. If the p-value > 0.05, the residual distribution is normal. The test results are shown in Table 5, and show p-value > 0.05 so that the ARIMa model (1,1,1) without a normal distribution residual.

**Table 5.** Saphiro Wilk Model ARIMA (1,1,1) No Constant

| | |
|---|---|
| Pr(skewness) | 0.0000 |
| Pr(kurtosis) | 0.0224 |
| Chi2 | 18.46 |
| P-value | 0.06343 |

Sources : FAOSTAT Data Processed, 2025

## Forecasting

ARIMA model (1,1,1) without the constant is selected as the best model and is performed for the next 60 months, from June 2023 to May 2028 (5 years).

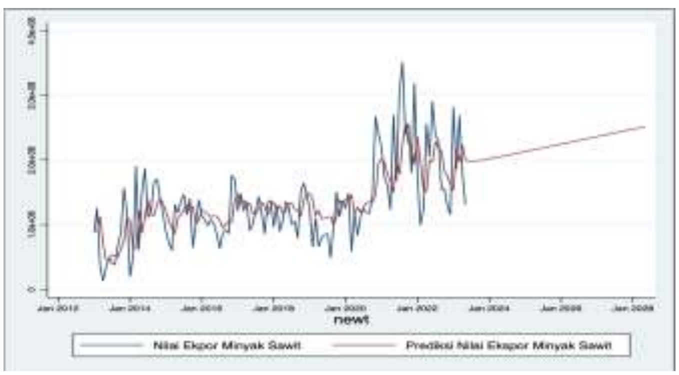


**Figure 6.** Plot Time Series Export Value Palm Oil
Sources : FAOSTAT Data Processed, 2025

**Table 6.** Indonesia's Coconut Oil Export Value Forecast figure to Pakistan June 2023 – May 2028

| Month | Orcasting Value | | | | | |
|---|---|---|---|---|---|---|
| | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** |
| January | - | 202000000 | 213000000 | 225000000 | 236000000 | 248000000 |
| February | - | 203000000 | 214000000 | 226000000 | 237000000 | 249000000 |
| March | - | 204000000 | 215000000 | 227000000 | 238000000 | 250000000 |
| April | - | 205000000 | 216000000 | 228000000 | 239000000 | 251000000 |
| May | - | 206000000 | 217000000 | 229000000 | 240000000 | 252000000 |
| June | 199000000 | 207000000 | 218000000 | 230000000 | 241000000 | - |
| July | 198000000 | 207000000 | 219000000 | 231000000 | 242000000 | - |
| August | 199000000 | 208000000 | 220000000 | 232000000 | 243000000 | - |
| September | 199000000 | 209000000 | 221000000 | 233000000 | 244000000 | - |
| Oktober | 200000000 | 210000000 | 222000000 | 233000000 | 245000000 | - |

| Month | Orcasting Value 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
|---|---|---|---|---|---|---|
| November | 200000000 | 211000000 | 223000000 | 234000000 | 246000000 | - |
| Desember | 201000000 | 212000000 | 224000000 | 235000000 | 247000000 | - |

Sources: Data is Processed, 2025

The results of forecasting the value of Indonesia's palm oil exports to Pakistan over the next 60 months can be expected to continue to rise with an estimated 0.40% increase per year. "So that is, Indonesia can maximize the opportunity of the large share of the palm oil market in Pakistan and make it a ""non-traditional market""." The findings are supported by several studies that suggest that Pakistan has a trade balance deficit because it relies on imports. The most imported goods are semi-finished goods for industry and agriculture as production materials for domestic purposes (Khalid, 2019; Saragih et al., 2025). This condition is experienced by most countries in South Asia that have increased economic growth and food demand, but agricultural production is actually experiencing a decrease trend (Liu et al., 2020).

