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COMPETITIVENESS AND INFLUENCING FACTORS INDONESIAN COCOA BEAN EXPORTS IN THE INTERNATIONAL MARKET

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Abstract

Indonesia is known as an agricultural country. This is because the majority of Indonesia's population lives in rural areas and works in the agricultural sector. Indonesia is one of the countries that participates in international trade. This research aims to 1) analyse the competitiveness of Indonesian cocoa bean exports in the international market, 2) analyse the factors that influence the value of Indonesian cocoa bean exports in the international market. This research has 5 destination countries, namely Malaysia, Belgium, Singapore, India and the United States. The research method used to analyse competitiveness is Revealed Comparative Advantage (RCA) which is used to determine dynamic competitive performance or not. Meanwhile, in analysing the factors that influence the value of Indonesian cocoa bean exports, an analysis method using panel data regression was used using Eviews 12 software. The results of this research show that Indonesia has a strong comparative advantage in cocoa bean exports. This is indicated by the average RCA value being greater than 1 for all destination countries. Meanwhile, the factors that influence cocoa bean exports with production variables and export prices significantly have a positive effect on the value of Indonesian cocoa bean exports on the international market. The Rupiah Exchange Rate and GDP variables have a negative influence on the value of Indonesian cocoa bean exports on the international market, but the significance of the influence needs to be studied in more depth.

Keywords: Competitiveness, Exports, Factors, RCA.

1. Introduction

Indonesia is known as an agrarian country, with most of the population living in rural areas and working in the agricultural sector. One important sector that supports the Indonesian economy is the plantation sector. Aside from being a major commodity, this sector has developed into an important internationally traded industry, even becoming a potential source of investment (Manaroinsong et al., 2023). Within the plantation sector, one of Indonesia's leading commodities is cocoa beans, which have become one of the country's main export products. The comparative advantage of Indonesian cocoa beans lies in their distinctive flavour and the quality of the beans that do not melt easily, making them ideal for use in the manufacture of processed chocolate products or as blending ingredients in other products (Manalu, 2020).

Indonesia's cocoa bean exports play an important role in international trade (Rojaba & Jalunggono, 2022)(Izzah & Damayanti, 2023)(Sari, 2024)(Salsabila et al., 2024). Indonesian cocoa beans are generally exported in the form of whole beans which are then further processed according to the needs of the global market (Ariningsih et al., 2019)(Siregar & Putra, 2022)(Raharjo et al., 2024). In the period 2020 to 2022, Indonesia's exported cocoa products include various types, such as cocoa butter, cocoa powder, and cocoa beans (Wijaya, 2024). Among these products, cocoa butter recorded the largest export value. Indonesia's cocoa bean export data shows annual fluctuations, with Singapore as the main export destination country recording the highest export value, while Malaysia is recorded as the country with the lowest export value.

Indonesia's economy relies heavily on the export sector, which in 2021 was recorded at US$231,609.5 million, with the agricultural sector also contributing significantly to the national economy. In the context of plantations, Indonesia ranks third in

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the world as the largest cocoa producer, and ranks sixth as the world's largest exporter of cocoa beans (Cahya Rizqika et al., 2021). Improving the competitiveness of Indonesia's cocoa exports is essential to provide significant benefits to the country's economy, such as increased farmer income and the growth of related industries (Halwani, 2010). Therefore, an in-depth understanding of the factors affecting Indonesia's cocoa export competitiveness is key to formulating effective strategies to strengthen Indonesia's position in the international market.

Research conducted by (Izzatin et al., 2013) shows that although Indonesia's cocoa export competitiveness is better than other cocoa producing countries, such as Germany and Colombia, countries such as Ecuador and Nigeria have higher competitiveness. The study also revealed that Indonesia's cocoa export volume is a significant factor affecting its export competitiveness, while factors such as export price and US dollar exchange rate do not have a significant impact. Therefore, to improve Indonesia's cocoa export competitiveness, it is important to focus on improving production quality, disseminating agricultural technology to farmers, and developing infrastructure that supports the sustainability of cocoa production in Indonesia. By doing so, Indonesia can continue to strengthen its position as a major player in the international cocoa market and ensure maximum economic benefits from the sector.

