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EXPORT COMPETITIVENESS OF INDONESIAN COCOA DERIVATIVE PRODUCTS IN MAIN DESTINATIONCOUNTRIES

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ABSTRACT

The purpose of this study is to examine the competitiveness of Indonesian cocoa derivative product exports, especially cocoa paste, cocoa butter, and cocoa powder, to the main destination countries: Malaysia, China, the Philippines, the United States, and India and to analyze the export trends of cocoa derivative products to make a forecast for the next 10 years. Data analysis includes the RCA (Revealed Comparative Advantage), ECI (Export Competitiveness Index) and ARIMA models. The results show that Indonesian cocoa paste has significant competitiveness in Malaysia, China, the Philippines, and the United States, but not in India because the RCA value is <1. Indonesian cocoa butter and powder have a high competitive advantage in the main destination countries, indicated by the RCA value> 1. Indonesian cocoa paste, cocoa butter, and cocoa powder have been competitive since 2005 to 2022, indicated by the average ECI score>1. In addition, the projection of Indonesia cocoa paste export prospects to major destination countries shows an increasing trend from 2023 to 2032, except for the Philippines which is expected to decline during that period, with an average of only 142.51 tons per year. The projection of the quantity of Indonesia's cocoa butter exports to major destination countries shows an increasing pattern. The projection of the amount of Indonesia's cocoa powder exports to Malaysia, China, the Philippines, and India is on an increasing trajectory; however, in the United States, it shows fluctuations with a downward trend with an average of 1,899,175 tons per year.

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INTRODUCTION

Indonesia is the world's third largest cocoa production center, behind Ghana and Ivory Coast. (Badan Pusat Statistik, 2022). Cocoa is one of Indonesia's potential commodities (Dianawati et al., 2023) and superior (Zulfiandri, 2018). Indonesia's contribution as the world's third largest cocoa production center in 2016-2020 tends to increase, so it can be stated that Indonesia has the opportunity to compete with the world cocoa market.

Indonesia's exports from 2001-2021 have always fluctuated. The highest export value reached US$1,643,773 in 2010, while the lowest was in 2004, reaching US$549,348. For Indonesia's cocoa export volume from 2002 to 2021, the highest volume was in 2006, reaching 612,124 tons, while the lowest was in 2016 at 330,029 tons (Badan Pusat Statistik, 2022). Overall, the fluctuation in the volume of cocoa exports tends to decrease while the export value tends to increase. The value of cocoa exports fluctuates according to the processing of cocoa products, which is still traditional (85% is not fermented), so the quality is not very good. This quality causes the price of cocoa on the international market to be discounted by about USD200/ton or 10%-15% of the market price (Putri & Prihtanti, 2020).

Cocoa downstream is an essential strategy for increasing the added value and sustainability of the cocoa business in Indonesia. Rather than relying solely on producing raw cocoa beans, downstream through diversification, cocoa-derived products will have higher economic value and attract a broader market. Diversification measures can include developing various processed cocoa products such as chocolate, cocoa powder, and cocoa butter and other innovative products such as cocoa-based beverages, snacks, and cocoa-based cosmetics. By creating a longer value chain, cocoa agribusiness diversification provides opportunities for businesses to increase their income and strengthen the competitiveness of cocoa products from Indonesia in the international market. In addition, this diversification also helps reduce the risk of fluctuating cocoa bean prices in the global market. When demand for raw cocoa beans declines or global prices are volatile, agribusinesses can maintain revenue by selling derivative products with more stable and diverse markets.

Indonesian cocoa is exported to various countries. From 2009 to 2018, Malaysia, the United States, China, Singapore, Germany, the Netherlands,

Australia, India, and Brazil were the top destinations for Indonesian cocoa exports, ranked from largest to smallest (Adelina et al., 2020). However, in 2021, the five main destination countries for cocoa exports changed to Malaysia, China, India, the United States, and the Philippines. Indonesia exports cocoa in various forms to these destination countries based on the Harmonized System (HS), including HS 1801 Cocoa beans, HS 1802 Cocoa shells, HS 1803 Cocoa paste, 1804 Cocoa butter, 1805 Cocoa powder, and HS 1806 Chocolate and other food preparations containing cocoa. These products are made from cocoa beans, becoming raw materials for candy, drinks, food, and cosmetic mixtures (Prete & Samoggia, 2020).

The decrease in cocoa exports in the form of beans started in 2012. This occurred because the government issued the Minister of Finance Regulation No. 67/PMK.011/2010, which stipulated export duties for cocoa beans and has been in effect since April 2010. This policy intends to ensure raw material availability and boost the competitiveness of the local processing industry (Nauly et al., 2014). From 2011 to 2013, Indonesia's cocoa exports were still dominated by cocoa beans (1801). Furthermore, in 2014-2022, the volume of cocoa exports in the form of beans decreased, both fermented and unfermented. An increase followed the decline in exports of other cocoa derivative products, namely cocoa shells, cocoa paste, cocoa butter, cocoa powder, and other derivative products containing cocoa. Indonesia will get more excellent added value from exporting processed cocoa than just exporting cocoa in the form of beans. In 2011-2022, the most significant export volume of cocoa derivative products was cocoa butter, cocoa powder, and cocoa paste (Badan Pusat Statistik, 2023).

