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The Influence of Domestic Soybean Production, Consumption, Prices, and Exchange Rates on Soybean Imports in Indonesia

Indah Pratiwi[1*], Joko Sutrisno[2], Ernoiz Antriyandarti[2]

[1] Master of Agribusiness Program, Faculty of Agriculture, Universitas Sebelas Maret, Indonesia
[2] Department of Agribusiness, Faculty of Agriculture, Universitas Sebelas Maret, Indonesia

*Correspondence: E-mail: indah.p2492@gmail.com

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ABSTRACT

Background: Domestic soybean production that has not been able to meet national soybean needs is an implication of the decline in soybean harvested area in Indonesia. The opposite condition occurs at the level of demand for soybeans, which increases every year. The soybean import policy is an alternative step for government to overcome the gap between soybean production and consumption in Indonesia. Soybeans in this study are not separated from the type, namely with HS code 1201 (Soya beans, whether or not broken).
Aims: This study aims to analyze the factors that influence soybean imports in Indonesia by using secondary data from 2001 to 2021. The research method used is descriptive quantitative.
Methods: The analysis method used is OLS which is used to determine the regression equation so that the actual value can be know from each independent variable to the dependent variable.
Results: The result of the study found that partially soybean production had no significant effect on soybean imports in Indonesia, soybean consumption had no significant effect on soybean imports in Indonesia, domestic soybeans prices had a significant effect on soybeans imports in Indonesia, the exchange rate had no significant effect on soybean imports in Indonesia, and simultaneously all free variable had a significant effect on soybean imports in Indonesia.

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1. Introduction

The rising demand for soybeans has forced producers to ramp up production to keep up. However, on the other hand, domestic soybean production has been steadily declining. This drop is attributed to farmers losing interest in cultivating soybeans, compounded by the lack of sufficient land for soybean farming. To address the growing, often uncontrolled demand, the government has resorted to importing soybeans, creating a dependency on imports (Purba *et al.,* 2018; Situmorang *et al.,* 2020; Yusri *et al.,* 2021).

Indonesia, as a country that adheres to an open economy, enables trade and collaboration with other nations worldwide. International trade in this context includes the exchange of goods and services, allowing nations to improve their standard of living through exports and imports (Khan, 2011). On the other hand, local soybean production in Indonesia which is unstable from year to year has a negative impact so that in order to meet domestic soybean needs, the government must import soybeans from other countries. The increase in soybean imports that occurs continuously and is not limited can cause the domestic market to be flooded by imported soybeans products, and local soybeans will be replaced by imported soybeans which have cheaper prices compared to local soybeans, as a result the number of unemployed will increase due to the reduction in farmers livelihoods in the agricultural sector (Prawoto, 2016).

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2. Methods

This research approach is a quantitative research approach; quantitative research focuses on hypothesis testing against measurable data to draw written conclusions. In general, this research uses data in numerical form or quantitative research numbers is an approach to test objective theory by testing the relationship between variables. The place or object in this research is Indonesia, the type of data in this research uses secondary data, namely data obtained indirectly by researchers from related agencies to the required data. While the data source needed in this research is obtained from publications by the Central Statistics Agency (BPS), the Data and Information Center (PUSDATIN) of the Ministry of Agriculture, and the Ministry of Trade. The data examined includes soybean production, soybean consumption, domestic soybean prices, exchange rates, and soybean imports. The type of data used in this research is time series data, spanning the period from 2001 to 2021.

In analyzing the data, this study utilizes multiple linear regression analysis. This method is employed to estimate or predict the average value of the dependent variable based on the known values of the independent variables. To support the analysis, several statistical tests are applied, such as hypothesis testing, which includes simultaneous hypothesis testing (F-test) and partial hypothesis testing (t-test), along with the determination of the coefficient of determination (R^2). These tests aim to assess both the individual and collective influence of the independent variables on the dependent variable while measuring the extent to which the independent variables explain variations in the dependent variable.

3. Results and Dicussion

3.1 Multiple Linear Regression Analysis

The researchers employed the multiple linear regression method to analyze the influence of independent variables, including domestic soybean production (X1), soybean consumption (X2), domestic soybean prices (X3), and exchange rates (X4), on the dependent variable, soybean imports (Y). The multiple linear regression equation used in the analysis is expressed as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e$$

Details and Explanation:

Y	= Soybean Imports
a	= Intercept
X_1	= Domestic soybean production
X_2	= Soybean Consumption
X_3	= soybean price
X_4	= Exchange price
b_1,b_2,b_3,b_4	= Regression Coefficients
e	= *Error*

Based on the analysis results using the EViews 12 program, the following results were obtained:

Table 1. Results of Multiple Linear Regression Test

Variable	Koef.	Std.Error	t-Stat	Prob.
(Constant)	0.670804	0.656264	1.022155	0.3219
Soybean Production	-0.000587	0.000339	-1.730005	0.1029
Soybean Consumption	0.003393	0.047121	0.072016	0.9435
Soybean price	0.104307	0.018420	5.662822	0.0000
Exchange price	0.061668	0.035248	1.749548	0.0993
F-statistic				33.45268
R Squared (R^2)				0.866534
Durbin-Watson				1.249371

Source: Processed secondary data, 2024

It is known that the results from the multiple linear regression analysis yield the following equation:

$$Y= 0.670804 – 0.000587X1 + 0.003393X2 + 0.104307X3 + 0.061668X4$$

Explanation of the Regression Equation Results:

a : 0.670804 This means that if soybean production (X1), soybean consumption (X2), domestic soybean prices (X3), and the exchange rate (X4) are all zero, soybean imports (Y) will be positive.

b_1 : -0.000587 This indicates that if domestic soybean production (X1) increases, soybean imports (Y) will decrease, assuming that soybean consumption (X2), domestic soybean prices (X3), and the exchange rate (X4) remain constant.

b_2 : 0.003393 This shows that if soybean consumption (X2) increases, soybean imports (Y) will also increase, assuming that domestic soybean production (X1), domestic soybean prices (X3), and the exchange rate (X4) remain constant.

b3 : 0.104307 This means that if domestic soybean prices (X3) increase, soybean imports (Y) will also increase, assuming that domestic soybean production (X1), soybean consumption (X2), and the exchange rate (X4) remain constant.

b_4 : 0.061668 This means that if the exchange rate (X4) increases, soybean imports (Y) will increase, assuming that domestic soybean production (X1), soybean consumption (X2), and domestic soybean prices (X3) remain constant.

From this, it can be concluded that the most dominant factor influencing soybean imports (Y) in Indonesia from 2001 to 2021 is domestic soybean prices (X3), as the regression coefficient value of 0.104307 is the highest among the other variables.

The results of the t-test analysis are used to test the partial effects of domestic soybean production (X1), soybean consumption (X2), domestic soybean prices (X3), and the exchange rate (X4) on soybean imports (Y) in Indonesia. Using EViews 12, the following results were obtained:

a. **Test for the significance of the effect of domestic soybean production (X1) on soybean imports(Y)** The t-statistic value is -0.000587, with a p-value of 0.1029 > 0.05. Therefore, hypothesis 1, which states "Domestic soybean production does not significantly affect soybean import volume in Indonesia," is proven to be correct.
b. **Test for the significance of the effect of soybean consumption (X2) on soybean imports (Y)** The t-statistic value is 0.003393, with a p-value of 0.9435 > 0.05. Therefore, hypothesis 2, which states "Soybean consumption significantly affects soybean import volume," is proven to be incorrect.
c. **Test for the significance of the effect of domestic soybean prices (X3) on soybean imports (Y)** The t-statistic value is 0.104307, with a p-value of 0.0000 < 0.05. Therefore, hypothesis 3, which states "Domestic soybean prices significantly affect soybean import volume," is proven to be correct.
d. **Test for the significance of the effect of the exchange rate (X4) on soybean imports (Y)** The t-statistic value is 0.061668, with a p-value of 0.0993 > 0.05. Therefore, hypothesis 4, which states "The exchange rate does not significantly affect soybean import volume in Indonesia," is proven to be correct.

The F-test result shows a significance with the value of 33.46268 with a p-value (F-statistic) of 0.000000 (<0.05). This indicates that all four independent variables—domestic soybean production (X1), soybean consumption (X2), domestic soybean prices (X3), and the exchange rate (X4)—simultaneously affect the dependent variable, which is the volume of soybean imports in Indonesia.

Based on Table 1, the Adjusted R-squared value is 0.866534, meaning that 86.6% of the variation in soybean imports in Indonesia is explained by the relationship between production, consumption, prices, and the exchange rate. The remaining 13.4% is influenced by other variables not included in the model.

3.1.1 Effect of Domestic Soybean Production (X1) on Soybean Imports in Indonesia (Y)

Based on the partial statistical test results, there is a negative but insignificant relationship between domestic soybean production and soybean import volume in Indonesia. The significance level shows that the domestic soybean production variable has a value of 0.1029, which is greater than the required significance level of 5% (0.1029 > 0.05). In addition, the coefficient value of -0.000587 means that for every additional ton of domestic soybean production (X1), soybean imports (Y) will decrease by 0.000587 tons, assuming other variables remain constant.

