

The Effect of Exchange Rates, Import Tariffs, and Gross Domestic Product (GDP) on The Value of Indonesian Food Imports From 2017 to 2024

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Abstract

This study aims to analyze the economic effects of exchange rates, import tariffs, and Gross Domestic Product (GDP) on the import value of five major Indonesian food commodities, namely rice, wheat, sugar, soybeans, and beef during the period 2017–2024. The data were obtained from the Central Statistics Agency (BPS) and the Minister of Finance Regulation (PMK), then analyzed using panel data regression with the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches. The results show that exchange rates, import tariffs, and GDP simultaneously have a significant effect on food import values. Partially, only import tariffs have a positive and significant effect, while exchange rates and GDP do not show a significant effect. These findings confirm that import tariff policies play an important role in determining food import values, while exchange rates and GDP are less dominant factors. The implications of this study encourage the need for more adaptive tariff policies and consideration of other factors, such as international food prices and domestic production, in maintaining national food security.

Keywords: *Exchange Rate, Foodstuffs, GDP, Import Tariffs, Import Value*

JEL Codes : **M41, M15**

INTRODUCTION

Indonesia is an agricultural country crossed by a line of fertile mountains, so most of its population farms or works in the agricultural sector. As an agricultural country, Indonesia contributes significantly to the economy and the basic needs of the community, especially in the agricultural sector. The increasing population has led to an increase in food demand (Ayun et al., 2020). In Indonesia, limited production land, relatively long harvest periods, and inadequate agricultural facilities and infrastructure are obstacles to meeting domestic food needs. Therefore, the government has implemented an import policy in an effort to maintain food availability for the community (Putra, 2022).

Imports are necessary because Indonesia's food needs cannot be met independently due to the lack of available food for production. Higher food demand compared to supply can cause economic, social, and political instability (Putra, 2022). This condition is reflected in the development of Indonesia's total import value in recent years. Based on data from the Central Statistics Agency (BPS), the total value of Indonesia's imports tended to fluctuate from 2017 to 2024, with the highest value in 2024 reaching US\$253,199.6 million and the lowest in 2020 at US\$141,568.8 million. Fluctuations in import value can also be influenced by several economic factors, one of which is the exchange rate. Research conducted by Asiyah & Puspitasari (2023) found that the exchange rate had no effect on Indonesia's import value during the period from January 2019 to December 2022. This is because during that period, the movement of the rupiah exchange rate against the dollar tended to be stable and did not fluctuate extremely.

Another economic factor that affects import value is import tariffs. As shown in a study conducted by Bayu (2024), import tariffs have an effect on the volume of soybean imports. The first analysis revealed that the exemption of soybean imports tariffs had a positive impact on import volume, as indicated by an increase in soybean consumption and a decrease in domestic soybean production, thereby encouraging an increase in import volume. Conversely, the second analysis showed that the application of soybean imports tariffs of 5% and 10% had a negative impact on import volume, as indicated by a decrease in

soybean consumption and an increase in domestic production, thereby causing a decline in soybean import volume.

On the other hand, Gross Domestic Product (GDP) is closely related to import activities. However, previous research conducted by Hadi & Chung (2022) found that in the long term, Gross Domestic Product (GDP) per capita has no significant effect on imports, particularly on the demand for beef imports, which was the subject of the study. However, in the short term, GDP per capita growth can significantly affect beef import demand. Previous studies generally discuss this topic in general terms or are limited to a single commodity, whereas this study examines five food commodities in Indonesia simultaneously, namely rice, wheat, sugar, soybeans, and beef. The purpose of this study is to analyze the effect of exchange rates, import tariffs, and GDP on the value of Indonesian food imports from 2017 to 2024.

LITERATURE REVIEW

International Trade

International trade is a trading activity between countries based on trust and mutual benefit. This activity is carried out by both developed and developing countries (Galih, 2008; Bangun et al., 2024). International trade allows countries to focus on producing efficient and competitive goods and services, thereby encouraging exports, increasing state revenue, foreign exchange reserves, capital transactions, and creating jobs. Global competition requires domestic companies to compete more fiercely with foreign companies. Each country can export and import products according to their needs. In general, international trade has a positive impact, but facing global competition requires improving human resource performance (Ngatikoh & Faqih, 2020; Saragih, 2022; Salsabila & Setyowati, 2023).