In addition to these factors, it is crucial to consider the impact of global commodity price fluctuations on the long-term stability of Indonesia's cocoa exports. Cocoa, being an agricultural commodity, is highly sensitive to price volatility, influenced by global demand, weather conditions, international trade policies, and currency exchange rates. Price fluctuations can reduce farmers' income, affecting production and export stability. In times of price increases, while short-term benefits may arise, an oversupply may lead to price crashes. Such volatility can also discourage long-term investments in the sector, impacting infrastructure development and technology adoption. As such, managing price risks, diversifying export markets, and enhancing the sector's resilience are critical for maintaining stable cocoa exports.

Furthermore, comparing the quality of Indonesia's cocoa with that of major competitors like Ecuador and Ivory Coast reveals some challenges. While Indonesia's cocoa is known for its distinctive flavor and resilience, Ecuador is renowned for producing fine-flavor cocoa, highly sought after in the premium chocolate market. Similarly, Ivory Coast has invested significantly in improving cocoa quality through sustainable farming practices and advanced processing techniques. Indonesia, while competitive in terms of volume, faces challenges in maintaining consistent quality, which may hinder its competitiveness against countries like Ecuador and Ivory Coast. To strengthen its position, Indonesia must invest in quality control, improve post-harvest processes, and adopt certifications that enhance its reputation for high-quality cocoa beans. Improving farmer training, fermentation, and drying methods will help Indonesia attract higher demand and compete more effectively in the global market. By addressing these challenges, Indonesia can enhance its cocoa export competitiveness and secure a stronger foothold in the international cocoa trade.

2. Methods

The type of data used in this study is secondary data in the form of panel data, panel data is

a combination of time series data with cross section data (Alamsyah et al., 2022). The time series data includes annual data from 2018 to 2022. While cross section data includes Cocoa Bean exporting countries, namely Indonesia, and Indonesian Cocoa Bean export destination countries consisting of Malaysia, Belgium, Singapore, India and the United States (Andriantoni et al., 2020)(Nugraheni et al., 2021)(Arum, 2021)(Riwaldi & Wijayanti, 2023)(Naufal, 2024). The data used is an estimate of Indonesia's cocoa export demand from the value and destination countries of cocoa bean exports with HS code 180100 (Cocoa beans, whole or broken, raw or roasted). The analytical method applied in this study to identify the level of competitiveness is the Revealed Comparative Advantage (RCA) approach used to determine whether the competitiveness performance is dynamic or not. Meanwhile, in order to assess the impact of factors affecting the value of Indonesian cocoa bean exports, a panel data regression analysis method was used with the help of Eviews 12 software.

The panel data regression method employed in this study controls for external variables that may influence cocoa exports by considering both time-series and cross-sectional dimensions. This method allows for the examination of the variations within countries over time and across different countries. The fixed effects model or random effects model, depending on the specifications, controls for unobserved heterogeneity by accounting for time-invariant factors, such as geographical, cultural, or historical factors that could affect export demand. Additionally, external variables, such as global cocoa price fluctuations, global economic trends, and trade policies (e.g., tariffs, subsidies, or trade agreements), are integrated into the regression model as explanatory variables. By including these variables, the regression model can isolate the impact of specific factors, such as export volume and product quality, on the value of Indonesian cocoa bean exports, controlling for other external influences.