Based on the explanation above, Indonesia has the potential to become the world's leading cocoa producer and largest cocoa exporter. However, with the fluctuating cocoa production problems and the declining quality of cocoa beans and their processed products, Indonesian cocoa exports continue to decline compared to other countries. Therefore, research on the competitiveness of Indonesian cocoa exports in the five central destination countries is important to conduct. Therefore, this study focuses on cocoa derivative products. This research used several methods, including a combination of several previous studies. Then another difference is found in the trend analysis, which uses the main destination countries for Indonesian cocoa exports, which is different from previous research, different from research by Augustin et al. (2022). In contrast to previous research, which analyzed the export competitiveness of all cocoa products or just beans, such as by Manalu (2019), this research focuses on analyzing the competitiveness of three cocoa derivative products. In previous research, competitiveness was only seen based on comparative advantage (RCA), whereas in this research, competitiveness was seen based on comparative and competitive advantage. The export volume forecasting analysis used is

ARIMA, whereas linear regression analysis was more often used in previous research.

In the last ten years, the destination country's export volume and value of cocoa butter, paste, and powder have increased. Therefore, the export trend of cocoa paste, cocoa butter, and cocoa powder in the next 10 years is important to analyze because, when it comes to quality, Indonesian cocoa is on par with global chocolate. Proper fermentation can make Indonesian chocolate taste just as good as Ghanaian cocoa. Competitiveness analysis and trend forecasting are expected to be considered when developing the cocoa industry for export to major destination countries. A rise in processed cocoa exports and a decline in raw cocoa (beans) exports will increase the cocoa industry's added value and ultimately increase national income.

RESEARCH METHODS

This research was conducted in Indonesia. The location was chosen purposively because Indonesia is the world's third-largest cocoa producer after the Ivory Coast and Ghana, and it has experienced an increase in the volume of derivative product exports. In the plantation sector in 2022, cocoa ranks among the third-highest export commodities. Data collection was carried out in October-November 2023.

This study uses secondary data in the form of time series covering a period of 18 years, specifically 2005–2022. Secondary data obtained comes from BPS, the Directorate General of Plantations, the Ministry of Agriculture of the Republic of Indonesia, the International Cocoa Organization (ICCO), Bank Indonesia (BI), the International Trade Center (Intracen), and related agencies. The data collected include the export volume of Indonesian cocoa paste, cocoa butter, and cocoa powder, the export value of Indonesian cocoa paste, cocoa butter, and cocoa powder, the value of all Indonesian exports, the export value of world cocoa paste, cocoa butter, and cocoa powder, and the export value of all world commodities to 5 central destination countries, namely Malaysia, China, the United States, Philippine, and India. These countries were chosen because, since 2021, Indonesia has exported the most cocoa products to these five countries compared to other countries. Indonesia exports the most cocoa to Malaysia, with a total cocoa export volume of 55.91 thousand tons, China at 51.76 thousand tons, the United States at 47.00 thousand tons, India at 50.38 thousand tons, and the Philippines at 20.44 thousand tons. The remaining 41% of all cocoa is exported to other countries that are not the central destination countries (Bada Pusat Statistik, 2022). This study uses quantitative descriptive analysis. The data analysis used in this study is as follows:

Revealed Comparative Advantage (RCA) and Export Competitiveness Index (ECI)

RCA allows the evaluation of a country's export performance for a specific product by comparing the export value of that product to the country's total export value and then comparing it to the export value of that product to the total world export value. The ability of one nation to provide a good or service at a lower opportunity cost than another is known as comparative advantage (Made et al., 2025). Comparative advantage is formed due to trade between countries (Wellyanti, 2015). RCA can evaluate the exporting country's advantages in the import or destination market (Izzatin et al., 2023). The comparative advantage of Indonesian cocoa is examined in this study using the Revealed Comparative Advantage (RCA) approach. The RCA calculation is based on the concept that trade between regions shows the comparative advantage possessed by a region (Aji et al., 2017). RCA is formulated as follows:

$$RCA = \frac{(\frac{Xij}{Xit})}{(\frac{Wj}{Wt})} \quad \text{.....(1)}$$

Information :

Xij = Export value of commodity i from country j to destination country (USD)

Xit = Total export value of country j to destination country (USD)

Wj = World export value of commodity i to destination country (USD)

Wt = Total value of world export to destination country (USD)