Imports

Imports are defined as the purchase and entry of goods from abroad into the country. Import activities are economic activities that involve the purchase of products from abroad for domestic needs or for marketing within the country (Prastia et al., 2019). Factors that influence a country's imports include competitiveness and foreign exchange rates (Sukirno, 2004; Purba et al., 2021). Imports have both positive and negative effects on a country's economy. On the positive side, imports provide access to goods and services that are not available domestically or that can be obtained at a lower cost from abroad. This contributes to meeting consumer needs and supports economic growth. However, imports can also reduce demand for domestic products, thereby potentially weakening national industries. In addition, imports affect currency exchange rates. When the volume of imports exceeds exports, demand for the domestic currency decreases, which can lead to a depreciation in the exchange rate (Basia et al., 2025).

Import Value

The import value is the monetary value used as the basis for calculating the value of goods when import duties and other levies are imposed in accordance with customs and excise regulations for goods from abroad that are subject to tax tariffs (Asiyah & Puspitasari, 2023). The value of imports is influenced by various factors, one of which is the level of national income. When the value of imports increases, this has the potential to reduce domestic production productivity and slow down domestic economic growth (Chairani & Septriani, 2023).

Exchange Rate

The exchange rate is the price of the domestic currency for one unit of foreign currency (Salvatore, 2014; Purba et al., 2021). The exchange rate plays a significant role in an open economy because it affects the current account balance and various other economic variables (Sari et al., 2019). Exchange rate fluctuations also affect import activities. If the domestic currency is the rupiah and the foreign currency is the USD, the rupiah exchange rate indicates the amount of rupiah needed to obtain one unit of USD (Purba et al., 2021). Changes in the exchange rate also affect import activities. Exchange rate depreciation has a negative impact on the trade balance, reduces domestic demand for goods, and causes a decline in domestic interest rates. As a result, imports decline and exports are boosted (Asiyah & Puspitasari, 2023). Conversely, the appreciation of the rupiah makes the price of imported goods relatively cheaper than domestic products, which ultimately increases import demand (Purba et al., 2021).

Import Tariffs

Tariffs are taxes imposed on international trade activities involving the movement of goods across national borders. Tariffs consist of import tariffs, which are taxes paid when a country imports commodities from another country, and export tariffs, which are taxes imposed on goods exported to other countries (Helmiah & Nasrudin, 2021) . Import tariffs serve to regulate the flow of goods from abroad, become a source of state revenue, and protect domestic producers. The imposition of import tariffs can make imported goods more expensive, thereby increasing demand for domestically produced goods. This is considered beneficial for local producers to expand their production (Bayu, 2024).

Gross Domestic Product

Gross domestic product (GDP) is the main indicator used to measure a country's economic development in a given period. GDP is defined as the market value of all goods and services produced by domestic factors of production, both owned by citizens and foreign nationals, within a country's territory (Mankiw 2007; Purba et al., 2021) . Gross Domestic Product (GDP) is closely related to import activities. An increase in GDP is generally followed by growth in imports, especially in developing countries whose productivity levels are not yet able to optimally meet domestic needs. An increase in GDP drives changes in consumption patterns and purchasing power, thereby increasing demand for various types of goods, including imported goods. As a result, to meet these needs, countries need to import, which ultimately causes the value of imports to increase (Purba et al., 2021).

Previous Research

There have been many previous studies similar to this one, such as the study conducted by Sari et al. (2019) with the aim of analyzing the effect of inflation, foreign exchange reserves, and exchange rates on the value of imports in Indonesia during the 2000-2017 period using multiple linear regression. The study found that simultaneously, the three independent variables had a significant effect on the value of imports. Meanwhile, partially, inflation and foreign exchange reserves have a positive and significant effect on import value, while the exchange rate has no effect on import value in Indonesia. Using the same method, research conducted by Batubara et al. (2023) aimed to investigate the impact of gross domestic product (GDP) growth, inflation rate, and rupiah exchange rate on import value in Indonesia during the period 2014-2022 from an Islamic economic perspective. It can be concluded that GDP has a significant effect on import value, while the inflation rate and rupiah exchange rate do not have a significant effect on import value in Indonesia. However, simultaneously, these three independent variables have a significant effect on import value.

On the other hand, Bayu (2024) highlights the impact of soybean import tariffs in Indonesia using the partial equilibrium analysis method. The results of this study state that the exemption of soybean import tariffs can increase the volume of soybean imports and benefit consumers, but soybean producers are disadvantaged. Conversely, if import tariffs are applied at 5% and 10%, the volume of imports will decrease and soybean producers will benefit, but this could harm consumers.