Countries that require goods that cannot be produced domestically will engage in imports with other countries. Import activities are also part of government policy in international trade, typically when foreign products are of better quality or lower price (Saskara & Batubara, 2015). According to Mahdi & Suharno (2019), with government efforts, trends in increased production, along with the extension and efficiency of the soybean cultivation system as part of the rice, corn and soybean program, will be achievable. This increase in production and competitive soybean prices will encourage importers to buy local soybeans. Thus, with the accumulation of these efforts, a response to a decrease in soybean imports in Indonesia is expected.

The results of this study are in line with those of Mahdoh & Risyanto (2018), who stated that domestic soybean production does not significantly affect imports because, even if domestic production increases, if the

existing soybean reserves are insufficient to meet the minimum reserve requirements, the government will continue to import soybeans.

3.1.2 Effect of Soybean Consumption on Soybean Imports in Indonesia

Soybean consumption does not have a significant effect on soybean imports in Indonesia. This is because, although soybean consumption in Indonesia has increased, it does not affect import volumes. This is due to the fact that people continue to consume soybeans and soybean-based products regardless of price fluctuations. Soybeans are a healthy food that remains affordable for all segments of society. Even though Indonesia is one of the largest soybean consumers in the world, it is unfortunate that Indonesia still relies on imports to meet its soybean needs, despite having land for soybean cultivation (Hermawan & Prawoto, 2018). The findings of this study align with research conducted by Setyawan & Huda, (2022), which also found that soybean consumption does not significantly influence soybean imports in Indonesia.

3.1.3 Effect of Domestic Soybean Prices on Soybean Imports in Indonesia

Based on the estimation results, the variable of domestic soybean prices has a positive relationship with a coefficient value of 0.104307, which supports the initial hypothesis. The probability for domestic soybean prices is 0.00000, which is smaller than the 5% significance level, indicating that domestic soybean prices significantly affect soybean import volume. The significance of this effect means that for every 1% increase in domestic soybean prices, soybean imports will increase by 0.104307%. This makes imported soybeans a substitute for domestic soybeans. When domestic soybean prices rise, importers will prefer cheaper imported soybeans from international markets. These findings align with research by Mahdi & Suharno (2019), who also concluded that domestic soybean prices significantly affect soybean imports.

3.1.4 Effect of the Exchange Rate on Soybean Imports in Indonesia

Based on this research, it is known that the exchange rate coefficient is 0.061668. The probability for this exchange rate variable is 0.0993, which is greater than the 5% significance level, meaning the exchange rate does not have a significant effect on soybean imports.

According to the theory by Mankiw (2018), import demand is negatively related to the exchange rate, meaning that when the exchange rate strengthens, imports should decrease. However, the results of this study contradict this theory. This is because soybeans are an inelastic commodity, meaning they are not highly sensitive to price changes (in relation to the currency used for imports). The demand for soybeans, being a key food item, does not significantly decrease or increase with price fluctuations (Wahyuni *et al.,* 2016).

Furthermore, despite the exchange rate of USD to IDR increasing from 2015 to 2021, soybean imports have continued to rise. Ideally, if the exchange rate rises, imports should decrease. However, this research found that this was not the case. People place soybeans as nutritious food with affordable prices. So when the price of soybeans rises because the rupiah exchange rate weakens, people will still buy it because processed soybeans such as tofu and tempe are the favorite side dishes of Indonesian people. In addition even though the rupiah exchange rate strengthened and the proce of imported soybeans decreased, local soybean production still cannot meet the high domestic demand. Because foreign exchange rates and domestic income levels also have a considerable influence on high import demand (Hermawan & Purwanto, 2018).

These findings align with research conducted by Wiguna (2014), Ichsan *et al.* (2016), and Khairunisa (2022), which also concluded that the exchange rate does not significantly influence imports.

4. Conclusion

Based on the results of the study on the influence of domestic soybean production, soybean consumption, domestic soybean prices, and the exchange rate on soybean imports in Indonesia during the period 2001-2021, the following conclusions can be drawn:

1. Simultaneously, the variables of domestic soybean production, soybean consumption, domestic soybean prices, and the exchange rate collectively affect soybean imports in Indonesia from 2001 to 2021.
2. Partially, the variable of domestic soybean prices significantly affects soybean imports, while the variables of soybean production, soybean consumption, and the exchange rate do not significantly influence soybean imports in Indonesia during the 2001-2021 period.

It is hoped that the Indonesian government can pay more attention and maximize its performance in terms of soybean production so that it can provide a goal direction in successfully releasing dependence on soybean consumption that can be fulfilled.

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