

The Analysis Of The Effect Of Production, International Prices, And Inflation On The Export Volume Of Indonesian Tea

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Abstract

This study aims to analyze the effect of tea production, international tea prices, and inflation on the volume of Indonesian tea exports during the period 2004–2024. The research uses a quantitative approach with secondary time-series data obtained from the Central Statistics Agency (BPS) and Indonesian tea statistics. The data were analyzed using multiple linear regression analysis with the SPSS program. The results show that tea production has a positive and significant effect on the export volume of Indonesian tea, indicating that an increase in production leads to higher export volumes. Meanwhile, international tea prices have a negative but insignificant effect, suggesting that fluctuations in global tea prices do not significantly influence Indonesia's tea export performance. In addition, inflation has a positive but insignificant effect on export volume. Simultaneously, the F-test results indicate that tea production, international tea prices, and inflation significantly affect Indonesian tea export volumes. The coefficient of determination ($R^2 = 0.829$) indicates that 82.9% of the variation in Indonesian tea export volume can be explained by the three independent variables, while the remaining 17.1% is influenced by other factors outside the model, such as domestic consumption, domestic tea prices, and exchange rates. These findings highlight the importance of improving production capacity and maintaining competitive export strategies to support the sustainability of Indonesian tea exports in the global market.

Keywords: *Tea Production; International Tea Prices; Inflation; Indonesian Tea Exports.*

A. INTRODUCTION

Indonesia is a country endowed with abundant natural resources, enabling it to possess various leading commodities that can be traded internationally through export activities. With such potential, Indonesia is able to utilize productive sectors as drivers of economic growth. One sector that plays an important role in stimulating national economic circulation while also contributing significantly to state revenue is the agricultural subsector.

A country cannot be separated from international trade activities, namely exports and imports. International trade itself occurs due to differences among countries. These differences include variations in economic structures, natural resources, human resources, technology, prices, climate, and many other factors. Based on these mutually beneficial and interdependent needs, international trade can take place.

International trade activities such as exports play an important role in increasing national income. From a macroeconomic perspective, exports stimulate a country's economy and provide opportunities for economic growth in developing countries such as Indonesia. Some of the benefits obtained by a country from export activities include the inflow of foreign exchange as a result of transaction payments, which contributes to the accumulation of foreign exchange reserves (Adrias & Masinambow, 2025).

Export activities in Indonesia are divided into two types: (1) oil and gas and (2) non-oil and gas. The non-oil and gas sector is further divided into three sectors, namely the industrial sector, the mining sector, and the agricultural sector. One agricultural sector with considerable potential is the plantation subsector. One of the plantation commodities in Indonesia is tea. Tea commodities play a significant role in Indonesia's economy. Most Indonesian tea commodities are exported, while only a

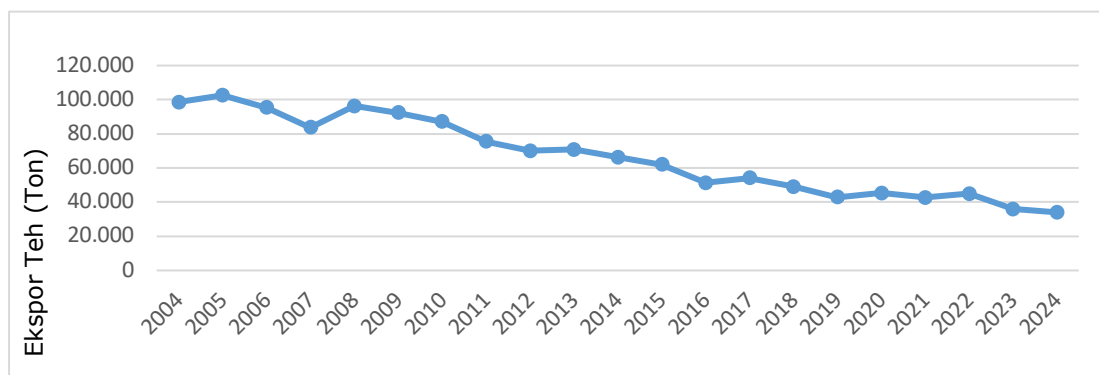
small portion is marketed domestically, making tea one of Indonesia's key export commodities (Rahmatul Putri et al., 2021).