There have been several previous studies that used different analytical methods from this study. Purba et al. (2021) used the Error Correction Model (ECM) research method, which had the main research objective of analyzing the effect of Gross Domestic Product (GDP), foreign exchange reserves, exchange rates, and inflation on imports in Indonesia from 2000 to 2019. The results show that in the short term, the three independent variables, except for exchange rates, have a positive and significant effect on imports in Indonesia. Meanwhile, in the long term, all variables have a positive and significant effect on imports in Indonesia. Unlike Purba et al. (2021), Kartikasari & Khoirudin (2022) used the Vector Error Correction Model (VECM) analysis method with the research objective of determining whether the independent variables consisting of inflation, exchange rates, money supply, and BI interest rates had an effect in the short and long term on imports in Indonesia. The results indicate that in the short term, inflation and interest rates do not have a significant effect, while the exchange rate has a significant effect on imports. In the long term, the three independent variables except interest rates do not have a significant effect on imports. For both the long and short terms, only the money supply has an effect on imports in Indonesia.

Framework and Hypothesis

Based on economic theory and previous research, the relationship between exchange rates, import tariffs, and GDP with the value of Indonesian food imports can be tested empirically with the following research model. Figure 1 explains research model.

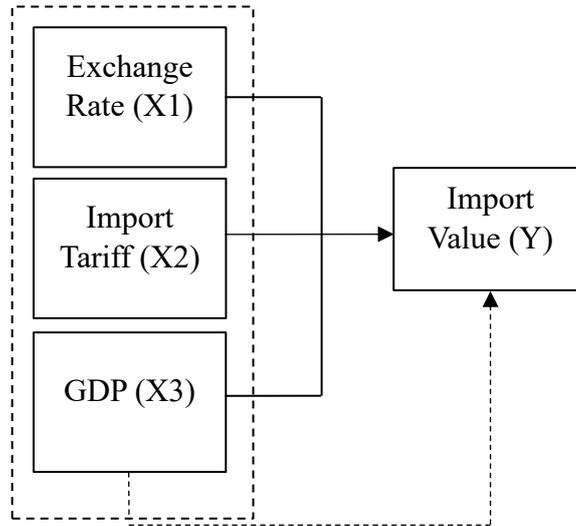


Figure 1 Research Model

Then the proposed hypothesis:

H1: Exchange rates, import tariffs, and GDP simultaneously have a significant effect on the value of food imports in Indonesia.

H2: Exchange rate partially has a significant effect on the value of food imports in Indonesia.

H3: Import tariffs partially have a significant effect on the value of food imports in Indonesia.

H4: GDP partially has a significant effect on the value of food imports in Indonesia.

RESEARCH METHOD

The research data was obtained from the Central Statistics Agency (BPS) and the Minister of Finance Regulation (PMK) of the Republic of Indonesia for the period 2017–2024. The analysis was conducted using panel data regression with Eviews 13, with estimates using the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) and selection of the best model using the Chow Test, Hausman Test, and Lagrange Multiplier Test. The variables used consisted of import value as the dependent variable, as well as exchange rates, import tariffs, and GDP as independent variables.

Import value in this study is defined as the total monetary value of goods entering Indonesia from trading partner countries in a certain period, which is generally expressed in CIF (Cost, Insurance, and Freight) prices. This variable is used as the dependent variable (Y) because it reflects the level of economic dependence on foreign products. To analyze the factors that influence import value, this study uses a panel data regression approach by including several independent variables, namely exchange rate (X1), which represents the purchasing power of the domestic currency against foreign currencies; import tariffs (X2), which reflect trade policy in the form of import duties; and GDP (X3), which describes a country's economic capacity. Thus, the empirical model of the study can be formulated as follows:

$$Y_{it} = a + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \varepsilon_{it}$$

To standardize units and reduce data heterogeneity, all variables in this study were transformed using natural logarithms (Ln). Thus, the data used in the model estimation was in logarithmic form so that it was more uniform and easier to interpret, forming the following equation:

$$\text{Ln}Y_{it} = a + \beta_1 \text{Ln}X1_{it} + \beta_2 \text{Ln}X2_{it} + \beta_3 \text{Ln}X3_{it} + \varepsilon_{it}$$

Explanation:

- Y = Indonesia's import value from partner countries i in the period t .
- a = Constant.
- $X1_{it}$ = Exchange rate of the rupiah against the foreign currencies of partner countries i during the period t .
- $X2_{it}$ = Import tariffs (import duties) imposed on goods from partner countries i during the period t .
- $X3_{it}$ = Gross Domestic Product (GDP) of Indonesia or partner countries i during the period t , which describes economic capacity.
- β = Regression Coefficients that indicate the direction and magnitude of the influence of each independent variable on import values.
- ε = Error component or other factors not explained in the model.