RCA values greater than 1 indicate strong competitiveness. RCA values lower than 1 indicate that country j does not have a comparative advantage (has weak competitiveness). In addition to RCA, this study uses the Export Competitiveness Index (ECI) method, one of the competitiveness indicators, to demonstrate the competitive advantage of cocoa product exports (Anggraini et al., 2021). The Export Competitiveness Index is a value that depicts the proportion of a country's exports in the global market concerning a specific commodity in a given period (t) compared to a previous period (t-1). If the ECI of a commodity is greater than 1, it means that the commodity is facing an increasing competitiveness trend. Conversely, if the ECI values are lower than 1, the commodity experiences a decrease in competitiveness. Export Competitiveness Index (ECI), with the following formula:

$$ECI = \frac{(\frac{Xij}{Xj})_t}{(\frac{Xij}{Xj})_{t-1}} \quad \text{.....(2)}$$

Information :

X_{ij} = Export value of Indonesian cocoa derivatives to destination countries in year j (USD)
X_j = Value of world derivative cocoa exports to destination countries in year j (USD)
t = current year
t-1 = previous year

Autoregressive Integrated Moving Average (ARIMA)

The first step in creating an ARIMA model is identifying whether the data is stationary (Sitepu & Sinaga, 2018). The ARIMA modelling steps are data input, viewing data stationarity, estimating the model, and the last is forecasting (Oni et al., 2021). Time series data in the ARIMA model must be stationary (Qadrini et al., 2020). Stationarity is defined as a time series whose mean and variance remain constant across time. A time plot of the data can indicate whether the time series requires any differentiation prior to undertaking formal tests. In addition, the stationarity and non-stationarity qualities of a unit root in a time series sample are tested using the Augmented Dickey-Fuller test (ADF). There is a propensity for two or more models to compete when fitting models (model selection criteria). To choose the best model, it is therefore appropriate to apply sound model selection criteria. The mean, variance, and autocorrelation of the ARIMA model must all remain constant throughout time for it to be considered stationary. As a result, until the series is stationary, it must first be varied. However, if there is no seasonal fluctuation, the time plot must be examined in order to identify an ARIMA process. The time plot of the series, the time plot of autocorrelation at different lags (ACF), and the time plot of the partial autocorrelation function (PACF) are the three often used graphical techniques for time series identification.

ARIMA has a good level of accuracy for short-term forecasting (Tenriawaru et al., 2022). The Autoregressive Integrated Moving Average model is unsuitable for long-term forecasting because it relies on past data and parameters. The further into the future a prediction is made, the less accurate the results are made.

An example of the ARIMA model form is as follows :

$$\Delta Y_t = \phi_1 \Delta Y_{t-1} + \varepsilon_t - \omega_1 \varepsilon_{t-1} \quad \text{.....(3)}$$

Or

$$(Y_t - Y_{t-1}) = \phi(Y_{t-1} + Y_{t-2}) + \omega_1 \varepsilon_{t-1} \quad \text{.....(4)}$$

In many cases, differencing is required before the resulting data is stationary. In a simple model, if differencing is done twice, then the stationary data is:

$$\Delta^2 Y_t = \Delta(\Delta Y_t) = \Delta(Y_{t-1} - Y_{t-1}) = Y_t - 2Y_{t-1} + Y_{t-2} \quad \text{.....(5)}$$

The distinction is still made until the plot data series indicates varying or

changing around a certain level, so the autocorrelation plot (ACF) naturally disappears quickly. The number of differencing required to achieve stationary data is symbolized by d. ARIMA does not involve independent variables in producing forecasting values but only uses information in the series to produce forecasting values.This is very different from the regression model, wherein the regression model needs forecasts from the values of the independent variables to make forecasts. ARIMA has perfect accuracy for short-term forecasting.

RESULT AND DISCUSSION

RCA Analysis of Indonesian Cocoa Paste in Main Destination Countries

Indonesian cocoa paste is the cocoa derivative product with the third highest average export value after cocoa butter and cocoa powder. Based on Figure 1, in five destination countries, the average RCA value of cocoa paste greater than 1 (RCA>1), except for India, which has an average RCA value of <1. The RCA value of cocoa paste in the five central destination countries has fluctuated and tended to increase during 2005-2022. Figure 1 also shows that the government's implementation of the export duty policy on cocoa beans since 2010 has increased the competitiveness of Indonesian cocoa paste. In line with research by Tupamahu & Apituley (2022), the commodity whose competitiveness increased after the export duty policy is cocoa paste. The export duty policy that began in 2010 positively impacted Indonesia's cocoa export performance (Gautama, 2019). This policy caused the volume of cocoa exports to increase. Apart from that, this type of Indonesian cocoa has advantages compared to the destination country, causing demand for cocoa products from Indonesia to grow.

RCA of Indonesian Cocoa Paste in Malaysia

The average RCA of Indonesian cocoa paste in the Malaysian market is 9.95, which is greater than 1 (2005-2022). In the Malaysian market, Indonesian cocoa paste's RCA value can rival that of global cocoa paste (Seran et al., 2023). Indonesia exports more cocoa paste to Malaysia than other central destination countries, thus affecting the RCA value. Malaysia also imports more cocoa paste from Indonesia than from other countries. The value of RCA is also influenced by the world price of cocoa paste (Ginting et al., 2021).