Indonesia is the fifth-largest tea-producing country in the world, after India, China, Sri Lanka, and Kenya, with nearly half of its production exported to international markets. Most exported tea comes from large state-owned plantations, while medium-quality tea is generally consumed domestically. The main tea-producing provinces are West Java, Central Java, and North Sumatra, with West Java contributing the largest production (Statistics Indonesia, 2024). Indonesian tea has reached markets across five continents, with the main export destinations in 2023 including Malaysia, the Russian Federation, the United States, Germany, and China. Despite its wide market reach, the Indonesian tea sector currently faces several challenges, including declining production, reduced international competitiveness, low crop productivity, and limited technological capacity in tea processing among farmers (Simalango et al., 2023).

It is unfortunate that while global demand for tea continues to increase, domestic tea productivity is actually declining. In fact, if managed properly, this sector has the potential to significantly increase the country's foreign exchange earnings (Sidabalok et al., 2017).

Figure 1 shows that during the period 2004–2024, Indonesian tea exports have tended to decline.

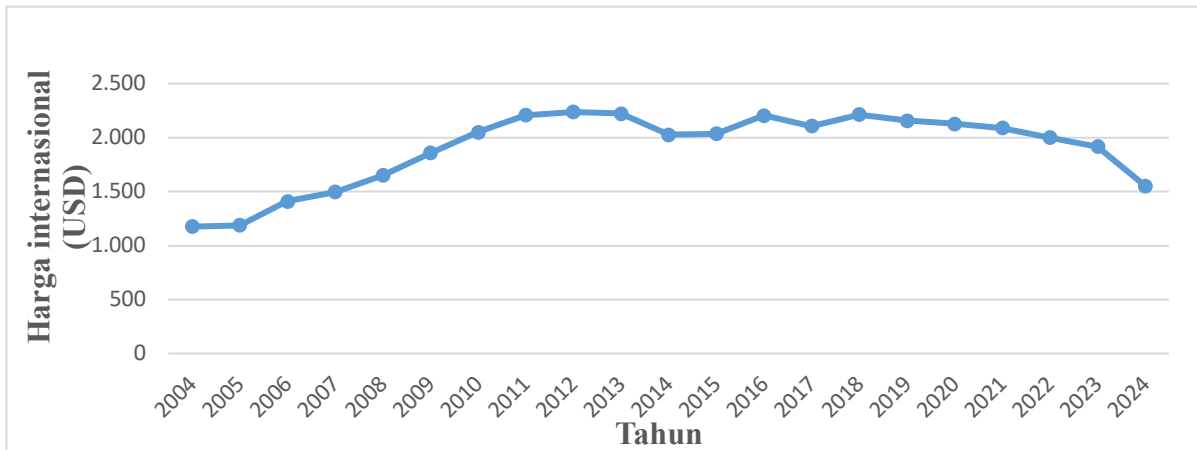
Figure. 1 The Development of Indonesian Tea Exports, 2004–2024



Based on Figure 1.1, the export performance of Indonesian tea during the period 2004–2024 generally shows a declining trend throughout the observation period. At the beginning of the period, in 2004, Indonesia's tea export volume reached 98,572 tons and increased in 2005 to 102,572 tons, which represented the highest export volume during the observed years. However, after 2005, Indonesian tea exports began to demonstrate a downward trend, although fluctuations occurred in several subsequent years. During 2006–2009, export volumes remained within the range of 83,659–96,210 tons, indicating a decline compared to the early years of the period. The downward trend became more evident after 2010, when exports were recorded at 87,101 tons, and continued to decrease to 70,071 tons in 2012. Although there was a slight increase in 2013 to 70,842 tons, exports again declined in the following years. Between 2014 and 2016, Indonesian tea exports experienced a significant decrease, with export volumes falling from 66,399 tons in 2014 to 61,915 tons in 2015, and further dropping sharply to 51,319 tons in 2016, indicating weakening performance of Indonesian tea exports in the international market.

