

# Analysis of the Influence of Tobacco Production and Consumption Tobacco on Volume of Tobacco Export with the Excise Tax on Tobacco as a Moderating Variable in Indonesia

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## Abstract

*This study analyzes the impact of tobacco production and domestic consumption on Indonesia's tobacco export volume, with the excise tariff as a moderating variable. Using annual data from 2008 to 2023, the research applies multiple linear regression and Moderated Regression Analysis (MRA). Results indicate that production positively and significantly affects exports, while consumption has a significant negative effect. However, the tobacco excise tariff does not significantly moderate these relationships. These findings highlight that production and consumption directly influence export performance, whereas the current excise policy is ineffective as a moderating tool. The study offers important insights for improving tobacco trade policy and boosting the competitiveness of Indonesia's tobacco industry in international markets.*

**Keywords:** Tobacco Export Volume, Tobacco Production, Consumption Tobacco, Excise Tax Tobacco.

## INTRODUCTION

In the era of globalization, state revenues are supported not only through traditional taxation but also through excise policy, which plays a dual role: as a fiscal instrument and a regulatory tool. In Indonesia, tobacco excise (Cukai Hasil Tembakau/CHT) is a key source of national income, contributing up to 97% of total excise revenue (Sabri et al., 2022). The Indonesian government's efforts to increase excise revenues aim not only to boost fiscal capacity but also to control tobacco consumption. In 2023, the excise revenue

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target was set at IDR 303.2 trillion, marking a 23.8% increase from the previous year (Kemenkeu, 2023). This illustrates the growing role of excise taxes in national economic policy.

The increase in tobacco excise rates has not only impacted domestic consumption but also influenced Indonesia's competitiveness in the international tobacco trade. With excise rates rising by an average of 10% for 2023 and 2024, the government seeks to reduce smoking prevalence—particularly among youth—while increasing revenue (Kemenkeu, 2023). However, these policies also raise the cost structure for producers, potentially reducing their competitiveness in global markets. Many tobacco producers are compelled to shift strategies from domestic sales to export markets to maintain profitability.

Indonesia is the world's fourth-largest tobacco producer (FAO, 2022), supported by favorable climate, labor availability, and fertile land. Despite this comparative advantage, fluctuations in production, consumption, and export volumes indicate the complexity of the tobacco industry in Indonesia. For instance, while tobacco production peaked in 2019 at 269.8 thousand tons, it dropped to 221.9 thousand tons in 2022 before rebounding to 238.8 thousand tons in 2023. Meanwhile, tobacco consumption showed a generally increasing trend, rising from 271.5 thousand tons in 2017 to 343.5 thousand tons in 2021, indicating strong domestic demand even in the face of higher excise (BPS, 2023). On the other hand, Indonesia's tobacco exports have declined over the past decade. From 26,469 tons in 2014, export volumes dropped to just 6,447 tons in 2022, with a minor recovery to 7,310 tons in 2023 (BPS, 2023). This trend signals challenges faced by Indonesia in maintaining its export market share, particularly due to increasing domestic costs and stiff global competition. Tariff policies and excise adjustments may reduce Indonesia's comparative advantage if not properly managed. Thus, government intervention in excise policies has become a critical moderating factor influencing the interaction between domestic production, consumption, and export performance



