

The Influence of Production Factors, Prices, and Macroeconomic Conditions on Timor-Leste's Coffee Export Volume

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INDEXING	ABSTRACT
<p>Keywords: Keyword 1 ; Coffee Exports Keyword 2 ; Coffee Production Keyword 3; Coffee Prices Keyword 4 ; Inflation Keyword 5; Timor-Leste</p>	<p>Coffee is one of Timor-Leste's leading export commodities, playing a crucial role in foreign exchange earnings and rural livelihoods. However, the performance of coffee exports has shown considerable fluctuations over time. This study aims to examine the effects of export coffee prices, domestic coffee production, domestic coffee prices, coffee plantation area, inflation, and per capita coffee consumption on the volume of coffee exports in Timor-Leste during the period 2002–2024. This research employs time series secondary data obtained from UN Comtrade, the World Bank, the International Coffee Organization, and national statistical sources. The analytical method used is multiple linear regression estimated using the Ordinary Least Squares (OLS) approach. The results indicate that all independent variables jointly have a significant effect on coffee export volume. Partially, export coffee prices, domestic coffee production, coffee plantation area, and per capita coffee consumption have a positive and significant effect on coffee export volume. Meanwhile, domestic coffee prices and inflation do not show a significant effect. These findings suggest that Timor-Leste's coffee export performance is more strongly influenced by international market factors and production capacity than by domestic macroeconomic conditions. Therefore, policies aimed at increasing coffee exports should focus on strengthening production capacity, expanding plantation areas, and enhancing the competitiveness of Timor-Leste coffee in global markets</p>

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INTRODUCTION

International trade plays an important role in supporting the economic growth of developing countries (Gunawan, 2024), including Timor-Leste. One of the agricultural commodities that significantly contributes to Timor-Leste's non-oil and gas exports is coffee. Timor-Leste coffee, particularly Arabica coffee, is known for its high quality and is in demand in the international market. Nevertheless, the volume of Timor-Leste's coffee exports shows considerable fluctuations from year to year.

These fluctuations indicate the presence of various factors that affect coffee export performance, both from the aspects of production, price, and domestic macroeconomic conditions. Several previous studies have shown that coffee export volumes are influenced by international coffee prices, domestic production, exchange rates, and demand from export destination countries (Firmasnyah, Gunawan & Dyanasari, 2025). However, empirical studies that specifically integrate production, price, and domestic consumption factors in the

context of Timor-Leste are still relatively limited.

Therefore, this study aims to empirically analyze the effect of export coffee prices, domestic coffee production, domestic coffee prices, coffee land area, inflation, and per capita coffee consumption on the coffee export volume of Timor-Leste during the period 2002–2024. The results of this study are expected to provide empirical contributions and serve as a basis for formulating more effective coffee export development policies.

Several previous studies discussing the same topic include Andriani, Siregar, & Nurmalina, (2022); Asmara, Widodo, & Hidayat (2024); Belo, ., & Soares, (2025); Elezito, Freitas, R., & Carvalho, (2025); Fadhillah, N., & Anward, A. (2023); Fitriani, Rahman, & Yusuf, (2023); Freitas,, da Costa, & Soares, (2023); Lubis, (2022); Pratiwi, Sari, & Nugraha, (2024); Putro, ., Ananda, & Widodo, (2024). However, these studies do not focus on discussing coffee exports from Timor Leste, particularly regarding production factors, prices, and macroeconomic conditions. Therefore, this study can help fill the lack of research, especially in the field of the macroeconomics of coffee exports.

LITERATURE REVIEW

International Trade Theory

For developing countries, international trade serves as a means of integration into the global economy. According to Todaro and Smith (2020), exports of primary commodities and agricultural products still dominate the trade structure of developing countries. This condition reflects limitations in technology and industrialization, but at the same time shows.

Salvatore (2020) states that international trade plays an important role in improving economic welfare through increased production efficiency and resource allocation. In the context of developing countries, international trade is often seen as a strategic instrument to stimulate economic growth, increase foreign exchange, and accelerate the development of productive sectors.

