
FACTORS AFFECTING THE VALUE OF INDONESIAN COCOA EXPORTS IN 2000–2023



Wahyu Wulandari¹

Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

b300220122@student.ums.ac.id

Yuni Prihadi Utomo^{2*}

Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

xprihadime@gmail.com*

Abstract

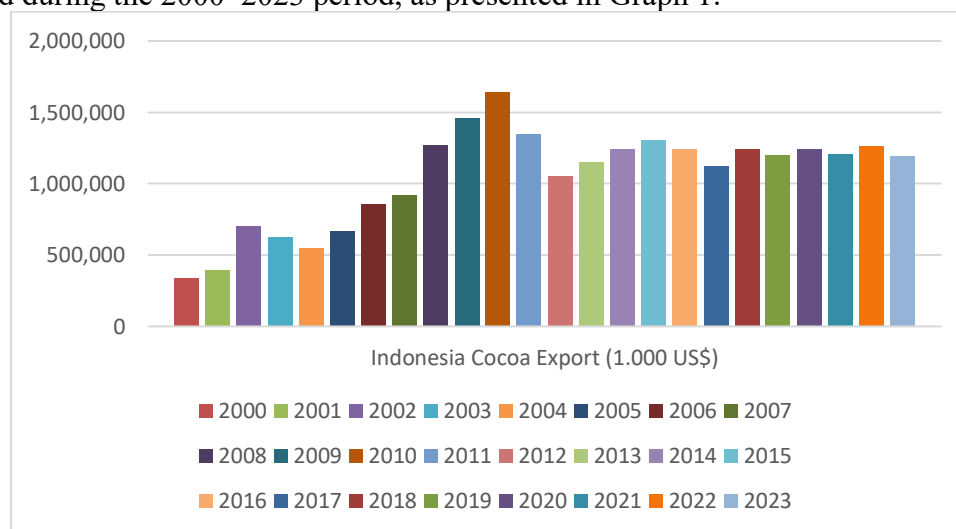
This study analyzes the determinants of Indonesian cocoa export value during the 2000–2023 period. The research aims to examine the effects of domestic cocoa production, domestic producer prices, international cocoa prices, international cocoa consumption, the rupiah exchange rate against the US dollar, and total world cocoa production on Indonesia's cocoa export performance. The study employs the Ordinary Least Squares (OLS) regression method using annual time series data obtained from Statistics Indonesia (BPS), Bank Indonesia, the Food and Agriculture Organization (FAO), the International Cocoa Organization (ICCO), and the United States Department of Agriculture (USDA). The econometric model is developed based on export supply and demand theories as well as previous empirical studies. The estimation results indicate that Indonesian cocoa production and international cocoa prices have a positive and statistically significant effect on cocoa export value. Meanwhile, domestic producer prices, international cocoa consumption, exchange rate fluctuations, and total world cocoa production do not have a significant effect. The model is statistically robust, as indicated by the F-test and coefficient of determination ($R^2 = 0.936$), which shows that the model explains most variations in cocoa export value. These findings suggest that domestic production capacity and global price dynamics are the main drivers of Indonesia's cocoa export performance.

Keywords: Cocoa Exports, Exchange Rate, International Price, OLS Regression, Production

INTRODUCTION

Cocoa is one of Indonesia's important plantation commodities and contributes to the country's international trade through export activities (Augustin et al., 2022). Indonesia has historically been recognized as one of the major cocoa-producing countries in the world, alongside Côte d'Ivoire and Ghana (Wardhany & Adzim, 2018). Cocoa also serves as an important raw material for the chocolate and food-processing industries, creating economic opportunities for farmers and other actors along the cocoa value chain. Therefore, developments in cocoa production and exports are closely related to Indonesia's agricultural income and foreign trade performance.

Despite its economic importance, Indonesia's cocoa export performance has experienced considerable fluctuations. These fluctuations are reflected in the export value recorded during the 2000–2023 period, as presented in Graph 1.



Graph 1.
Indonesian Cocoa Export Value 2000–2023

Source: Statistics Indonesia (BPS)

Graph 1 indicates that the value of Indonesian cocoa exports fluctuated considerably during 2000–2023, although the overall trend was higher than at the beginning of the observation period. Cocoa export value increased from US\$341.859 million in 2000 to US\$701.034 million in 2002, before declining during 2003–2004. Export value subsequently increased and reached its highest level in 2010 at US\$1.644 billion. After 2010, the export value fluctuated and experienced several periods of decline before improving again during 2017–2022. In 2023, however, the export value declined to approximately US\$1.198 billion.