In 2017, Indonesian tea exports experienced a slight recovery, increasing to 54,187 tons, although this improvement did not last long. In 2018 and 2019, export volumes declined again to 49,038 tons and 42,811 tons, respectively. This continued decrease indicates that Indonesian tea exports still faced various constraints, both from the production side and international demand. In 2020, exports rose again to 45,265 tons, but declined in 2021 to 42,654 tons. A slight increase occurred in 2022, reaching 44,919 tons, yet exports dropped significantly in 2023 to 35,970 tons, and reached their lowest level in 2024 at 34,024 tons. These conditions indicate a weakening competitiveness of Indonesian tea exports in the global market, which is also influenced by several economic factors affecting export performance over time.

Figure. 2 International Prices of Indonesian Tea, 2004–2024

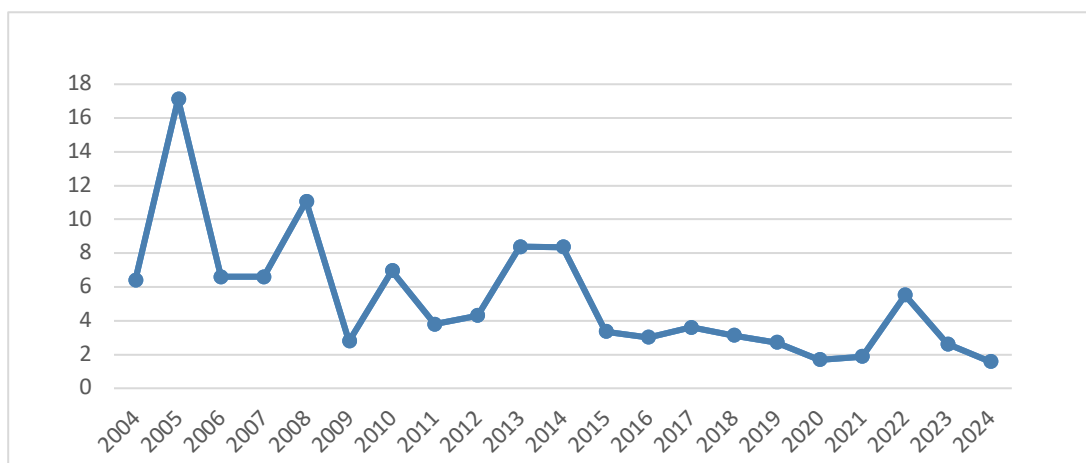


One of the key factors influencing tea exports is production, as it determines a country’s capacity to supply international markets. When production exceeds domestic demand, the surplus is typically exported, thereby increasing export volumes and potentially strengthening competitiveness. This competitiveness is often measured using the Revealed Comparative Advantage (RCA) index, which is based on the export value of a commodity. Figure 1.2 shows the development of Indonesian tea production from 2004–2024, indicating a generally declining trend with several fluctuations. Production was recorded at 165,951 tons in 2004 and slightly increased to 166,091 tons in 2005, before declining to 146,858 tons in 2006. Although production temporarily recovered during 2007–2009 and reached 156,901 tons in 2009, the overall trend afterward remained downward, despite brief increases in 2014 and 2017.