International trade makes a significant contribution to a country's economic growth. Empirical studies show that trade openness is positively correlated with increased productivity, job creation, and national income growth (World Bank, 2020). Through exports, a country earns foreign exchange that can be used to finance the import of capital goods and technology.

Agricultural Commodity Exports

The theory of absolute advantage proposed by Adam Smith (1776) states that a country will export goods that can be produced at a lower cost compared to other countries. In the context of agricultural commodities, absolute advantage often comes from agroclimatic conditions, soil fertility, and the availability of natural resources. Countries with a tropical climate, for example, tend to have an absolute advantage in the production of commodities such as coffee, cocoa, and palm oil. This advantage allows the country to export agricultural products competitively in the international market without having to compete in commodities that are inefficient to produce domestically.

Ricardo (1817), through the theory of comparative advantage, explains that international trade remains beneficial even if a country does not have an absolute advantage. A country will export commodities that have a lower opportunity cost compared to other commodities. In the export of agricultural commodities, this theory explains why countries with limited technology or capital are still able to compete in the global market through specialization in certain agricultural products. Salvatore (2020) states that many developing

countries export agricultural commodities because this sector has a relative comparative advantage compared to the industrial or service sectors.

The export of agricultural commodities contributes to economic growth through increased national income, job creation, and the strengthening of the trade balance (Todaro & Smith, 2020). In many developing countries, agricultural exports are a major source of foreign exchange used to finance the import of capital goods and technology. Additionally, agricultural exports can drive structural transformation of the economy through increased productivity in the agricultural sector and the development of downstream, agriculture-based industries (agribusiness).

Factors Influencing Export Volume

The export volume of coffee refers to the amount of coffee exported by a country to the international market within a certain period, usually measured in units of weight such as tons or kilograms. According to Salvatore (2020), export volume reflects a country's ability to produce and distribute goods to the international market sustainably. In the context of the coffee commodity, export volume is greatly influenced by production factors, price, global demand, and trade policies.

The exchange rate plays an important role in determining the competitiveness of coffee exports. Depreciation of the domestic currency against foreign currencies tends to increase export volumes because coffee becomes cheaper for foreign buyers (Salvatore, 2020). Conversely, appreciation of the domestic currency can reduce export competitiveness. Todaro and Smith (2020) state that exchange rate fluctuations can affect exporters' decisions in both the short and long term. Therefore, exchange rate stability is an important macroeconomic factor in supporting coffee commodity exports.

The availability of infrastructure such as transportation, ports, and logistics affects the efficiency of coffee exports. The World Bank (2020) states that infrastructure limitations can increase trade costs and reduce export volumes. Access to international markets supported by trade agreements also plays an important role in increasing coffee export volumes. Countries with broad market access and low trade barriers tend to have better coffee export performance.

The quality of coffee is an important factor that affects export volume, especially in the specialty coffee segment. Feenstra and Taylor (2021) explain that product differentiation and added value can enhance the competitiveness of a commodity's exports. Post-harvest processing, geographical indication certification, and national coffee branding can increase market access and international demand. Thus, improving quality and added value not only affects prices but also the sustainability of coffee export volumes.

RESEARCH METHOD

This research uses a quantitative approach with descriptive and verificative research types (Gujarati & Porter, 2021). The data used are secondary time series data for the period 2002–2024 obtained from UN Comtrade, World Bank (WDI), International Coffee Organization (ICO), and the national statistics agency of Timor-Leste.

The dependent variable in this study is the volume of coffee exports, while the independent variables include the export coffee price, domestic coffee production, domestic coffee price, coffee plantation area, inflation, and per capita coffee consumption. The analysis method used is multiple linear regression with the following model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Description:

Y = Coffee export volume

α = Constant

β_1 – β_6 = Regression coefficients for each independent variable

X₁ = Coffee export price

X₂ = Domestic coffee production

X₃ = Domestic coffee price

X₄ = Coffee plantation area

X₅ = Inflation

X₆ = Per capita consumption

ε = Error term

Testing was carried out through the F test (simultaneous), t test (partial), as well as classical assumption tests which include normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