The fluctuations in export value cannot be interpreted solely from changes in export volume because export value is jointly determined by the quantity exported and the price received in international markets. Consequently, an increase in export value may occur because of higher international prices even when export volume declines, while a decrease in export value may occur despite relatively stable export volume when international prices fall. Changes in export composition are also relevant because Indonesia's cocoa trade includes both cocoa beans and processed cocoa products. Therefore, fluctuations in Indonesia's cocoa export value should be examined by considering both domestic supply conditions and developments in the international cocoa market.

One important domestic factor affecting cocoa exports is cocoa production. Higher domestic production increases the availability of cocoa for export markets and therefore provides greater potential for export supply (Hakiki, 2019). Conversely, declining production may constrain export availability and reduce export performance. Indonesia's domestic cocoa production declined from 734.80 thousand tons in 2019 to 632.12 thousand tons in 2023, indicating a reduction in the supply base available to support export activities. In addition to production, domestic producer prices may influence farmers' production decisions. Higher producer prices can provide stronger economic incentives for farmers to maintain or increase cocoa production, thereby potentially increasing export supply (Purnomo et al., 2019).

External market conditions also play an important role in determining cocoa export value. International cocoa prices directly affect the monetary value obtained from cocoa exports. An increase in international prices can raise export value even without a proportional increase in export volume. Global cocoa consumption may also increase international demand and create greater market opportunities for exporting countries. In contrast, higher world cocoa production may increase global supply and place downward pressure on international prices. Exchange rate movements are another relevant factor because changes in the rupiah–US dollar exchange rate affect the domestic-currency value of export revenues and the international price competitiveness of Indonesian cocoa.

These relationships can be explained through international trade theory. The theory of comparative advantage proposed by David Ricardo suggests that countries tend to specialize in and export commodities for which they possess relative production advantages. In the context of Indonesia, cocoa production provides a basis for participation in the international cocoa market. Export supply theory further explains that the quantity available for export is related to domestic production and the allocation of domestic supply between domestic consumption and foreign markets. Meanwhile, export demand theory indicates that international demand, prices, and consumption conditions influence the demand for exported commodities. Price theory also suggests that changes in relative domestic and international prices affect producers' and exporters' incentives to participate in international markets (Putri et al., 2023).

The recent development of Indonesia's cocoa sector makes an examination of these factors particularly relevant. The decline in domestic production, fluctuations in international cocoa prices, movements in the exchange rate, and changes in global cocoa demand and supply create an international market environment in which Indonesia's export performance may vary substantially over time. The 2000–2023 observation period is also relevant because it encompasses different phases of the global cocoa market, including periods of substantial commodity-price fluctuations and the disruption associated with the COVID-19 pandemic.

Previous studies have examined the determinants of Indonesia's cocoa exports, but their findings regarding the effects of prices, exchange rates, production, and other economic variables remain inconsistent. In addition, several studies have focused primarily on export volume or cocoa competitiveness rather than export value, while some have used relatively short observation periods. These limitations indicate the need for further analysis that considers export value over a longer period and incorporates both domestic and international determinants. Such an approach is important because changes in export value may reflect

simultaneous changes in production, export quantity, international prices, exchange rates, and global market conditions.

Therefore, this study aims to analyze the factors affecting the value of Indonesian cocoa exports during the 2000–2023 period. By examining domestic production, domestic producer prices, international cocoa prices, global cocoa consumption, the rupiah–US dollar exchange rate, and world cocoa production, this study seeks to provide a more comprehensive understanding of the determinants of Indonesia’s cocoa export performance. The findings are expected to contribute to the empirical literature on agricultural exports and provide information relevant to efforts to strengthen the competitiveness and stability of Indonesia’s cocoa exports.

REVIEW OF LITERATURE

Previous studies on Indonesian cocoa exports have examined various domestic and international factors, including cocoa production and productivity, prices and exchange rates, demand and consumption, and international competitiveness. The findings generally indicate that domestic production is one of the most consistent determinants of cocoa exports, while the effects of prices, exchange rates, and demand-related variables remain more heterogeneous. These differences suggest that the determinants of cocoa exports may vary depending on the observation period, analytical method, and dependent variable used.

Cocoa Production and Productivity

Cocoa production and productivity are among the most frequently examined determinants of cocoa exports. Most previous studies indicate a positive relationship between domestic cocoa production and exports. Feni et al. (2022) found that cocoa production has a positive and significant effect on Indonesian cocoa exports over the 1981–2019 period. Similar findings were reported by Wardhany and Adzim (2018), Susantinah (2019), Purnomo et al. (2019), and Setiawan et al. (2025), who consistently found that higher cocoa production increases Indonesian cocoa exports. This relationship is economically plausible because higher domestic production increases the quantity of cocoa available for export markets.