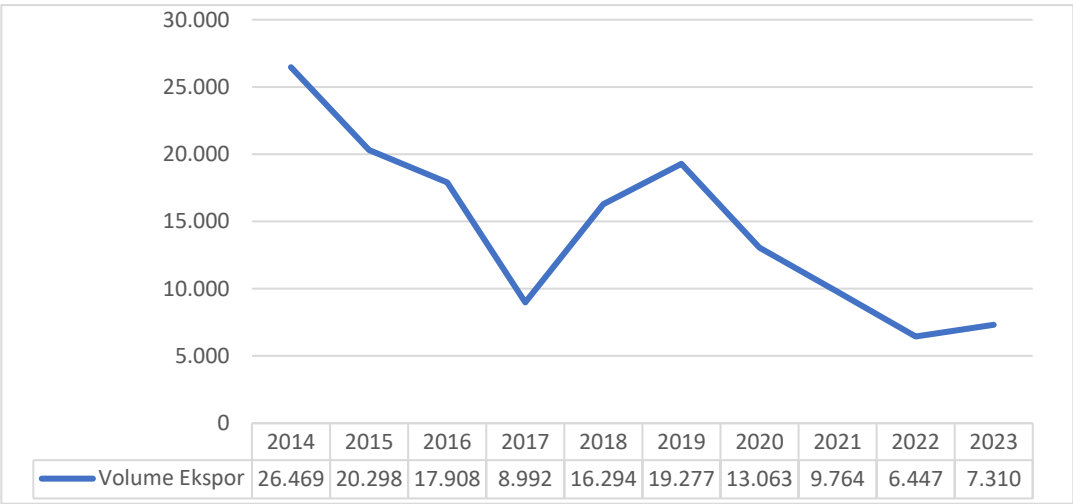


**Figure 1: The Condition of Volume of Indonesian Tobacco Exports**

Excise duties, therefore, serve as a moderating variable in this study, bridging the influence of production and consumption on international trade. The excise tax policy’s effectiveness can either enhance or hinder the competitiveness of Indonesia’s tobacco exports. Previous studies have shown that higher excise rates may encourage producers to seek international markets, especially in regions like the Middle East and Southeast Asia (Wahyuni & Ratnawati, 2020). At the same time, excise increases have been linked to reduced domestic production, factory closures, and workforce reductions (Triono, 2018), underscoring the broader socioeconomic impacts of such policies.

Based on this background, this research aims to analyze the influence of tobacco production and consumption on tobacco exports, with tobacco excise rates as a moderating variable. This study spans the period from 2008 to 2023 and is expected to contribute to the formulation of balanced fiscal, industrial, and trade policies that support both public health and economic sustainability.

**Objectives**

The objectives of this research are formulated as follows. First, this study aims to analyze the effect of tobacco production on Indonesia’s tobacco export volume during the period 2008–2023. Second, it seeks to analyze the effect of tobacco consumption on Indonesia’s tobacco export volume within the same period. Furthermore, this research is intended to examine whether the excise tax moderates the relationship between tobacco



production and Indonesia's tobacco export volume. Lastly, it aims to analyze whether the excise tax also moderates the effect of tobacco consumption on Indonesia's tobacco export volume.

## DISCUSSION

type of research to be used is quantitative research. Quantitative research is one of the methods used to examine the relationship between variables, measured using various research instruments and based on specific theoretical frameworks. The research data, consisting of numerical values, will be analyzed using statistical procedures.

The approach employed in this study is quantitative descriptive analysis with an explanatory research design. Explanatory research is conducted to provide explanations regarding the positions and relationships among the variables being studied (Sekaran & Bougie, 2016). This forms the basis for hypothesis testing, with the aim of describing the relationships that arise between the independent variables namely tobacco production and consumption tobacco and the dependent variable, tobacco export volume, with excise tax on tobacco serving as a moderating variable.

## RESEARCH RESULT

### Classical Assumption Test

#### Normality Test

**Table 1. The Result of Normality Test**

|                        | <b><i>Unstandardized<br/>Residuals</i></b> | <b>Note</b> |
|------------------------|--------------------------------------------|-------------|
| Asymp. Sig. (2-tailed) | 0.200                                      | Normal      |

Based on Table 1, the results of the normality test show that the Asymp. Sig. (2-tailed) value is 0.200. Therefore, it can be concluded that the data is normally distributed, as the significance value is greater than 0.05. All formulas or formulas must also be numbered.