During the 2018–2023 period, tea production continued to decline and reached its lowest level in 2023 at 116,506 tons, before slightly increasing to 118,895 tons in 2024. Overall, Indonesian tea production over the 2004–2024 period shows a long-term decline, largely influenced by climate changes and the conversion of tea plantation land. The reduction in production is also linked to the decreasing plantation area, particularly in State-Owned Large Plantations (PBN), which declined from 38,333 hectares in 2020 to 26,976 hectares in 2023. Meanwhile, the area of Private Large Plantations (PBS) also declined in 2021, although it slightly increased again in 2022–2023 (Statistics Indonesia, 2024). This decline in production potentially contributes to the decreasing volume of Indonesian tea exports.

Besides production, international price is another important factor influencing tea exports. In international trade, the world price represents the price of a commodity in the global market. When international prices are higher than domestic prices, producers tend to export their products to take advantage of higher returns in foreign markets. Conversely, when international prices are lower, countries may prefer to import goods to benefit from cheaper prices offered by other trading partners (Yani et al., 2023). Figure 1.3 illustrates the development of international tea prices from 2004–2024, which reflects external market conditions affecting Indonesia’s tea export performance.

Figure. 3 The Development of Indonesia’s Inflation Rate, 2004–2024



Based on Figure 1.4, the development of inflation in Indonesia from 2004 to 2024 shows a fluctuating pattern but generally indicates a declining trend. At the beginning of the period, inflation was relatively high, recorded at 6.40% in 2004, and increased sharply to 17.11% in 2005, which was the highest level during the observation period. Although inflation rose again to 11.06% in 2008, it gradually became more stable afterward, ranging between 2.78% and 8.38% during 2009–2014. From 2015 to 2024, inflation continued to decline and remained relatively stable at a lower level, fluctuating between 1.57% and 5.51%. In 2024, inflation reached 1.57%, the lowest level recorded during the study period. This pattern suggests that inflationary pressures in Indonesia have gradually eased over time, reflecting the effectiveness of price stabilization policies as well as the influence of domestic and global economic dynamics over the past two decades.

B. LITERATURE REVIEW

International Trade Theory

International trade theory explains the reasons countries engage in trade, the patterns of trade, and the economic benefits obtained from export and import activities. Trade between countries occurs because of differences in natural resources, production capacity, technology, labor skills, and economic structures. These differences encourage countries to exchange goods and services in order to meet domestic needs and maximize economic efficiency. Through international trade, countries are able to expand markets, increase productivity, and strengthen their integration into the global economy (Emayanti & Rivai, 2024).

Classical theories of international trade emphasize the importance of specialization and efficiency. Adam Smith’s Absolute Advantage Theory states that a country should specialize in producing goods that it can produce more efficiently than other countries. By focusing on products with higher efficiency, countries can increase productivity and trade these goods for other commodities that are more efficiently produced elsewhere. This specialization allows countries to gain mutual benefits from trade and improve overall economic welfare.

Another important concept is David Ricardo’s Comparative Advantage Theory, which explains that countries can still benefit from trade even if they do not possess absolute advantages. A country should specialize in producing goods that have the lowest opportunity cost compared to other countries. Through this specialization, each country can optimize its resources and increase global production efficiency, making international trade an important driver of economic growth.

Export

Export refers to goods and services produced domestically and sold to foreign markets. When a country is able to produce goods in large quantities and domestic demand has been fulfilled, the surplus production can be exported to other countries. Export activities are important because they increase foreign exchange earnings, stimulate domestic production, and contribute to national income growth (Saragih & Aslami, 2022).

In addition to increasing foreign exchange reserves, exports also contribute to employment creation. When export demand increases, domestic production must also increase to meet international

market demand. This leads to higher production levels, which in turn creates new job opportunities and supports economic growth.

From a macroeconomic perspective, exports are closely related to net exports, which represent the difference between the value of exports and imports. Net exports are influenced by several factors such as consumer preferences, prices of domestic and foreign goods, income levels, transportation costs, and government policies related to international trade (Mankiw, 2007).