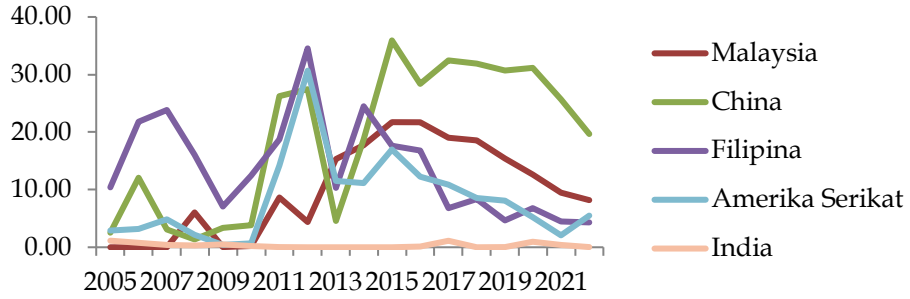

Figure 1.
RCA Value of Indonesian Cocoa Paste to Main Destination Countries
(2005-2022)

RCA of Indonesian Cocoa Paste in China

Indonesian cocoa paste's average RCA value in China from 2005 to 2022 fluctuated with an increasing trend, which means that the cocoa paste's comparative competitiveness in China also increased. Indonesian cocoa paste in the Chinese market has the most considerable RCA value of the five main cocoa export destinations. This is because China imports more cocoa paste from Indonesia than other countries. The average RCA value of Indonesian cocoa paste to China is 18.84. During 2005-2022, the RCA value of Indonesian cocoa paste in China has always been larger than 1.

RCA of Indonesian Cocoa Paste in Philippine

The RCA value of cocoa paste in the Philippines from 2005-2022 is always more than 1 (RCA>1). This means that cocoa paste is competitive in the Philippines market. The average RCA value of Indonesian cocoa paste to the Philippines in 2005-2022 reached 13.86. Since 2013, the RCA value of Indonesian cocoa paste in the Philippines market has tended to decrease. This is due to increased world cocoa paste exports to the Philippines, while the exports value of cocoa paste from Indonesia to the Philippines is decreasing.

RCA of Indonesian Cocoa Paste in The United States

The RCA value of Indonesian cocoa paste in the United States has also fluctuated. The RCA value was consistently greater than one (RCA>1) between 2005 and 2022, indicating that Indonesian cocoa paste is highly competitive in the United States trade. In line with research by Maulana & Kartiasih (2017), in the US market, Indonesian processed cocoa commodities consistently have an RCA value greater than 1. The average RCA value of Indonesian cocoa paste in the US is below China, Philippines, and Malaysia, which is 8.40.

RCA of Indonesian Cocoa Paste in India

Indonesia exports the smallest volume of cocoa paste to India compared to any other country. The Indonesian cocoa paste's RCA value in the Indian market is the lowest of the five central destination countries for Indonesian cocoa exports. Indonesia exports the least amount of cocoa paste to India compared to other countries. India imports more cocoa paste from Ghana and Malaysia. The average RCA value is only 0.33 or less than 1 (RCA<1). This means Indonesia has no comparative advantage (weak competitiveness) in the Indian market.

RCA Analysis of Indonesian Cocoa Butter in Main Destination Countries

Cocoa butter is Indonesia's exported cocoa derivative product with the highest export volume and value (Widhiyoga & Wijayati, 2022). Indonesian cocoa butter has a comparative advantage in the international market, in line with the research of Andini et al. (2016). The RCA value of cocoa butter in 2005-2022 to the main cocoa export destinations is presented in Figure.

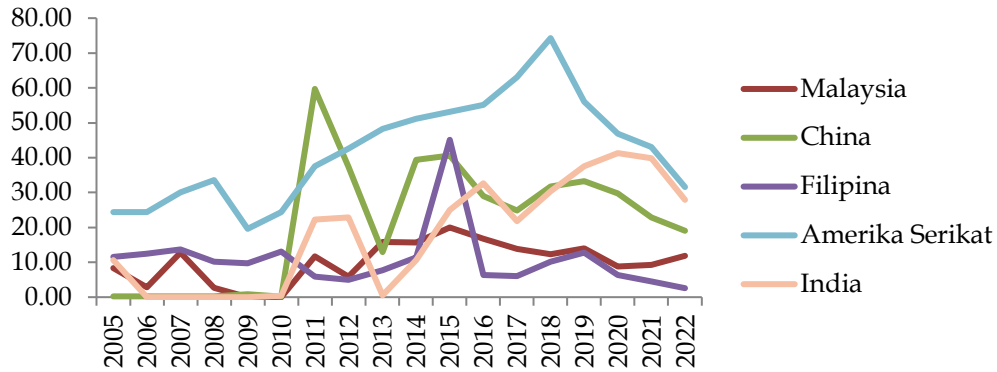

Figure 2.
RCA Value of Indonesian Cocoa Butter to the Main Destination Countries (2005-2022)

RCA of Indonesian Cocoa Butter in Malaysia

In the Malaysian market, Indonesian cocoa butter has an average RCA value of 10.14. After the export tax on cocoa beans in 2011-2016, the export value of Indonesian cocoa butter exported to Malaysia increased, causing fluctuations in the resulting RCA value. In line with the research of Augustin et al. (2022), the average RCA value of Indonesian cocoa butter in Malaysia from 2011-2019 has increased from 2010.