The importance of production is also supported by evidence on cocoa productivity. Agbolosoo et al. (2024) found that cocoa productivity has a positive and significant effect on Indonesian cocoa exports during 1990–2022. Setiawan et al. (2025) similarly reported a positive and significant long-run effect of productivity on exports. These findings indicate that export performance is influenced not only by the total quantity of cocoa produced but also by the efficiency of production. However, Agbolosoo et al. (2024) also found that domestic cocoa supply has a negative and significant effect on exports, suggesting that the allocation of cocoa between domestic markets and export markets may influence the relationship between production and exports.

Overall, the empirical evidence provides relatively consistent support for the role of domestic production and productivity in increasing cocoa exports. However, most of these studies examine export volume rather than export value. Therefore, an increase in production does not necessarily imply a proportional increase in export value because export value is also affected by international prices and exchange rate movements.

Prices and Exchange Rates

In contrast to production, the effects of cocoa prices and exchange rates on exports are less consistent across previous studies. Regarding international cocoa prices, Feni et al. (2022) found a negative and insignificant effect on Indonesian cocoa exports, whereas Meidrieswida (2018) and Purnomo et al. (2019) reported a positive effect of world cocoa prices. Wardhany and Adzim (2018) also found a negative effect of international cocoa prices, although the relationship was only significant at the 10 percent level. Susantinah (2019), meanwhile, found that world cocoa prices did not significantly affect Indonesian cocoa exports. These contrasting results indicate that changes in international cocoa prices do not necessarily translate uniformly into changes in Indonesia's export performance.

Differences are also evident in the findings concerning domestic cocoa prices. Feni et al. (2022) reported a positive relationship between domestic prices and exports, while Wardhany and Adzim (2018) and Susantinah (2019) found that domestic cocoa prices were statistically insignificant. Meidrieswida (2018) found a negative effect of export prices on cocoa exports. The inconsistent findings may reflect differences in the measurement of prices, observation periods, market conditions, and the adjustment mechanisms between domestic and international markets.

Exchange rate effects are similarly mixed. Agbolosoo et al. (2024) and Setiawan et al. (2025) found positive and significant effects of the exchange rate on Indonesian cocoa exports. Andriyani and Septiani (2023) also reported a positive long-run effect of the exchange rate, while Wardhany and Adzim (2018) found a positive but relatively weak effect. In contrast, Susantinah (2019), Adelina et al. (2020), and Sandry and Malik (2017) found that the exchange rate was not statistically significant. Amoro and Shen (2013), examining cocoa exports in Côte d'Ivoire, also found no significant effect of the exchange rate. These findings demonstrate that the relationship between exchange rate movements and cocoa exports remains empirically inconclusive.

Demand and Consumption

Demand-side conditions also influence the international market for cocoa. Susantinah (2019) found that domestic consumption has a positive and significant effect on Indonesian cocoa exports. This finding indicates that consumption may be associated with developments in the cocoa industry and market activity, although the direction of the relationship requires careful interpretation because domestic consumption may also compete with exports through the allocation of domestic cocoa supply.

International and destination-market demand has also been examined through several approaches. Putri et al. (2023), using a gravity model for Indonesian cocoa exports to five destination countries, found that export volume has a positive and significant relationship with export growth, while destination-country characteristics such as GDP, economic distance, and population also affect export performance. Adelina et al. (2020) found that the GDP of destination countries has a positive and significant effect on Indonesian cocoa exports, indicating that economic conditions in importing countries can influence Indonesia's export opportunities.

Evidence from international cocoa markets further supports the relevance of consumption. Sandry and Malik (2017) found that U.S. cocoa consumption has a significant positive effect on Indonesia's cocoa competitiveness. These findings suggest that cocoa exports are influenced not only by Indonesia's domestic supply capacity but also by

developments in international demand. However, the existing literature has generally examined demand through individual destination-country characteristics or competitiveness rather than directly examining global cocoa consumption as a determinant of Indonesian cocoa export value.

Competitiveness and Export Structure

Another strand of literature focuses on Indonesia's competitiveness and export structure rather than directly estimating the determinants of export value. Tresliyana et al. (2015) found that Indonesia had a comparative advantage in several cocoa products, including cocoa beans, cocoa paste, cocoa butter, and cocoa powder. Augustin et al. (2022) similarly reported that Indonesian cocoa products had comparative advantages in several destination markets, although cocoa bean exports showed a declining trend while cocoa butter exports increased. These findings indicate that Indonesia possesses export potential across both raw and processed cocoa products.