**Multicollinearitas Test****Table 2. The Result of Multicollinearitas Test**

| Independent Variable | Tolerance | VIF   | Note                          |
|----------------------|-----------|-------|-------------------------------|
| (X1)                 | 0.268     | 3.730 | There is no multicollinearity |
| (X2)                 | 0.301     | 3.323 | There is no multicollinearity |
| (Z)                  | 0.814     | 1.229 | There is no multicollinearity |

Based on Table 2, the tolerance values for each variable are greater than or equal to 0.10, and the VIF values for each variable are less than 10. Therefore, it can be concluded that there is no multicollinearity, or in other words, there is no correlation among the independent variables in this regression model.

**Heteroscedasticity Test****Table 3. The Result of Heteroscedasticity Test**

| Model | Sig.  | Note                           |
|-------|-------|--------------------------------|
| (X1)  | 0.925 | There is no heteroscedasticity |
| (X2)  | 0.112 | There is no heteroscedasticity |
| (Z)   | 0.178 | There is no heteroscedasticity |

Based on Table 3, the significance value for Tobacco Production is 0.925, for Consumption Tobacco it is 0.112, and for Excise Tax on Tobacco the value is 0.178. All of these values are above the threshold of 0.05, indicating that each independent variable has a significance level greater than 0.05. Therefore, it can be concluded that the regression model does not exhibit heteroscedasticity, meaning the variance of the residuals is constant (homoscedasticity).



### Autocorrelation Test

**Table 4. The Result of Autocorrelation Test**

| Model | Durbin-Watson |
|-------|---------------|
| I     | 1.021         |

Based on the results of the autocorrelation test using the Durbin-Watson method, the Durbin-Watson value of 1.456 indicates that there is no serious autocorrelation in this regression model. This value is still close to 2, suggesting that the model meets the assumption of residual independence.

### Multiple Linear Regression Analysis

**Table 5. The Result of Multiple Linier Regression Test**

|          | Unstandardized Coefficients |            |
|----------|-----------------------------|------------|
|          | B                           | Std. Error |
| Constant | 59.610                      | 16.758     |
| X1       | 0.171                       | 0.068      |
| X2       | -0.130                      | 0.036      |
| Z        | -38.740                     | 17.564     |

The regression equation from the multiple linear regression analysis can be formulated as follows:

$$VET = \alpha + \beta_1 PT + \beta_2 CT + \varepsilon$$

$$VET = a + 0.171 - 0.130 - 38.740 + \varepsilon$$

The constant value of 59.610 indicates that if all variables—such as tobacco production, tobacco consumption, and tobacco excise rates—are at zero, then the tobacco export volume will increase by 59.610 thousand tons.

The regression coefficient for tobacco production (X1) is 0.171, which means that each one-unit increase in tobacco production will increase the volume of tobacco exports by 0.171 thousand tons, assuming other variables remain constant. This positive coefficient indicates that the higher the tobacco production, the greater the potential for Indonesia's tobacco exports.



The regression coefficient for tobacco consumption ( $X_2$ ) is -0.130, meaning that each one-unit increase in domestic tobacco consumption will reduce the volume of tobacco exports by 0.130 thousand tons, assuming the other variables are constant. This implies that an increase in domestic consumption can reduce the amount of tobacco available for export, thus negatively impacting exports.

The regression coefficient for tobacco excise rate ( $Z$ ) is -38.740, indicating that every one-unit increase in the excise rate leads to a decrease in the volume of tobacco exports by 38.740 thousand tons, assuming other variables remain unchanged. This large negative coefficient suggests that high excise taxes can burden tobacco producers, reduce price competitiveness, and lower the volume of tobacco that can be sold abroad.