The choice of the five export destination countries—Malaysia, Belgium, Singapore, India, and the United States—represents a strategic selection that aligns with the trends in global cocoa trade and Indonesia's export profile. These countries are significant players in the international cocoa trade and represent a diverse range of markets with different economic profiles and demand patterns. Singapore, for example, is one of the largest re-export hubs for cocoa in Asia, making it a key transit point for Indonesian cocoa beans. Belgium, as a major European chocolate producer, represents a high-demand market for premium cocoa. Malaysia, as a regional neighbor, plays an important role in the Southeast Asian cocoa trade. The United States, as one of the largest global markets for chocolate and cocoa-based products, is essential for understanding the competitive position of Indonesian cocoa beans in North America. India, with its growing demand for cocoa products, serves as a rapidly emerging market. These countries collectively capture a significant portion of Indonesia's cocoa exports and mirror the global trade trends in the cocoa sector, allowing the study to accurately analyze Indonesia's export competitiveness across diverse and strategically important markets.

3. Results and Discussion

Revealed Comparative Advantage (RCA) Analysis

Based on the results of data analysis that has been carried out related to Revealed Comparative Advantage analysis to determine the competitiveness of Indonesian cocoa

bean exports in export destination countries, the following are data on the RCA values of Malaysia, Belgium, Singapore, India and the United States:

Table 1. Results of revealed comparative advantage (RCA) analysis of Indonesia to five major export destination countries for cocoa beans

Country	Year				
	2018	2019	2020	2021	2022
Malaysia	25,994	31,443	31,670	41,739	56,134
Belgium	26,641	52,526	37,437	4,740	0,001
Singapore	41,590	8,700	44,643	20,041	23,621
India	18,508	5,072	18,225	15,764	42,760
United States	0,482	0,718	1,579	4,332	30,632

Source: UN Comtrade (processed by researchers)

Based on the results of Table 1, it can be seen the average value of RCA (Revealed Comparative Advantage) for Indonesian Cocoa Beans products exported to several countries in the world such as Malaysia, Belgium, Singapore, America India and the United States. Each RCA average value for Malaysia is 41.064, for Belgium is 13.321, for Singapore is 32.606, for India is 30.634 and for the United States is 15.557. This shows that the competitiveness position of Indonesia in exporting cocoa beans to several countries in the world has competitiveness because the average value of RCA is RCA> 1, this shows that Indonesia can export cocoa beans to various countries in the world because it is competitive. The following will be described based on the destination countries of Indonesian cocoa bean exports to Malaysia, Belgium, Singapore, India and the United States as follows:

1. Indonesia Exports Cocoa Beans to Malaysia, based on the analysis conducted, the average value of Indonesia's RCA to Malaysia is 41.064, which indicates that the competitiveness of Indonesia's cocoa bean exports to Malaysia has a comparative advantage in the cocoa bean commodity and has strong competitiveness due to the RCA value >1 (RCA 41.064 >1). According to the RCA method, if a country has a comparative advantage, then the country should improve itself in that commodity.

2. Indonesia Exports Cocoa Beans to Belgium, based on the analysis conducted, the average value of Indonesia's RCA to Belgium is 13.321, indicating that the competitiveness of Indonesia's cocoa bean exports to Belgium has a comparative advantage in the cocoa bean commodity and has strong competitiveness due to the RCA value >1 (RCA 13.321 >1). According to the RCA method, if a country has a comparative advantage, then the country should improve itself in that commodity.

3. Indonesia Exports Cocoa Beans to Singapore, based on the analysis conducted, the average value of Indonesia's RCA to Singapore is 32.606, indicating that the competitiveness of Indonesia's cocoa bean exports to Singapore has a comparative advantage in the cocoa bean commodity and has strong competitiveness due to the RCA value >1 (RCA 32.606 >1). According to the RCA method, if a country has a comparative advantage, then the country should improve itself in that commodity.

4. Indonesia Exports Cocoa Beans to India, based on the analysis conducted, the average value of Indonesia's RCA to India is 30.634, indicating that the competitiveness of Indonesia's cocoa bean exports to India has a comparative advantage in the cocoa bean commodity and has strong competitiveness due to the RCA value >1 (RCA 30.634 >1).

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According to the RCA method, if a country has a comparative advantage, then the country should improve itself in that commodity.