Factors Affecting Exports

Export performance is influenced by various economic factors. According to Sukirno (2016), one of the main determinants of export demand is the availability of goods needed by other countries. If a country produces goods that cannot be sufficiently produced by other countries, international demand will increase, encouraging export activities.

Other important factors affecting exports include export prices, exchange rates, global income levels, and government policies. Higher export prices or favorable exchange rates can increase export competitiveness in international markets. In addition, rising global income levels may increase demand for imported goods, which can further stimulate export growth.

Another important factor is the competitiveness of exported products, including quality, product standards, and consumer preferences in foreign markets. Countries that are able to produce high-quality goods that meet international standards will have greater opportunities to compete in global markets. Export Promotion Policies

Definition

Production is the process of transforming inputs such as raw materials, labor, and capital into outputs in the form of goods or services that have economic value. In economic activities, production is considered a key process that creates value by combining various resources efficiently (Mustari et al., 2020). Within a company, the production function plays a critical role in converting raw materials into finished goods that meet certain quality standards. This process involves a series of activities designed to add value at each stage of production, from raw material processing to final product distribution (Nuraeni et al., 2024). Therefore, production can be understood as an economic activity that integrates various resources to generate goods or services that satisfy market demand and contribute to economic growth.

Factors of Production

Factors of production refer to the inputs used in producing goods and services. According to economic theory, the main factors of production include labor, capital, natural resources, and entrepreneurship (Mankiw, 2007). Labor represents human effort and skills used in the production process, including unskilled, skilled, and educated workers. Capital refers to man-made resources such as machinery, tools, and equipment used to support production activities.

Natural resources such as land, water, and minerals are also essential production inputs provided by nature. Meanwhile, entrepreneurship refers to the ability of individuals to organize resources, manage risks, and create innovative business opportunities that contribute to production activities.

International Prices

International price refers to the price of a commodity that is determined in the global market where the product is traded. In international trade, prices play a significant role in determining export and import activities because they reflect the value of goods in the global marketplace (Putri & Juanda, 2024). The relationship between international prices and export volume is generally positive. When international prices are higher than domestic prices, producers are more likely to export their products in order to obtain greater profits. As a result, higher international prices tend to increase export volumes (Mejaya et al., 2016).

Prices also serve several important economic functions, including determining sales volume, influencing profit levels, and shaping the product's market image. Therefore, fluctuations in international commodity prices can significantly affect the competitiveness of exports in global markets (Kristanto, 2011).

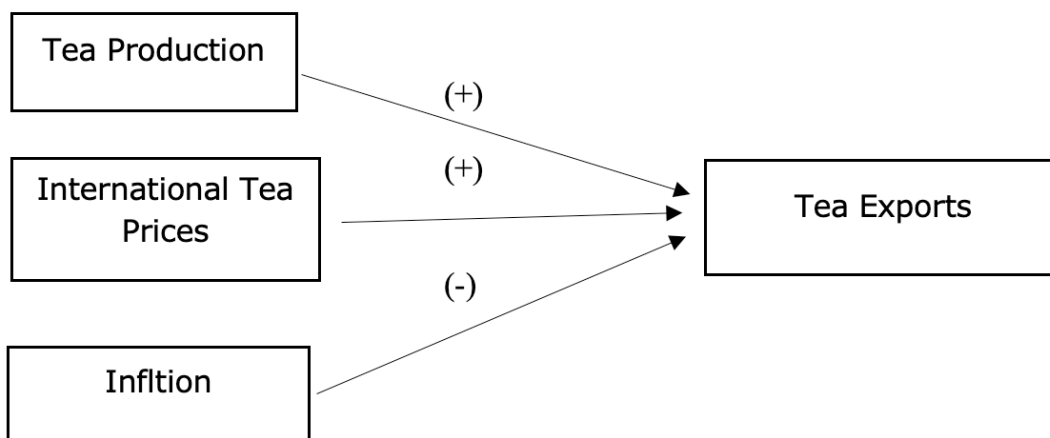
Inflation

Inflation refers to a continuous increase in the general price level of goods and services in an economy over a certain period. Inflation occurs when the purchasing power of money decreases, causing prices of goods and services to rise gradually (Sihotang & Purba, 2023). The level of inflation varies across countries and time periods. Low inflation typically occurs when price increases remain below 2–3 percent, while moderate inflation ranges between 4–10 percent. In more severe cases, inflation can reach very high levels and disrupt economic stability (Sukirno, 2016).