RCA of Indonesian Cocoa Butter in China

China's average RCA value for cocoa butter from Indonesia reached 21.25, more than Malaysia's market. The RCA value is more than 1, meaning Indonesian cocoa butter in China has strong comparative competitiveness. The lowest RCA value of Indonesian cocoa butter in China was in 2010, only 0.15.

RCA of Indonesian Cocoa Butter in Philippine

In the Philippines, Indonesian cocoa butter has an average RCA value of 10.82. This indicates that the Indonesian cocoa butter market in the Philippines is very competitive, as the RCA is more than 1. This value is higher than the RCA of Indonesian cocoa butter in Malaysia but lower than the RCA value of Indonesian cocoa butter in China.

RCA of Indonesian Cocoa Butter in United States

Indonesia exports more cocoa butter to the United States than other major cocoa export destinations. As a result, the RCA value of Indonesian cocoa butter in the United States is also higher than in other countries. The RCA value of Indonesian cocoa butter in the United States from 2005-2022 has always been more than 1, with an average of 42.18. Therefore, Indonesian cocoa butter has a high comparative advantage in the US market.

RCA of Indonesian Cocoa Butter in India

The average RCA value of Indonesian cocoa butter in India is 17.39. This figure indicates that Indonesian cocoa butter is highly competitive in the Indian market because its RCA value is more than 1. Like Indonesian cocoa butter in other countries, Indonesian cocoa butter exported to India has increased since the introduction of the export tax on cocoa beans. India imports an average of 23,490,803 tons of cocoa butter from Indonesia each year, and since 2011, it has continued to increase.

RCA Analysis of Indonesian Cocoa Powder in Main Destination Countries

Cocoa powder is Indonesia's third-highest cocoa derivative product, and it is exported to significant destination countries. The average RCA value during the period 2005-2022 can be categorized as having a comparative advantage because it is worth more than one, with the interval of Indonesia's average RCA value in five countries ranging from 2.25 to 15.27. This is in line with the research of Rahmadona et al. (2023), which states that the average RCA value of all significant destination countries for Indonesian cocoa powder exports (United States, Malaysia, China, Brazil, and Germany) is above one.

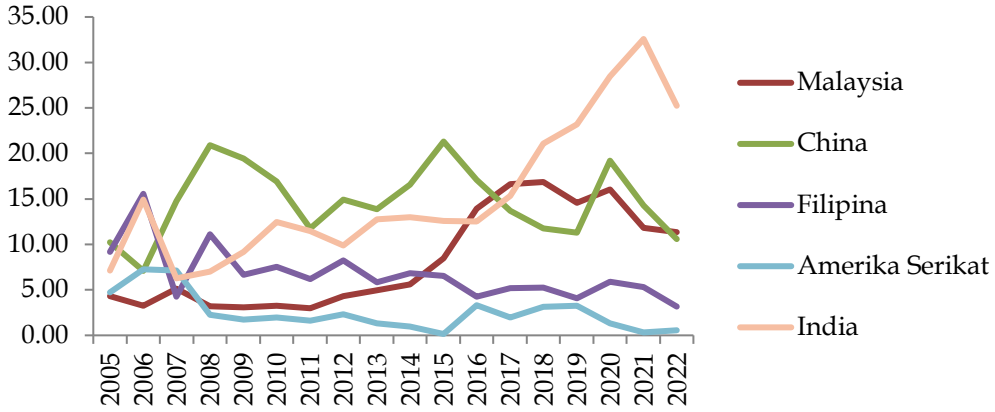

Figure 3.
RCA value of Indonesian cocoa powder to major destination countries (2005-2022)

RCA of Indonesian Cocoa Powder in Malaysia

The average RCA value in Malaysia is 8.31, which is third in the world. This is supported by the research of Augustin et al. (2022), which states that from 2010 to 2019, Malaysia occupied the third position of the largest RCA value of Indonesian cocoa powder among the five export destination countries for Indonesian cocoa commodities.

RCA of Indonesian Cocoa Powder in China

From 2005 to 2022, the average RCA value of Indonesian cocoa powder in China reached 14.76, the second-highest RCA. This value is greater than the RCA in Malaysia, meaning Indonesian cocoa powder in China has a higher comparative advantage than in Malaysia.