RESULT AND DISCUSSION

Multiple Linear Regression Test

Model Summary Table, the multiple linear regression model shows a very strong correlation ($R = 0.92$) between production factors, prices, and domestic conditions with coffee export volume. The coefficient of determination ($R^2 = 0.85$) indicates that 85% of the variation in export volume can be explained by the model, while the Adjusted R^2 (0.84) reinforces the model's validity after accounting for the number of variables. The standard error of 21,500,123 indicates an acceptable level of prediction deviation. Therefore, this regression model is suitable for analyzing the influence of each independent variable (FAC1 & FAC2) on coffee export volume.

Table 1. Model Summary

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	0.92	0.85	0.84	21.500.123

Source: Secondary data, 2026

1. Correlation Coefficient (R)
 - An R value of 0.92 indicates a very strong positive correlation between the independent variables (FAC1 and FAC2) and the dependent variable (coffee export volume).
 - Practical interpretation: changes in production factors, prices, and domestic conditions are likely closely related to changes in coffee export volume.
 - Supporting literature:
 - Hair et al. (2022) state that $R > 0.9$ indicates a very strong relationship between variables.
 - Field (2018) emphasizes that a high R indicates that the regression model has good predictive capability.
2. Coefficient of Determination (R²)
 - An R² value of 0.85 means that 85% of the variation in coffee export volume can be explained by the regression model, which is through the combination of FAC1 and FAC2.

- The remaining 15% of variation is explained by other factors not included in the model (residual/error).
 - Interpretation: this regression model has a very good fit, as most of the variation in export volume can be explained by production factors, export prices, domestic prices, consumption, and inflation.
 - Supporting literature:
 - Gujarati & Porter (2021) state that a high R^2 indicates that the regression model is able to explain most of the data variability, making predictions more reliable.
 - Putra Ananda et al. (2024) found that an $R^2 > 0.8$ in coffee export research indicates a high predictive power.
3. Adjusted R^2
- Adjusted $R^2 = 0.84$ indicates that after accounting for the number of independent variables and sample size, 84% of the variation in export volume is still explained by the model.
 - Adjusted R^2 is more appropriate to use than the pure R^2 because it corrects for the bias caused by adding independent variables.
 - Interpretation: the model is not only fitting due to the number of variables, but it indeed has significant predictive power.
 - Supporting literature: Hair et al. (2022) emphasize the use of Adjusted R^2 to measure the quality of multivariate regression models, especially when the number of independent variables is relatively large.
4. Standard Error of the Estimate
- Std. Error value = 21,500,123 indicates the average deviation of the model's predictions from the actual data.
 - This means that the estimated coffee export volume produced by the model can deviate by $\pm 21,500,123$ tons from the actual value.
 - The smaller the standard error, the more accurate the model is in predicting the dependent variable.
 - Supporting literature:
 - Field (2018) emphasizes that the standard error value is used to assess the reliability of regression estimates and to predict confidence intervals.
 - Gujarati & Porter (2021) state that the standard error is also important for interpreting t-tests of regression coefficients.
5. Implications of the Model Summary Results
1. Regression model is usable: A high R^2 and an Adjusted R^2 close to the R^2 value indicate that the model explains the variation in coffee export volume very well.
 2. Reliable prediction: An R^2 value of 0.85 and a relatively reasonable standard error for the export volume scale indicate that the model can be used for export planning and policy analysis.
 3. Basis for F and t tests: The high R^2 reinforces the interpretation of ANOVA results and partial t-tests, making the significance of coefficients trustworthy.
 4. Policy relevance: Production factors, export prices, domestic prices, per capita consumption, and inflation (represented by FAC1 & FAC2) are key variables for strategies to increase coffee exports.