Based on its intensity, inflation can be categorized into four types, namely mild inflation (below 10 percent per year), moderate inflation (10–30 percent), high inflation (30–100 percent), and hyperinflation (above 100 percent). A stable and controlled inflation rate generally reflects a healthier and more stable economic condition.

Hypotesis

Figure. 1 Conceptual Framework



C. METHODOLOGY OF RESEARCH

This study is conducted within the scope of Indonesia, focusing on analyzing the influence of tea production, international tea prices, and inflation on Indonesia’s tea exports. The research aims to examine how these economic variables affect the performance of Indonesian tea exports over time. By analyzing these relationships, the study seeks to provide a clearer understanding of the factors that influence the export dynamics of tea commodities in Indonesia.

The type of data used in this study is secondary data in the form of time-series data covering the period 2004–2024. The dataset includes several key variables, namely Indonesia’s tea export data, Indonesian tea production data, international tea price data, and Indonesia’s inflation data. All data utilized in this research were obtained from reliable official sources, particularly Statistics Indonesia (Badan Pusat Statistik) and Indonesian Tea Statistics, which provide comprehensive statistical records related to agricultural commodities and macroeconomic indicators.

To analyze the influence of production, international prices, and inflation on Indonesia’s tea exports, this study employs a quantitative analysis approach. Quantitative analysis is used to explain the relationships among variables through statistical methods. Specifically, this research applies a multiple linear regression model to measure the magnitude and direction of the relationship between the independent variables (tea production, international tea prices, and inflation) and the dependent variable (tea exports). The data are processed and analyzed using the SPSS statistical software.

The hypothesis testing procedure in this study is conducted through multiple linear regression analysis. This method allows the researcher to examine the extent to which each independent variable contributes to changes in the dependent variable. The analysis begins with determining the regression equation, which represents the relationship between the variables and serves as the basis for evaluating the proposed research hypotheses.

D. RESULT AND DISCUSSION

Data Processing

Table. 1 Results of Data Processing for the Indonesian Tea Export Model

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-69993,580	33277,591		-2,103	,051		
	produksi	1,128	,208	,682	5,425	,000	,626	1,597
	harga	-16,026	7,749	-,244	-2,068	,054	,709	1,410
	inflasi	907,961	844,104	,149	1,076	,297	,516	1,938

a. Dependent Variable: ekspor

Source: Processed from research data for the period 2004–2024

The regression results in Table 4.1 show the estimated equation of the Indonesian tea export model as follows: $Y = -69993.580 + 1.128X_1 - 16.026X_2 + 907.961X_3$. The constant value of -69993.580 indicates that if all independent variables—namely tea production, international tea prices, and inflation—are assumed to be zero, the volume of Indonesian tea exports would decline. This negative constant suggests that without the contribution of these explanatory variables, export performance would experience a significant decrease.

The regression coefficient for tea production (X_1) is 1.128, indicating a positive relationship between production and the volume of tea exports. This means that an increase of one ton in tea production is expected to increase the volume of Indonesian tea exports by 1.128 tons, assuming other variables remain constant. Meanwhile, the regression coefficient for international tea prices (X_2) is -16.026, indicating a negative relationship with tea export volume. This implies that an increase of one USD in international tea prices would reduce Indonesia’s tea export volume by approximately 16.026 tons.