Nevertheless, more recent evidence suggests that Indonesia's cocoa competitiveness has weakened. Dermawan and Saputera (2026), using RCA, RSCA, and Market Share Index approaches, reported a decline in Indonesia's cocoa competitiveness during 2014–2023. The decline in competitiveness was reflected in reductions in RCA, RSCA, and market share, while Côte d'Ivoire and Ghana maintained stronger positions in the international cocoa market. This development is particularly relevant because changes in competitiveness may influence Indonesia's ability to maintain export performance amid competition from major cocoa-producing countries.

The literature on competitiveness also highlights the importance of export composition. Augustin et al. (2022) found a declining trend in cocoa bean exports alongside an increasing trend in cocoa butter exports. This suggests that changes in Indonesia's cocoa exports cannot be assessed solely from aggregate export values or volumes because changes in the composition of exported cocoa products may also influence overall export performance.

Research Synthesis and Research Gap

The reviewed literature indicates that cocoa production and productivity have the most consistent positive relationship with Indonesian cocoa exports. Studies by Feni et al. (2022), Wardhany and Adzim (2018), Susantinah (2019), Purnomo et al. (2019), Agbolosoo et al. (2024), and Setiawan et al. (2025) generally demonstrate that greater production or productivity increases export capacity. This finding supports the argument that domestic supply is an important foundation for Indonesia's cocoa export performance.

In contrast, the effects of international prices, domestic prices, and exchange rates remain inconsistent. Some studies identify positive effects, while others report negative or statistically insignificant relationships. The differences are particularly evident for international cocoa prices and exchange rates, suggesting that their effects may depend on market conditions, observation periods, model specifications, and the way export performance is measured.

The literature also demonstrates that demand and competitiveness are relevant to cocoa export performance. However, existing studies frequently focus on export volume, destination-country characteristics, or competitiveness indicators such as RCA and RSCA. Relatively fewer studies examine the determinants of Indonesia's aggregate cocoa export value by simultaneously considering domestic production, domestic producer prices,

international cocoa prices, global cocoa consumption, exchange rates, and world cocoa production over a long observation period.

Therefore, this study contributes to the existing literature by analyzing the determinants of Indonesian cocoa export value during 2000–2023. The relatively long observation period allows the study to capture changes in domestic cocoa production and market conditions as well as major developments in the international cocoa market. In addition, focusing on export value provides a different perspective from studies that primarily examine export volume or competitiveness. By integrating domestic supply factors and international market conditions within a single empirical framework, this study seeks to provide a more comprehensive explanation of fluctuations in Indonesia's cocoa export value.

RESEARCH METHOD

This study employs the Ordinary Least Squares (OLS) regression method to analyze the effects of cocoa production, domestic producer prices, international cocoa prices, international cocoa consumption, the rupiah exchange rate against the US dollar, and total world cocoa production on Indonesia's cocoa export value. The econometric model is specified as follows:

$$EKSP_t = \beta_0 + \beta_1 PK_t + \beta_2 HP_t + \beta_3 HKI_t + \beta_4 KKI_t + \beta_5 NT_t + \beta_6 TPKD_t + \varepsilon_t$$

Where:

<i>EKSP</i>	= Indonesia's cocoa export value (in million USD)
<i>PK</i>	= cocoa production (tons)
<i>HP</i>	= domestic producer price (IDR/kg)
<i>HKI</i>	= international cocoa price (USD/ton)
<i>KKI</i>	= international cocoa consumption (tons)
<i>NT</i>	= rupiah exchange rate against USD (IDR per USD)
<i>TPKD</i>	= total world cocoa production (tons)
ε	= <i>Error term</i>
β_0	= Constant
$\beta_1, \beta_2, \dots, \beta_6$	= regression coefficients
<i>t</i>	= time period

The econometric model above is developed from several previous studies. The Indonesian cocoa production variable (PK) is adopted from Feni et al. (2022) and Wardhany & Adzim (2018), while the international cocoa price (HKI) and exchange rate (NT) variables are taken from Meidrieswida (2018) and Andriyani & Septiani (2023). The international cocoa consumption (KKI) and total world cocoa production (TPKD) variables are developed based on export demand theory and international trade theory. The variables PK, HKI, KKI, and NT are hypothesized to have a positive effect on Indonesia's cocoa export value (EKSP), while HP and TPKD are expected to have a negative effect on cocoa export value.

