

THE EFFECT OF SOYBEAN PRODUCTION AND IMPORTS ON SOYBEAN PRICES IN INDONESIA

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Abstract

This study aims to analyze the influence of soybean production and soybean imports on soybean prices in Indonesia. This study uses time series data from 1990-2024 using multiple linear regression methods. The results show that soybean production has a negative and significant effect on soybean prices in Indonesia. Conversely, soybean imports have a positive and significant effect on soybean prices in Indonesia. Simultaneously, soybean production and soybean imports significantly influence soybean prices in Indonesia.

Keywords: Soybean Production, Soybean Imports, Soybean Prices

1. Introduction

Indonesia is an agricultural country, with the agricultural sector playing a vital role in food security and economic activity. Soybeans are a strategic food commodity, serving as the primary raw material for tofu, tempeh, soy sauce, soy milk, and various widely consumed processed products. The high consumption of soybeans has implications for consumers, micro, small, and medium enterprises (MSMEs), processing industries, and soybean farmers. In economic theory, prices are determined through the interaction of supply and demand. When demand exceeds supply, prices tend to rise, while increased supply with relatively stable demand tends to depress prices. In the Indonesian soybean market, supply comes from both domestic production and imports. Therefore, changes in production and imports are important in explaining domestic soybean price dynamics (Mankiw, 2018; Azzahra & Amaliah, 2023). The dependent variable in this study is the soybean price (Y), which is the price of soybeans in Indonesia expressed in rupiah per kilogram (Rp/kg). Price is an important indicator because it is related to consumer purchasing power, as well as farmer income and incentives. Prices that are too low can reduce farmer profits and reduce interest in cultivation, while high prices increase raw material costs for the tofu and tempeh industry. Research data shows that soybean prices have tended to increase over the long term, but remain volatile.

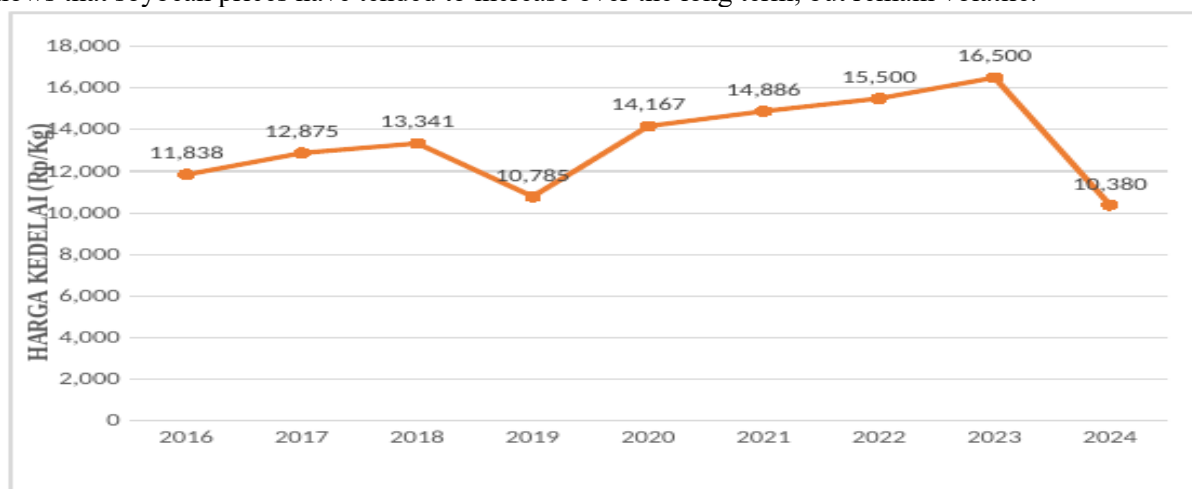


Figure 1.1 Soybean Price Data 2016-2024

Source: Central Statistics Agency (2025), processed from research data.

Figure 1 shows that soybean prices increased from IDR 1,015/kg in 1990 to IDR 16,500/kg in 2023, then decreased to IDR 10,380/kg in 2024. In the 2016–2018 period, prices increased from IDR 11,838/kg to IDR 13,341/kg, decreased to IDR 10,785/kg in 2019, and then increased again in 2020–2023. The sharp decline in 2024 is a significant phenomenon because it occurred when domestic production also declined. This phenomenon shows that prices are not only determined by domestic production, but also by imported supplies and other market factors.