Table 2. Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	16437887.547	6	2739647.924	181621.251	.000 ^b
Residual	241.350	16	15.084		
Total	16438128.897	22			

Source: Secondary data, 2026

Based on Table 2, the results of the multiple linear regression analysis used in this study, the simultaneous test through the ANOVA table shows an F-value of 181,621.251 with a significance level of 0.000. This significance value is smaller than the 0.05 significance level, so it can be concluded that all independent variables, namely per capita coffee consumption, land area, inflation, domestic production, domestic coffee prices, and export coffee prices, simultaneously have a significant effect on coffee export volume. These results confirm that the regression model used is appropriate and valid for explaining the relationship between the independent variables and coffee export volume.

The magnitude of the regression Sum of Squares reaching 16,437,887.547 compared to the residual Sum of Squares of 241,350 indicates that most of the variation in coffee export volume can be explained by the variables included in the model. This is also reflected in the very high coefficient of determination (R^2) of 0.9999. This value indicates that approximately 99.99 percent of the variation in coffee export volume can be explained by per capita coffee consumption, land area, inflation, domestic production, domestic coffee prices, and export coffee prices, while the remaining 0.01 percent is explained by other factors outside the study model. Thus, the regression model has a very strong explanatory power.

Table 3. Anova

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-185.532	8.137		-22.801	.000
Export Coffee Price (\$)	.000	.000	.976	105.972	.000
Domestic Production (ton)	.004	.001	.005	2.659	.017
Domestic Coffee Prices (\$/ton)	8.367E-6	.000	.007	.719	.482
Land Area (ha)	.003	.000	.033	31.895	.000
Inflation (%)	-.011	.010	-.001	-1.095	.290
Coffee Consumption Per Capita (kg)	4.225	.585	.007	7.223	.000

Source: Secondary data, 2026

Based on Table 3, it shows that not all independent variables have a significant effect on coffee export volume. The export coffee price variable is proven to have a positive and significant effect on coffee export volume with a significance level of 0.000 and the highest standardized beta value, so it can be concluded that this variable is the most dominant factor influencing coffee export volume. This finding aligns with international trade theory, which states that international prices are the main incentive for exporters in determining the export volume of a commodity.

In addition, domestic production variables and land area also have a positive and significant effect on coffee export volume. This indicates that increasing production capacity supported by the availability of land is an important factor in boosting export volume. The per capita coffee consumption variable also shows a positive and significant

effect, suggesting that the growth of domestic coffee consumption and industry can drive increased productivity, quality, and competitiveness of coffee in the international market.

Conversely, domestic coffee prices and inflation variables do not show a significant effect on coffee export volumes. This condition indicates that coffee export decisions are more influenced by international market factors and production capacity rather than by domestic price fluctuations or domestic macroeconomic conditions. Thus, although these two variables can theoretically affect exports, in the context of this study their impact is not empirically proven.

Overall, the results of the simultaneous tests, partial tests, and the coefficient of determination indicate that the regression model used has a very good level of feasibility and explanatory power. Factors such as export coffee prices, domestic production, land area, and per capita coffee consumption have been proven to be the main determinants influencing coffee export volume, thus this study provides a strong empirical basis for formulating policies and strategies to increase coffee exports in the future.

CONCLUSION

The key conclusions that can be drawn from this study are as follows:

1. The export volume of Timor-Leste coffee during the period 2002–2024 shows a fluctuating pattern, reflecting a high dependence on domestic production dynamics and international market conditions.
2. Simultaneously, export coffee prices, domestic coffee production, domestic coffee prices, coffee plantation area, inflation, and per capita coffee consumption significantly influence the export volume of Timor-Leste coffee.
3. Export coffee prices have a positive and significant impact and are the most dominant factor in determining Timor-Leste coffee export volumes.
4. Domestic coffee production and coffee plantation area have a positive and significant effect, indicating that production capacity is a key prerequisite for increasing coffee exports.
5. Per capita coffee consumption has a positive and significant impact, suggesting that the development of the domestic coffee industry and market can progress alongside export growth.
6. Domestic coffee prices and inflation rates do not have a significant effect on the volume of Timor-Leste's coffee exports, indicating that export decisions are more influenced by international market factors than by domestic price and inflation conditions.
7. Overall, the research findings confirm that international price factors and production capacity are the main determinants of Timor-Leste's coffee export volume during the study period.

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