The data used in this study are annual time series data from 2000 to 2023 obtained from several sources, namely Statistics Indonesia (BPS), Bank Indonesia, the Food and

Agriculture Organization (FAO), the International Cocoa Organization (ICCO), and the United States Department of Agriculture (USDA).

The econometric estimation procedure includes parameter estimation using the Ordinary Least Squares (OLS) method, classical assumption tests consisting of the normality test of residuals, autocorrelation test, heteroscedasticity test, and multicollinearity test, model goodness-of-fit tests including the F-test and coefficient of determination (R^2), as well as hypothesis testing using the t-test to examine the effect of each independent variable on Indonesia's cocoa export value.

RESULTS AND DISCUSSION

The estimation results of the econometric model along with the supporting diagnostic tests are summarized in Table 1.

Table 1
Econometric Model Estimation Results

$\log(EKSP) = 6.661622 + 0.638990\log(PK) + 0.284664\log(HP) + 0.258653HKI$			
	(0,0141)**	(0,2040)	(0,0164)**
$+2.010222KKI + 0.037572\log(NT) - 0.414823\log(TPKD)$			
	(0,1943)	(0,8989)	(0,5147)
$R^2 = 0,936$; DW-Stat. = 1,919; F-Stat. = 41,708; Prob. F-Stat. = 0,000			

Diagnostic Tests

1. Multicollinearity (VIF):
LOG(PK) = 2.021; LOG(HP) = 16.935; HKI = 6.495; KKI = 11.437; LOG(NT) = 5.952;
LOG(TPKD) = 18.847
2. Normality of Residuals:
JB(2) = 1.008; Prob. JB(2) = 0.604
3. Autocorrelation:
 $\chi^2(3) = 2.503$; Prob. $\chi^2(3) = 0.475$
4. Heteroscedasticity:
 $\chi^2(11) = 11.800$; Prob. $\chi^2(11) = 0.379$
5. Linearity:
F(2,15) = 1.329; Prob. F(2,15) = 0.294

(Source: BPS, processed. Notes: * significant at $\alpha = 0.01$; ** significant at $\alpha = 0.05$; *** significant at $\alpha = 0.10$. Values in parentheses are p-values of the t-statistics.)

The diagnostic tests indicate that the probability values for the normality, autocorrelation, heteroscedasticity, and linearity tests are 0.604, 0.475, 0.379, and 0.294, respectively. All probability values are greater than 0.10. Thus, based on the diagnostic tests conducted, the residuals do not indicate violations of normality, autocorrelation, heteroscedasticity, or functional-form linearity at the 10 percent significance level.

The multicollinearity test indicates relatively high VIF values for several independent variables. The VIF values are 2.021 for LOG(PK), 16.935 for LOG(HP), 6.495 for HKI, 11.437 for KKI, 5.952 for LOG(NT), and 18.847 for LOG(TPKD). Therefore, LOG(HP), KKI, and LOG(TPKD) have VIF values above 10, indicating the presence of multicollinearity among some explanatory variables. This result should be considered when interpreting the individual statistical significance of the regression coefficients.

The F-statistic of 41.708 with a probability value of 0.000 indicates that the independent variables included in the model are jointly statistically significant in explaining variation in Indonesia's cocoa export value. The coefficient of determination (R^2) is 0.936, indicating that 93.6 percent of the variation in Indonesia's cocoa export value is accounted for by the independent variables included in the model, while the remaining 6.4 percent is associated with factors outside the model. The R^2 value is reported as a measure of the model's explanatory fit and is interpreted together with the other statistical tests.

The partial estimation results show that cocoa production (LOG(PK)) and international cocoa prices (HKI) have positive and statistically significant coefficients. Cocoa production has a p-value of 0.0141, which is below the 5 percent significance level, while international cocoa prices have a p-value of 0.0164, also below 5 percent. In contrast, domestic producer prices (LOG(HP)), international cocoa consumption (KKI), the exchange rate (LOG(NT)), and total world cocoa production (LOG(TPKD)) have p-values of 0.2040, 0.1943, 0.8989, and 0.5147, respectively, which exceed the 10 percent significance level. Thus, the regression results provide statistically significant evidence for the positive associations of cocoa production and international cocoa prices with cocoa export value, whereas no statistically significant evidence is obtained for the other four variables at the 10 percent significance level.