RCA of Indonesian Cocoa Powder in Philippine

The average RCA value during this period reached 6.73. Indonesian cocoa powder in the Philippines has a strong comparative advantage because the RCA value is more than 1. The RCA value of cocoa powder in the Philippines is lower than in Malaysia and China. The low RCA value in the Philippines is due to the low value of Indonesian cocoa powder exports to the Philippines compared to other countries.

RCA of Indonesian Cocoa Powder in the United States

The RCA value of cocoa powder in the US market is the lowest compared to cocoa powder in other central destination countries. In the US, Indonesian cocoa powder's average RCA value is 2.51. This is due to the low value of

Indonesian cocoa powder exports to the United States compared to other countries. In addition, the value of Indonesian cocoa powder exports is decreasing while the value of world cocoa powder exports to the United States is increasing.

RCA of Indonesian Cocoa Powder in India

The RCA value of Indonesian cocoa powder in the Indian market has fluctuated and tends to increase yearly (2005-2022), averaging 15.27. This figure indicates that Indonesia is comparatively competitive with India, the leading destination of cocoa commodity exports. The RCA value of cocoa powder in India occupies the first position, which indicates that the comparative competitiveness of Indonesian cocoa powder is higher than that of Malaysia, China, the Philippines and the United States.

ECI Analysis of Indonesian Cocoa Paste in Main Destination Countries

The average ECI value of Indonesian cocoa paste in the Malaysian market from 2006 to 2022 is 3.74. Given that this value is greater than 1, Indonesian cocoa paste in Malaysia is experiencing a growing competitive advantage. In the Malaysian market from 2006 to 2022, Indonesian cocoa paste's ECI value falls between 0 and 40.81. In the Chinese market, Indonesian cocoa paste's ECI score averages 1.84, which is greater than 1. ECI values vary from 0.16 to 8.04. In the Philippine market, Indonesian cocoa paste has an average ECI value of 1.18. Given that this value is greater than 1, Indonesian cocoa paste faces fierce competition in the Philippine market.

The ECI value of Indonesian cocoa paste in the Philippines is in the range of 0.31 - 2.35. This is the smallest value compared to the ECI value of Indonesian cocoa paste in other countries. The amount of cocoa paste exported by Indonesia and the world to the Philippines affects the ECI value. By 2023, the Philippines will import most of the cocoa paste from Ghana, not Indonesia. The ECI value of Indonesian cocoa paste in the United States averages 2.19 (2006-2022). The ECI value of Indonesian cocoa paste in the United States is 0.21 - 20.23. The ECI value of Indonesian cocoa paste in India averages 6.83. This value is more significant than the ECI in other main export destinations for cocoa commodities.

ECI Analysis of Indonesian Cocoa Butter in Main Destination Countries

Overall, Indonesian cocoa butter has a competitive advantage in the international market. This is in line with the research of Nurwansyah et al. (2024), which states that the ECI of Indonesian cocoa butter shows an upward trend. The average ECI value of Indonesian cocoa butter in Malaysia is 1.03. This is the smallest value compared to the ECI value of Indonesian cocoa butter in other countries. This is due to competition with other countries, such as Singapore,

where in 2023, Malaysia imported the most cocoa butter from Singapore instead of Indonesia.

In the Chinese market, Indonesian cocoa butter has the highest ECI value compared to other markets. The average ECI value reached 27.82. During 2006-2022, the average ECI value of Indonesian cocoa butter in the Philippines was 1.18. This value is more than 1, meaning Indonesian cocoa butter in the Philippines faces an increasing trend of competitive advantage. The Philippines's participation in regional trade agreements, such as the ASEAN Free Trade Area (AFTA), influences its trade competitiveness.

The ECI value of Indonesian cocoa butter in the United States averages 1.06. This value is lower than the ECI in China and the Philippines but more significant than the ECI value in Malaysia. The United States imports more cocoa butter from Indonesia than other countries. The lowest cocoa butter ECI value in the United States was in 2009 at 0.66, while the highest was in 2011 at 1.54. The average ECI value of Indonesian cocoa butter in the Indian market during 2006-2022 is 6.09. This value is higher than that of Malaysia, the Philippines, and the United States.

ECI Analysis of Indonesian Cocoa Powder in Main Destination Countries

The average ECI value of Indonesian cocoa powder exports to Malaysia tends to be >1. This means that during the period 2006-2022, the average ECI value amounted to 1.13, which means that, in theory, Indonesia has a strong competitiveness in exporting cocoa powder to Malaysia. The ECI value of Indonesian cocoa powder exports to China in 2006-2022 is 1.10. This figure shows that the ECI value > 1. The ECI value of Indonesian cocoa powder in China is below Malaysia. Then, the ECI value of Indonesian cocoa powder in the Philippines in 2006-2022 averages 1.10. The ECI value of Indonesian cocoa powder in the Chinese and Philippines markets is the smallest. This is due to competition with other countries such as Malaysia, where in 2023, China and the Philippines imported the most cocoa powder from Malaysia instead of Indonesia.

