

Research Article

# The Relationship Between Production, Consumption, and Food Estate Budget on Soybean Imports in Indonesia

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**Abstract:** Carbon emission disclosure is increasingly important for companies in establishing legitimacy, enhancing stakeholder trust, and drawing public attention to sustainability issues. This study aims to examine how profitability, leverage, and company size affect carbon emission disclosure. The research is grounded in legitimacy theory and stakeholder theory, which provide the theoretical foundation for understanding corporate carbon disclosure behavior. The population of this study comprises energy companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2023 period. The sample was selected using non-probability purposive sampling, resulting in 113 observations. Data were analyzed using SPSS with multiple linear regression techniques. The results indicate that profitability and company size have a positive influence on carbon emission disclosure, while leverage does not have a significant effect. Theoretically, the findings support the notion that profitability and company size drive carbon disclosure, in line with legitimacy and stakeholder theories.

**Keywords:** consumption, food estate budget, imports, production, soybeans

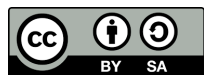
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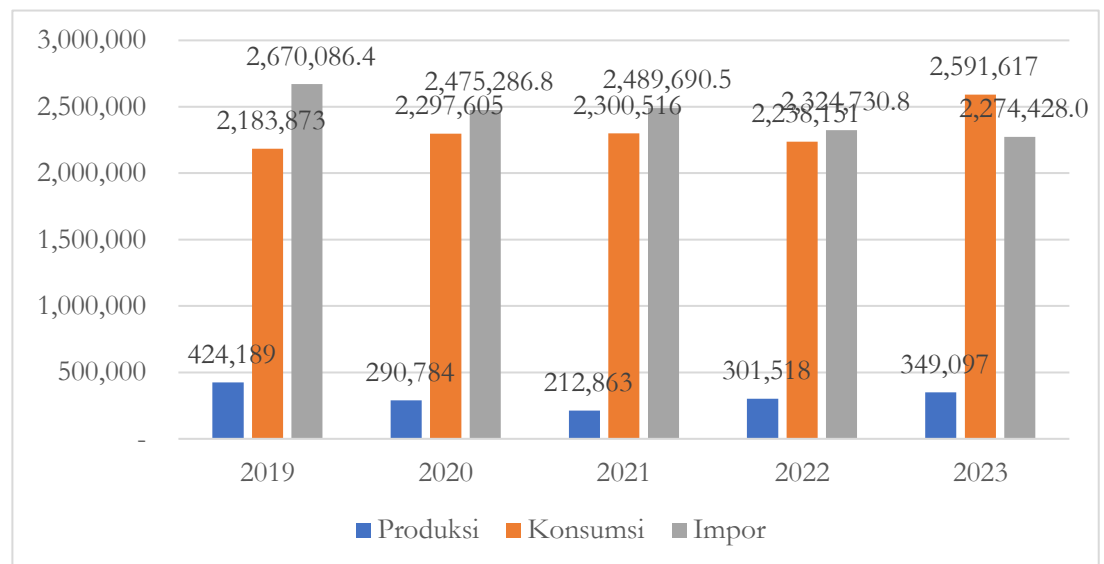
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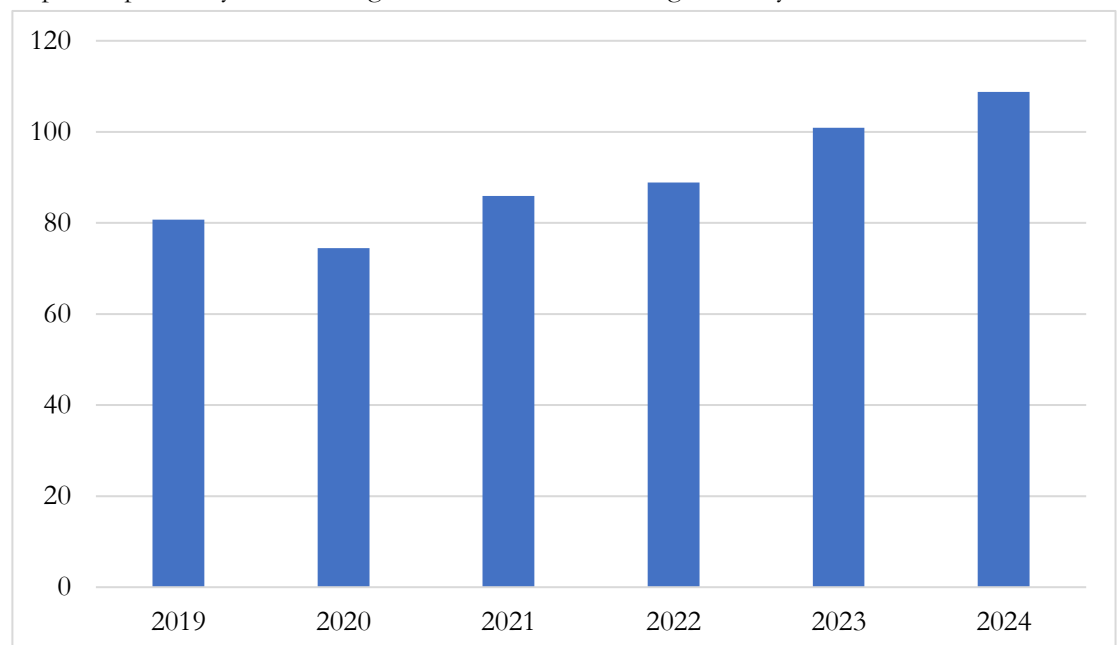
## 1. INTRODUCTION