Cocoa production has a coefficient of 0.638990 and is specified in logarithmic form for both the dependent variable and the production variable. Therefore, the coefficient can be interpreted as an elasticity. A 1 percent increase in cocoa production is associated with an approximately 0.639 percent increase in Indonesia's cocoa export value, *ceteris paribus*. Conversely, a 1 percent decrease in cocoa production is associated with an approximately 0.639 percent decrease in export value.

International cocoa prices have a coefficient of 0.258653, while the dependent variable is expressed in logarithmic form and HKI is expressed in levels. Therefore, the coefficient represents a log-linear relationship rather than an elasticity. A one-unit increase in international cocoa prices, measured in USD/ton, is associated with an increase of 0.258653 in the logarithm of Indonesia's cocoa export value. Expressed in percentage terms, the corresponding change in export value is approximately 29.5 percent, calculated as $(e^{0.258653} - 1) \times 100$, *ceteris paribus*.

Discussion

The regression results indicate that Indonesian cocoa production and international cocoa prices are positively and statistically significantly associated with Indonesia's cocoa export value during 2000–2023. In contrast, domestic producer prices, international cocoa consumption, the rupiah exchange rate against the US dollar, and total world cocoa production do not show statistically significant evidence of an association with Indonesian cocoa export value at the 10 percent significance level. However, the interpretation of the insignificant variables should be made cautiously because the model shows multicollinearity for several explanatory variables, as indicated by VIF values above 10 for domestic producer prices, international cocoa consumption, and total world cocoa production.

Cocoa Production

Cocoa production has a positive and statistically significant association with Indonesian cocoa export value. The coefficient of 0.638990 indicates that, holding other variables constant, a 1 percent increase in Indonesian cocoa production is associated with an

approximately 0.639 percent increase in cocoa export value. Because both export value and cocoa production are expressed in logarithmic form, the coefficient represents an elasticity.

This relationship is consistent with the role of domestic production in determining the availability of cocoa for international markets. An increase in domestic production can expand the quantity of cocoa available for export, provided that other market conditions support the allocation of production to international markets. However, the regression result should be interpreted as an association rather than direct evidence of causality, because the OLS model does not by itself establish that changes in production cause changes in export value.

The finding is consistent with Feni et al. (2022), Wardhany and Adzim (2018), Setiawan et al. (2025), and Purnomo et al. (2019), who reported positive relationships between cocoa production and cocoa exports. The result is also in line with export supply theory, which suggests that greater domestic production can increase the quantity of a commodity available for export. From the perspective of comparative advantage, Indonesia's continued participation in international cocoa trade also indicates the importance of domestic production capacity in supporting its position in the cocoa market.

International Cocoa Prices

International cocoa prices have a positive and statistically significant association with Indonesian cocoa export value. The estimated coefficient of 0.258653 is specified in a log-linear form because export value is expressed in logarithms while international cocoa prices are expressed in levels. Therefore, the coefficient should not be interpreted as an elasticity. A one-unit increase in international cocoa prices, measured in USD/ton, is associated with an increase of 0.258653 in the logarithm of Indonesian cocoa export value. Using the exact exponential interpretation, this corresponds to an approximately 29.5 percent increase in export value, *ceteris paribus*.

The positive relationship indicates that international cocoa prices are an important factor associated with the value of Indonesian cocoa exports. One possible interpretation is that higher international prices increase the monetary value received from cocoa exports, particularly when export quantities do not decline proportionally. However, the regression result does not establish that changes in international prices are caused by changes in Indonesian export value or that higher prices necessarily result from stronger international demand. International cocoa prices may also be influenced by broader global market conditions, including changes in supply and demand.

This finding is consistent with Meidrieswida (2018) and Purnomo et al. (2019), who found a positive relationship between world cocoa prices and Indonesian cocoa exports. It is also consistent with the argument presented by Putri et al. (2023) that international price conditions are relevant to export decisions and export performance.

Domestic Producer Prices

Domestic producer prices have a positive coefficient but do not show statistically significant evidence of an association with Indonesian cocoa export value. The coefficient of 0.284664 has a p-value of 0.2040, which exceeds the 10 percent significance level. Therefore, the result does not provide sufficient statistical evidence to conclude that changes in domestic producer prices are associated with changes in cocoa export value within the estimated model.

This finding should be interpreted cautiously because the VIF value for LOG(HP) is 16.935, indicating substantial multicollinearity. Multicollinearity can increase the standard error of an estimated coefficient and make individual statistical significance more difficult to detect. Consequently, the insignificant coefficient should not be interpreted as evidence that domestic producer prices have no economic relationship with cocoa exports.