RESULTS AND DISCUSSION

This section presents the results of the econometric model estimation using panel data regression. The analysis was carried out through three main approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM), with the selection of the most appropriate model conducted using the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test.

Chow Test Results

The Chow Test results for model selection are shown in the following table 1. The Chow test results above show that the probability value of $0.0000 < 0.05$ means that between CEM and FEM, FEM is selected.

Table 1 Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	668.294201	(4.32)	0.0000
Cross-section Chi-square	177.487466	4	0.0000

Source: Eviews13 analysis output, 2025

Hausman Test Results

The results of the Hausman test conducted on this research model are shown in the following table 2. The Hausman test results above show that the probability value of $1.0000 > 0.05$ means that between FEM and REM, REM is selected, so a follow-up LM test needs to be conducted to choose between the CEM and REM models.

Table 2 Hausman Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	668.294201	(4.32)	0.0000
Cross-section Chi-square	177.487466	4	0.0000

Source: Eviews13 analysis output, 2025

LM Test Results

The following table presents the LM test results for the research model. The Lagrange Multiplier test (Breusch-Pagan Cross-section = 135.2702; $p = 0.0000$) indicates that the Random Effect Model (REM) is more appropriate than the Common Effect Model (CEM). Subsequent panel data analysis uses REM, which accommodates individual heterogeneity, making classical assumption tests non-mandatory for this study.

Table 3 LM Test Results

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	135.2702 (0.0000)	4.945286 (0.0262)	140.2155 (0.0000)

Source: Eviews13 analysis output, 2025

Panel Data Regression Analysis

$$\ln \text{Import Value} = -45,146 + 7,485 \ln \text{Exchange Rate} + 0,436 \ln \text{Import Tariffs} + 0,075 \ln \text{GDP}$$

The model equation above is interpreted in detail as follows.

1. Constant (-45.146): Indicates that if all independent variables are zero, the predicted value of imports is -45.146.
2. LnExchange Rate coefficient (7.485): Indicates that a 1% increase in the exchange rate will increase the value of imports by 7.485%, and vice versa.
3. Coefficient LnImport Tariff (0.436): Indicates that a 1% increase in import tariffs will actually increase the value of imports by 0.436%, and vice versa.
4. Coefficient LnGDP (0.075): Indicates that a 1% increase in GDP only increases imports by 0.075%, and vice versa.

F-test: Simultaneous Effect

The results of the F-statistic test can be seen in the following table 4. The F-test results show that the calculated F value is 8.055699 and the significance value (probability) is 0.000310, which is much smaller than 0.05. This means that the exchange rate, import tariffs, and GDP variables simultaneously affect import values. This indicates that the diversity or variability of import values can be explained by the three independent variables of exchange rate, import tariffs, and GDP.

Table 4 F-test results

F-statistic	8.055699
Prob(F-statistic)	0.000310

Source: Eviews13 analysis output, 2025

Coefficient of Determination (R²)

The value of the coefficient of determination (R²) is shown in the following table 5. The coefficient of determination obtained is 0.401666, meaning that the three independent variables, namely exchange rate, import tariffs, and GDP, are able to explain 40.16% of the diversity or variability of import values. The remaining diversity or variability in import value is explained by other variables not included in this research model, with a value of approximately 59.84%.

Table 5 Coefficient of determination R²

R-squared	0.401666
Adjusted R-squared	0.351805

Source: Eviews13 analysis output, 2025

T-test: Partial Effect

The results of the partial test using the t-test are presented in the table below.

Table 6 t-test results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-45.14674	36.72547	-1.229303	0.2269
Ln Exchange Rate	7.485886	6.551282	1.142660	0.2607
Ln Import Tariff	0.436496	0.134281	3.250622	0.0025
Ln GDP	0.075761	1.775494	0.042671	0.9662

Source: Eviews13 analysis output, 2025

The t-test results above show that the probability values of the three independent variables are as follows: exchange rate 0.2607, import tariff 0.0025, and GDP 0.9662. The probability values of the exchange rate variable ($0.2607 > 0.05$) and GDP ($0.9662 > 0.05$) are greater than 0.05, which means that these two independent variables have no significant partial effect on the dependent variable, namely import value. Meanwhile, the second independent variable, import tariffs, has a different value from the other independent variables, with a probability value smaller than 0.05 ($0.0025 < 0.05$), meaning that import tariffs have a positive and significant partial effect on import value.