This makes Indonesia a chance to gain market share in Pakistan, even expanding to other South Asian countries. The findings were supported by previous research that suggested Indonesia's palm oil exports to South Asia grew significantly during 2013-2017 with India's highest destination country (26.44%) and Pakistan (7.89%). The high export of Indonesian palm oil to South Asia describes the region potentially as captive market of Indonesian palm oil (Girsang et al., 2018; Tampubolon et al., 2022). In addition to low palm oil prices and regular supply (Chalil & Barus, 2018), the loyalty of palm oil consumers in Pakistan are classified as loyal to certain brands and are not easily affected by the decrease in competitor product prices. This is a force for Indonesian palm oil strengthens its competitiveness in Pakistan and South Asia Region (Hanif, 2018). Widyastutik et al. (2023) says the Middle East, Central Asia and South Asia region needs to be focused on becoming a new market for Indonesian palm oil. In fact, with the presence of One Belt One Road provides ease of Indonesia-Pakistan trade to be a liaison or gateway exporting palm oil to other surrounding areas.

## Conclusion

The results of research analysis of Indonesia's palm oil market share in 5 destination countries using EPD analysis showed Pakistan, US, China and Egypt were in the position of Rising Star. Overall, Pakistan is the most potential country with an average growth in total commodity export share of 0.00028% and an average growth in palm oil exports of 0.0030%. Furthermore, forecasting with ARIMA analysis method is done and the right ARIMA model used is ARIMA (1,1,1) without constants. The results showed the value of Indonesia's palm oil exports to Pakistan in the form of a positive increase trend with an average of 0.40% growth per month. Based on the results, it is expected that governments and related parties can make prefentive and soluitive efforts from tariff wars like those that occurred in 2025 between the US and China. The research found Pakistan market as an alternative market to be used as an export destination. This discovery contributes to providing the country with the best market share as a destination for penetration of Indonesian palm oil exports. It can be used to take export business strategies, as well as policy-making basis for the government in sustainability and stability of oil palm commodities trading. Recommendations for further research are to analyze the determinant factor of palm oil exports to Pakistan using relevant variables.

## References

Abidin, A. A., Buiney, P. F., & Nohe, D. A. (2022). Peramalan Data Ekspor Kalimantan Barat Dengan

Volume: 4 | Number 01 | March 2025
E-ISSN: 2829-2421
https://doi.org/10.47709/joa.v4i01.5921

Metode Autoregressive Integrated Moving Average (Arima). ... *Nasional Matematika Dan ...*, 96–107.http://jurnal.fmipa.unmul.ac.id/index.php/SNMSA/article/view/900%0Ahttp://jurnal.fmipa.unmul.ac.id/index.php/SNMSA/article/download/900/380

Abreha, K. G., Smeets, V., & Warzynski, F. (2020). Coping with the crisis and export diversification. *World Economy*, *43*(5), 1452–1481. https://doi.org/10.1111/twec.12937

Adiguna, A. D., Krisnamurthi, B., & Erwidodo, E. (2022). Analisis Daya Saing Ekspor Rumput Laut Olahan Indonesia. *Jurnal Agribisnis Indonesia*, *10*(1), 31–39. https://doi.org/10.29244/jai.2022.10.1.31-39

Agustina, T., Amanda, T., & Mardhotillah, B. (2024). *Peramalan Nilai Ekspor Batu Bara Menggunakan Metode ARIMA Terhadap Perekonomian Penduduk Provinsi Jambi Berbasis Thecnopreneurship Forecasting the Value of Coal Exports Using the ARIMA Method on the Economy of the Population of Jambi Province Based on The*. *3*(1), 36–52.

Arisanto, P. T., & Adi Wibawa. (2021). Perang Dagang Era Donald Trump Sebagai Kebijakan Luar Negeri Adaptif Convulsive Amerika Serikat. *Indonesian Journal of International Relations*, *5*(2), 163–183. https://doi.org/10.32787/ijir.v5i2.222

Atmanegara, E. (2022). Peramalan Ekspor Karet Provinsi Jambi dengan Model Seasonal ARIMA. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, *6*(2), 263–277. https://doi.org/10.22437/jiituj.v6i2.22964

BPS, 2024. (2024). *Analisis Komoditas Ekspor 2019-2023*. 6.