The positive coefficient nevertheless indicates the direction of the estimated relationship in the model. However, the available regression results do not provide sufficient evidence to identify the specific mechanism underlying this relationship. Therefore, explanations involving domestic processing policies or domestic industrial demand should be regarded as possible factors rather than established explanations, unless supported by additional empirical evidence.

International Cocoa Consumption

International cocoa consumption has a positive coefficient but does not show statistically significant evidence of an association with Indonesian cocoa export value. The coefficient of 2.010222 has a p-value of 0.1943, which is above the 10 percent significance level. Thus, the estimated model does not provide sufficient statistical evidence that changes in international cocoa consumption are associated with changes in Indonesian cocoa export value.

From an economic perspective, higher global cocoa consumption could potentially create greater demand for cocoa products in international markets. Nevertheless, an increase in global consumption does not necessarily translate proportionally into higher exports from Indonesia because global demand is supplied by multiple cocoa-producing countries. Indonesia therefore competes with other producers in supplying the international cocoa market.

The insignificant result should also be interpreted in light of the VIF value of 11.437 for KKI, which indicates multicollinearity. Accordingly, the lack of statistical significance may partly reflect the relationship between international cocoa consumption and other variables included in the model. The result is therefore more appropriately described as the absence of statistically significant evidence of an association rather than evidence that international cocoa consumption has no effect on Indonesian cocoa exports.

Exchange Rate

The rupiah exchange rate against the US dollar has a positive coefficient but does not show statistically significant evidence of an association with Indonesian cocoa export value. The coefficient of 0.037572 has a p-value of 0.8989, which is substantially above the 10 percent significance level.

The positive coefficient is consistent with the theoretical expectation that currency depreciation may improve the price competitiveness of exports when export prices are denominated in foreign currency. However, the estimated relationship is not statistically significant in this study. Therefore, the results do not provide sufficient evidence that movements in the rupiah–US dollar exchange rate were associated with changes in Indonesian cocoa export value during the study period.

The result also suggests that exchange-rate movements alone may not be sufficient to explain changes in cocoa export value. Export performance may simultaneously be related to production conditions, international cocoa prices, product characteristics, and international

market conditions. However, these mechanisms are not directly tested in the present model and therefore should not be interpreted as causal explanations of the insignificant coefficient.

Total World Cocoa Production

Total world cocoa production has a negative coefficient but does not show statistically significant evidence of an association with Indonesian cocoa export value. The coefficient of -0.414823 has a p-value of 0.5147 , which exceeds the 10 percent significance level.

The negative coefficient is consistent with the possibility that an increase in global cocoa production expands the supply available in the international market and may intensify competition among exporting countries. In such circumstances, additional supply from competing producers could potentially reduce Indonesia's relative position in the international market. Nevertheless, the estimated coefficient is statistically insignificant, so the present results do not provide sufficient evidence that changes in total world cocoa production are associated with changes in Indonesian cocoa export value.

The interpretation also needs to consider the VIF value of 18.847 for $\text{LOG}(\text{TPKD})$, which indicates substantial multicollinearity. Therefore, the estimated coefficient and its statistical significance should be interpreted with caution. The insignificant result should not be interpreted as proof that global production conditions have no economic relevance to Indonesian cocoa exports.

Overall Discussion

Overall, the results indicate that cocoa production and international cocoa prices are the variables for which the model provides statistically significant evidence of a positive association with Indonesian cocoa export value. The other variables—domestic producer prices, international cocoa consumption, the rupiah exchange rate, and total world cocoa production do not show statistically significant evidence of an association at the 10 percent significance level.

The interpretation of these results should take into account the functional form of the model and the presence of multicollinearity. In particular, the coefficient of international cocoa prices represents a log-linear relationship rather than an elasticity, while the high VIF values for domestic producer prices, international cocoa consumption, and total world cocoa production indicate that their individual coefficient estimates should be interpreted cautiously. Accordingly, the findings provide evidence of statistical associations within the estimated OLS model rather than definitive causal effects.

CONCLUSION

In conclusion, the estimated model shows that Indonesian cocoa exports during 2000–2023 are significantly influenced by domestic cocoa production and international cocoa prices, while domestic producer prices, international cocoa consumption, the exchange rate, and total world cocoa production do not have a statistically significant effect. These findings imply that strengthening domestic production capacity and maintaining competitiveness in response to global price movements are key factors in enhancing Indonesia's cocoa export performance. Therefore, the government is advised to focus on improving cocoa productivity through better cultivation practices, farmer support programs, and downstream industry development, while also enhancing market access and price competitiveness in international

markets. In addition, policies should be directed toward increasing value-added cocoa products rather than relying solely on raw bean exports. However, this study has limitations, particularly the relatively short annual time span (2000–2023), the use of aggregate national-level data that may mask regional variations, and the presence of multicollinearity among some explanatory variables. Future research is recommended to incorporate regional panel data, include additional determinants such as export policy and quality factors, and apply alternative econometric approaches to obtain more robust and comprehensive results.