5. Indonesia Exports Cocoa Beans to the United States, based on the analysis conducted, the average value of Indonesia's RCA to India is 15.557, indicating that the competitiveness of Indonesia's cocoa bean exports to India has a comparative advantage in the cocoa bean commodity and has strong competitiveness due to the RCA value >1 (RCA 15.557 >1). According to the RCA method, if a country has a comparative advantage, then the country should improve itself in that commodity.

Classical Assumption Test Results

This classic assumption test is a statistical requirement that must be met in panel data regression analysis based on ordinary least square (OLS). There are at least three classic assumption tests applied in this study, namely Normality Test, Multicollinearity Test, Heteroscedasticity Test.

Normality Test

Normality test to test the residual values that have been distally normalised and distributed in the regression model. This test can be seen through the Jarque-Bera value in the form of a residual histogram. If the probability value of Jarque-Bera is greater than the significance level α 5% (0.05), then the research data is normally distributed.

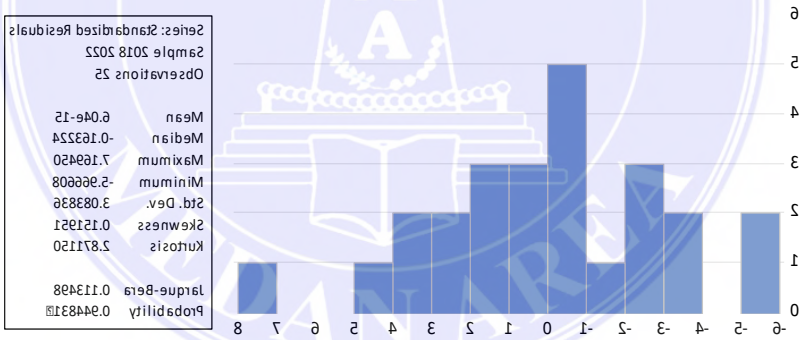

Figure 1. Normality test results

Based on the data in our database, we know that the probability value is 0.944831 > 0.05, so it is concluded that the data in this study is normally distributed.

Multicollinearity Test

According to Ghozalli (2016), multicollinearity testing aims to evaluate the validity of the regression model by examining the correlation between the independent variables. The criteria for determining multicollinearity are as follows: if the correlation coefficient is less than 0.85, the data does not exhibit multicollinearity, and no transformation is needed for the model. However, if the correlation coefficient exceeds 0.85, the data is considered to have multicollinearity, and transformation of the model is required. The following are the results of the multicollinearity test.

Table 2. Multicollinearity test results

	X1	X2	X3	X4
X1	1.000000	0.000679	-0.005328	-0.021629
X2	0.000679	1.000000	-0.486223	0.627156
X3	-0.005328	-0.486223	1.000000	-0.518784
X4	-0.021629	0.627156	-0.518784	1.000000

Based on the table above, it can be seen that there is no multicollinearity because no variable has a high multicollinearity value, and the correlation coefficient value between variables does not exceed 0.85.

Heterocedaticity Test

The heteroscedasticity test is used to test whether in a regression model there is inequality of variance from residuals or from one experiment to another. If the variance from residuals or from one experiment to another is constant, it is called homoscedasticity. On the other hand, a regression model with heteroscedasticity means that there is inequality of variance in the residuals.

To determine whether or not there is heteroscedasticity, it can be done using the absolute residual method, then looking at the probability value in each variable with a significance level of α = 5% (0.05). If the probability value of each variable > α = 5% (0.05), then there is no heteroscedasticity. Conversely, if the probability value of each variable is < α = 5% (0.05), then it can be concluded that heteroscedasticity occurs.