Chalil, D., & Barus, R. (2018). The Sustainability of Indonesia Pakistan Palm Oil Supply Chain. *Jurnal Manajemen Dan Agribisnis*, *15*(2), 136–142. https://doi.org/10.17358/jma.15.2.136

Christiadi, R., Institut, S., Bogor, P., Desi, Y., Silalahi, A., Pertanian Bogor, I., Intan, R., Institut, S., Karo, R., Sitepu, K., Pertanian, I., Alamat, B., Kumbang, J., 14, N., 06, / Rw, Tengah, K. B., & Bogor, K. (2024). Analisis Daya Saing Ekspor Karet Indonesia ke Negara Amerika Serikat dan Jepang. *Jurnal Ilmiah Ekonomi Dan Manajemen*, *2*(6), 277–286. https://doi.org/10.61722/jiem.v2i6.1390

Esterhuizent, D. (2006). *COMPETITIVENESS OF THE agribusiness phd*. 1–371.

Fitri, F. A., & Toiba, H. and S. (2023). *Determining Factors of Indonesian Coffee Export in the US Market : Using LA / AIDS Approach*.

Girsang, L., Sukiyono, K., & Asriani, P. S. (2018). Error Correction Model for Pakistan Export Demand for Indonesia'sCrude Palm Oil (CPO). *Journal of Agricultural Sciences*, *1*(2), 68–77.

Hanif, M. (2018). An Analysis of International Trade of Pakistan: With a Focus on Exports. *Journal of Commerce, Economics, and Social Sciences*, *12*(1), 22–30. https://doi.org/10.24312/paradigms120104

Hartanto, T. R., Suharno, & Burhanuddin. (2021). Export Competitiveness of Indonesian Tunas-Skipjack Tunas-Eastern Littles Tunas in The United States of America's Market. *Jurnal Pengolahan Hasil Perikanan Indonesia*, *24*(2), 227–235. https://doi.org/10.17844/jphpi.v24i2.36075

**Journal of Agriculture (JoA)**
Volume: 4 | Number 01 | March 2025
E-ISSN: 2829-2421
https://doi.org/10.47709/joa.v4i01.5921

Hidayah et al, 2022. (2022). *Daya Saing Ekspor Cengkeh Indonesia*. *6*, 930–937.

Khalid, et al. (2019). Import-Led Growth Hypothesis: A Case Study of Pakistan. *Journal of Economics and Sustainable Development*, *March*. https://doi.org/10.7176/jesd/10-8-04

Liu, J., Wang, M., Yang, L., Rahman, S., & Sriboonchitta, S. (2020). Agricultural productivity growth and its determinants in south and southeast Asian countries. *Sustainability (Switzerland)*, *12*(12). https://doi.org/10.3390/su12124981

Mahmoud Sayed Agbo, H. (2023). Forecasting agricultural price volatility of some export crops in Egypt using ARIMA/GARCH model. *Review of Economics and Political Science*, *8*(2), 123–133. https://doi.org/10.1108/REPS-06-2022-0035

Malau, L. R. E., Ulya, N. A., Martin, E., Anjani, R., Premono, B. T., & Yulni, T. (2022). Competitiveness and Flow of Indonesian Paper Trade in The Global Market. *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi Dan Pembangunan*, *23*(1), 1–18. https://doi.org/10.23917/jep.v23i1.17648

Manalu, D. S. T., Harianto, H., Suharno, S., & Hartoyo, S. (2019). Posisi Daya Saing dan Kinerja Ekspor Kopi Indonesia di Pasar Global. *Jurnal Ekonomi Pertanian Dan Agribisnis*, *3*(4), 830–839. https://doi.org/10.21776/ub.jepa.2019.003.04.18

Muslika, R., & Tamami, N. D. B. (2019). Daya Saing Komoditas Ekspor (Karet) Indonesia Ke China. *Agriekonomika*, *8*(2), 194–205. https://doi.org/10.21107/agriekonomika.v8i2.5426

Nadiyah Ananda, A., Sagita Azzahra, T., Susanti, W., & Wikansari, R. (2023). Analisis Daya Saing Ekspor Kopi Indonesia Pada Pasar Internasional Analysis of the Competitiveness of Indonesian Coffee Exports in the International Market. *Agroradix*, *7*(1), 128–135.