Indonesia, as an agrarian country, is highly dependent on the agricultural sector, particularly in meeting food demands such as soybeans. Soybeans are often referred to as the “gold from the soil” due to their high plant-based protein content and serve as the primary ingredient for tempeh, tofu, and other processed products. However, domestic production has not kept pace with increasing national consumption. For example, in 2021, domestic production reached only around 212,863 tons, while consumption amounted to 2.8 million tons (BPS, 2024). This gap has led to a substantial reliance on imports, primarily from the United States and Canada. Although soybean imports declined to 2.32 million tons in 2022, this figure still reflects Indonesia’s significant dependence on international markets (BPS, 2024).



Source: Statistics Indonesia (BPS, 2024) and Agricultural Data and Information Center (2024)

In response to this issue, the Indonesian government launched the food estate program as part of its national food security strategy. The program aims to increase agricultural productivity in an integrated manner, including soybean production. The food estate budget from 2019 to 2024 shows an upward trend—from IDR 80.7 trillion in 2019 to IDR 108.8 trillion in 2024—despite a temporary decline in 2020 due to the COVID-19 pandemic (Databoks, 2023). This budget increase highlights the government's commitment to reducing import dependency and building a sustainable and sovereign food system.



Source: Databoks (2024)

This study was conducted to bridge the gap in previous research, which primarily focused on macroeconomic aspects without incorporating policy variables such as the food estate budget. By examining the relationship between production, consumption, and the food

estate budget and their effect on soybean imports over the 2019–2024 period, this study aims to assess the effectiveness of national food policy. The following table summarizes Indonesia's soybean imports by main countries of origin, illustrating the country's dependency:

**Table 1. Soybean Imports by Major Countries of Origin (2019–2023, in Tons)**

No	Country of Origin	2019	2020	2021	2022	2023
1	United States	2,513,311.4	2,238,480.0	2,152,633.3	1,928,076.9	1,949,365.2
2	Canada	128,911.8	229,644.0	232,009.0	287,991.8	271,280.6
3	Argentina	0.0	633.0	89,951.0	60,823.0	23,127.0
4	Brazil	18,900.0	0.002	9,238.3	41,735.0	24,220.0
5	Malaysia	8,683.4	6,363.1	5,547.5	5,208.3	6,331.7
6	France	230.9	120.7	212.4	0.0	40.0
7	India	0.0	0.004	76.5	0.0	5.5
8	Other Countries	48.7	45.8	22.5	895.8	58.2
9	Total	750,070.7	606,730.2	722,711.9	724,746.4	724,746.4

Source: BPS (2024)

Although Indonesia's soybean imports remain heavily reliant on the United States and Canada, the downward trend in import volumes from 2019 to 2023 reflects a serious governmental effort to enhance domestic production. One of the main strategies has been the continuous increase in the food estate budget aimed at boosting agricultural productivity, including soybean cultivation. Nevertheless, the implementation of this program still faces several structural challenges, such as limited arable land, inadequate irrigation infrastructure, and the low production capacity of local farmers. Therefore, the effectiveness of the food estate program must be continually evaluated to ensure that it can significantly contribute to reducing import dependency and achieving sustainable soybean self-sufficiency.

## 2. METHOD

This study employs a quantitative approach with a correlational design aimed at analyzing the relationship between soybean production, consumption, and the food estate budget on soybean imports in Indonesia during the 2019–2024 period. Utilizing time series data, the analysis is conducted through Pearson correlation to determine the strength and direction of the relationships among the variables: soybean production (X1), soybean consumption (X2), food estate budget (X3), and soybean imports (Y). Pearson correlation was chosen for its ability to objectively and systematically measure the linear relationship between numerical variables.

The research was conducted at the national level in Indonesia, given the country's high dependence on soybean imports despite the government's efforts to strengthen food security through the allocation of the food estate budget. The objects of this study consist of secondary data obtained from official sources such as Statistics Indonesia (BPS), the Ministry of Agriculture, and Databoks, including statistics on soybean production, consumption, and import volumes, as well as food estate budget allocations. The variables are defined operationally and analyzed to determine the impact of fiscal policy on reducing import dependency.