The Simultaneous Effect of Exchange Rate, Import Tariff, and GDP on Import Value

The F test results, as shown in Table 4, indicate that all independent variables in this study, namely exchange rates, import tariffs, and Gross Domestic Product (GDP), simultaneously have a significant effect on import values with a coefficient of determination (R²) of 0.401666, as shown in Table 5. As explained earlier, this indicates that the three independent variables studied are able to explain 40.16% of the diversity or variability of import values. This means that approximately 59.84% of the remaining diversity or variability of import values is explained by other variables not included in the model in this study. Based on this, it can be concluded that the first hypothesis is accepted, namely: H₁: Exchange rates, import tariffs, and GDP simultaneously have a significant effect on the value of food imports in Indonesia.

Another meaning of simultaneous influence is that the value of imports can be predicted based on the values of the three independent variables, namely exchange rate, import tariffs, and GDP, using a regression equation. The accuracy level of the prediction using this equation is approximately 40.16%.

The Effect of Exchange Rates on Import Values

Based on the t-test results in Table 6 above, it can be seen that the exchange rate does not have a significant partial effect on the value of food imports in Indonesia. Food imports continue even when the exchange rate rises or falls because most foods (rice, wheat, soybeans, sugar) are basic necessities. So even though the rupiah has weakened (import prices have risen), Indonesia still has to import to meet the needs of its people. Based on this, it is concluded that the second hypothesis is rejected, namely: H₂: The exchange rate has a significant effect on the value of food imports in Indonesia.

This is in line with research conducted by Asiyah & Puspitasari (2023), which states that the exchange rate does not affect Indonesia's import value for the period January 2019 - December 2022. This result is reinforced by research conducted by Batubara et al. (2023), which shows that the rupiah exchange rate also has no significant effect on import value in Indonesia. Meanwhile, research conducted by Sari et al. (2019) shows different results, namely that the exchange rate variable has no partial effect on import value in Indonesia.

The Effect of Import Tariffs on Import Value

Unlike the exchange rate variable, the results of this study show that import tariffs partially have a positive and significant effect on the value of food imports in Indonesia. This indicates that the imposition of import tariffs increases the price of imported goods so that even though the volume does not increase, the value of imports continues to increase in trade statistics. This is reinforced by the inelastic nature of foodstuffs and high domestic demand, so that imports continue even though prices rise. As a result, tariffs intended to limit imports are instead reflected as a significant increase in import value. Based on this, it is concluded that the third hypothesis is accepted, namely: H₃: Import tariffs have a significant effect on the import value of foodstuffs in Indonesia.

The results of this study are in line with research conducted by Adhikari (2019), which states that in the long term, import tariffs have a significant but different (negative) effect on the value of imports. Conversely, in the short term, import tariffs do not have a significant effect on the value of imports.

The Effect of GDP on Import Value

The results of the study of the third variable, GDP, show that GDP has no significant partial effect on the value of food imports in Indonesia. This means that even though there has been an increase in national income, this does not necessarily lead to an increase in food imports. This can be explained by the fact that staple foods are basic necessities whose demand is relatively stable and inelastic to changes in income. In addition, the value of food imports is more influenced by domestic production constraints, government policies, and international food prices than by GDP growth. Thus, GDP is not the main factor determining the value of food imports in Indonesia. Based on this, it can be concluded that the fourth hypothesis is rejected, namely: H₄: GDP has a significant effect on the exchange rate of foodstuffs in Indonesia.

This finding is in line with previous research conducted by Hadi & Chung (2022), which concluded that in the long term, gross domestic product (GDP) per capita has no significant effect on imports. However, in the short term, GDP per capita growth can significantly affect import demand. Another study conducted by Batubara et al. (2023) also shows the same result, namely that there is a significant effect of gross domestic product on import value in Indonesia.

CONCLUSION AND SUGGESTION

Based on research conducted on the effect of exchange rates, import tariffs, and GDP on the value of Indonesian food imports from 2017 to 2024 using panel data regression analysis, it can be concluded that exchange rates, import tariffs, and GDP simultaneously have a significant effect on the value of food imports in Indonesia. Partially, import tariffs have a significant effect on the value of food imports in Indonesia, while exchange rates and GDP do not have a significant effect on the value of food imports in Indonesia.

Based on the results of this study, it is recommended that the government pay attention to food import tariff policies, given the significant effect of tariffs on import value. Although exchange rates and GDP do not have a significant effect, monitoring macroeconomic conditions is still necessary to anticipate market fluctuations. Further research is recommended to add other variables such as domestic production, international commodity prices, or use a longer data period to gain a more comprehensive understanding of the factors that influence food imports.

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