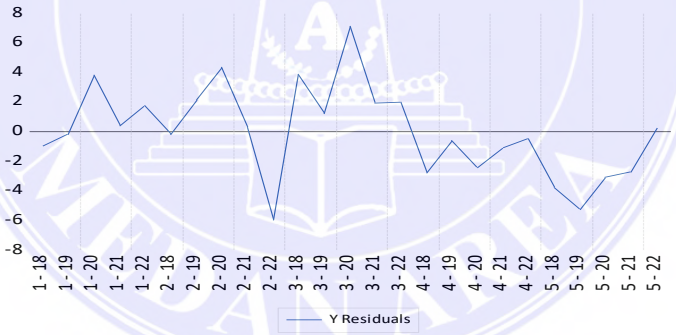

Figure 2. Heterocedaticity test results

Based on the image contained in the references used in this study, a value exceeding 0.05 was obtained. Therefore, a heteroscedasticity test was carried out and the results showed that there was no heteroscedasticity, or in other words, it passed the heteroscedasticity test.

Selected Test Results

In this study, the selected model selection test was the Random Effect Model (REM). Previously, before selecting REM, tests were carried out on the three model selection models, namely the Chow Test, the Hausman Test, and the LM Test. Based on the results of the three tests, the REM test was selected as the most suitable model.

Table 3. Selected test results

Variables	Coefficient	Std. Error	t-statistic	Prob
C	-247.9733	122.5806	-2.022941	0.0567
X1	18.93412	8.883919	2.131280	0.0457

Variables	Coefficient	Std. Error	t-statistic	Prob
X2	2.021769	0.889539	2.272827	0.0342
X4	-1.936096	1.1665462	-1.162498	0.2587

Effect Specification		
	S.D.	Rho
Cross-section random	4.167117	0.7356
Idiosyncratic random	2.498340	0.2644
Weighted Statistics		

Table 4. Partial significance test results (t test)

Variables	Coeficient	Std. Error	t-Statistic	Prob.
C	-247.9733	122.5806	-2.022941	0.0567
X1	18.93412	8.883919	2.131280	0.0457
X2	2.021769	0.889539	2.272827	0.0342
X3	0.142702	0.622027	0.229414	0.8209
X4	-1.936096	1.665462	-1.162498	0.2587

Based on the table above, the partial effect of the independent variables on the dependent variable can be explained as follows: For the Production variable (X1), the t-calculated value of 2.131280 is greater than the t-table value of 2.068658, and the significance value of 0.0457 is less than 0.05. As a result, H0 is rejected, and H1 is accepted, indicating that the Production variable has a positive effect on Indonesian cocoa bean exports in the international market. For the Export Price variable (X2), the t-calculated value of 2.272827 exceeds the t-table value of 2.068658, and the significance value of 0.0342 is less than 0.05. Thus, H0 is rejected, and H1 is accepted, meaning that the Export Price variable has a positive effect on Indonesian cocoa bean exports in the international market. However, for the Rupiah Exchange Rate variable (X3), the t-calculated value of 0.229414 is less than the t-table value of 2.068658, and the significance value of 0.8209 is greater than 0.05, leading to the acceptance of H0 and the rejection of H1. This implies that the Rupiah Exchange Rate variable has no effect on Indonesian cocoa bean exports in the international market. Lastly, for the Gross Domestic Product variable (X4), the t-calculated value of -1.162498 is smaller than the t-table value of 2.068658, and the significance value of 0.2587 is greater than 0.05. Hence, H0 is accepted, and H1 is rejected, meaning that the Gross Domestic Product variable has no effect on Indonesian cocoa bean exports in the international market.

Simultaneous Significance Test Results (Test f)

The test of simultaneous significance is conducted by examining the F-significance value at the chosen significance level ($\alpha = 0.05$). The hypotheses for this test are formulated as follows: H0 (Null Hypothesis) suggests that if the F-significance value is greater than 0.05, the independent variables do not simultaneously affect the dependent variable. On the other hand, H1 (Alternative Hypothesis) states that if the F-significance value is less than 0.05, the independent variables do indeed simultaneously affect the dependent variable.

If the F-significance value is less than 0.05, H0 is rejected and H1 is accepted, which means that the independent variables simultaneously have an effect on the dependent variable. Conversely, if the F-significance value is greater than 0.05, H0 is accepted and H1 is rejected, which means that the independent variables simultaneously do not affect the dependent variable.