REFERENCES

- Adelina, S., Wibowo, R. P., & Hasyim, H. (2020). *Analysis of the Export Determinants of Indonesian Cocoa with Gravity Model Approach*. 7(October), 66–75.
- Agbolosoo, J. A., Sari, R. M., Midamba, D. C., & Massaquoi, I. (2024). *Influential Factors of Indonesian Cocoa Export : Evidence from FMOLS and DOLS Approaches*. 9(6), 295–305.
- Amoro, G., & Shen, Y. (2013). *The Determinants of Agricultural Export : Cocoa and Rubber in Cote d ' Ivoire*. 5(1), 228–233. <https://doi.org/10.5539/ijef.v5n1p228>
- Andriyani, D., & Septiani, M. (2023). *Key factors analysis in optimizing indonesian cocoa exports*. 1(1), 1–10.
- Augustin, N. P., Prasetyo, E., & Santoso, S. I. (2022). *Analisis Daya Saing dan Trend Ekspor Kakao Indonesia ke Lima Negara Tujuan Tahun 2010-2019*. 6, 442–455.
- Dermawan, D. D., & Saputera, D. (2026). *A Comparative Study of Cocoa Beans in Indonesia , Ghana , Côte d ' Ivoire , Ecuador , and Cameroon Using the RCA , RSCA , and MSI Approaches*. 6, 300–315.
- Feni, R., Marwan, E., Kesumawati, N., & Efendi, R. (2022). *International Journal of Multicultural and Multireligious Understanding The Analysis of Factors Affecting Indonesian Cocoa Bean Exports 1981-2019*. 377–384.
- Hakiki, S. I. (2019). *Pengaruh Luas Lahan, Produksi, Harga Kakao Internasional Terhadap Ekspor Kakao Indonesia*. 02, 48–64.
- Isbahi, M. B., Zuana, M. M. M. ., & Mariana, E. R. . (2022). *The Technology Strategy in Website Communication Media in Improving Business Activities*. *Majapahit Journal of Islamic Finance and Management*, 1(2), 126–138. <https://doi.org/10.31538/mjifm.v1i2.17>
- Maulana, R. N., Wipangga, T., & Angeli, B. (2025). *Kajian Daya Saing Ekspor Komoditas Kakao Indonesia*. 2(1), 1–10.
- Meidrieswida, A. G. (2018). *Pengaruh Jumlah Produksi Kakao , Harga Kakao Dunia , Nilai Tukar , dan Harga Ekspor Kakao terhadap Ekspor Kakao di Indonesia*. 1(2), 73–79.
- Purnomo, D. M., Koesriwulandari, & Siswati, E. (2019). *Pengaruh Ekspor Kakao Indonesia Yang Ditinjau Dari Kebijakan Perdagangan Internasional*. 19(2), 28–44.
- Putri, D., Ivo, J., Nisa, N., & Antriandarti, E. (2023). *The Determinant of Indonesian Cocoa Export Growth to the Main Export Destination Countries*. 9(4), 1035–1044. <https://doi.org/10.26555/jiteki.v9i4.27232>
- Sandry, H. buana, & Malik, N. (2017). *Analisis Harga Internasional, Nilai Tukar, Dan Konsumsi Kako Amerika Terhadap Daya Saing ekspor Kakao Indonesia*. *Jurnal Ilmu Ekonomi*, 1, 340–351.

- Setiawan, R. F., Soedarto, T., & Hendrarini, H. (2025). *Dynamics Of Competitiveness And Determinants Of Indonesian Cocoa Exports In The Global Market*. 22(3), 302–316.
- Susantinah, N. (2019). *Analisis Ekspor Komoditi Indonesia*. 19(2), 15–27.
- Tresliyana, A., Fariyanti, A., & Rifin, dan A. (2015). *Daya Saing Kakao Indonesia di Pasar Internasional*. 12(2), 150–162. <https://doi.org/10.17358/JMA.12.2.150>
- Wardhany, M., & Adzim, F. (2018). *Economics Development Analysis Journal*. 7(3), 286–293.