### Moderated Regression Analysis (MRA)

**Table 6. The Result of Moderated Regression Analysis Test**

| Model    | Unstandardized Coefficients |            |
|----------|-----------------------------|------------|
|          | B                           | Std. Error |
| Constant | -26.548                     | 201.654    |
| $X_1Z$   | 2.079                       | 1.162      |
| $X_2Z$   | -1.941                      | 1.346      |

The regression equation from the moderation analysis can be formulated as follows:

$$Y = \alpha + \beta_3 (X_1 \times Z) + \beta_4 (X_2 \times Z) + \varepsilon$$

$$Y = \alpha + (2.079)(X_1Z) + (-1.941)(X_2Z) + \varepsilon$$

The constant value of -26.548 indicates that when the interaction variables between tobacco production and excise tax ( $X_1Z$ ), and tobacco consumption and excise tax ( $X_2Z$ ), are zero, the predicted tobacco export volume is at a negative value of -26.548 thousand tons. This value does not carry strong economic meaning in practical terms, as zero interaction between variables rarely occurs in real-world contexts. However, this value is still necessary to maintain the integrity of the regression model.

The regression coefficient for the interaction term  $X_1Z$  (Tobacco Production  $\times$  Excise Tax) is 2.079, indicating that the excise tax positively moderates the relationship



between tobacco production and export volume. This means that for every one-unit increase in the interaction between tobacco production and excise tax, the tobacco export volume increases by 2.079 thousand tons, assuming the other interaction variable remains constant. This suggests that higher excise taxes enhance the positive impact of production on exports—possibly because producers become more efficient or shift their output to export markets to avoid the domestic tax burden.

The regression coefficient for the interaction term  $X_2Z$  (Tobacco Consumption  $\times$  Excise Tax) is -1.941, indicating that the excise tax negatively moderates the relationship between tobacco consumption and export volume. For every one-unit increase in the interaction between consumption and excise tax, the export volume of tobacco decreases by 1.941 thousand tons, assuming other variables remain constant. This suggests that higher domestic consumption, coupled with higher excise taxes, further reduces the amount of tobacco available for export due to tax burdens affecting demand, distribution allocation, and producers' production strategies.

### Hypothesis Testing Result

**Table 7. The Result of Hypothesis Test**

| Variable | t      | Sig.  |
|----------|--------|-------|
| Constant | 3.557  | 0.004 |
| X1       | 2.504  | 0.028 |
| X2       | -3.645 | 0.003 |
| $X_1Z$   | -1.149 | 0.288 |
| $X_2Z$   | -1.423 | 0.198 |

#### 1. Tobacco Production (X1)

A significant influence was found between Tobacco Production and Tobacco Export Volume, with a significance value of 0.028, which is less than 0.05. Therefore,  $H_0$  is rejected and  $H_1$  is accepted.

#### 2. Consumption Tobacco (X2)

A significant influence was found between Tobacco Consumption and Tobacco Export Volume, with a significance value of 0.003, which is less than 0.05. Therefore,  $H_0$  is rejected and  $H_2$  is accepted.



### 3. Tobacco Excise Tax (Z) as a Moderator of the Effect of Tobacco Production ( $X_1$ ) on Tobacco Export Volume (Y)

Based on the t-statistic test results, the moderating variable Tobacco Excise Tax (Z) does not moderate the influence of the independent variable Tobacco Production ( $X_1$ ) on the dependent variable Tobacco Export Volume (Y). This is evident from the significance value of 0.104, which is greater than 0.05. Therefore, based on the t-statistic test,  $H_0$  is accepted and  $H_3$  is rejected.

### 4. Tobacco Excise Tax (Z) as a Moderator of the Effect of Tobacco Consumption ( $X_2$ ) on Tobacco Export Volume (Y)

Based on the t-statistic test results, the moderating variable Tobacco Excise Tax (Z) does not moderate the influence of the independent variable Tobacco Consumption ( $X_2$ ) on the dependent variable Tobacco Export Volume (Y). This is evident from the significance value of 0.180, which is greater than 0.05. Therefore, based on the t-statistic test,  $H_0$  is accepted and  $H_4$  is rejected.

#### 1. The result of the first hypothesis test (H1)

In this study indicate that Tobacco Production has a significant impact on Tobacco Export Volume during the period 2008–2023. This finding is consistent with the theory proposed by David Ricardo (1817), which states that the greater a country's production capacity with high cost-efficiency, the greater its potential to leverage comparative advantage in international trade. High levels of production, if not entirely absorbed by domestic consumption, will create a surplus that can be directed toward exports.