The first independent variable is soybean production (X1). Production indicates the amount of soybeans produced by the Indonesian agricultural sector in a year and is measured in tons. In theory, production is a supply-side variable. Increased production will increase the availability of commodities in the market, so that, with constant demand, prices tend to decline. Conversely, decreased production can reduce supply and increase pressure on prices (Sukirno, 2015; Wijaya et al., 2022).

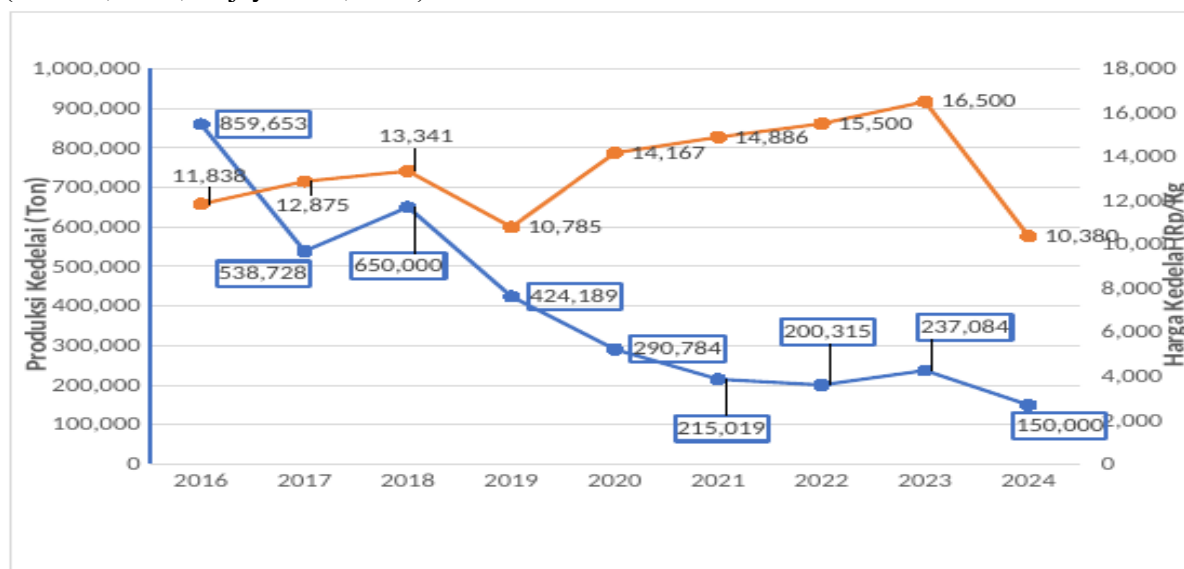


Figure 1.2 Soybean Production Data 2016-2024

Source: Central Statistics Agency (2025), processed from research data.

Figure 2 shows that Indonesian soybean production fluctuates but shows a downward trend. The highest production occurred in 1992 at 1,869,713 tons, while the lowest production occurred in 2024 at 150,000 tons. This decline is related to various structural issues explained in the thesis, including reduced farmer interest, land conversion, technological limitations, and inadequate economic incentives. Low production conditions have further limited domestic production capacity to meet national demand.

The second independent variable is soybean imports (X2), which is the amount of soybeans imported from abroad to meet domestic demand that cannot be met by local production, measured in tons per year. In theory, imports can increase supply in the domestic market and, under certain conditions, can depress prices. However, in an economy that is highly dependent on imports, increased imports can also be an indicator that domestic demand is exceeding domestic production capacity. Thus, the empirical relationship between imports and prices may differ from the simple predictions of supply theory (Mankiw, 2016; Purnamasari et al., 2025).