On the other hand, the regression coefficient for inflation (X_3) is 907.961, indicating a positive relationship between inflation and the volume of Indonesian tea exports. This result suggests that an increase of one percent in inflation is associated with an increase of approximately 907.961 tons in Indonesian tea exports, assuming other factors remain constant. These findings illustrate how each independent variable contributes differently to changes in Indonesia’s tea export performance.

Autocorrelation

Autocorrelation testing is conducted to determine whether there is a correlation between the error terms (residuals) in one period and those in the previous period within a regression model. The Durbin–Watson (DW) test is used to detect the presence of such autocorrelation. This test is performed to ensure that the regression model employed in the study is free from autocorrelation problems, thereby improving the reliability of the regression results.

Table. 2 Model Summary

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,911 ^a	,829	,799	10163,227	1,530

a. Predictors: (Constant), inflasi, ln_x2, ln_x1

b. Dependent Variable: ekspor

Source: Processed from research data for the period 2004–2024

Based on Table 4.3, the Durbin–Watson (DW) value is 1.530. For $n = 21$ and $k = 3$, using a significance level of $\alpha = 5\%$, the obtained values are $dL = 1.0262$ and $dU = 1.6694$. Therefore, the calculated values of $4 - dU = 2.3306$ and $4 - dL = 2.9738$ are obtained.

Table. 3 Run Test

Runs Test	
	Unstandardiz ed Residual
Test Value ^a	-313,79528
Cases < Test Value	10
Cases >= Test Value	11
Total Cases	21
Number of Runs	9
Z	-,887
Asymp. Sig. (2-tailed)	,375

a. Median

Source: Processed from research data for the period 2004–2024

Based on the Run Test results above, the Asymp. Sig. (2-tailed) value is 0.375, which is greater than 0.05. Therefore, it can be concluded that there is no autocorrelation in the research model.

Table. 4 Normality test

One-Sample Kolmogorov-Smirnov Test

		Unstandardiz ed Residual
N		21
Normal Parameters ^{a,b}	Mean	,0000000
	Std. Deviation	9370,032768
Most Extreme Differences	Absolute	,109
	Positive	,109
	Negative	-,108
Test Statistic		,109
Asymp. Sig. (2-tailed)		,200 ^{c,d}

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Source: Processed from research data for the period 2004–2024

From Table 4.5, the Asymp. Sig. value obtained is 0.200, which is greater than 0.05. Therefore, based on the Kolmogorov–Smirnov normality test, it can be concluded that the residual (error) data are normally distributed. Thus, the normality assumption in the regression model has been fulfilled.

Table. 5 F test

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8525065112	3	2841688371	27,511	,000 ^b
	Residual	1755950282	17	103291193,0		
	Total	1,028E+10	20			

a. Dependent Variable: ekspor

b. Predictors: (Constant), inflasi, ln_x2, ln_x1

Source: Processed from research data for the period 2004–2024

Based on Table 4.3, the results of the data processing show an F-statistic value of 27.511 with a significance level of 0.000. This indicates that, simultaneously, the three independent variables—tea production, international tea prices, and inflation—have a significant effect on the volume of Indonesian tea exports.

Discussion of the Multiple Linear Regression Model

Multiple linear regression analysis is used to examine the influence of tea production, international tea prices, and inflation on the volume of Indonesian tea exports during the period 2004–2024. The results of the regression analysis indicate that tea production has a positive and significant effect on the volume of Indonesian tea exports. Meanwhile, international tea prices have a negative but insignificant effect, and inflation has a positive but insignificant effect on the export volume of Indonesian tea. These findings provide an overview of how each independent variable contributes to the fluctuations in Indonesia’s tea export performance.

Overall, the regression model shows that variations in export performance are influenced by both domestic and external economic factors. Production capacity represents the supply-side factor that determines the availability of commodities for export, while international prices and inflation represent market and macroeconomic conditions that may influence export competitiveness. The following sections explain in more detail the relationship between each independent variable and the export volume of Indonesian tea.