Data were collected through documentation studies of relevant official sources and scholarly publications. All data were analyzed using the Pearson correlation test, with a significance threshold of  $\leq 0.05$  used to determine the statistical relevance of the relationships. Correlation coefficients were used to evaluate the strength of the relationships between variables. Through this approach, the study aims to provide a comprehensive overview of the effectiveness of the food estate policy in enhancing domestic production and reducing dependence on soybean imports.

### 3. RESULT AND DISCUSSION

#### Variable Description

Table 2. Descriptive Statistics Test

	Soybean Production (Ton)	Soybean Consumption (Ton)	Food Estate Budget (Trillion IDR)	Soybean Imports (Ton)
Mean	356,124.0	2,378,558	89.95	2,505,314
Median	325,307.5	2,299,061	87.40	2,482,488
Maximum	558,293.0	2,659,585	108.80	2,797,610
Minimum	212,863.0	2,183,873	74.50	2,274,480
Standard Deviation	121,102.7	197,297.0	12.78	199,813.6

The average soybean production in Indonesia during the observed period was 356,124 tons, with a median of 325,307.5 tons. The higher mean compared to the median indicates a positively skewed distribution. The highest production was recorded at 558,293 tons, while the lowest was 212,863 tons, demonstrating significant year-to-year fluctuations. The standard deviation of 121,102.7 tons reflects a wide spread of data from the mean, indicating inconsistent production levels. These fluctuations may be attributed to various factors such as climate conditions, shifts in agricultural policy, and farmers' interest in soybean cultivation.

Soybean consumption in Indonesia averaged 2,378,558 tons, with a median of 2,299,061 tons. The minimal difference between the mean and median suggests a relatively symmetrical distribution. The highest consumption was 2,659,585 tons, while the lowest was 2,183,873 tons, indicating a generally upward trend in demand. The standard deviation of 197,297 tons shows moderate variation across years, reflecting the stable and increasing demand for soybean-based products like tempeh and tofu among the population.

Between 2019 and 2024, the average government allocation for the food estate program was IDR 89.95 trillion, with a median of IDR 87.40 trillion. The slight difference between the mean and median suggests a mildly positively skewed distribution, possibly due to increased allocations in recent years. The highest allocation was recorded in 2024 at IDR 108.8 trillion, while the lowest was IDR 74.5 trillion in 2020, which was likely influenced by the reallocation of funds due to the COVID-19 pandemic. The standard deviation of IDR 12.78 trillion indicates a substantial, yet reasonable variation, reflecting the government's increasing focus on food security through agricultural intensification and expansion.

Indonesia's average soybean imports during the study period stood at 2,505,314 tons, with a median of 2,482,488 tons. The close values of the mean and median suggest a balanced

distribution. The highest import volume occurred in 2024 at 2,797,610 tons, and the lowest in 2023 at 2,274,480 tons, indicating considerable fluctuations. The standard deviation of 199,813.6 tons highlights significant annual variability in imports. This aligns with domestic production instability and persistent dependency on imported soybeans to meet national demand, despite efforts to boost local production and increased budget allocation for the food estate program.

### Pearson Correlation Test

**Table 3. Pearson Correlation Test Results**

	Production	Consumption	Food Estate Budget	Imports
Correlation Coefficient	0.710735	0.151632	0.170296	1.000000
P-value	0.1134	0.7743	0.7470	-----

Based on Table 3, the variable production yields a p-value of 0.1134 ( $> 0.05$ ), indicating that there is no statistically significant relationship between soybean production and imports. However, the correlation coefficient of 0.710735 suggests a strong positive association, meaning that when production increases, imports also tend to increase, even though the relationship is not statistically significant.

The consumption variable shows a p-value of 0.7743 ( $> 0.05$ ), which also indicates no significant relationship with imports. Its correlation coefficient of 0.151632 reveals a positive but very weak relationship between consumption and imports.

Finally, the food estate budget variable has a p-value of 0.7470 ( $> 0.05$ ), demonstrating no significant correlation with soybean imports. The correlation coefficient of 0.170296 indicates a weak positive relationship, suggesting that increases in the food estate budget are slightly associated with increases in imports, but this relationship is not strong or statistically meaningful.

### Discussion

#### The Relationship Between Production and Soybean Imports in Indonesia

The correlation test results show that there is no statistically significant relationship between soybean production and imports in Indonesia during the 2019–2024 period. The p-value is 0.1134, which is greater than the 0.05 significance level. Therefore, the null hypothesis ( $H_0$ ), which states that production has a weak relationship with soybean imports, cannot be rejected. However, the correlation coefficient value of 0.710735 indicates a strong positive relationship between the production and import variables. This suggests that as domestic soybean production increases, soybean imports also tend to rise. This phenomenon may indicate that the increase in domestic production is still insufficient to meet market demand, hence imports remain necessary. It may also reflect an imbalance between production growth and national consumption, as well as the possibility that increased production is unevenly distributed or not yet competitive in terms of quality and price compared to imported soybeans.