From 2006 to 2022, the average ECI value of Indonesian cocoa powder in the United States market reached 2.19. This value is the highest among other cocoa export destination countries. The average ECI value of Indonesian cocoa powder in India is 1.15.

Forecasting Analysis of Indonesian Cocoa Derivatives Export Volume in Main Destination Countries

1. Forecasting of Indonesian Cocoa Paste Export Volume

The quantity of cocoa paste exported to Malaysia will continue to increase, although there was a decline in 2023, from 12,833 tons in 2022 to 7,930 in 2023.

Indonesia's cocoa paste export volume to China has the potential to increase in the next 10 years. In the next 10 years, the volume of Indonesian cocoa paste exported to the Philippines will decrease. The Philippines also has its local producers of cocoa paste and chocolate products. If the cocoa and chocolate industry in the Philippines develops rapidly or can fulfil most local market needs, this could reduce the volume of cocoa paste exports from Indonesia. In the United States, the amount of cocoa paste exported by Indonesia is predicted to increase in the next 10 years. The condition of Indonesian cocoa paste in the US market is at the maturity stage, allowing its export volume to grow yearly (Rahmadona et al., 2023). The results of forecasting Indonesian cocoa powder exports to India experienced fluctuations because the forecasting results were influenced by the export volume of the previous 18 years, where the export volume was minimal compared to other destination countries. Forecasting the export volume of Indonesian cocoa paste is presented in Table 1.

Table 1. Forecasting of Indonesian cocoa paste export volume (tons)

Year	Malaysia	China	Philippines	US	India
2023	7,930.03	6,727.20	239.52	10,475.22	16.25
2024	8,460.19	7,119.00	210.14	10,975.01	12.11
2025	8,990.35	7,510.82	184.36	11,474.80	33.66
2026	9,520.54	7,902.65	161.75	11,974.59	26.20
2027	10,050.74	8,294.49	141.91	12,474.38	12.94
2028	10,580.94	8,686.31	124.50	12,974.17	4.65
2029	11,111.14	9,078.14	109.23	13,473.96	4.65
2030	11,641.35	9,469.96	95.84	13,973.75	4.65
2031	12,171.56	9,861.78	84.08	14,473.54	4.65
2032	12,701.77	10,253.61	73.77	14,973.33	29.51

2. Forecasting of Indonesian Cocoa Butter Export Volume

The forecasting results show that in the next 10 years, the quantity of Indonesian cocoa butter exported to Malaysia will increase. Indonesian cocoa butter in Malaysia is growing (Rahmadona et al., 2023). In the next 10 years, the amount of cocoa butter exported by Indonesia to China will increase. Based on Table 2, the amount of Indonesian cocoa butter exported to the Philippines is still experiencing fluctuations that tend to grow. The amount of Indonesian cocoa butter exported to the United States is experiencing an increasing trend over the next 10 years. The increase averaged 1,479.88 tons per year. Indonesian cocoa butter exported to India will experience a growing trend over the next 10 years. The increase reaches 5,855 tons per year.

Table 2. Forecasting export volume of Indonesian cocoa butter (tons)

Year	Malaysia	China	Philipine	US	India
2023	3,961.57	8,787.97	102,43	41,300.89	25,068.36
2024	4,153.44	9,268.80	103,97	42,780.77	29,727.15
2025	4,345.30	9,749.64	101,81	44,260.66	35,097.42
2026	4,537.17	10,230.47	100,27	45,740.54	40,341.12
2027	4,729.03	10,711.30	104,89	47,220.42	45,705.94
2028	4,920.90	11,192.13	83,32	48,700.31	51,615.61
2029	5,112.76	11,672.96	78,38	50,180.19	57,826.34
2030	5,304.63	12,153.79	78,38	51,660.07	64,152.19
2031	5,496.49	12,634.63	102,43	53,139.95	70,777.95
2032	5,688.36	13,115.46	103,97	54,619.84	77,766.67

3. Forecasting of Indonesian Cocoa Powder Export Volume

The amount of Indonesian cocoa powder exported to Malaysia is experiencing a positive upward trend over the next 10 years. The increase is estimated at 156.04 tons per year. The volume of Indonesian cocoa powder exports to China is predicted to increase in the next 10 years. According to Harahap & Yeniwati (2023), the international cocoa bean price and industrial production index are one of the causes of the increase in Indonesian cocoa powder exports. Cocoa powder is one of the industrial products because it converts raw materials into semi-finished materials or goods that have added value, so the industrial production index will be one factor that impacts Indonesia's cocoa powder exports to China.