Ninaquispe, J. C. M., Arbulú-Ballesteros, M. A., Valle, M. G., Paredes Morales, A. E., Cruz Salinas, L. E., Farfán-Chilicaus, G. C., García Juárez, H. D., & Sanchez, J. E. B. (2024). Diversification of Export Markets: A Literature Review. *Journal of Educational and Social Research*, *14*(5), 260. https://doi.org/10.36941/jesr-2024-0137

Phung, D. Q., Trinh, Q. T., Do, Q. T., Nguyen, N. G., Nguyen, V. H., Ngo, G. K., & Tran, T. M. N. (2024). Building the ARIMA Model for Forecasting the Production of Vietnam’s Coffee Export. *Journal of Applied Mathematics and Physics*, *12*(04), 1237–1246. https://doi.org/10.4236/jamp.2024.124076

Purba, H. J., Erwidodo, Hestina, J., Yusuf, E. S., Azahari, D. H., Dabukke, F. B., & Darwis, V. (2021). Export performance and competitiveness of Indonesian coconut oil and desiccated coconut. *IOP Conference Series: Earth and Environmental Science*, *892*(1). https://doi.org/10.1088/1755-1315/892/1/012072

Rakhmawan, S., Notodiputro, K. A., & Sumertajaya, I. M. (2015). A Study of Arima and Garch Models To Forecast Crude Palm Oil (Cpo) Export In Indonesia. *Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences*, 251–260. www.comtrade.un.org

Saragih, R. N., Budiningsih, N. K., Agung, A., & Putu, B. (2025). *The Effect of Substitute Good Price on the Volume of Indonesian Refined Palm Oil ( RPO ) Exports to Pakistan 2014-2021*. *3*(1), 174–195.

**Journal of Agriculture (JoA)**
Volume: 4 | Number 01 | March 2025
E-ISSN: 2829-2421
https://doi.org/10.47709/joa.v4i01.5921

Sukraini, T. T. (2017). Peramalan Kunjungan Wisatawan Ke Uluwatu Dengan Menggunakan Model Autoregressive Integrated Moving Average. *Matrix Jurnal Manajemen Teknologi Dan Informatika*, *6*(1), 47.

Tampubolon, B. I., Hastuti, Firdaus, M., Anggraeni, L., & Muna, N. (2022). Kinerja Ekspor Indonesia dan Persepsi Konsumen Pakistan terhadap Minyak Sawit dan Produk Turunannya. *Buletin Ilmiah Litbang Perdagangan*, *16*(1), 41–58. https://jurnal.kemendag.go.id/bilp/article/view/692

Widyastutik, W., Amaliah, S., Hotsawadi, H., & Firdaus, M. (2023). The Impact of One Belt One Road and Indonesia-Pakistan Palm Oil Trade Liberalization. *Jurnal Manajemen Dan Agribisnis*, *20*(3), 466–476. https://doi.org/10.17358/jma.20.3.466

Won W. Koo and P. Lynn Kennedy. (2005). International Trade and Agriculture. In *International Journal of Sustainability in Higher Education* (Vol. 6, Issue 4). https://doi.org/10.1108/ijshe.2005.24906dae.005

Yulhar, T. F. M., & Darwanto, D. H. (2019). Competitiveness of Indonesian Crude Coconut Oil Export in Destination Countries. *Agro Ekonomi*, *30*(2). https://doi.org/10.22146/ae.49014

Zahra Ihwati, H., Rosyidah, I., Sarah Sirait, Y., & Septiani Pontoh, R. (2022). SEMINAR NASIONAL STATISTIKA AKTUARIA I (2022) Prediksi Nilai Ekspor Migas di Indonesia Menggunakan Analisis Autoregressive Integrated Moving Average (ARIMA). *Seminar Nasional Statistika Aktuaria I*. http://prosiding.statistics.unpad.ac.id