Table 5. Simultaneous significance test results

R-squared	0.442908
Adjusted R-squared	0.331489
S.E. of regression	22865.85
Sum squared resid	1.05E+10
Log likehood	-283.6192
F-statistic	3.975171
Prob (F-statistic)	0.015631

Based on the table above, the obtained F-value is 3.975171 > F table 2.866081 and the significance value is 0.015631 < 0.05. Therefore, H0 is rejected and H1 is accepted, which means that the Production (X1) and Export Price (X2) variables have an effect on Indonesian cocoa bean exports in the international market.

Test Results of the Coefficient of Determination (Adjusted R^2)

In Ghozali (2016) states that the coefficient of determination R^2 is a measurement of how far the model's ability to explain the dependent variables. The coefficient of determination has a value between zero and one. The greater the coefficient of determination, the greater the ability of the independent variable to explain the dependent variable. The coefficient of determination ranges from 0-1. If the R^2 value is less than 0.5, the independent variable can explain the dependent variable less than 50% (weak). While the value of R^2 equal to 0.5 indicates that the coefficient of determination is moderate, while R^2 more than 0.5 indicates a strong ability to explain the dependent variable.

Table 6. Determination coefficient test results

R-squared	0.442908
Adjusted R-squared	0.331489
S.E. of regression	22865.85
Sum squared resid	1.05E+10
Log likehood	-283.6192
F-statistic	3.975171
Prob (F-statistic)	0.015631

Based on table 6, the adjusted R-squared value is 0.331489 or 33.1489%. The coefficient of determination shows that the independent variables consisting of Production (X1), Export Price (X2), Exchange Rate (X3) and Gross Domestic Product (X4) have the i to i the i for the Indonesian Cocoa Bean Export variable (Y).

4. Conclusion

Based on the results of the study, it can be concluded that Indonesia has a strong comparative advantage in exporting cocoa beans to five main destination countries, namely Malaysia, Belgium, Singapore, India, and the United States, as reflected in the average value of Revealed Comparative Advantage (RCA) which is greater than 1 for all destination countries. In addition, the variables of production and export price are proven to have a significant positive influence on the export value of Indonesian cocoa beans in the international market. In contrast, the variables of Rupiah exchange rate and GDP show a negative influence on the export value of Indonesian cocoa beans, although the significance of the influence still needs to be studied more deeply. Based on these findings, it is recommended that the government and industry players improve production efficiency and the quality of cocoa beans, so that Indonesia can remain competitive in the international market, especially in major destination countries such as Malaysia and

Singapore. In addition, the development of modern post-harvest technology will also be helpful in increasing the added value of Indonesian cocoa beans, making them more competitive in the global market.

To enhance the stability of Indonesia's cocoa exports amidst global economic uncertainties, several policy measures can be implemented. First, diversifying export markets by seeking new and emerging markets in regions like Africa, the Middle East, and Eastern Europe can reduce reliance on traditional markets and mitigate risks associated with external economic shocks. Second, the government can encourage the use of risk management tools, such as forward contracts or futures, to help exporters manage price volatility and secure more stable revenue. Third, increasing support for cocoa farmers through subsidies, training, and access to advanced agricultural technologies will improve the consistency and quality of cocoa production. Fourth, promoting sustainable and fair trade certifications, such as Fair Trade or organic certifications, would help Indonesia meet growing global demand for ethically sourced products and improve the marketability of its cocoa. Fifth, strengthening infrastructure for transportation, storage, and processing, especially through modern post-harvest technology, will enhance the quality of cocoa and reduce waste. Finally, investing in research and development (R&D) focused on cocoa genetics, disease resistance, and climate resilience will ensure that cocoa production remains sustainable and competitive in the face of environmental and economic challenges. By implementing these policy measures, Indonesia can strengthen its cocoa export sector and ensure greater stability and competitiveness in a volatile global market.

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