Based on Table 3, the volume of Indonesian cocoa powder exports to the Philippines has increased in the next 10 years. This increase is estimated to reach 282.84 tons per year. The volume of Indonesian cocoa powder exports to the United States will still fluctuate in the next 10 years, from 2005 to 2022. This is due to fluctuations in the volume of cocoa powder exports in the previous 18 years. The United States imports more cocoa powder from European countries than from Indonesia. The United States imports cocoa powder from Indonesia when imports from European countries are insufficient to fulfil domestic demand. In addition, the United States has been importing cocoa powder from European countries for longer than Asian countries like Indonesia. European countries have better technology than Indonesia.

Indonesia's cocoa powder exports to India will increase in the next 10 years, with an average increase of 3,434 tons per year. This forecasting is expected to provide an overview of Indonesia's cocoa powder exports to India. Table 3 presents the results of forecasting the volume of Indonesian cocoa powder exports to the main destination countries.

Table 3. Forecasting of Indonesian Cocoa Powder Export Volume (tons)

Year	Malaysia	China	Philipine	US	India
2023	3,134.06	9,297.76	9,162.49	1,438.24	45,716.78
2024	3,290.82	14,990.56	9,445.34	2,417.23	49,140.24
2025	3,449.26	15,389.79	9,728.19	3,031.96	52,567.94
2026	3,586.44	16,086.45	10,011.04	2,719.46	55,999.65
2027	3,757.88	16,783.11	10,293.88	1,993.52	59,433.62
2028	3,914.63	17,479.78	10,576.73	1,461.49	62,869.73
2029	4,073.07	18,176.44	10,859.58	1,249.72	66,307.04
2030	4,210.25	18,873.10	11,142.43	1,298.60	69,745.49
2031	4,381.69	19,569.77	11,425.28	1,536.08	73,184.59
2032	4,538.45	20,266.43	11,708.13	1,845.45	76,624.29

Indonesia's cocoa processing capabilities can support the growth of export volumes of Indonesian cocoa derivative products to major destination countries because Indonesia's downstream cocoa industry has begun to develop, especially in areas that are the largest cocoa producers in Indonesia, such as Sulawesi. The export duty tax policy for cocoa beans supports the development of the downstream industry. Global climate change and shifting consumer preferences significantly impact Indonesia's cocoa industry. A changing climate will affect cocoa production and the quality of cocoa beans and derivative products. If the cocoa beans produced are of low quality, the quality of the derivative products will be damaged. Low quality of cocoa derivative products will affect competitiveness in destination markets.

Indonesia has a comparative advantage in exporting cocoa butter within the European Union region, as indicated by the positive value of the Average Revealed Comparative Advantage (RCA) of its cocoa butter commodity, which ranks fifth after Ivory Coast, Ghana, Malaysia, and Cameroon (Izaati & Annas, 2022). There is a strong relationship between Indonesia's cocoa bean competitiveness with Cameroon and Indonesia's cocoa competitiveness with Ghana and the Ivory Coast in the race for world market share. Positive relationships exist, and the two exporting countries compete for the same market as Indonesia (Napitupulu et al., 2024).

CONCLUSION AND SUGGESTION

Conclusion

Considering the findings of this study, Indonesian cocoa paste in Malaysia, China, the Philippines, and the United States is highly competitive. Meanwhile, Indonesian cocoa paste in India is not competitive. Indonesia's cocoa butter and cocoa powder in the central destination countries have strong competitiveness

comparatively due to RCA>1. Competitively, Indonesian cocoa paste, cocoa butter, and cocoa powder were competitive from 2005 to 2022, with an average ECI of>1. Forecasting of Indonesian cocoa paste exported to Malaysia, China, the United States, and India has an increasing trend in 2023-2032, while Indonesian cocoa paste in the Philippines is expected to experience a decreasing trend. Forecasting Indonesian cocoa butter export volume to major destination countries has an increasing trend. Forecasting the export volume of Indonesian cocoa powder to Malaysia, China, the Philippines, and India shows an increasing trend, while in the United States, it fluctuates with a downward trend.

Suggestion

Cocoa paste, cocoa butter, and cocoa powder are competitive in significant destination markets, and the number of exports is predicted to increase in the last 10 years. To maintain competitiveness and increase export volume, industry practitioners are expected to improve the quality of processed cocoa products by focusing on the quality of raw materials in the form of cocoa beans and improving processing technology. To increase cocoa competitiveness, Indonesia needs to maintain the quality and quantity of cocoa derivative products by paying attention to export stability and ensuring the availability of raw materials for processed cocoa products, namely quality cocoa beans. Farmers and industry players are expected to improve the quality of Indonesian cocoa by conducting good post-harvest processes such as fermentation, relying on the sun as a drying method, and using special ovens. The government can help procure cocoa processing machines or technology from Europe, provide financial support for farmers, and other regulations that support the cocoa industry and promote Indonesian products in the global market. Stakeholder collaboration is vital. Policymakers, farmers, and exporters must collaborate. Policy initiatives include subsidies for advanced processing technology, quality certification programs, and research funding. Farmers-exporter partnerships improve quality control and market access.

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