The results of this test are supported by the study of Wahyuni & Ratnawati (2020), which found that export volume experienced a significant increase in line with the rise in production, particularly in years when Indonesia's tobacco production capacity increased due to good harvests and abundant availability of raw materials. However, this finding contrasts with the study conducted by Purba et al. (2021), which showed that production had a negative but insignificant effect on tobacco export volume.

#### 2. The result of the second hypothesis test (H2)

In this study show that domestic tobacco consumption has a negative influence on Indonesia's tobacco export volume. This means that the higher the level of domestic consumption, the smaller the portion of tobacco production that can be allocated to meet international market demand. This finding can be theoretically explained using the framework of comparative advantage proposed by David Ricardo (1817), which suggests that a country should allocate its resources to sectors that provide relatively greater benefits compared to other countries in this case, tobacco exports. However, when



domestic consumption is too high, national production capacity is largely directed toward fulfilling domestic needs, thereby limiting the optimal utilization of comparative advantage in exports.

The results of this test are supported by the study of Maulidiyah & Darsono (2024), which showed that high domestic consumption tends to absorb production, thereby reducing the supply available for export and suppressing the volume of tobacco exports.

3. The result of the third hypothesis test (H3)

The results of this study indicate that tobacco excise taxes do not significantly moderate the effect of tobacco production on Indonesia's tobacco export volume. In other words, an increase in tobacco production is not automatically accompanied by an increase in exports, even when excise taxes are imposed. This condition suggests that fiscal policy in the form of excise taxes has not been effective in encouraging the tobacco industry to shift production surpluses to the export market. This ineffectiveness indicates that the excise tariff instrument has not been optimally utilized as a moderating tool in the dynamics of tobacco trade. According to Ramsey's specific tariff theory (1927), tariffs should be optimally imposed on commodities with low demand elasticity in order to minimize market distortion and maximize government revenue. However, in practice, the implementation of excise tariffs on tobacco products in Indonesia has not fully adhered to this principle.

4. The result of the fourth hypothesis test (H4)

The results of this study indicate that tobacco excise tariffs do not significantly moderate the effect of tobacco consumption on tobacco export volume. In other words, although domestic tobacco consumption may change and excise taxes are imposed, these factors do not substantially affect the direction or strength of the relationship between consumption and exports. This finding suggests that excise tariffs have not yet fulfilled their role as a regulator or balancer between domestic demand and the allocation of production for export. The effect of consumption on exports persists independently of the excise policy. According to Ramsey's specific tariff theory (1927), optimal tariffs should be imposed at higher rates on goods with low demand elasticity to minimize market distortion and maximize government revenue. Tobacco products, which are known to have inelastic demand, are theoretically suitable for high taxation. However, in this context, high tariffs have not significantly altered the structure of domestic consumption, thereby failing to create greater space for production to be redirected toward the export market.



## CONCLUSION

This study concludes that tobacco production and consumption significantly influence the volume of tobacco exports in Indonesia from 2008 to 2023. The regression analysis demonstrates that increased production positively affects export volume, while higher domestic consumption negatively affects it. However, the excise tax variable is not proven to significantly moderate the relationship between either production or consumption and export volume. These findings indicate that while production capacity and domestic market absorption are key to export performance, excise policy has not yet effectively acted as a regulatory instrument in export optimization strategies.

## Recommendations:

1. The government should further encourage policies that support increased tobacco production efficiency to improve export potential.
2. Domestic tobacco consumption must be managed wisely to ensure sufficient production allocation for export markets.
3. Excise policies need to be evaluated and restructured so that they not only serve fiscal purposes but also support the competitiveness of the tobacco export industry.
4. Export-oriented tobacco producers are encouraged to optimize production efficiency and explore new international markets to reduce dependence on domestic demand.

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