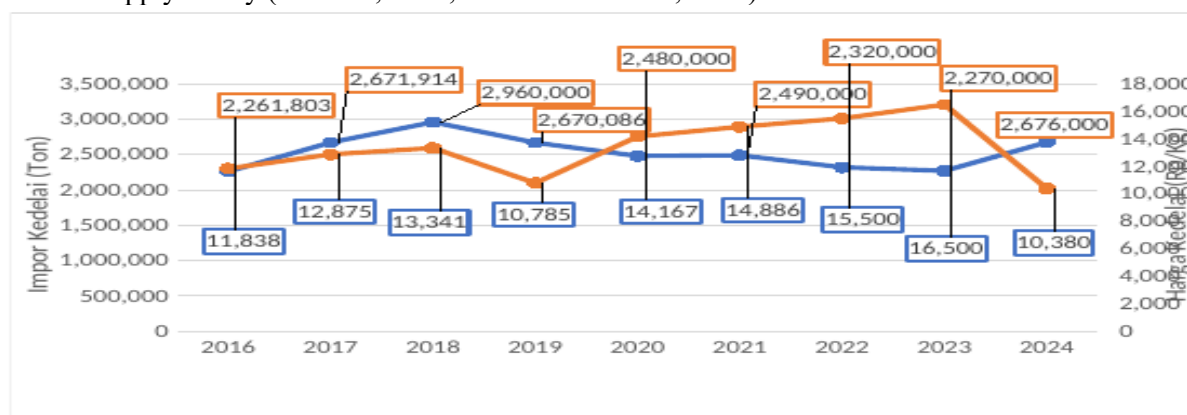


Figure 1.3 Soybean Import Data 2016-2024

Source: Central Statistics Agency (2025), processed from research data.

Figure 3 shows that Indonesia's soybean imports have tended to increase over the long term and fluctuated over several periods. The lowest imports occurred in 1998 at 343,124 tons, while the highest imports occurred in 2018 at 2,960,000 tons. The increase in imports reflects the gap between national demand and domestic production capacity. Import dependence also makes domestic prices more sensitive to changes in international prices, exchange rates, and trade policies (Barboza Martignone et al., 2022; Dewi & Widanta, 2025).

Empirical evidence suggests that the relationship between variables does not always follow a simple theoretical direction. In 2024, production fell from 237,084 tons to 150,000 tons, but prices also fell from Rp16,500/kg to Rp10,380/kg. During the same period, imports increased from 2,270,000 tons to 2,676,000 tons. This suggests that additional import supply can play a role in mitigating price pressures when domestic production declines. Conversely, in 2017–2018, imports increased and prices also rose, suggesting that rising imports can coincide with rising prices when domestic demand and other external factors are stronger.

Previous research by Azzahra and Amaliah (2023) examined the factors influencing domestic soybean prices by including local soybean quantity, imports from China, international soybean prices, Indonesian imports, and the exchange rate. Meanwhile, international research by Barboza Martignone et al. (2022) emphasized soybean price transmission between international markets. This study narrows its focus to two main supply components: domestic production and imports, with soybean prices as the dependent variable and using the timeframe 1990–2024. This focus provides a more comprehensive overview of the relationship between Indonesian soybean production, imports, and prices.

Based on the description, this study aims to analyze the effect of soybean production on soybean prices in Indonesia, analyze the effect of soybean imports on soybean prices in Indonesia, and test the effect of soybean production and imports simultaneously on soybean prices in Indonesia.

2. Methods, Data, and Analysis

This study uses a quantitative approach with secondary data in the form of annual time series for 1990–2024, resulting in 35 observations. Data on soybean prices, soybean production, and soybean imports are sourced from the Central Statistics Agency (BPS), as used in this thesis. Data collection methods include documentation and literature review of relevant data and publications.

Variables	Code	Operational definition	Unit
Soybean prices	Y	The price of soybeans in Indonesia is used as the dependent variable.	Rp/kg
Soybean production	X1	National soybean production amount per year.	Ton
Soybean imports	X2	The amount of soybeans imported by Indonesia per year.	Ton

Table 1. Operational Definition of Variables

Source: processed data (2025).

The analysis was conducted using multiple linear regression with the Ordinary Least Squares (OLS) method. The research model is formulated as:

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \epsilon_t$$

Model feasibility was tested using classical assumption tests, including normality, autocorrelation, heteroscedasticity, and multicollinearity. Furthermore, partial (t) tests, simultaneous (F) tests, and coefficient of determination (R^2) tests were performed.

3. Results and Discussion

3.1 Results of the Classical Assumption Test

The Jarque-Bera normality test results show a probability of 0.4946, greater than 0.05, so the residual model is declared normally distributed. The Breusch-Godfrey test produces a Chi-Square probability of 0.3371, so there is no indication of autocorrelation. The White test produces a probability of Obs*R-squared of 0.0833, greater than 0.05, so there is no indication of heteroscedasticity. The centered VIF values of production and imports are each 2.701765, so there is no indication of multicollinearity problems.

Testing	Core values	Prob.	Conclusion
Normality (Jarque-Bera)	—	0.4946	Normal
Autocorrelation (BG LM)	Obs*R ² = 2.174965	0.3371	No autocorrelation
Heteroscedasticity (White)	Obs*R ² = 9.727636	0.0833	No heteroscedasticity
Multicollinearity	Centered VIF X1 = 2.701765	—	No problem
Multicollinearity	Centered VIF X2 = 2.701765	—	No problem

Table 2. Summary of Classical Assumption Tests

Source: Results of EViews 13 data processing, (2025).