Tea Production and the Volume of Indonesian Tea Exports

The regression results show that tea production has a positive and significant effect on the volume of Indonesian tea exports, with a regression coefficient of 1.128 and a significance value of 0.000. This finding indicates that an increase in tea production will lead to an increase in the export volume of Indonesian tea. In other words, higher production levels provide a larger supply of tea that can be distributed to international markets after domestic demand has been fulfilled.

This result is consistent with the findings of Putri et al. (2021), which state that tea production has a positive and significant effect on Indonesia’s tea exports to Malaysia during the period 2008–2019. Similarly, Emayanti et al. (2024) found that the production variable has a positive and significant influence on Indonesian tea export volumes in both the short and long term. However, this result differs from the study by Saleh et al. (2016), which found that production had a positive but statistically insignificant effect on Indonesian tea export volumes.

International Tea Prices and the Volume of Indonesian Tea Exports

The regression coefficient for international tea prices is –16.026 with a significance value of 0.054, indicating a negative but insignificant relationship with the export volume of Indonesian tea. This result implies that an increase in international tea prices tends to reduce Indonesia’s tea export volume, although the effect is not statistically significant. This suggests that fluctuations in international tea prices do not strongly influence Indonesia’s export performance.

The findings of this study are consistent with the results of Saleh et al. (2016), which found that international prices had a negative and partially insignificant effect on Indonesian tea export volumes during the period 2010–2013. However, the findings differ from those of Emayanti and Rivai (2024),

who concluded that international tea prices have a positive and significant influence on export volumes in both the short and long term. Therefore, the results of this study do not fully support the theoretical expectation of the supply theory, which suggests that changes in international prices should influence export supply.

Inflation and the Volume of Indonesian Tea Exports

The regression results show that inflation has a positive but insignificant effect on the volume of Indonesian tea exports, with a regression coefficient of 907.961 and a significance value of 0.297. This indicates that increases in inflation do not necessarily lead to a decrease in tea export volumes. In other words, inflationary conditions in the domestic economy do not significantly disrupt Indonesia's ability to export tea to international markets.

These findings are consistent with the study conducted by Devi and Murtala (2019), which concluded that inflation has a positive but statistically insignificant influence on Indonesian tea exports to Germany. This suggests that inflation may not be a dominant factor affecting the export performance of tea commodities, as export activities are often influenced more strongly by production capacity, global demand, and international market conditions.

E. CONCLUSION

Based on the results of the data analysis and the discussion presented in this study, several conclusions can be drawn. First, tea production has a positive and significant effect on the volume of Indonesian tea exports during the period 2004–2024. This indicates that an increase in tea production contributes directly to the increase in export volume. Meanwhile, international tea prices have a negative but insignificant effect on the export volume of Indonesian tea, suggesting that fluctuations in global tea prices do not significantly determine Indonesia's export performance. In addition, inflation has a positive but insignificant effect on the export volume of Indonesian tea during the same period.

Furthermore, the results of the F-test show that tea production, international tea prices, and inflation simultaneously have a significant effect on the export volume of Indonesian tea for the period 2004–2024. The coefficient of determination (R^2) value of 0.829 indicates that 82.9% of the variation in Indonesian tea export volume can be explained by the variables of tea production, international tea prices, and inflation, while the remaining 17.1% is explained by other variables outside the model, such as domestic consumption, domestic tea prices, exchange rates, and other economic factors.

Based on these findings, several recommendations can be proposed. The government should continue to support policies aimed at improving the quality and quantity of tea production, as production is the only variable found to have a positive and significant effect on export volume. In addition, although international tea prices show a negative and insignificant relationship with export volume, Indonesia should maintain competitive pricing strategies in the global market to compete with other tea-exporting countries. Finally, although inflation does not significantly influence tea exports, the government should still maintain effective inflation control policies to ensure overall economic stability and support the sustainability of export activities.

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