When viewed through the lens of Paul Krugman's New Trade Theory, this relationship can be explained by the concept of economies of scale and product differentiation. This theory argues that international trade is not solely driven by classical comparative advantage, but also by production at large scales, consumer preferences for

product variety, and cost efficiency. In the context of soybeans, even if local production increases, imported soybeans may still be more competitive due to lower prices, higher quality, or greater availability, thereby maintaining high demand for imports.

This finding contrasts with that of Melisa & Jafar (2024), whose study titled “Analysis of the Influence of Production Volume, Per Capita Income, and Exchange Rate on Soybean Imports in Indonesia” found that local soybean production had a significant negative effect on imports during 2002–2021. In that study, increased production tended to reduce imports and vice versa.

### **The Relationship Between Consumption and Soybean Imports in Indonesia**

The analysis shows that the consumption variable has a p-value of 0.7743, which is greater than the significance threshold of 0.05. This indicates that there is no statistically significant relationship between soybean consumption and imports in Indonesia during the observed period. Consequently, the null hypothesis ( $H_0$ ), which states that consumption has a weak relationship with imports, is accepted. The correlation coefficient of 0.151632 indicates a positive relationship, but the degree of association is very weak. This means that although increased consumption tends to be followed by increased imports, the relationship is too weak to serve as a reliable basis for policymaking.

Nevertheless, in the context of Paul Krugman’s New Trade Theory, this phenomenon can be interpreted through the concepts of consumer preference for product variety and economies of scale. According to the theory, trade is also driven by domestic demand for product differentiation and the ability of exporting countries to produce efficiently on a large scale. Therefore, even with rising domestic consumption, the local market may continue to prefer imported soybeans due to more competitive prices, stable availability, and better alignment with consumer or processing industry preferences.

This result differs from the findings of Assifah (2022), who in a study covering the period 1980–2013 found a significantly positive relationship between soybean consumption and imports in Indonesia, assuming other variables remained constant. The study also found that soybean production and consumption simultaneously had a significant influence on imports, suggesting that domestic supply and demand factors are key determinants of import volume.

### **The Relationship Between the Food Estate Budget and Soybean Imports in Indonesia**

The analysis indicates that the food estate budget variable has a p-value of 0.7470, which exceeds the 0.05 threshold. This implies that there is no significant relationship between the food estate budget and soybean imports. The null hypothesis ( $H_0$ ), which states that the budget has a weak relationship with imports, is accepted. Additionally, the correlation coefficient of 0.170296 indicates a positive but very weak relationship. This means that despite the increasing food estate budget, it does not directly lead to a reduction in imports; rather, it tends to coincide with rising imports, although the correlation is weak. This phenomenon suggests that budget allocation alone has not been fully effective in reducing dependency on soybean imports. Possible contributing factors include suboptimal implementation of the food estate program, the long production cycle, and inefficiencies in land management and product distribution.

According to Paul Krugman’s New Trade Theory, factors such as economies of scale, technological innovation, and production system efficiency are critical for a country’s

competitiveness in global trade. Therefore, merely increasing the budget is not sufficient unless accompanied by improvements in productivity and efficiency—traits exhibited by major soybean exporters such as the United States and Brazil, known for their modern cultivation systems and efficient supply chains.

This finding is also supported by a study by Purwanto et al. (2022), published in the *Agricultural Development Journal*. The study revealed that while the food estate program increased domestic soybean production by up to 15% in its first year, the volume was still insufficient to meet the growing national demand. Moreover, Indonesia's productivity per hectare remains far behind that of major producing countries, leading to relatively higher domestic production costs and reduced competitiveness in the market.

Thus, although the food estate program is theoretically and strategically designed to achieve food self-sufficiency and reduce imports, this study suggests that increasing the budget alone is inadequate. Structural improvements in agricultural technology, distribution efficiency, and farmer capacity building are necessary to ensure the program has a tangible impact on reducing dependency on soybean imports.

#### 4. CONCLUSION

This study aims to examine the relationship between soybean production, soybean consumption, the food estate budget, and soybean imports in Indonesia during the 2019–2024 period. Based on the results of the Pearson correlation test, several important conclusions can be drawn as follows:

1. The strength of the relationship between production and soybean imports in Indonesia from 2019 to 2024 is strong.
2. The strength of the relationship between consumption and soybean imports in Indonesia from 2019 to 2024 is very weak.
3. The strength of the relationship between the food estate budget and soybean imports in Indonesia from 2019 to 2024 is very weak.

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