3.2 Multiple Linear Regression Results

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	2604,948	2357,001	1,105196	0.2773
Production (X1)	-0.002708	0.001303	-2,078600	0.0458
Import (X2)	0.004407	0.000804	5.484029	0.0000

Table 3. Multiple Linear Regression Results

Source: Results of EViews 13 data processing, (2025).

Based on the estimation results, the regression equation is $Y = 2604.948 - 0.002708X_1 + 0.004407X_2$. The constant of 2604.948 indicates the price value when production and imports are considered to be zero. The production coefficient of -0.002708 means that an increase in production of 1 ton, with imports remaining constant, is associated with a price decrease of approximately Rp0.002708/kg. This negative direction is in accordance with the supply-side mechanism, namely that increased production increases supply and tends to suppress prices.

The import coefficient of 0.004407 indicates that a 1-ton increase in imports, with constant production, is associated with a price increase of approximately Rp0.004407/kg. This positive finding differs from the simple prediction that additional imports always lower prices. In the Indonesian context, increased imports can be a response to domestic supply shortages and high national demand. Therefore, import volumes can move in the same direction as prices, as both are influenced by demand conditions, international prices, and Indonesia's dependence on foreign supplies.

3.3 Hypothesis Testing

Testing	Mark	Prob.	Decision
Production t-test (X1)	-2,078600	0.0458	Significant
Import t-test (X2)	5.484029	0.0000	Significant
F test	70.90624	0.0000	Significant
Adjusted R ²	0.804387	—	80.43%

Table 4. Summary of Hypothesis Testing

Source: Results of EViews 13 data processing, (2025).

Partially, soybean production has a negative and significant effect on soybean prices, as the probability value of 0.0458 is less than 0.05. This result supports the hypothesis that increased production can increase supply and

depress prices. This finding aligns with the discussions of Permana et al. (2024) and Oktafiani et al. (2024) regarding the importance of domestic production in maintaining supply availability. Soybean imports have a positive and significant effect on prices, as the probability value of 0.0000 is less than 0.05. This result indicates that imports in the study do not merely serve as additional supply that lowers prices, but may also reflect high domestic demand and dependence on foreign markets. This finding aligns with Purnamasari et al. (2025) and Devi et al. (2024), which emphasize that low domestic production and high consumption demand drive imports. Simultaneously, the F-statistic value of 70.90624 with a probability of 0.0000 indicates that production and imports together have a significant effect on soybean prices. The Adjusted R-squared value of 0.804387 means that 80.43% of the variation in soybean prices can be explained by these two variables, while the remaining 19.57% is influenced by other factors outside the model, such as consumption, exchange rates, inflation, harvested area, productivity, and international soybean prices.

3.4 Discussion

The research results show that Indonesian soybean prices are the result of the interaction of various supply sources. Domestic production has a negative impact, while imports have a positive one. This difference in direction emphasizes that the function of imports in Indonesia must be understood within the context of supply dependency. When domestic production declines, the need for imports increases. Because imports are used to meet supply shortages, import volume increases can occur during times of high demand and price pressures. The research findings also have implications for food policy. Increasing domestic production needs to be directed towards strengthening supply and reducing dependence on imports. At the same time, imports remain necessary when domestic production is insufficient to meet demand. Therefore, import policies need to be implemented in a measured manner, taking into account national needs, domestic production conditions, global prices, and farmer protection. This approach is crucial to maintaining price stability for consumers and MSMEs without reducing farmers' incentives to produce.

4. Conclusion and Suggestions

Based on the results of multiple linear regression for the period 1990–2024, soybean production has a negative and significant effect on soybean prices in Indonesia. This means that increased domestic production tends to increase supply and depress prices. Soybean imports have a positive and significant effect on prices, indicating that the increase in imports in the Indonesian context is related to high domestic demand and dependence on foreign supplies. Simultaneously, production and imports significantly influence soybean prices, with an adjusted R-squared of 80.43%. The government needs to strengthen domestic production by increasing productivity, access to inputs, cultivation technology, and providing price incentives for farmers. Import policies must be implemented in a measured manner and tailored to national needs to maintain raw material availability without weakening the competitiveness of local farmers. Future research could include variables such as consumption, exchange rates, inflation, harvested area, productivity, and international soybean prices for a more comprehensive explanation.

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